SPECTRUM
PRECISION AND PERFORMANCE
IN PC INSTRUMENTATION

2016

Digitizers | **Transient Recorders** | **Arbitrary Waveform and Pattern Generators** | **Data Acquisition Instruments**
for PCI Express, LXI, PXIe, PXI, PCI-X, PCI and CompactPCI

Preface

Dear Valued Customer,

Welcome to the 2016 Spectrum catalog! Within these pages you will find a summary of all our modular products, instruments and accessories. Available in a wide range of the most popular industrial standards (like PCIe, PXI, and LXI) we offer you the widest choice of PC based digitizer, generator and I/O modules and systems.

We currently manufacture more than 450 digitizer cards and instruments. With sampling rates from 100 kS/s to 5 GS/s, resolutions from 8 to 16 bit, large memories and advanced designs these products will let you capture and analyze almost any signal in the frequency range from DC to 1.5 GHz. The huge range of available models let you select the digitizer that best matches your requirements. The products also follow a common software structure so that programming them is quite straight forward. Any development made for one product can easily be adapted for another or, if you don't wish to write a program, our powerful SBench 6 control, display and analysis software is available and supports all the various models.

This year we will be extending our digitizer range even further by adding a series of high-performance PXIe modules. Based on the technology used in our M4i series PCIe cards these new modules will boast very high sampling rates, high resolution and ultra-fast data transfer capabilities.

Complementing the digitizers is our line-up of Arbitrary Waveforms Generators (AWG's). We have more than a dozen different models to choose from offering output rates from 20 MS/s up to 1.25 GS/s and resolutions from 8 to 16 bit. These products are ideal for generating complex modulated signals or reproducing those found in almost any electronic system. Capture a signal with a scope or digitizer, transfer it to the AWG, and then reproduce or modify it as desired. It's the perfect tool for waveform generation and combined with a digitizer makes for easy testing in stimulus-response or capture-replay applications.

For digital acquisition and generation we also have a range of high speed I/O products. These offer acquisition rates up to 720 MHz (on 32 channels synchronously) and allow high speed logic analysis, data logging and pattern generation.

All Spectrum products can run under Windows or LINUX operating systems and can be programmed in a wide range of languages. We understand that hardware is just a part of the total measurement solution and that's why we aim to provide the widest choice of software tools and direct engineering support. Whether you develop your own software, or use our turn-key solutions, we want to make the process both easy and convenient.

We hope you find this catalog a helpful way to view the range of products that we have available. For more detailed product information we suggest that you visit our web site at www.spectrum-instrumentation.com where you will find additional documentation such as full product data sheets, notes and manuals. As always, we are at your service and happy to receive requests and feedback.
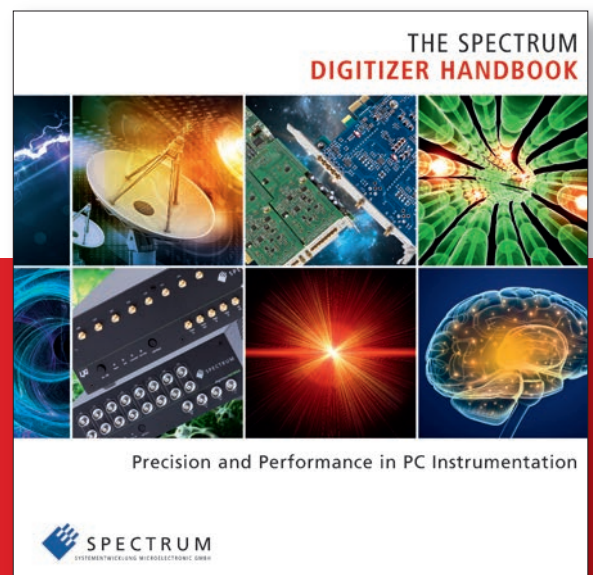
Yours Sincerely,

Gisela Hassler
Managing Director

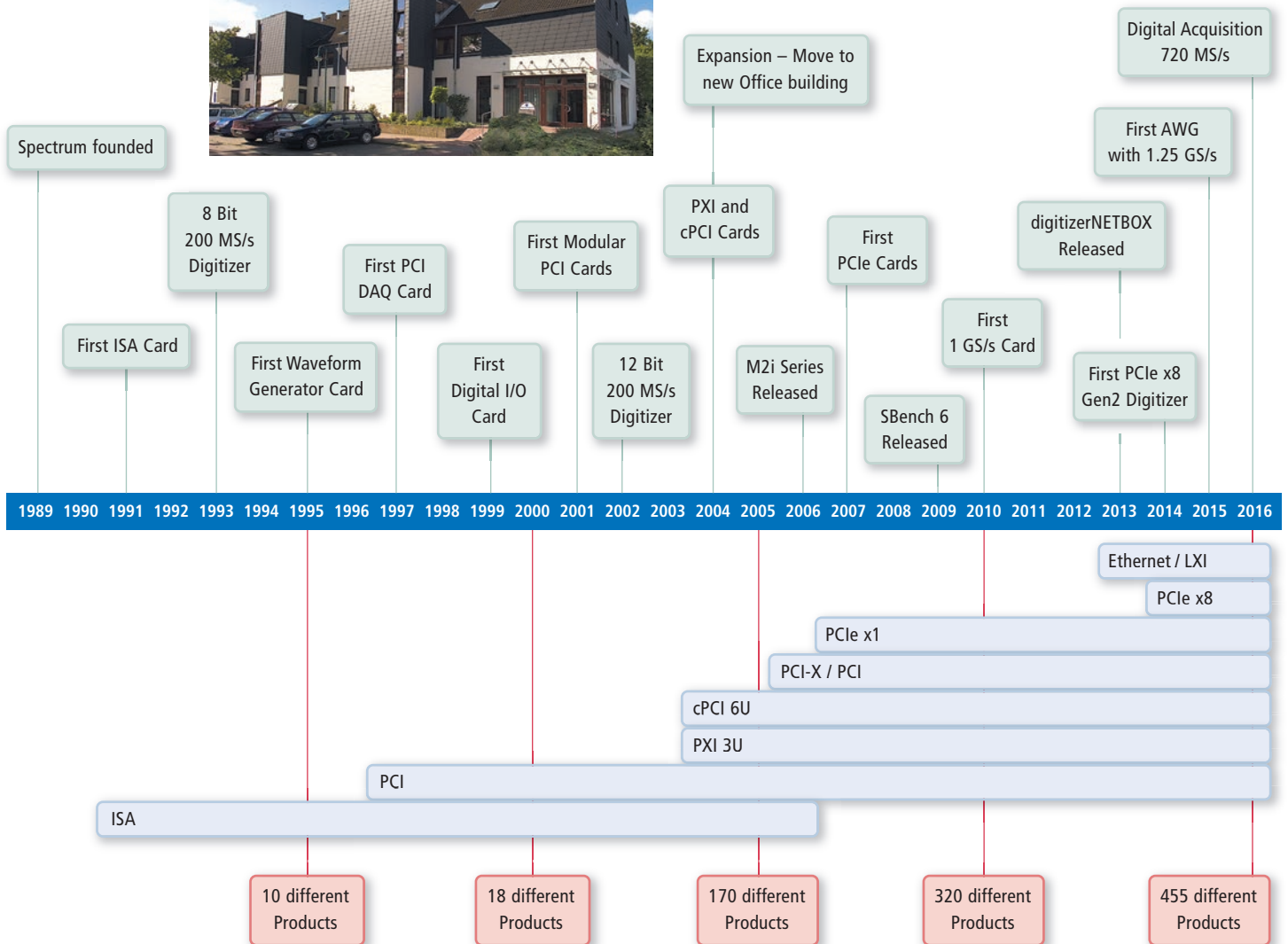Oliver Rovini
Technical Director

FREE DIGITIZER HANDBOOK

To keep engineers and scientists up to date with the latest developments in PC based digitizer technology Spectrum has published a handbook that covers the major product features of this powerful class of instrument and also explains when a digitizer can replace an oscilloscope. The 120 page booklet is printed in full color and includes a number of graphical images that highlight and explain key digitizer concepts and their application.

Request your free copy of the Digitizer Handbook directly at Spectrum

History

Spectrum founded — 1989

First ISA Card — 1991

8 Bit 200 MS/s Digitizer — 1993

First Waveform Generator Card

First PCI DAQ Card — 1997

First Digital I/O Card — 1999

First Modular PCI Cards — 2000

12 Bit 200 MS/s Digitizer — 2002

Expansion – Move to new Office building

PXI and cPCI Cards — 2004

M2i Series Released

First PCIe Cards — 2007

SBench 6 Released

First 1 GS/s Card

digitizerNETBOX Released

First PCIe x8 Gen2 Digitizer

First AWG with 1.25 GS/s

Digital Acquisition 720 MS/s

Timeline: 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

Ethernet / LXI

PCIe x8

PCIe x1

PCI-X / PCI

cPCI 6U

PXI 3U

PCI

ISA

10 different Products

18 different Products

170 different Products

320 different Products

455 different Products

Support and Warranty

Customer satisfaction is our highest priority so when you buy a Spectrum product we expect you will be pleased. All our products are designed and manufactured in Germany where we endeavor to attain the highest quality and reliability. The same philosophy applies to technical support. Our engineers are at your disposal. Need help on a software or hardware issue? Just send us a message to **support@spec.de** and our engineers will respond to you directly. You can have confidence that your message will be answered by the right specialist for the task. All the technical support from our engineers and partners is free, with no hidden charges. Spectrum products are covered by a standard warranty for two years while software and driver updates are available to download free of charge from our website for the life-time of the product.


In the unusual event that a repair is necessary our service department will assist you to make it happen as quickly and efficiently as possible. We will diagnose the problem and then help you to get the repair made in the fastest and most cost effective way.

For demanding applications, Spectrum also offers an extended warranty for up to five years and a complete calibration service. Calibration is performed with fully certified instruments ensuring traceability and specification confidence. All products are manufactured and tested to meet our rigid design standards and they are shipped with the **CE** mark to certify that they meet all the necessary requirements of the European **CE** directives.

Lead-free products – we do it unsolicited. All Spectrum products are listed in category 9 "Monitoring and Control Instruments" of the **RoHS** directive and are therefore not forced to be lead-free. Our ambition is to produce as many lead-free products as possible. All new boards are developed with lead-free components only. Existing products are changed to lead-free as soon as all components are available in a lead-free version.
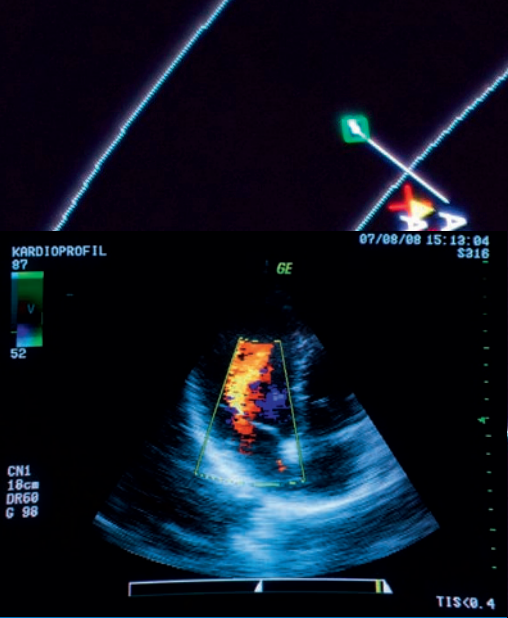
Ultrasound

- 14 and 16 Bit Resolution
- Segmented Memory with FIFO Readout
- Low Dead-Time Between Triggers (< 80 ns)
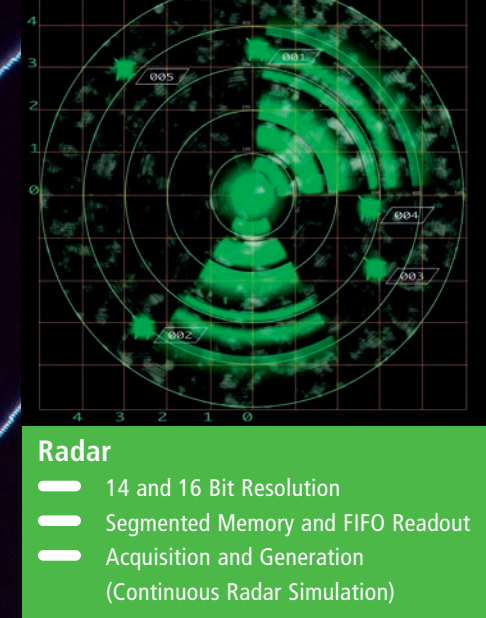
Radar

- 14 and 16 Bit Resolution
- Segmented Memory and FIFO Readout
- Acquisition and Generation
  (Continuous Radar Simulation)

Communications

- 14 and 16 Bit Resolution
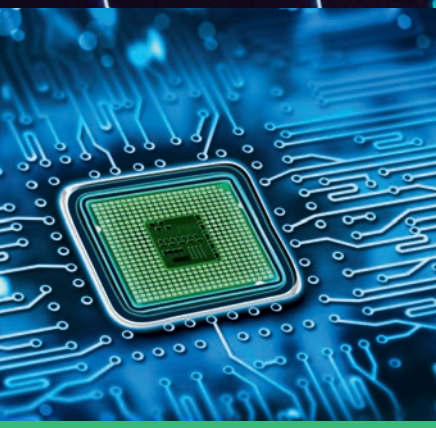- Time and Frequency Domain Analysis
- Advanced Display Modes

Astronomy

- High Sampling Rates and Resolution
- Time and Frequency Domain Analysis
- Low-noise Front-end Circuitry

Aerospace

- High Sampling Rates and Resolution
- Data Streaming and Storage
- Ultrafast Data Transfer (>3.4 GB/s)

Acoustics

- Low Noise and High Resolution
- Very high SNR (> 90 dB) and SFDR (>105 dB)
- Hundreds of Synchronous Channels

Semiconductor Tests

- LXI, PXI and CompactPCI Modules
- Optimized SNR and SFDR
- Fully Functional Front-end Circuitry
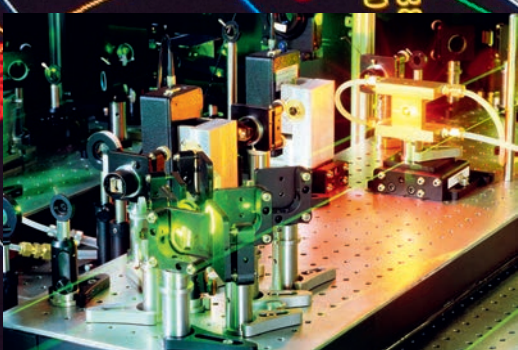
Laser

- 5 GS/s Sampling Rates and High Bandwidth
- Fast Trigger and Read-Out Rates
- On-Board Block Statistics (Peak Detection)

4

Applications and Modular Instrumentation

One of the great benefits of modular instrumentation is how it allows you to keep pace with the ever changing developments in PC technology. Unlike most stand-alone products, modular instruments let you connect to the latest hardware, accessing today's fastest bus speeds, microprocessors and graphical tools. Furthermore, you have the flexibility to choose your own software. You can use custom specific programs, tap into extensive third party analysis products and access an extensive array of shareware utilities.

Connecting a Spectrum PC product, be it PCI, PCI-X, PCI Express, PXI, LXI or CompactPCI, can transform a standard PC to a universal powerful instrument; an instrument that can be customized to match your exact application. You can start with a single card and quickly verify proof-of-concept before expanding your system as required. Spectrum provides all the software tools you may need to link in to programs like MATLAB, LabVIEW or Excel. You can have complete customization and write your own control programs or take a turn-key approach and simply run our powerful SBench 6 utility. Spectrum also provides the hardware functionality to let you best match your requirements. Products are available with 1, 2, 4, 8 and even 16 channels. Need more? Use our Star-Hub system to connect cards together and build systems with hundreds of synchronous channels!

When it comes to data acquisition Spectrum offers the widest range and choice. With sampling rates from as low as 100 kS/s to as high as 5 GS/s you can capture signals from the Hz to GHz range. Models offer resolution from 8 to 16 bits and are optimized for dynamic performance to ensure the best possible accuracy and precision. Acquired signals can be stored in large on-board memories, processed using the latest FPGA technology or transferred to external storage devices using a variety of versatile readout modes.

Spectrum lets you choose the product format that best suits your needs. For example, you can select products from our PCIe family when you need the fastest data transfer speeds, or the LXI family when you require remote access or networking capabilities. PXI and CompactPCI modules are available so that you can even integrate Spectrum technology with hundreds of other products from a host of different vendors. Based on a modular concept, where each product consists of a main card and plug-on mezzanine boards, it's also easy for Spectrum to customize a product to better match your requirements. If you can't find the product you need in this catalog then let us know your mandatory specifications and we will be happy to investigate the possibility of making a customized product just for you!
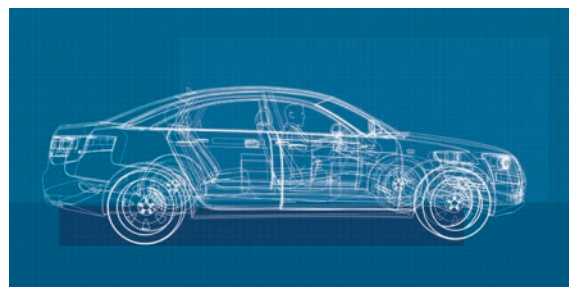
Spectroscopy
- Ultrafast Data Transfer
- Large Acquisition Memories
- On-Board Signal Averaging

Medical Science (OCT)
- High Sampling Rates and Resolution
- Fast Trigger and Read-Out Rates
- External Clock

Automotive
- Acquisition and Replay of Analog and Digital Signals
- Combination of Slow and Fast Channels
- Portable (DC Supply) Systems

ATE – Automatic Test Equipment
- LXI, PXI and CompactPCI Modules
- Acquisition and Generation
- LabVIEW, MATLAB and IVI Interface

Big Physical Experiments
- Distributed Ethernet Acquisition
- High Channel Density with Hundreds of Synchronous Channels
- Combination of Slow and Fast Channels

High Voltage Testing
- Fully Buffered Front-end Circuitry
- Single-ended and Differential Inputs
- On-Board Block Statistics (Peak Detection)

M4i Series Highlights

- 4 GByte on-board data memory (2 GSamples for 14/16 Bit)
- High-speed continuous streaming on PCIe up to 3.4 GBytes/s (data acquisition) or 2.8 GBytes/s (data generation)
- Extended trigger modes: Level, Edge, Window, Re-Arm, OR/AND
- Internal Synchronization up to 8 cards
- Signal Processing Options for on-board data analysis: Block Average and Block Statistics (Peak Detect)
- Sequence Replay Mode for Arbitrary Waveform Generator
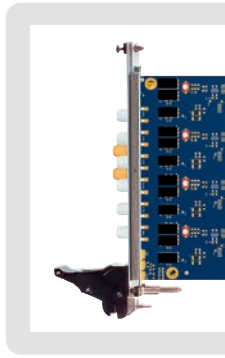
▶ 5 GS/s 8 Bit Digitizer

- One, two and four channel versions available
- 50 Ohm high bandwidth front-end with 4 input ranges between ±200 mV and ±2.5 V

PXIe version released in 2016

Fastest Digitizer with 8 Bit 5 GS/s

Card Versions				
PCIe x8 Gen2	1 Channel	2 Channels	4 Channels	Bandwidth
M4i.223x-x8	5 GS/s	2.5 GS/s	1.25 GS/s	1.5 GHz
M4i.222x-x8	2.5 GS/s	2.5 GS/s		1.5 GHz
M4i.221x-x8	1.25 GS/s	1.25 GS/s	1.25 GS/s	500 MHz

▶ 500 MS/s 14/16 Bit Digitizer

- Two and four channel versions available
- 50 Ω and 1 MΩ front-end with 6 input ranges between ±200 mV and ±10 V
- High quality front-end with SNR up to 72 dB and ENOB up to 11.6 LSB

PXIe version released in 2016

Fastest 14 Bit Digitizer with 500 MS/s

| Card Versions					
PCIe x8 Gen2	Resolution	1 Channel	2 Channels	4 Channels	Bandwidth
M4i.445x-x8	14 Bit	500 MS/s	500 MS/s	500 MS/s	250 MHz
M4i.442x-x8	16 Bit	250 MS/s	250 MS/s	250 MS/s	125 MHz
M4i.441x-x8	16 Bit	130 MS/s	130 MS/s	130 MS/s	65 MHz

▶ Outstanding Continuous Streaming Speed

The PCI Express x8 Gen 2 interface of the PCIe cards together with the optimized firmware and kernel driver allows a sustained acquisition (generation) streaming speed to (from) PC with more than 3 GByte/s (2 GByte/s) reaching **3.4 GByte/s (2.8 GBytes/s)** on selected motherboards. The card therefore needs a physical x8 or x16 PCIe slot with Generation 2 or Generation 3 interface. The on-board memory of 4 GByte is completely used as a FIFO buffer to ensure the maximum throughput over a long time even with parallel PC activities.

This outstanding streaming speed together with the intelligent memory segmentation mode (explained on page 17) fulfills even the most demanding application needs. A gap free streaming of for example one channel 8 bit acquisition 2.5 GS/s, four channels 14 bit acquisition 350 MS/s or 2 channel 16 bit generation 625 MS/s is easy to achieve. Using a SSD RAID 0 array with a dedicated RAID controller one can even store this amount of data continuously to disk array.

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M4x Series – PXIe version of the M4i Series

- Released in 2016
- 4 lane PXIe Gen2 interface with full streaming speed up to 1.7 GByte/s
- Support of PXIe and PXI reference clock, star-trigger and trigger bus
- Fully software compatible to existing M4i products
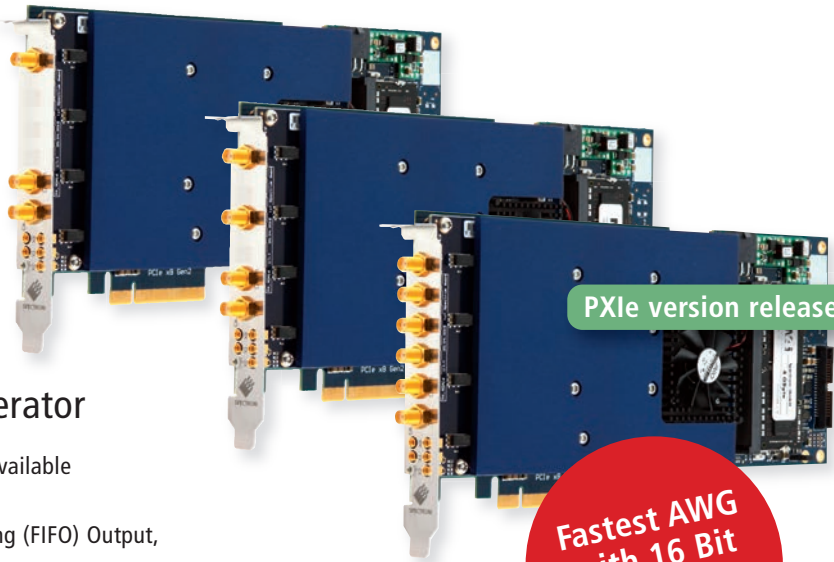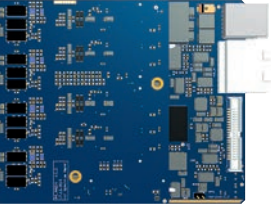
PXIe version released in 2016

▶ 1.25 GS/s 16 Bit Arbitrary Waveform Generator

- One, two and four channel versions available
- 2 GSample replay memory
- Single-Shot, Multiple Replay, Streaming (FIFO) Output, Sequence Replay Mode

Fastest AWG with 16 Bit 1.25 GS/s

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Card Versions

PCIe x8 Gen2	1 Channel	2 Channels	4 Channels	Bandwidth	Output into 50 Ω
M4i.662x	625 MS/s	625 MS/s	625 MS/s	212 MHz	±2.5 V
M4i.663x	1.25 GS/s	1.25 GS/s		400 MHz	±2.0 V

▶ 720 MS/s Digital Data Acquisition

- 32 synchronous digital channels
- Differential version compatible to LVDS, PECL, LVPECL, ECL, NECL and others
- Single-Ended version compatible to 1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V and 5.0 V logic levels
- Asynchronous external state-clock with programmable clock delay
- Single-Shot, Multiple Recording, Gated Sampling, Streaming (FIFO) Acquisition
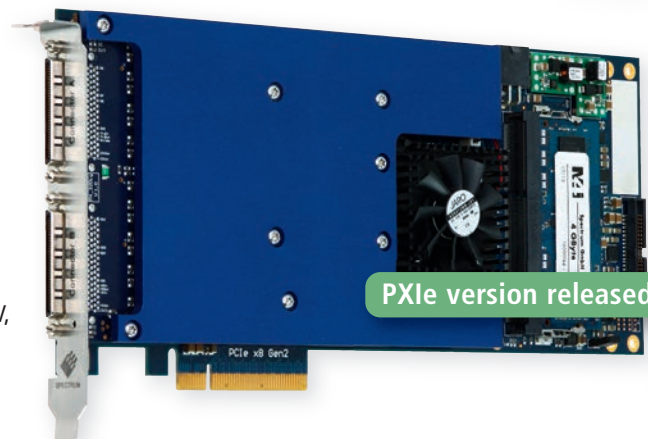
PXIe version released in 2016

Card Versions

| PCIe x8 Gen2	LVDS	Single-Ended	SDR State Clock	DDR State Clock
M4i.771x		125 MS/s	125 MS/s	
M4i.772x	250 MS/s	250 MS/s	250 MS/s	
M4i.773x	720 MS/s	720 MS/s	350 MS/s	700 MS/s

M3i Series Highlights

- Available as PCI Express x1 or PCI/PCI-X version
- 512 MByte (256 MSamples for 14/16 Bit) on-board memory
- Up to 2 GByte (1 GSample for 14/16 Bit)
- Internal Synchronization up to 8 cards

▶ 1 GS/s 8 Bit Digitizer

- One and two channel versions available
- 50 Ω and 1 MΩ front-end with 8 input ranges between ±50 mV and ±10 V

Card Versions				
PCIe x1 Gen1	PCI-X/PCI 32 Bit	1 Channel	2 Channels	Bandwidth
M3i.213x-exp	M3i.213x	1 GS/s	500 MS/s	500 MHz
M3i.212x-exp	M3i.212x	500 MS/s	250 MS/s	250 MHz
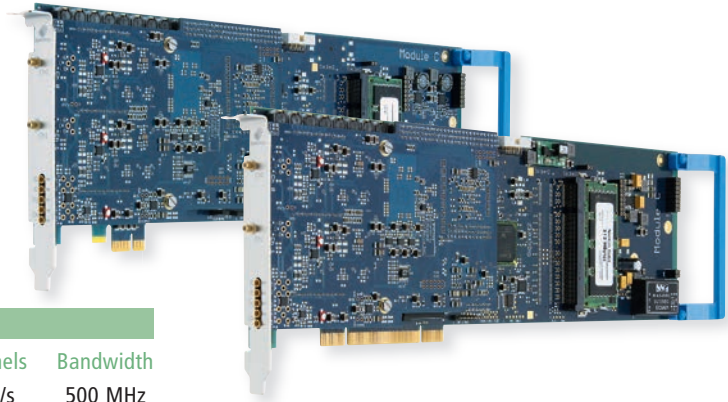
▶ 180 MS/s 16 Bit Digitizer

- One and two channel versions available
- Well suited for OEM projects
- 50 Ω and 1 MΩ front-end with 6 input ranges between ±200 mV and ±10 V

| Card Versions				
PCIe x1 Gen1	PCI-X/PCI 32 Bit	1 Channel	2 Channels	Bandwidth
M3i.486x-exp	M3i.486x	180 MS/s	180 MS/s	90 MHz
M3i.484x-exp	M3i.484x	105 MS/s	105 MS/s	50 MHz
M3i.483x-exp	M3i.483x	65 MS/s	65 MS/s	35 MHz
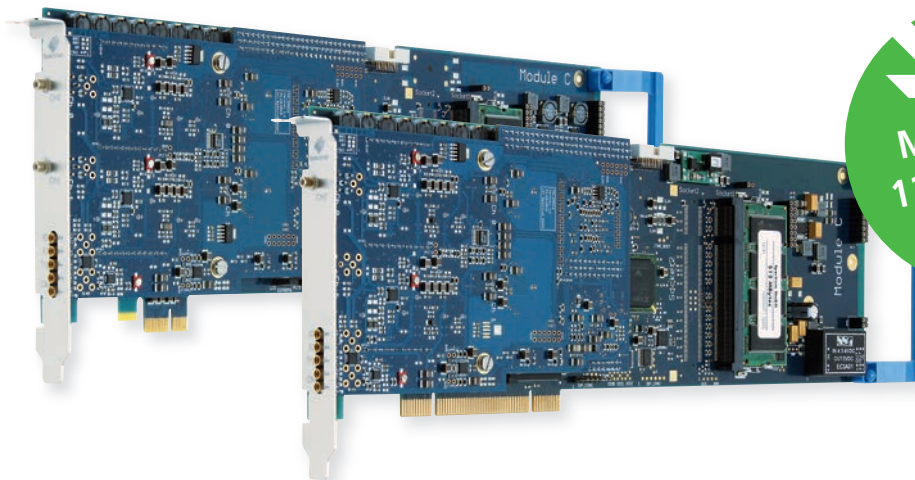
More than 12 ENOBs at 105 MS/s

▶ 400 MS/s 14 Bit Digitizer

- One and two channel versions available
- Well suited for OEM projects
- 50 Ω and 1 MΩ front-end with 6 input ranges between ±200 mV and ±10 V

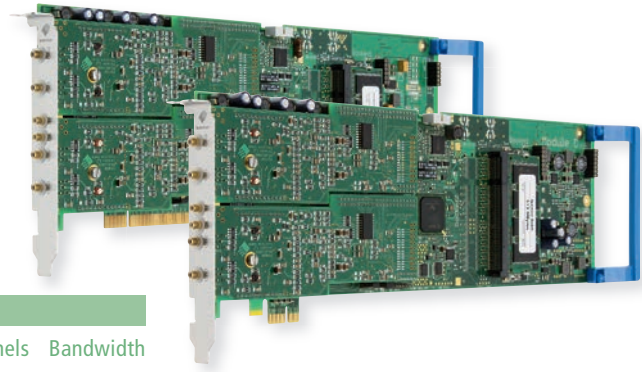| Card Versions				
PCIe x1 Gen1	PCI-X/PCI 32 Bit	1 Channel	2 Channels	Bandwidth
M3i.414x-exp	M3i.414x	400 MS/s	250 MS/s	200 MHz
M3i.412x-exp	M3i.412x	250 MS/s	250 MS/s	125 MHz
M3i.411x-exp	M3i.411x	100 MS/s	100 MS/s	50 MHz
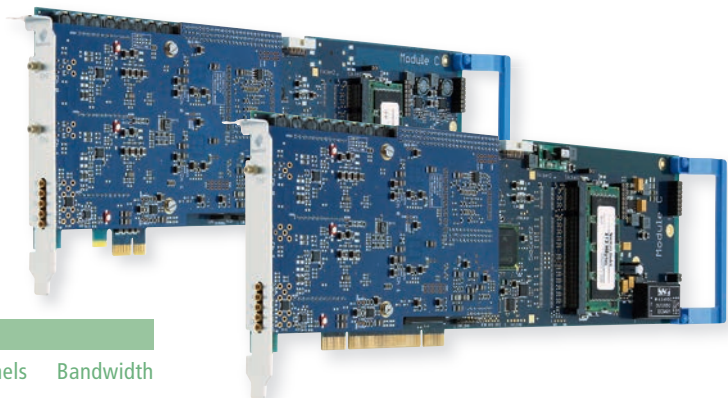
M2i Series Highlights

- Available as PCI Express x1 or PCI/PCI-X version
- 512 MByte (256 MSamples for 14/16 Bit) on-board memory
- Up to 2 GByte (1 GSample for 14/16 Bit) optional
- Internal Synchronization up to 16 cards mixing all M2i Series cards:
  Mixed Mode Acquisition, Stimulus Response or mixing slow and fast channels
- Additional Digital Inputs and Outputs as option

▶ 200 MS/s 8 Bit Digitizer

- Two and four channel versions available
- 50 Ω and 1 MΩ front-end with 7 input ranges between ±50 mV and ±5 V
- Well suited for OEM, Radar and Ultrasound applications

Card Versions

| PCIe x1 Gen1	PCI-X/PCI 32 Bit	1 Channel	2 Channels	4 Channels	Bandwidth
M2i.203x-exp	M2i.203x	200 MS/s	200 MS/s	100 MS/s	90 MHz
M2i.202x-exp	M2i.202x	50 MS/s	50 MS/s	50 MS/s	25 MHz

▶ 8 Channel 60 MS/s 16 Bit Digitizer

- Two, four and eight channel versions available
- Single-Ended or True Differential Inputs by software
- 50 Ω and 1 MΩ front-end with 6 input ranges between ±200 mV and ±10 V
- General Purpose High Quality Digitizer

Card Versions

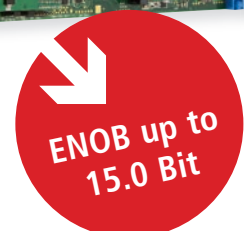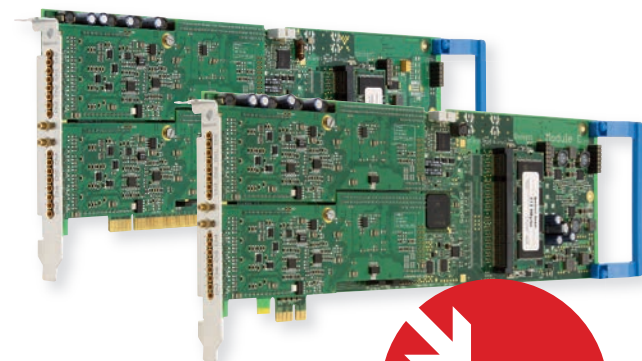| PCIe x1 Gen1	PCI-X/PCI 32 Bit	1 Channel	2 Channels	4 Channels	8 Channels	Bandwidth
M2i.496x-exp	M2i.496x	60 MS/s	60 MS/s	60 MS/s	30 MS/s	30 MHz
M2i.493x-exp	M2i.493x	30 MS/s	30 MS/s	30 MS/s	30 MS/s	15 MHz
M2i.491x-exp	M2i.491x	10 MS/s	10 MS/s	10 MS/s	10 MS/s	5 MHz
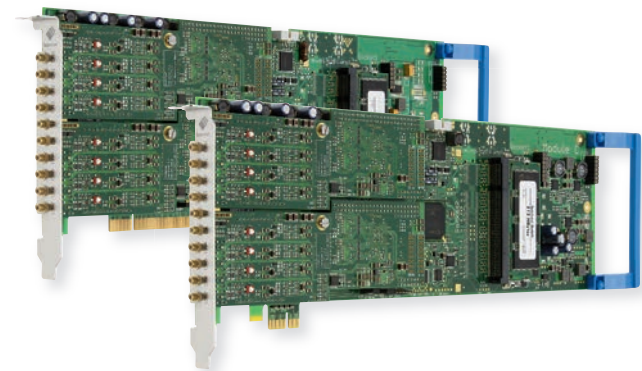
▶ 8 Channel 3 MS/s 16 Bit High-Resolution Data Acquisition

- Two, four and eight channel versions available
- Single-Ended or True Differential Inputs by software
- 1 MΩ front-end with 8 input ranges between ±50 mV and ±10 V
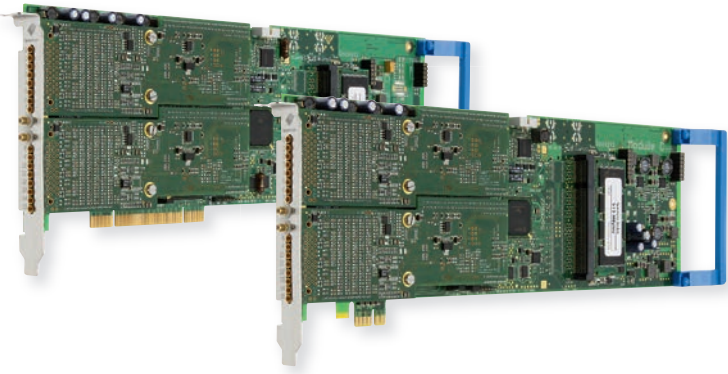- Highest quality input stage with SNR up to 91 dB and ENOB up to 15 LSB

Card Versions

PCIe x1 Gen1	PCI-X/PCI 32 Bit	1 Channel	2 Channels	4 Channels	8 Channels	Bandwidth
M2i.465x-exp	M2i.465x	3 MS/s	3 MS/s	3 MS/s	3 MS/s	1.5 MHz
M2i.464x-exp	M2i.464x	1 MS/s	1 MS/s	1 MS/s	1 MS/s	500 kHz
M2i.463x-exp	M2i.463x	500 kS/s	500 kS/s	500 kS/s	500 kS/s	250 kHz
M2i.462x-exp	M2i.462x	200 kS/s	200 kS/s	200 kS/s	200 kS/s	100 kHz

ENOB up to 15.0 Bit

▶ 16 Channel 1 MS/s 16 Bit synchronous Data Acquisition

- ▬ Eight and sixteen channel versions available
- ▬ 1 MΩ front-end with 8 input ranges between ±50 mV and ±10 V
- ▬ Up to 256 synchronous channels per system

Card Versions							
PCIe x1 Gen1	PCI-X/PCI 32 Bit	1 Channel	2 Channels	4 Channels	8 Channels	16 Channels	Bandwidth
M2i.474x-exp	M2i.474x	1.33 MS/s	1.33 MS/s	1.33 MS/s	1.33 MS/s	1.33 MS/s	500 kHz
M2i.473x-exp	M2i.473x	500 kS/s	500 kS/s	500 kS/s	500 kS/s	500 kS/s	250 kHz
M2i.472x-exp	M2i.472x	250 kS/s	250 kS/s	250 kS/s	250 kS/s	250 kS/s	125 kHz
M2i.471x-exp	M2i.471x	100 kS/s	100 kS/s	100 kS/s	100 kS/s	100 kS/s	50 kHz

▶ 125 MS/s 14 Bit Arbitrary Waveform Generator

- ▬ One, two and four channel versions available
- ▬ 256 MSample (1 GSample optional) replay memory
- ▬ ±3 V output level (±10 V with amplifier option)
- ▬ Single Shot, Multiple Replay, Streaming (FIFO) Output, Sequence Replay Mode

| Card Versions				
PCIe x1 Gen1	PCI-X/PCI 32 Bit	1 Channel	2 Channels	4 Channels
M2i.603x-exp	M2i.603x	125 MS/s	125 MS/s	60 MS/s
M2i.602x-exp	M2i.602x	60 MS/s	60 MS/s	60 MS/s
M2i.601x-exp	M2i.601x	20 MS/s	20 MS/s	20 MS/s
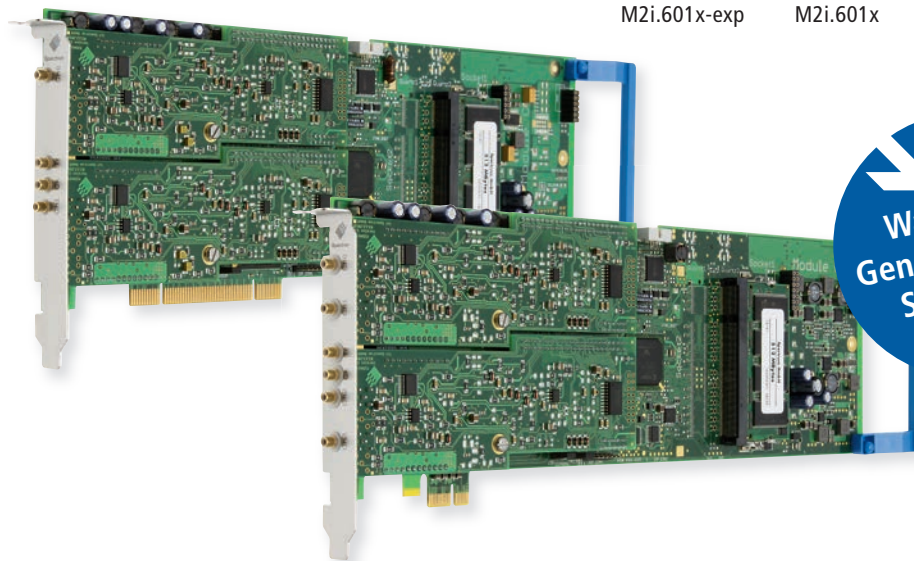
Waveform Generator with Streaming Mode

10

▶ 125 MS/s 64 Channel Digital Waveform Generation and Acquisition

- ▬ Versions with 16, 32 and 64 digital channels available
- ▬ TTL 3.3 V and 5 V compatible
- ▬ Single Shot, Multiple Recording and Replay, Streaming (FIFO) Output and Aquisition, Sequence Replay Mode

| Card Versions				
PCIe x1 Gen1	PCI-X/PCI 32 Bit	16 Channels	32 Channels	64 Channels
M2i.702x-exp	M2i.702x	125 MS/s	125 MS/s	60 MS/s
M2i.701x-exp	M2i.701x	125 MS/s	60 MS/s	
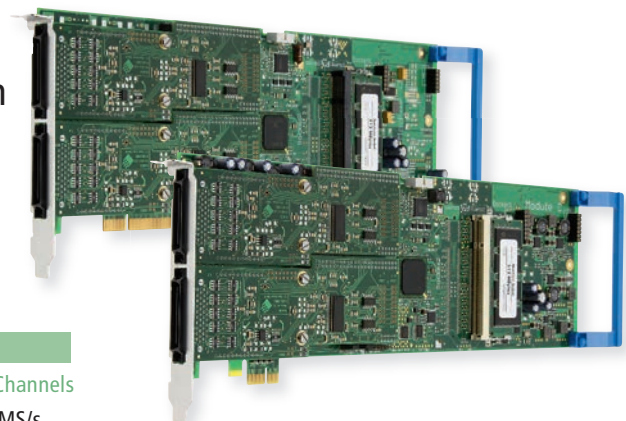
Turn-key PC System including Software

- Continuous (seamless) Data Recording
- Guaranteed Streaming Speed up to 3 GByte/s
- Complete turn-key PC solution
- Data Storage Options from 1 to 32 Terabyte
- Single-Shot and Multiple (segmented) Acquisition Modes
- Sampling rates up to 5 GS/s (segmented) and 2.5 GS/s (single-shot)
- Configurations with 1 to 96 channels in one chassis
- Configurations up to 256 channels with docking station
- SBench6 software for easy control, display and analysis
- Factory Integrated and Performance Tested

Streaming to disk up to 3 GByte/s

SB6

SBench 6 Professional
License included
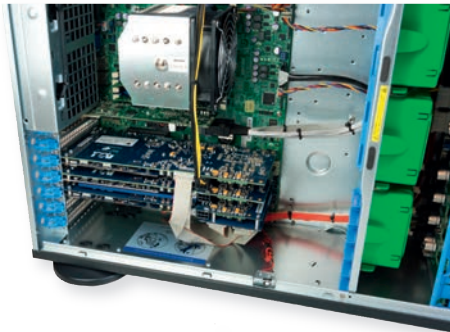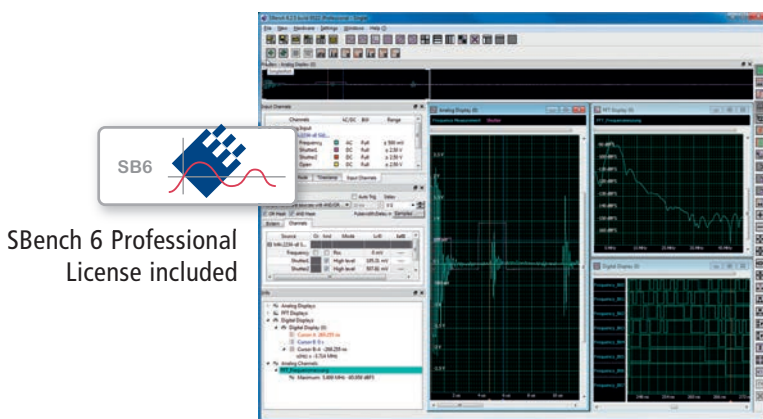
Combining a number of Spectrum M2i, M3i or M4i PCIe digitizers with a Tera-Store Data Streaming solution allows the capture and storage of long complex signals for extended periods of time. With systems offering from 1 to 32 TB of storage and streaming rates up to 3 GB/s signals can be digitized and stored seamlessly for hours on end.

At the heart of the system is a carefully selected base PC system. This powerful computer includes a Supermicro 4U/Tower with 8 drive bays and 6 free PCIe slots for Spectrum cards. The PC is powered by a Xeon Quad Core 2.4 GHz processor, has on-board graphics, 8 GB RAM, a separate 256 GB SSD for the system installation, a DVD drive, and runs under Windows 7 Professional. The chassis hosts a powerful 865W power supply and has whisper quiet fan-based cooling.

If more acquisition channels are needed than can fit into the base PC system, a special 16 slot docking station can be connected to extend the number of synchronous streaming data acquisition channels up to 256.

For large multi-digitizer systems Spectrum also provides the Star-Hub, a unique clock and trigger distribution system, which allows all the installed digitizer cards of one family to be clocked synchronously and to share a common trigger. The star-hub is already included in the base system.

Storage systems are available offering a range of streaming rates, from 500 MB/s up to 3 GB/s, and storage capacities, from 1 TB to 32 TB. The options consist of a high performance RAID controller and a number of solid-state or hard-disk drives (SSD/HDD's) configured to support the required transfer rates and storage times.

Spectrum integrates the complete system, providing factory configuration and performance testing. This includes the PC setup, software and hardware installation and digitizer calibration. Hardware and software are both optimized and tested to guarantee the specified streaming rates.

digitizerNETBOX Series Highlights
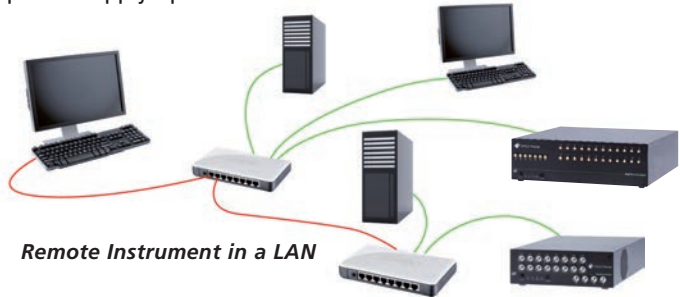
- Complete portable instrument solution
- Connect directly to your PC or Laptop or anywhere in the company LAN
- BNC (< 100 MS/s) or SMA (> 100 MS/s) connectors
- SBench 6 Professional software license included
- 19″ and DC power supply option available

Mobile or service

Shared instrument on desktop

Remote Instrument in a LAN

▶ 5 GS/s 8 Bit Digitizer

- Two to 24 channel versions available
- All channels run synchronously with full sampling speed
- 50 Ohm high bandwidth front-end with 4 input ranges between ±200 mV and ±2.5 V

8 Bit Digitizer with up to 6 x 5 GS/s

DN2.22x

DN6.22x

Versions

Speed	Bandwidth	2 Channels	3 Channels	4 Channels	5 Channels	6 Channels			
5 GS/s	1.5 GHz	DN2.223-02	DN6.223-03	DN6.223-04	DN6.223-05	DN6.223-06			

Speed	Bandwidth	2 Channels	4 Channels	6 Channels	8 Channels	10 Channels	12 Channels	16 Channels	20 Channels	24 Channels
2.5 GS/s	1.5 GHz	DN2.222-02	DN2.222-04	DN6.222-06	DN6.222-08	DN6.222-10	DN6.222-12			
1.25 GS/s	500 MHz	DN2.221-02	DN2.221-04		DN2.221-08		DN6.221-12	DN6.221-16	DN6.221-20	DN6.221-24

▶ 500 MS/s 14/16 Bit Digitizer

- Two to 24 channel versions available
- All channels run synchronously with full sampling speed
- 50 Ω and 1 MΩ front-end with 6 input ranges between ±200 mV and ±10 V
- High quality front-end with SNR up to 72 dB and ENOB up to 11.6 LSB

DN6.44x

DN2.44x

Versions

Speed	Resolution	Bandwidth	2 Channels	4 Channels	8 Channels	12 Channels	16 Channels	20 Channels	24 Channels
500 MS/s	14 Bit	250 MHz	DN2.445-02	DN2.445-04	DN2.445-08	DN6.445-12	DN6.445-16	DN6.445-20	DN6.445-24
250 MS/s	16 Bit	125 MHz	DN2.442-02	DN2.442-04	DN2.442-08	DN6.442-12	DN6.442-16	DN6.442-20	DN6.442-24
130 MS/s	16 Bit	65 MHz	DN2.441-02	DN2.441-04	DN2.441-08	DN6.441-12	DN6.441-16	DN6.441-20	DN6.441-24

▶ 60 MS/s 16 Bit General Purpose Digitizer

- Four up to 48 channel versions available
- Single-Ended or True Differential Inputs by software
- 50 Ω and 1 MΩ front-end with 6 input ranges
  between ±200 mV and ±10 V

Single-Ended and True Differential Inputs
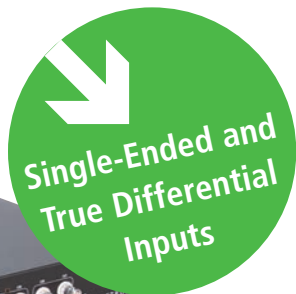
DN2.49x-08

DN2.49x-04

DN2.49x-16

Versions								
Speed	Bandwidth	4 Channels	8 Channels	16 Channels	24 Channels	32 Channels	40 Channels	48 Channels
60 MS/s	30 MHz	DN2.496-04	DN2.496-08	DN2.496-16	DN6.496-24	DN6.496-32	DN6.496-40	DN6.496-48
10 MS/s	5 MHz	DN2.491-04	DN2.491-08	DN2.491-16	DN6.491-24	DN6.491-32	DN6.491-40	DN6.491-48

▶ 3 MS/s 16 Bit High-Resolution Data Acquisition

- Four up to 48 channel versions available
- Single-Ended or True Differential Inputs by software
- 1 MΩ front-end with 8 input ranges
  between ±50 mV and ±10 V
- Highest quality input stage with SNR up to 91 dB
  and ENOB up to 15 LSB

DN2.46x-04

DN2.46x-08

Versions								
Speed	Bandwidth	4 Channels 4 x Single 4 x Diff	8 Channels 8 x Single 8 x Diff	16 Channels 16 x Single	16 Channels 16 x Single 16 x Diff	24 Channels 24 x Single 24 x Diff	32 Channels 32 x Single	40 Channels 40 x Single	48 Channels 48 x Single
3 MS/s	1.5 MHz	DN2.465-04	DN2.465-08	DN2.465-16	DN6.465-16	DN6.465-24	DN6.465-32	DN6.465-40	DN6.465-48
1 MS/s	500 kHz	DN2.464-04	DN2.464-08	DN2.464-16	DN6.464-16	DN6.464-24	DN6.464-32	DN6.464-40	DN6.464-48
200 kS/s	100 kHz	DN2.462-04	DN2.462-08	DN2.462-16	DN6.462-16	DN6.462-24	DN6.462-32	DN6.462-40	DN6.462-48

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▶ Embedded Server Option

The option turns the digitizerNETBOX into a powerful PC that can run your own programs on a small and remote data acquisition system. The digitizerNETBOX is enhanced by more memory, a powerful CPU, a freely accessible internal SSD and a remote software development access method.

The digitizerNETBOX can either run connected to LAN or it can run totally independently, storing data to the internal SSD. The original digitizerNETBOX remote instrument functionality is fully maintained but running the embedded server option allows the pre-calculation of results inside the unit. Then you can choose to transfer just the information (data or calculated results) that's required in a client-server based software structure. The digitizer-NETBOX embedded server option is ideal for surveillance/logger applications, which can run totally independently for days. When necessary, it can send notification emails or alerts over the LAN, or offload stored data as soon as it's connected again.

MX and MC Series Highlights

- Available as PXI 3U and cPCI 6U version
- Support of PXI Star-Trigger, Reference Clock and Trigger Bus
- cPCI allows internal synchronization of up to 16 cards in one crate

▶ 200 MS/s 8 Bit Digitizer

- Two and four channel versions available
- 50 Ω and 1 MΩ front-end with 7 input ranges between ±50 mV and ±5 V
- Well suited for OEM, Radar and Ultrasound applications

PXI with 200 MS/s
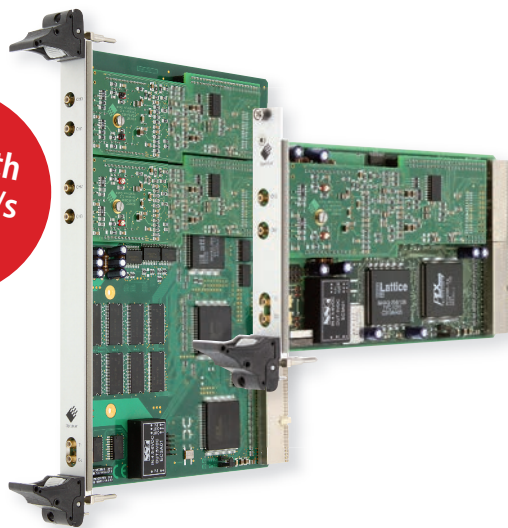
Card Versions		MX/MC	MX/MC	MC	
PXI 3U	cPCI 6U	1 Channel	2 Channels	4 Channels	Bandwidth
MX.203x	MC.203x	200 MS/s	200 MS/s	100 MS/s	90 MHz
MX.202x	MC.202x	50 MS/s	50 MS/s	50 MS/s	25 MHz

▶ 8 Channel 50 MS/s 16 Bit Digitizer

- Two, four and eight channel versions available
- Single-Ended or True Differential Inputs by software
- 50 Ω and 1 MΩ front-end with 6 input ranges between ±200 mV and ±10 V
- General Purpose High Quality Digitizer

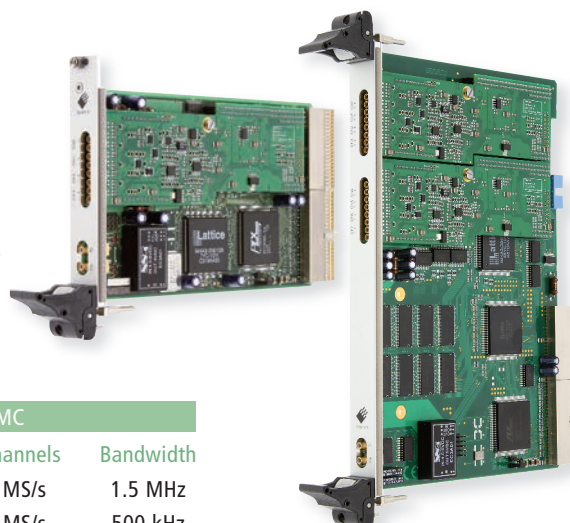*4 (PXI) and 8 (cPCI) x 25 MS/s 16 Bit Digitizer*
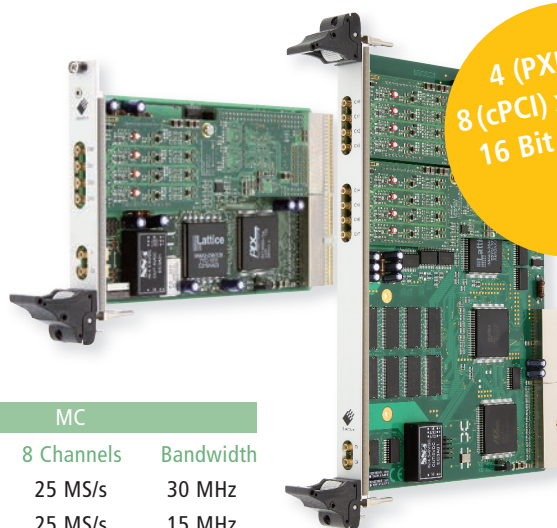
Card Versions		MX/MC	MX/MC	MX/MC	MC	
PXI 3U	cPCI 6U	1 Channel	2 Channels	4 Channels	8 Channels	Bandwidth
MX.496x	MC.496x	50 MS/s	50 MS/s	50 MS/s	25 MS/s	30 MHz
MX.493x	MC.493x	25 MS/s	25 MS/s	25 MS/s	25 MS/s	15 MHz
MX.491x	MC.491x	10 MS/s	10 MS/s	10 MS/s	10 MS/s	5 MHz

▶ 8 Channel 3 MS/s 16 Bit High-Resolution Data Acquisition

- Two, four and eight channel versions available
- Single-Ended or True Differential Inputs by software
- 1 MΩ front-end with 8 input ranges between ±50 mV and ±10 V
- Highest quality input stage with SNR up to 91 dB and ENOB up to 15 LSB

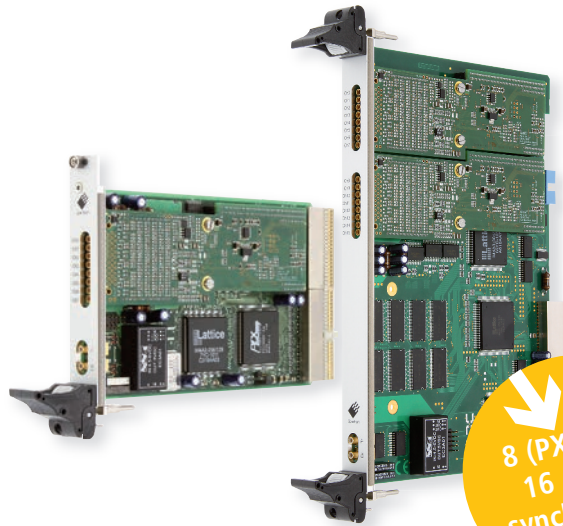| Card Versions		MX/MC	MX/MC	MX/MC	MC	
PXI 3U	cPCI 6U	1 Channel	2 Channels	4 Channels	8 Channels	Bandwidth
MX.465x	MC.465x	3 MS/s	3 MS/s	3 MS/s	3 MS/s	1.5 MHz
MX.464x	MC.464x	1 MS/s	1 MS/s	1 MS/s	1 MS/s	500 kHz
MX.463x	MC.463x	500 kS/s	500 kS/s	500 kS/s	500 kS/s	250 kHz
MX.462x	MC.462x	200 kS/s	200 kS/s	200 kS/s	200 kS/s	100 kHz

▶ 16 Channel 500 kS/s 16 Bit synchronous Data Acquisition

- ━ Eight and sixteen channel versions available
- ━ 1 MΩ front-end with 8 input ranges between ±50 mV and ±10 V
- ━ Up to 256 synchronous channels per system

8 (PXI) and 16 (cPCI) synchronous channels

Card Versions		MX/MC	MX/MC	MX/MC	MX/MC	MC	
PXI 3U	cPCI 6U	1 Channel	2 Channels	4 Channels	8 Channels	16 Channels	Bandwidth
MX.473x	MC.473x	500 kS/s	500 kS/s	500 kS/s	500 kS/s	500 kS/s	250 kHz
MX.472x	MC.472x	250 kS/s	250 kS/s	250 kS/s	250 kS/s	250 kS/s	125 kHz
MX.471x	MC.471x	100 kS/s	100 kS/s	100 kS/s	100 kS/s	100 kS/s	50 kHz

▶ 125 MS/s 14 Bit Arbitrary Waveform Generator

PXI Arbitrary Waveform Generator with 2 channels

- ━ One, two and four channel versions available
- ━ ±3 V output level (±10 V with amplifier option)
- ━ Single Shot, Multiple Replay, Streaming (FIFO) Output

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Card Versions		MX/MC	MX/MC	MC
PXI 3U	cPCI 6U	1 Channel	2 Channels	4 Channels
MX.603x	MC.603x	125 MS/s	125 MS/s	60 MS/s
MX.602x	MC.602x	60 MS/s	60 MS/s	60 MS/s
MX.601x	MC.601x	20 MS/s	20 MS/s	20 MS/s

▶ 125 MS/s 64 Channel Digital Waveform Generation and Acquisition

- ━ Versions with 16, 32 and 64 digitial channels available
- ━ TTL 3.3 V and 5 V compatible
- ━ Single Shot, Multiple Recording and Replay, Streaming (FIFO) Output and Aquisition, Sequence Replay Mode
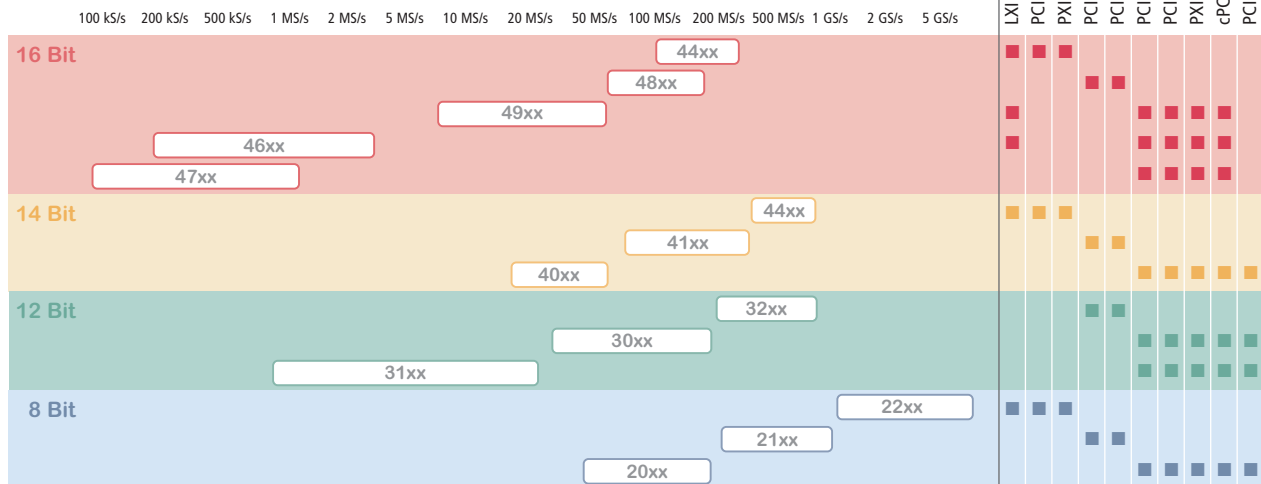
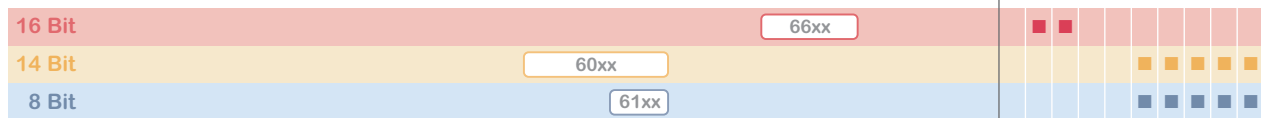| Card Versions		MX/MC	MX/MC	MC
PXI 3U	cPCI 6U	16 Channels	32 Channels	64 Channels
MX.702x-exp	MC.702x	125 MS/s	125 MS/s	60 MS/s
MX.701x-exp	MC.701x	125 MS/s	60 MS/s	
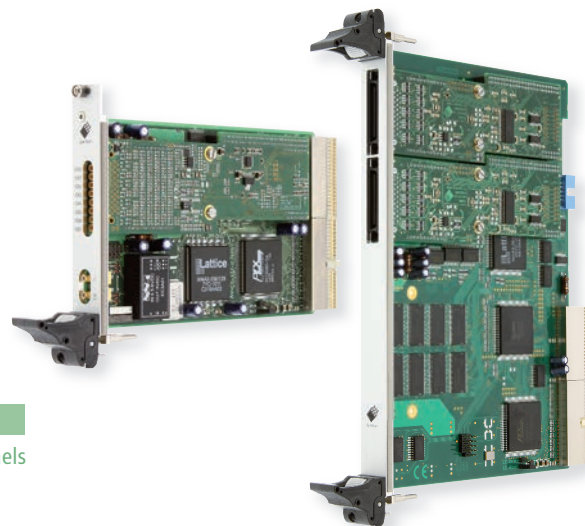
One of Spectrum's main goals ...

... is establishing a long term business relationship with our partners and customers. We know that applications may need years until they're finalized and should run for many further years with replacement and upgrade paths available. An investment in Spectrum products won't surprise you with sudden product line strategy changes or end-of-life (or end-of-support) announcements. All products released after the year 2000 are still in full production and can be ordered in single or volume quantities:

Digitizer, Transient Recorder and A/D Products

Series columns: LXI / Ethernet DN Series, M4i Series, M4x Series, M3i Series, M3i Series, M2i Series, M2i Series, MX Series, MC Series, MI Series

Connector types: LXI / Ethernet, PCIe x8, PXIe, PCIe x1, PCI/PCI-X, PCIe x1, PCI/PCI-X, PXI 3U, cPCI 6U, PCI

Samplerate scale: 100 kS/s, 200 kS/s, 500 kS/s, 1 MS/s, 2 MS/s, 5 MS/s, 10 MS/s, 20 MS/s, 50 MS/s, 100 MS/s, 200 MS/s, 500 MS/s, 1 GS/s, 2 GS/s, 5 GS/s

16 Bit: 44xx, 48xx, 49xx, 46xx, 47xx

14 Bit: 44xx, 41xx, 40xx

12 Bit: 32xx, 30xx, 31xx

8 Bit: 22xx, 21xx, 20xx

Arbitrary Waveform Generators

16 Bit: 66xx

14 Bit: 60xx

8 Bit: 61xx

Digital Waveform Generation and Acquisition

Digital Data Acquisition: 77xx

Digital I/O: 70xx

Pattern Generation: 72xx

Internet Search

All Spectrum products are listed in a parametric database on our website. Just select the details of interest and all the available products are shown with their key specifications, data sheets, manuals, drivers and software. All the relevant documentation is available for immediate download:

Platform:	Analog-In:	Resolution:	Samplerate:	Input Type:	Product Status:
☑ PCI Express	☐ 1 Channel	☐ 8 Bit	☑ 1 kS/s - 1 MS/s	☑ Single Ended	☑ Active
☐ PCI Express x1	☐ 2 Channel	☐ 12 Bit	☑ 1 MS/s - 10 MS/s	☑ Differential	☑ Preliminary
☑ PCI Express x8	☑ 4 Channel	☑ 14 Bit	☑ 10 MS/s - 105 MS/s		☐ Obsolete
☐ PCI / PCI-X	☐ 8 Channel	☐ 16 Bit	☑ 100 MS/s - 500 MS/s		☐ End-of-life
☐ PXI	☐ 16 Channel		☑ >= 500 MS/s		
☐ CompactPCI					
☑ Ethernet / LXI					

Apply parameters ☑ Show Input Parameters ☐ Show Memory & Options

Product	Platform	Analog-In	Digital-In	Resolution	Samplerate	Bandwidth	Input Ranges	Impedance	Coupling	Input Type	User Offset	Product
DN2.445-04	Ethernet	4	3	14 Bit	500 MS/s (4 active channels)	250 MHz	+/-200 mV to +/-10 V	50 Ohm / 1 MOhm	AC/DC	SE		DN2.445-04
M4i.4451-x8	PCI Express x8	4	3	14 Bit	500 MS/s (4 active channels)	250 MHz	+/-200 mV to +/-10 V	50 Ohm / 1 MOhm	AC/DC	SE		M4i.4451-x8

Synchronous Sampling

All digitizers from Spectrum are built with a completely synchronous design. Every channel has its own independent input amplifier as well as an independent A/D converter. All the input channel related settings can be individually programmed. Compared with standard products that use multiplex technology, where scanning of each channel is done one after the other with a single A/D converter, the more sophisticated design of the Spectrum products has a lot of advantages:

- Full sampling rate for all channels
- No phase delay between the single channels
- Smallest crosstalk between adjacent channels due to individual input amplifiers
- Direct comparison of acquired values with no need for interpolation
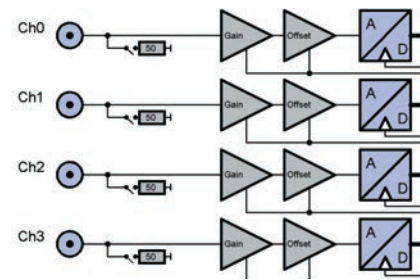
Integrated Signal Processing (M4i Series)

All digitizers of 44xx and 22xx series including PCIe, digitizerNETBOX and PXIe versions can be extended by integrated signal processing functions.

The Block Average Processing Module allows the accumulation and averaging of multiple repetitive signals. The function removes random noise from the signal, improving the signal-to-noise ratio and measurement resolution. Ultrafast triggering also ensures the dead-time between each acquisition is kept to a minimum.

The Block Statistics Processing Module is a hardware based data analysis and reduction function. Each acquisition block is scanned for minimum and maximum peaks and a summary including min, max, average, timestamps and peak position information is stored in memory.

Transient Capture / Ring Buffer Mode

The standard mode of the digitizer is the ring buffer mode. In this mode data is written into the buffer until a trigger event occurs. After the event additional posttrigger values are recorded enabling both pre- and posttrigger data to be acquired. It is also possible to read the acquired data directly after the trigger event, even while the acquisition is still running.
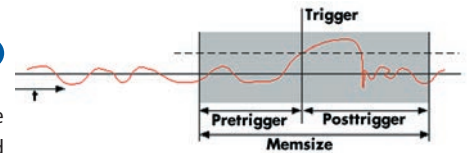
FIFO Mode

The FIFO mode is designed for continuous data transfer between the digitizer/generator and the PC memory or hard disk. It uses the complete on-board memory as a real FIFO buffer, making the transfer extremely reliable. Data is transferred over the bus by the driver without the need for the user to make any special setup. All Spectrum products are designed to reach maximum continuous transfer speed which can reach up to 3.4 GByte/s on a PCIe x8 Gen2 interface.
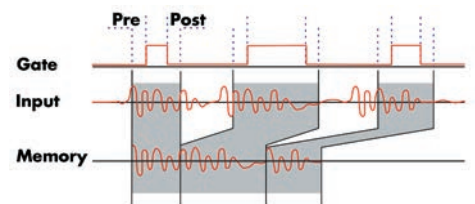
Multiple Recording

Multiple recording allows the acquisition of several trigger events without restarting the hardware. The on-board memory is split into segments and for each trigger event one segment is recorded. The segment size and the pre- and posttrigger settings can be freely defined. The powerful combination of a small re-arming time and FIFO mode makes it easy to adapt to nearly every measurement task.
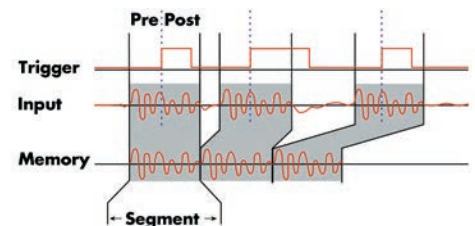
## Gated Sampling (M2i, M4i and digitizerNETBOX only)

With Gated Sampling the acquisition is controlled by an external gate signal. Data is only acquired if the gate signal has reached a programmed level. Before and after each gate a programmable number of samples will be acquired.

Gated Sampling can be combined with timestamps for time-correct positioning of the gate segments and to determine the length of each acquired gate segment.

ABA Mode / Dual Timebase (M2i, M3i, M4i and digitizerNETBOX only)

The ABA mode is similar to Multiple Recording. However, between the segments additional samples are acquired with a slower sampling rate, e.g. for monitoring purposes. The ABA mode works like the combination of a data logger and transient recorder inside one instrument.

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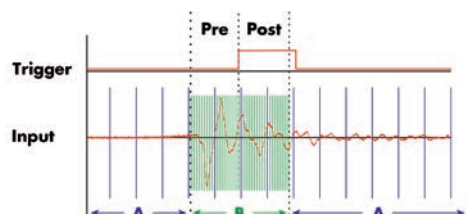
Timestamp

The Timestamp mode writes the time positions of the trigger events into an extra memory. The Timestamps are relative to the start of recording, to a defined zero time or externally synchronized to a seconds signal from a radio clock or a GPS receiver. With this mode acquisitions of systems on different locations may be set in a precise time relation. The Timestamp mode was developed as a useful extension to the Multiple Recording and Gated Sampling mode but can also be used without these options.

The Timestamp memory is designed as a FIFO buffer allowing the readout of Timestamps also in FIFO mode.

The reference signal for synchronization with a radio clock or a GPS receiver is connected using an additional special connector which is standard on digitizerNETBOX products and has to be requested separately for all card level products.
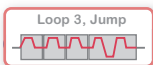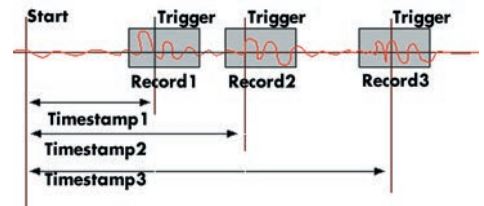
Sequence Replay Mode (Arbitrary and Pattern Generators)

The sequence mode allows to split the card memory into several data segments of different length. These data segments are chained up in a user defined order using an additional sequence step memory. In this sequence memory the number of loops for each segment can be programmed and trigger conditions can be defined to proceed from segment to segment. Using the sequence mode it is also possible to switch between replay waveforms by a simple software command or to redefine waveform data for segments simultaneously while other segments are being replayed.

Option Star-Hub

The Star-Hub is an additional module allowing the phase stable synchronization of up to 16 boards (M2i series) or up to 8 boards (M3i/M4i series). Independent of the number of boards there is no phase delay between all channels. As a result all connected boards are running with the same clock and the same trigger. Each board is internally connected with a small cable of the same length, even the master board. That minimizes the clock skew between the different boards.

On the M2i series the Star-Hub allows the synchronization of various cards when running with different sampling rates. This allows a mix of slow and fast sampling in one system whilst still preserving the phase relation between the different channels.

Accessoires

Adapter Cables

Matching the variety of different signal and auxiliary connections Spectrum is offering a complete range of adapter cables using proven industrial shielded connections. Supported connections are SMA, BNC, SMB and MMCX, all in male and female style.

For high-speed digitizers with signal frequencies way above 100 MHz, special low loss adapter cables are available.
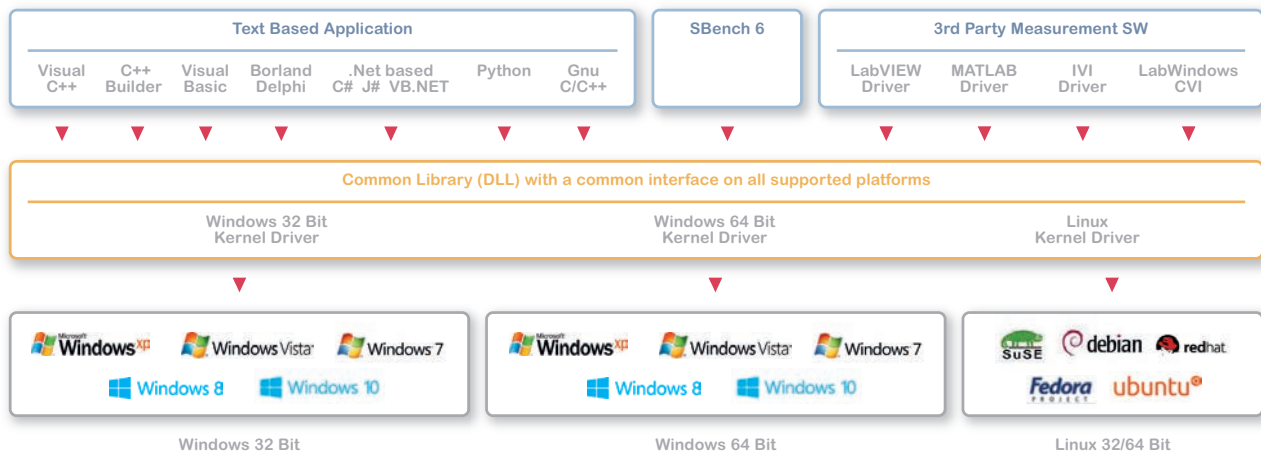
External Amplifiers

Independent external pre-amplifiers allow to acquire extremely small signals down into the low µV range with a reasonable quality. The external amplifiers are optimized for low noise inputs. The amplifiers of the SPA series are available with different bandwidth and input impedance options. No programming is needed to operate these amplifiers.
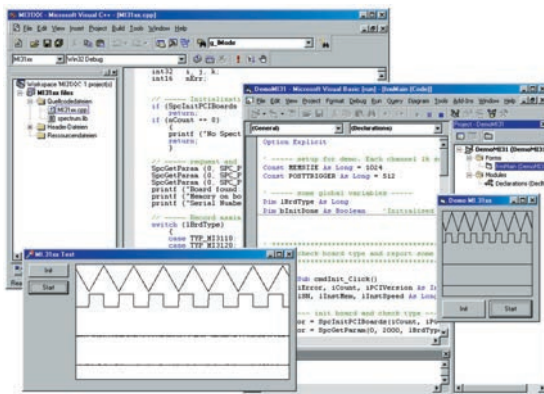
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Software

The connecting link between the user and the hardware is always the software. The wide range of software products supported by Spectrum allows the user to select the software that they want:

Text Based Application							SBench 6	3rd Party Measurement SW			
Visual C++	C++ Builder	Visual Basic	Borland Delphi	.Net based C# J# VB.NET	Python	Gnu C/C++		LabVIEW Driver	MATLAB Driver	IVI Driver	LabWindows CVI

Common Library (DLL) with a common interface on all supported platforms

Windows 32 Bit Kernel Driver	Windows 64 Bit Kernel Driver	Linux Kernel Driver

Windows 32 Bit	Windows 64 Bit	Linux 32/64 Bit

▶ Operating System Drivers

The standard driver is available for different operating systems and is programmed everywhere in the same way. This allows an easy change from one operating system to another without major changes in the source code.

The complete SDK including all drivers and examples is delivered with the hardware and updates are available from the Spectrum homepage at any time. There are **no additional SDK fees**!

The driver has a common interface for all products allowing an easy switch from one card type to another without big changes in the software. The different functionality of the products is realized with the help of board specific software registers. Programming examples are available for different languages as seen in the above overview picture. Due to the simple interface of the driver, the integration in other programming languages or special measurement software is an easy task.
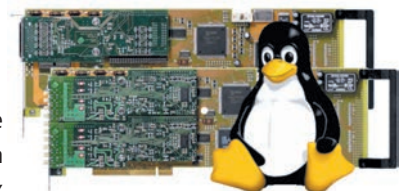
The number of examples is continuously increasing giving more detailed programming examples that allow an easy start with the Spectrum products.

▶ Linux Support

In many areas Linux has itself proven as a high-quality alternative to Windows. Also the instrumentation market uses more and more Linux-based systems. For many years Spectrum has provided loadable Linux kernel modules for all its products for the most common Linux distributions. We also support less common Linux versions. To make this possible the source code of the driver module and the required makefiles are available from Spectrum. The user can then compile a perfectly matching version for his Linux installation.

Linux driver delivery contains driver modules for more than 50 different Linux distribution versions, including the latest version of openSUSE, Fedora, Ubuntu and Debian, each as 32 bit and 64 bit kernel module.

Besides the Linux drivers Spectrum is giving full Linux support for all current software products. The Linux version of the Spectrum Control Center allows all card maintenance including firmware updates, calibration and test programs. Using the Linux versions of SBench 6 provides a fully functional data acquisition and streaming application under Linux. Both programs are made from the same source code as the Windows version giving Linux users full features and functions on the same level as Windows users. There's no development or porting delay between versions.
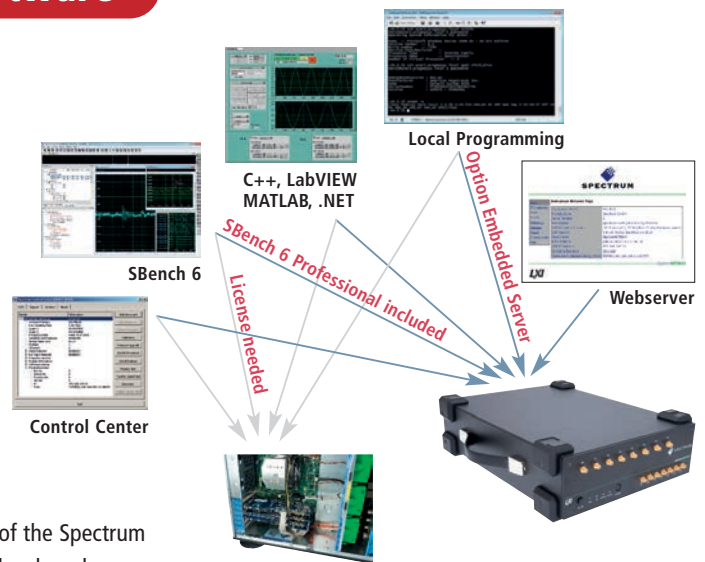
Local Programming

C++, LabVIEW
MATLAB, .NET

SBench 6

Control Center

SBench 6 Professional included

License needed

Option Embedded Server

Webserver

▶ Spectrum Remote Server

Using the Spectrum Remote Server it is possible to access the M2i/M3i/M4i card(s) installed in one PC (server) from another PC (client) via local area network (LAN), similar to using a digitizerNETBOX. The remote server option has to be activated by software license in any of the Spectrum cards in the remote system to operate it.

It is possible to use different operating systems on both server and client. For example the Remote Server is running on a Linux system and the client is accessing them from a Windows system.

Access to the remote cards is done through a transparent internal link of the Spectrum driver. There is no difference in accessing remote cards from accessing local cards.

▶ LabVIEW

LabVIEW – the most common graphical programming language for measurement applications – is very well supported by the Spectrum digitizer hardware with the use of dedicated LabVIEW drivers. They combine different functions into functional blocks and make them available within LabVIEW. The LabVIEW driver package consists of several different dynamic libraries (LLBs) and some open example VIs showing the use of the driver. Besides these libraries all driver functions can also be directly called.

The LabVIEW driver supports all LabVIEW for Windows versions starting with LabVIEW 2009 up to the current version. All new product releases are installed on our test systems and all examples are immediately checked against the latest version.
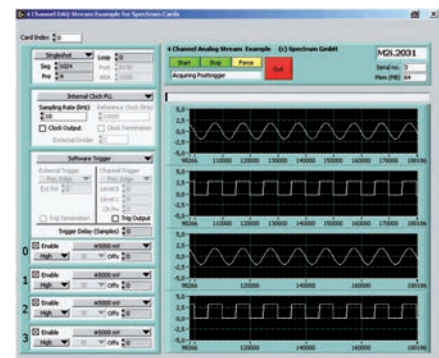
▶ MATLAB

The math software packet MATLAB from The Mathworks Inc. is supported starting from version 7.7 (R2008b). Both Windows and Linux versions are supported. The MATLAB driver consists of a set of Mex-files to access the Spectrum library and a bunch of examples in m-language. All features of the hardware can be accessed. The interface also offers an easy way to use the Spectrum cards with Simulink.

For control of the Spectrum products under MATLAB only the base version of the software package is necessary, no additional software options like the data acquisition tool kit are required.
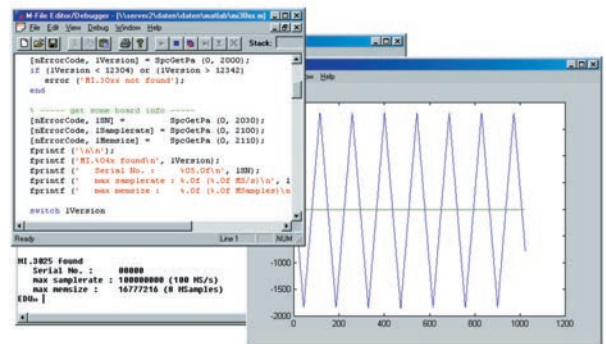
▶ LabWindows/CVI

LabWindows/CVI offers an easy-to-use combination of graphical elements for controlling hardware as well as the display of measured data and an universal C-compiler. For a fast start with the Spectrum boards there are some universal examples showing how to include the Spectrum driver. There are some example applications integrated like a universal oscilloscope program and a universal signal generator. All programs are available as source code. LabWindows/CVI offers a fast way to develop graphical measurement applications including the performance of a C-compiler.
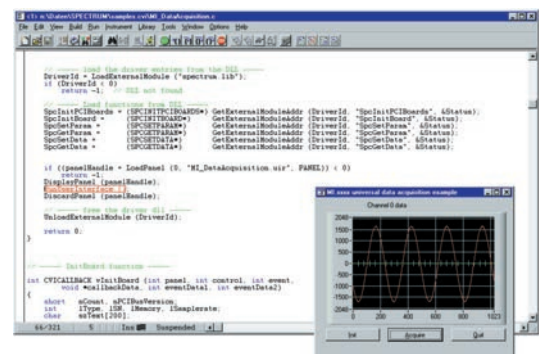

▶ IVI Drivers

All digitizer products from Spectrum for PCI, PCI Express and LXI bus also support the IVI class drivers IVI digitizer and IVI scope. The IVI drivers allow users to access instruments of one function class with a common software interface independent of the manufacturer of the hardware. This makes it possible to use software, based on an IVI instrument driver, with many of the different digitizers or scopes available on the market.

SB6

This easy-to-use software provides convenient and fast data acquisition and analysis of GBytes of analogue and digital data together with powerful export functions.

SBench 6 is powerful and intuitive interactive measurement software. SBench 6 allows you to commence making measurements immediately, without programming, and enables hardware setup, data display, oscilloscope, transient recorder, analysis and export functions all under one easy-to-use interface.
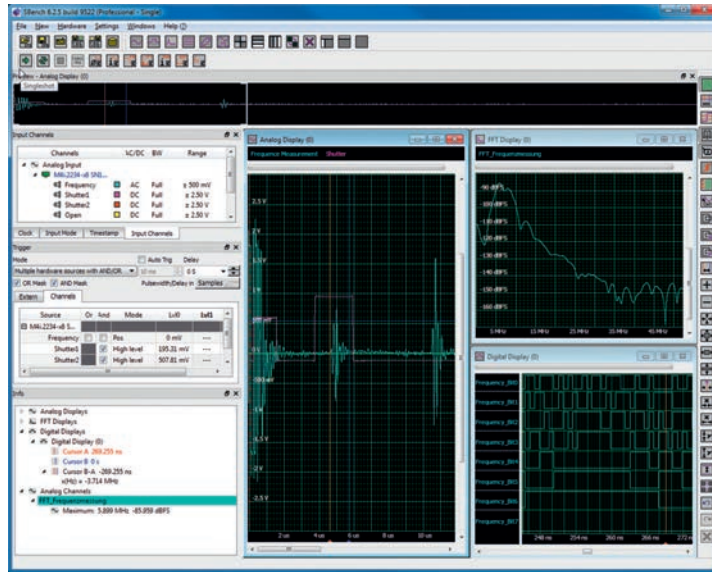
- Available for Windows XP / Vista / Windows 7 / Windows 8 / Windows 10
- Available for Linux KDE / GNOME
- Fast data acquisition supporting RAID disk arrays
- Designed to acquire and handle GBytes of data
- Display of analogue data (scope), X-Y data, chart recorder and frequency spectrum
- Integrated analysis functions
- Import and export filter
- Enhanced cursor functions
- Fast data preview function
- State-of-the-art drag-and-drop technology
- Thread based program structure, optimized to run with today's multi processor technology
- Easy usage with docking windows and context menus

Setup Windows

All the hardware settings of the Spectrum instrument can be accessed using sophisticated tabbed setup windows. All setup windows can be docked whenever it is required to have a full overview of the configuration. Input signals can be scaled and given an individual unit to show real world measured values, compensating for sensor characteristics. The scaling and units are then used throughout the complete SBench software, be it in the display screen or in the calculation results. The look and feel of SBench 6 can be customized by locating setup widgets wherever necessary and by the individual configuration of toolbars and shortcuts. Each layout can be stored separately in a user file that can be used for future sessions of SBench 6.
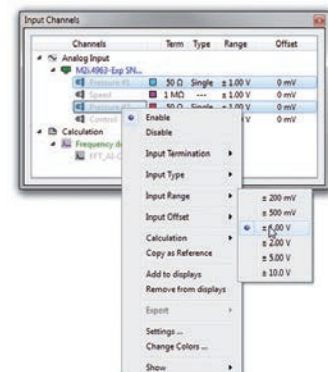
Acquisition and Replay

SBench 6 is able to act as a recorder as well as a generator front-end. The software is able to replay GBytes of either analog or digital data from various sources. Data can be imported from different file formats as well as using previously acquired data. SBench 6 automatically rescales and converts data to allow the mixed use of acquisition and replay cards of different resolutions and channel count.

Data Storage

The SBench 6 engine controls the complete data transfer whether into the PC RAM or onto hard disk. The streaming engine supports different binary formats that may be used for data storage. This eliminates all time-consuming conversion jobs after the end of the acquisition. Data files can be automatically split into smaller pieces even while writing data. SBench 6 has been optimized for working with multi GByte data files. The technology makes it possible for SBench 6 to handle data from up to 4 GBytes of on-board memory as well as hard disk recordings of several GBytes.

FFT Analysis and Display

Using the FFT calculation turns the oscilloscope like software into a spectrum analyzer. The FFT function converts time domain signals into the frequency domain. The input signal can be weighted by different window functions like Hanning, Hamming, Blackman, etc.,with the resulting FFT plot being shown as dBc, dBFS, dBuV, dBm or plain voltage. The resulting FFT signal can also be used for further calculations like SNR, THD, MAX value or others.

FFT Analysis, like all calculation functions, can run on full signals, on the visible signal area in one display or on a selected area between cursors.
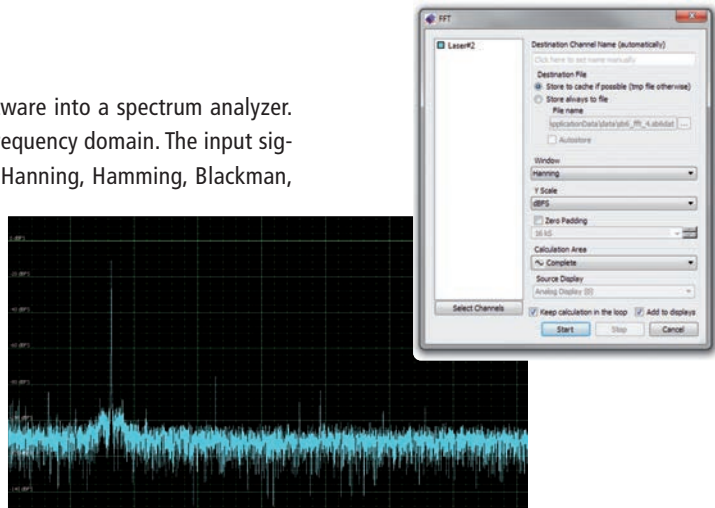
Calculation Routines and Measuring Results

A special info window shows extended information on the current cursor positions within the display windows. Each cursor can be locked on a signal showing the precise values for the signal. Using both cursors makes it possible to obtain some simple measurement functions and, with only one mouse click, it is possible to use additional calculation routines on any signal. The signal used can be any acquired signal, any loaded signal or even a freshly calculated signal like an FFT, allowing fully nested calculations. The calculation area can be selected to be the whole signal, an area that is shown inside the display window, or the segment defined by the two cursor positions.
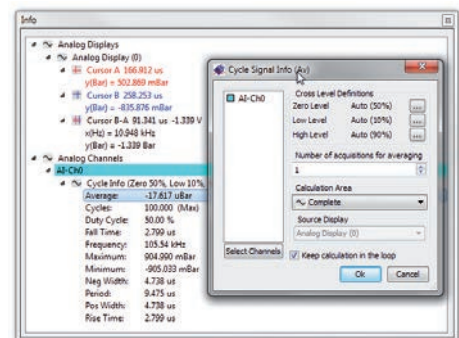
Digital Data Display (Logic Analyzer)

Besides the acquisition and display of analog data SBench 6 also contains a powerful digital data display allowing to group signals to a bus and to navigate through data by edge detection and pulse measurements. The digital data display is available for pure digital acquisition cards as well as for additional digital inputs of an analog data acquisition card. Analog data can be converted to digital data and vice versa to combine different signals into a mixed mode display. Digital displays and analog displays can be synchronized to have cursor and zoom settings automatically synchronous between different displays for comprehensive Mixed Signal Analysis.

Project Organization

The entire configuration, acquired data, reports, calculations and stored files are placed within a separate project folder. Projects can be used to organize measurement setups in production, to store, archive and share complete data sets, including all calculation and display details, or to generate default and write protected project templates for specific measurement jobs. A project is either stored as a set of sub-folders with separate files, that can be accessed individually, or it can be stored as a zip-archive which can be easily exchanged.

The project and also the separate data acquisitions can be extended by a user defined number of additional information fields. These can be made mandatory in cases that need to have a defined data set for each acquisition. The information fields can hold environmental details like temperature, used equipment, operator, additional test settings or it can be used to describe the DUT (device under test).

A project can hold a single acquisition as well as a number of automatically or manually stored acquisitions. All acquisitions can be found in a separate project data browser that also displays the acquisition information on the side.
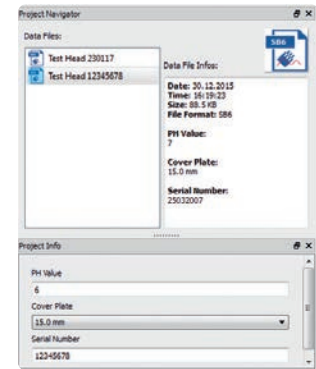
Reports

SBench 6 contains a powerful report editor and generator that documents the use of all components of SBench 6 for individual reports.

A report can contain analog, FFT, digital, histogram, spread and X-Y displays. Furthermore, all measurement results, cursor positions, project information, hardware information and the complete hardware configuration can be added to a report as single values or as overview tables.

Free text fields, lines and pictures can be used to add additional information to the report.

The report template itself is XML code and can be changed manually or archived with standard code managing software. The report is generated as a PDF-file and can be printed on any installed printer or stored as a pdf file. Different European and US paper formats are supported with freely definable borders, header and footer area.

The printout can be made in portrait or landscape format.
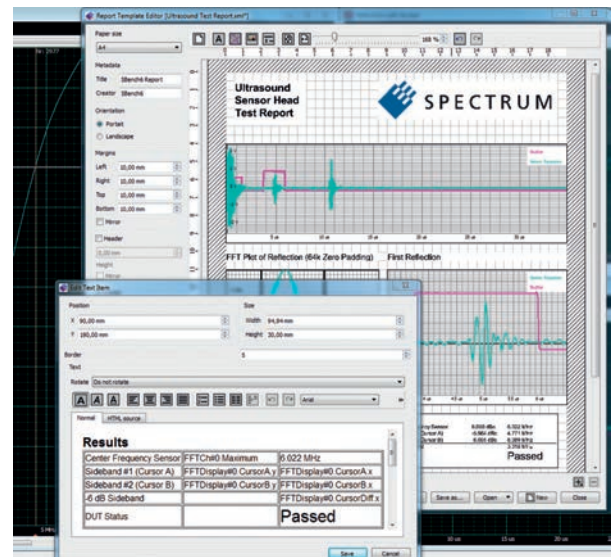
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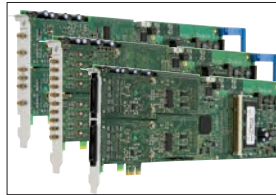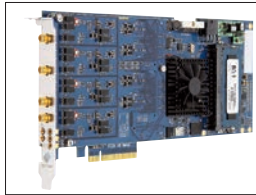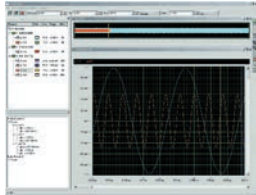
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Made in Germany

- Digitizer
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- High-Speed Data Acquisition
- D/A Converter Boards
- High-Speed Recorder

- digitizerNETBOX
- Arbitrary Waveform Generators
- Digital I/O Boards
- Pattern Generators
- SBench 6

Contact

- Our design engineers can be reached by telephone or by email: **support@spec.de**

- Would you like to get a detailed quotation, application notes, data sheets or other information? Please call **+49 (0)4102-6956-0** or email to **request@spec.de**

- We are looking forward to your request!

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