

Model MCA-3Series

PCI based Multichannel Analyzers

FEATURES (depends on model - see page 2)

- Complete MCA data acquisition system on a full lengths **PCI-bus** compatible board
- Three alternative operating modes **PHA** (pulse height analysis), **MCS** (multichannel scaling) using 1 or 2 inputs and PHA with **SVA** (Sampled Voltage Analysis)
- On board ultra fast pulse height analyzing 8k ADC with 500 ns conversion time for Pulse-Height Analysis
- ADC-port, 16 bit, throughput up to **15,000,000** converted events/s
- Digital Stabilizer for Gain and Zero stabilization
- Capability to store PHA data from ADC in **list-mode format** in addition to normal histogramming mode
- On-board 512k channels SRAM memory, 32 bit capacity
- Memory segmentation for sequential spectra acquisition
- Multiscaling mode offers two inputs with programmable discriminators, Count rates in excess of 350 MHz (400 MHz typical)
- No deadtime between channels, no end-of-sweep deadtime
- Dwell time from 100 ns to 50s (200ns to 50s using two inputs), manual and external
- Mossbauer Spectroscopy control lines are available on a mounting bracket connector:

APPLICATIONS

- Nuclear- and X-ray spectroscopy
- LIDAR
- Two channel Mössbauer Spectroscopy
- Dynamic Desorption Studies
- Cross-correlation measurements
- Scanning Mass Spectrometers
- One or two input, time-correlated single-photon and ion counting
- Fluorescence lifetime studies
- Laser induced chemical reactions
- Portable Spectrum Analysis
- Setup of experiments in High Energy Physics
- OEM-applications
- Remote Spectrum Acquisition

DESCRIPTION

The MCA-3 Series is a family of PC-based, software controlled PCI-bus Multichannel Analyzers. The design capable of converting incoming signals at up-to 1,000,000

events/s or collect data at rates of up-to 5 Megaevents/s.

The large data memory can be segmented to enable to accumulate successive measurements. Spectra accumulated in sequential PHA mode can be displayed in a two-dimensional array.

For use in remote locations an autostore function can be selected that will store both spectra and setup parameters at regular intervals.

The MCA-3-Series boards can be remotely controlled by a host computer. "GO"-line compatibility enables the MCA's to start and stop accumulation synchronously with other FAST ComTec products such as the MS-12 Timer/Scaler, the **MPA-3** Multiparameter System etc.

The MCA-3-Series Multichannel Analyzers are available in five versions:

MCA-3FADC - is an advanced Multi Channel Analyzer with a built-in ultra-fast ADC with 500 ns conversion time and 8k conversion range. The throughput capability is in excess of 1,000,000 events/s depending on the shape and duration of the input pulses. In addition an MCS mode is available with one or two inputs for fast multiscaling are provided - a time resolution of 100 ns sets the MCA-3-FADC apart from standard MCA's.

MCA-3A - this unit is identical to the MCA-3FADC but without the multiscaling facility

MCA-3 - this model offers an external ADC port and a dual input multiscaler. Such a combination is preferred by scientists doing Mossbauer work as it can be operated in PHA mode for setup and testing while one or both multiscalers are used for data acquisition.

MCA-3B - offers all features and more of a traditional MCA buffer board designed to connect external devices like ADC's, TOF frontends, etc. The throughput of the ADC port is 5,000,000 converted events/s

MCA-3S - is a dual-input Multiscaler. For details see the P7882 datasheet.

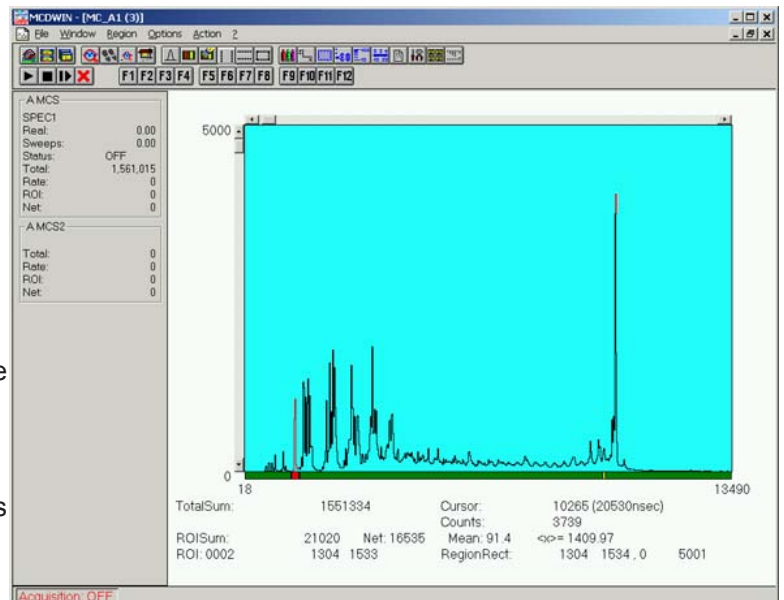


MCA-3 Series MCA's Rev.10 21072004

Operating Software is based on the MCDWIN software - a proven - easy to use graphical user interface for mouse and keyboard operation. High resolution displays with linear and log scales, autoscaling, ROI, zoom, Gaussian-Fit, FWHM calculation are just a few features MCDWIN offers. MACRO's offer a flexible way for user to execute task oriented batch programs. The interactive display software can be set to display spectra with a high resolution, linear or log scale. Screendumps allow text insertion and graphic editing with a variety of tools. This package also supports graphic output devices installed under WINDOWS 2000 and XP.

The open domain Analysis Software of the IAEA, Vienna, can be delivered with each MCA-3 that is capable of operating in PHA mode. An IAEA compatible software interface enables the user to directly use such analysis packages as GANAAS, QXAS, POSFIT and other programs. The file format is compatible to GAMMA-W, SODIGAM, ALPS and other precision analysis software from Dr. Westmeier

A valuable feature of the MCA-3-Series MCA's is the



selectable autostore facility. In case of a power failure the MCA-3's will retain all but the last minute of data. As all setup parameters are retained and a measurement can be continued as soon as power has been restored.

Key Feature Table

Features	MCA-3	MCA-3A	MCA-3B	MCA-3FADC	MCA-3S
					P7882
On-board 500 ns ADC, 8192 channel conversion range	No	Yes	No	Yes	No
ADC port for connection of external ADC	Yes	Yes	Yes	Yes	No
SCA output, programmable ULD, LLD and ZERO	No	Yes	No	Yes	No
Gate input for Anticoincidence/Coincidence signals	No	Yes	No	Yes	No
TAG-input for tagging PHA spectra 8-bit (= 256 tags)	Yes	Yes	Yes	Yes	No
Pulse-Height mode acquisition	Yes	Yes	Yes	Yes	No
SVA Sampled Voltage Analysis mode	ext. ADC	Yes	ext. ADC	Yes	No
Multi-point digital spectrum stabilizer, gain and zero	Yes	Yes	Yes	Yes	No
MCS Multichannel mode of acquisition	Yes	No	No	Yes	Yes
Two-inp. MCS with 100ns min. dwell time	Yes	No	No	Yes	Yes
Presettable sweep counter	Yes	No	No	Yes	Yes
Mossbauer Control Lines on mounting bracket	Yes	No	No	Yes	Yes
X-Ramp (triangular or sawtooth) output 0-10 V, 12 bit	Yes	No	No	Yes	Yes
Data Memory, 32 bit capacity	512k	512k	512k	512k	512k
Memory Segmentation 8k x 64 to 2 x 256k	Yes	Yes	Yes	Yes	Yes
Sequential PHA spectra acquisition	Yes	Yes	Yes	Yes	No
Sweep summing and segmented memory averaging	Yes	No	No	Yes	Yes
Digital I/O for external control, sample changer etc.	Yes	Yes	Yes	Yes	Yes
Remote control via RS232C, Ethernet, Exp. Control line	Yes	Yes	Yes	Yes	Yes
Inputs and outputs on LEMO 00 or D-SUB-15 connectors	Yes	Yes	Yes	Yes	Yes
Multi-tasking for up to four boards in one PC	Yes	Yes	Yes	Yes	Yes
MCDWIN Operating Software including 2D-display	Yes	Yes	Yes	Yes	Yes
Event by event storage in List-Mode	Yes	int+ext.ADC	Yes	int+ext.ADC	Yes
WIN 2000, WIN-NT and WIN-XP compatible	Yes	Yes	Yes	Yes	Yes
DLL for LabVIEW, "C" and Visual Basic	Option	Option	Option	Option	Option
Driver for LINUX	Option	Option	Option	Option	Option
Downloadable software upgrades free for one year	Yes	Yes	Yes	Yes	Yes

SPECIFICATIONS (dependent on model)

PHA Mode

ADC:

SAR type ADC with 500 ns conversion time. Programmable conversion gain of 256, 512, 1k, 2k, 4k and 8k. Software programmable ULD, LLD and THRESHOLD. Dead time: Input-Rise-Time + Conversion time (500 ns) +transfer time to memory (less than 150 ns).

INPUTS:

ADC Input: LEMO-Connector accepts +25mV to +10V standard (+8V optional) gaussian-shaped pulses, $Z_{in} = 1k$ ohm, risetime: $\geq 100ns$ to $100\mu s$, fall time: 200ns to $100\mu s$, dc coupled or a varying voltage level when used in SVA mode. Leading edge must be positive-going

Gate and SVA Sample inputs: 2 LEMO-Connectors

Memory: 2 MByte organized as 512k x 32bit on-board data memory segmentable in steps down to 64. Ultra high speed data storage and read operations guarantee **no additional dead time**. Real / Live Time storage with 1ms resolution.

Digital Stabilizer: Multipoint Gain and Zero stabilization

Listmode storage of PHA events from int. or ext. ADC

MCS MODE

Dwell Time Modes: software settable internal, external and manual channel advance

Dwell Time per channel: 100 ns (200 ns for two inputs) to 50 s, software selectable in steps of 25 ns

Max. Countrate: 350 MHz, typically >400 MHz

Deadtime between channels: zero

Bin accuracy (leading/trailing edge) rel. to the Reference Clock +/-0.15ns, typical +/-0.07ns

End-of-sweep deadtime: nil

Trigger Delay: 25 ns +/-12.5 ns

Trigger / Start uncertainty: ≤ 25 ns

Sweep Preset Range: 1 to 2^{32}

Listmode storage of MCS events

INPUTS:

START/TRIGGER/SVA SAMPLE: +/-5V range, 50 Ω /1k Ω slope and threshold programmable in steps of 2.44mV

COUNT1 and COUNT2: +/-5V range, 50 Ω /1 k Ω slope and threshold programmable in steps of 2.44mV, count rate capability 350 MHz, typically >400 MHz
Min. pulse width 2ns (typical)

EXTERNAL CLOCK/GATE: +/-5V range, 50 Ω /1 k Ω slope and threshold programmable in steps of 2.44mV

EXTERNAL ADC INPUT for nuclear type ADC's

SVA MODE

In SVA mode a voltage level or waveform can be successively sampled when an external trigger signal is applied to the SVA sample input

OUTPUTS: Sync 1, FAST-NIM, Sync 2, TTL
RAMP DAC, 0 to 10V, 12 bit
DAC, +/- 10V, 12 bit

CONNECTORS:

Analog signal input: LEMO 00 type connector

Start/Trigger/Sample: LEMO 00 type connector

Count1, Count2: LEMO 00 type connector

Clock/Gate: LEMO 00 type connector

Sync-Out: LEMO 00 type connector

26 pin wall mount connector with ribbon cable **t25 pin D-SUB on bracket** for connection of external ADC

D-SUB 15 pin female connector:

Analog Ground, Digital Ground, +5V OUT, Ramp
DAC OUT: 0 to 10V, DIG I/O:

Power Requirements:

+5V / 1.4A / 7W typ. (1.6A / 8W max.), +12V, 0.8A

PC Requirements: 32 bit PCI slot, 32 bit Windows XP / Vista / 7, no DELL PC.

Physical: full size PCI board

SOFTWARE:

Operating Software: MCDWIN operating software - see separate datasheet.

Software Options

DLL for LabVIEW, Visual Basic and "C"

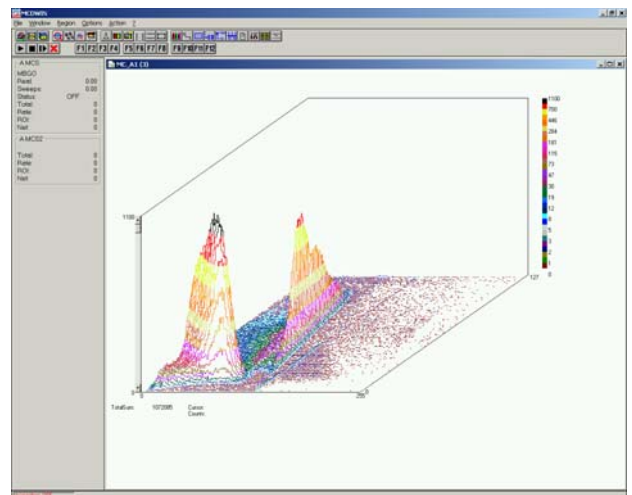
Driver for LINUX

Analysis Software: Software interfaces to programs compatible with the IAEA standard software interface. The MCA-3 Series MCA's are also compatible with a number of widely used analysis programs such as **aALPS**, **GAMMAW**, **SODIGAM**, etc.

The new version of **GAMMAW** now uses Fuzzy-Logic for Compton-edge recognition, Multiplet-deconvolution, calculation of the background on ROI endpoints etc. for a significantly better performance with small peaks. The following DOS-based open domain programs of the IAEA are presently available:

GANAA: Gamma spectrum analysis, activity calculations and neutron activation analysis system. It provides features like: Parameter Setup, Energy Calibration, Efficiency Calibration, Isotope Library, Nuclide Library Manager, Peak Search, Spectrum Analysis, Calculation of Activities, Activity Report, Neutron Activation Analysis, NAA Library Manager, Display of highresolution Gamma Spectrum.

QXAS: Quantitative X-ray analysis system



Specifications are subject to change without prior notice