



**MI.60/MC.60/MX.60**  
**MI.61/MC.61/MX.61**  
**DASYLab driver**  
**Library mi.dll**

English version

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<b>General Information .....</b>	<b>4</b>
Driver - structure .....	4
Installation Spectrum driver .....	4
Installation DASYLab driver .....	4
<b>Channels in DASYLab .....</b>	<b>5</b>
Analog Channels .....	5
Synchronization .....	5
Replay Modes .....	5
Output with Singleshot and Continous Mode .....	5
FIFO Output .....	5
Setup the hardware .....	5
Synchronization .....	6
Board Setup .....	6
Trigger Setup .....	7
Analog ouput, offset and filter .....	7
<b>DASYLab messages .....</b>	<b>8</b>
Error messages .....	8
Please use the DrvConfg Utility... ..	8
The Samplerate (Frequency) is not valid.....	8
An internal error occured.....	8
The blocksize is larger the programmed memsize .....	8
FIFO Buffer overrun. Recording stopped ! .....	8
Synchronisation of Timestamp to external Clock failed.....	8
FIFO mode is only possible up to a sum frequency of 125 MHz. ....	8
No Spectrum PCI board found in the system. Please check installation of board and driver.....	8
Output channels are not to be allowed as asynchronuou. Please change setup. ....	8
Mixing input and output. Channels of one module must have same direction .....	8
Mixing input and output. Not possible with this board type.....	8
Mixing input and output. Not possible when using FIFO mode (continuous) .....	8
Output channels are not allowed to be asynchronous. Please change them to synchronous.....	9
Singleshot and Continuous mode are only allowed if output is enabled. ....	9

## **General Information**

### **Driver - structure**

This driver for DASYLab is based on the standard Spectrum driver for Windows XP, Windows Vista, Windows 7 and Windows 8. New versions of the standard driver may be downloaded from the internet [www.spectrum-instrumentation.com](http://www.spectrum-instrumentation.com) without any cost. The driver supports the DASYLab versions beginning with 5.0.

The driver consists of a DLL for the selected board.

### **Installation Spectrum driver**

The standard Spectrum driver should be installed first. An installation guide is found in the hardware manual of the specific board. After a driver update, the PC must be rebooted.

### **Installation DASYLab driver**

The DLL files must be copied in the installation directory of DASYLab. When installing from CD, the corresponding setup program must be called. After typing the licence code the DLL is copied to the DASYLab directory.

After starting the program the driver file must be selected. After restarting DASYLab the board could be accessed.

Board installed in the system	Driver to select	Limits of DASYLab driver
M2i.30xx/MI.30xx/MC.30xx/MX.30xx	mi.dll	
M2i.31xx/MI.31xx/MC.31xx/MX.31xx	mi.dll	
M2i.40xx/MI.40xx/MC.40xx/MX.40xx	mi.dll	
MI.45xx/MC.45xx/MX.45xx	mi.dll	
M2i.46xx	mi.dll	
M2i.47xx	mi.dll	Only channel 0 to 7 can be trigger source
M2i.49xx	mi.dll	Differential inputs not supported. Digital inputs only partly supported.
M2i.60xx/MI.60xx/MC.60xx/MX.60xx	mi.dll	
M2i.61xx/MI.61xx/MC.61xx/MX.61xx	mi.dll	
M2i.70xx/MI.70xx/MC.70xx/MX.70xx	mi.dll	
PCI.DIO32	pcidio32.dll	
PCI.248	pci248.dll	
PCI.258	pci248.dll	
PCI.412-10	pci412.dll	
PCI.412-40	pci412.dll	
PAD82a	pad82a.dll	
PAD82b	pad82b.dll	
PAD52	pad52.dll	

## Channels in DASYLab

### Analog Channels

The Ml.60xx/MC.60xx/MX.60xx and the Ml.61xx/MC.61xx/MX.61xx offer up to four analog channels within DASYLab. Depending on the version the analog channels have a resolution of 8 or 14 bit.

### Synchronization

On synchronisation systems the channels are available in DASYLab beginning with the index 0. if different options are installed on the boards, there could be shifting of the channels.

#### Example:

Board 0: M2i.3131, 4 analog channels, option "Timestamp"

Board 1: M2i.3022, 2 analog channels, option "Digital Inputs"

Board 2: M2i.3131, 4 analog channels, option "Timestamp"

Analog In	Board	Digital In	Board	Counter	Board
0	0 channel 0	0	1 digital 0	0	0 TimeStamp 0
1	0 channel 1	1	1 digital 1	1	0 TimeStamp 1
2	0 channel 2	2	1 digital 2	2	0 TimeStamp 2
3	0 channel 3	3	1 digital 3	3	0 TimeStamp 3
4	1 channel 0	4	1 digital 4	4	2 TimeStamp 0
5	1 channel 1	5	1 digital 5	5	2 TimeStamp 1
6	2 channel 0	6	1 digital 6	6	2 TimeStamp 2
7	2 channel 1	7	1 digital 7	7	2 TimeStamp 3
8	2 channel 2				
9	2 channel 3				

### Replay Modes

Due to the fact that DASYLab was originally designed for data acquisition products the capabilities of the output modes are limited when using this board under DASYLab.

Please keep in mind that the driver of this board only supports the synchronous, block orientated output. Asynchronous outputs are not supported by this hardware. If setting up the experiment setup improperly an error message will occur.

### Output with Singleshot and Continous Mode

The output mode is selected in the hardware setup window. The driver supports standard output, singleshot output, continuous output, Multiple Replay and Gated Replay. Multiple Replay and Gated Replay are only available if installed on the board. As DasyLab is doing all driver communication in a block orientated way, one must setup the system carefully to obtain the requested behaviour. Especially the Experiment Setup must be filled up correctly. Please keep in mind that there must be enough blocks generated to fill up the cards on-board memory. The following table explains the different behaviours of the board when setting the experiment and the hardware setup

Experiment Setup		Hardware Setup		Description
Block Size	Output Buffer	Memory Size	Mode	
32k	Fill Once	32k	Singleshot	Memory is filled and replayed once, afterwards DASYLab stops.
32k	Fill Once	32k	Continuous	Memory is filled and replayed continuously until user stops the output.
32k	Fill Once	128k	Any mode	Only the first 32k of memory is filled afterwards DASYLab stops to generate data and the board is never started.
32k	Cont Refill	64k	Singleshot	After each second block that has been generated by DASYLab the board is started and outputs the memory. Afterwards the board stops automatically and is filled up with the next two blocks of memory and again started. This continues until the user stops the output.
32k	Cont Refill	64k	Continuous	After the second block that has been generated by DASYLab the board is started and outputs the memory in a continuous loop. Meanwhile DASYLab carries on with data generation and after a short time an error message will occur „Output is blocked in Module xxx“. The output in hardware still continuous until the user stops the hardware.

### FIFO Output

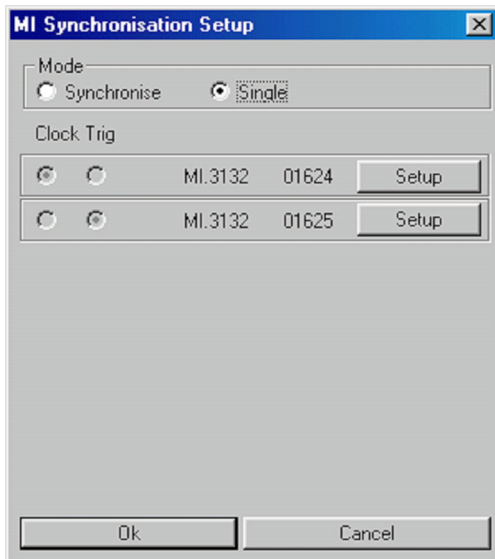
It is not possible under DASYLab to select whether output should run continuously in FIFO mode or in single series. Therefore the FIFO mode of the board is not supported.

### Setup the hardware

The following chapters show how the hardware setup is done under DASLab. For further details on the different settings one must have a look in the hardware manual that has been delivered together with the board.

## Synchronization

The synchronisation window is only available if more than one Spectrum board is used in the system. This window defines whether the boards are running independently or synchronously. Trigger master, clock master and board enable are also set in this window. Details are found in the hardware manual.



### Mode

In Single mode all boards are running independently. If Synchronise is selected, Clock and Trigger are synchronized.

### Clock

If the boards are running synchronized, select the clock master board with this radio button. Depending on the hardware configuration when using cards with different maximum sampling speeds it can be that single cards are not able to be clock master. These cards are then grayed.

### Trig

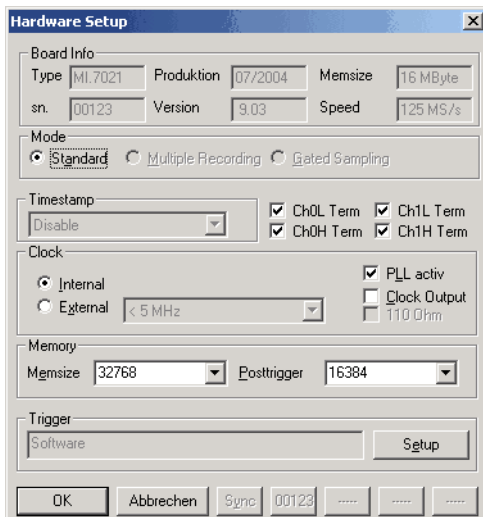
For MI/MC/MX cards inhere the trigger master board is selected for the synchronisation. M2i cards automatically have an OR/AND combined trigger and all cards are selected for trigger detection.

### Setup

The setup window for this board is called. See below for the settings that could be made there.

## Board Setup

If only one board is installed in the system, all setup is done in this window. If several boards are installed, one setup window is available for every installed board.



### Board Info

Board information of the currently selected board from the on-board EEPROM is shown here. You'll find the type, serial number, production date, hardware version, installed memory size and speed here.

### Mode

Select the recording mode for the board. The modes are explained in detail in the hardware manual. Depending on the selected mode some of the other settings may change also.

### Timestamp

If Timestamp is installed on the board, the timestamp mode could be selected here.

### Termination

This part is only visible when using a digital I/O board. Each 16 bit input channel of the digital i/o board can be terminated against ground with 110 Ohms by activating one of the checkboxes.

### Clock-Mode

If board is running in Single mode or as a clock master, the clock source could be selected with the radio button. The external clock range must be selected in external clock mode. See hardware manual for details.

### Clock-PLL

PLL is used for clock generation. If deactivated the internal quartz clock is used

### Clock Output

Activates internal clock output to connector.

### Clock 50/110 Ohm

Activates the clock input termination. Only available if external clock is selected.

### Memory

Memsize and Posttrigger value for standard mode. The memsize must be at least as large as the DASYLab block size.

**Trigger**

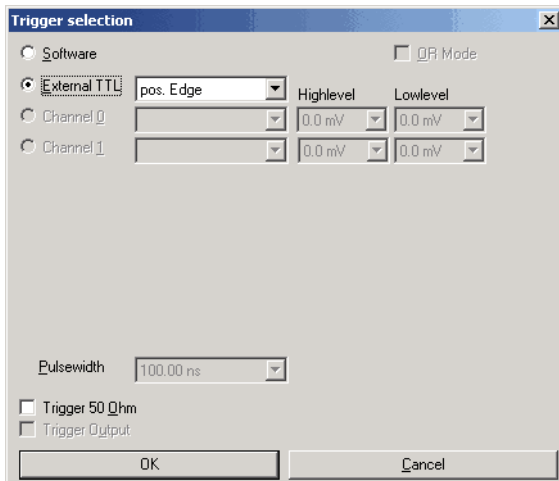
Start the trigger window if board is running in Single mode or as a trigger master

**Sync**

Call the synchronisation window to set up the synchronization. The synchronization window itself is explained in the chapter before.

**Serial number**

These buttons select the board setup of the particular board. With the buttons at the bottom it is possible to switch between the setup screens of the different boards.

**Trigger Setup**

This window defines the used trigger. The trigger setup is called directly from the setup window of the board. Settings that are not available at the moment are disabled. The selected trigger mode is used for the next acquisition or generation and is also used for Multiple Replay or Gated Replay mode if one of these options is installed and activated on your board.

**Software**

Software trigger will start the board immediately without waiting for a trigger event.

**External TTL**

External TTL waits for a TTL signal on the trigger connector. There are several different external trigger modes selectable.

**50 Ohm**

When activated the external trigger input is terminated with 50 Ohm against ground. Only available if external trigger is selected.

**Trigger Output**

Enables the trigger signal output of an internally recognized modul trigger.

**Analog output, offset and filter**

The analog output boards are using the possibilities of DASyLab to generate the output level. The output level that is generated within DASyLab is directly replayed on the hardware connector. Please keep in mind the hardware limitation of  $\pm 3$  V. Signal levels beyond this range are cutted automatically. The output filters are fixed to filter 1.

## **DASYLab messages**

### **Error messages**

This list of error messages explains all errors that could occur when using the Spectrum boards with DASYLab. Not all of these error messages are relevant for all boards.

#### **Please use the DrvCfg Utility...**

When using Windows NT, Windows 2000 or Windows XP ISA boards are installed using the DrvCfg utility. If this error message is shown this board is not matching the loaded driver. Either DASYLab has loaded the wrong driver or the board was not set-up correctly under Windows NT. Please have a look at the hardware manual for a detailed description.

#### **The Samplerate (Frequency) is not valid...**

The samplerate is not in the valid range. Please compare the selected value with the allowed values from the hardware description. The samplerate could only be set to even divider from the maximal possible samplerate. No other settings are allowed.

#### **An internal error occurred...**

This message is shown if an internal error occurred in the driver. Please document the values shown in the error message as well as all other settings and the action that was made before this error occurs. Send this information to the developer of the driver to get an error free version.

#### **The blocksize is larger the programmed memsize**

The block size defined in DASYLab for data transfer is larger than the programmed memory size on the board. Either the memory size on the board must be increased or the block size in DASYLab must be decreased. A recording with the given parameters is not useful.

#### **FIFO Buffer overrun. Recording stopped !**

The internal FIFO buffer of the board or the FIFO buffer of the driver overruns because DASYLab could not process the data fast enough. Recording has been stopped. Start recording again with a slower samplerate or minimise the number of modules that process the data.

#### **Synchronisation of Timestamp to external Clock failed.**

The synchronisation to the external seconds signal of the radio clock did not work. Perhaps the connection is interrupted. If no radio clock is installed, please use another timestamp mode.

#### **FIFO mode is only possible up to a sum frequency of 125 MHz.**

The sum frequency of all activated channels is higher than 125 MHz. FIFO mode could only work up to a sum frequency of 250 MB/s (125 MHz). Deactivate some channels or select a lower samplerate.

#### **No Spectrum PCI board found in the system. Please check installation of board and driver.**

No Spectrum board was found in the system. Please check whether the board is installed properly in the system and whether the driver of the operating system was loaded correctly.

#### **Output channels are not to be allowed as asynchronous. Please change setup.**

This board could only make a data output that is synchronously with the data acquisition. An asynchronous output is not possible. Please change the experiment setup to have synchronous outputs.

#### **Mixing input and output. Channels of one module must have same direction**

Due to hardware limitations all channels on one module must be programmed in the same direction. Please change the setup and use other channels to perform the desired task.

#### **Mixing input and output. Not possible with this board type**

This hardware type doesn't allow to mix input channels and output channels.

#### **Mixing input and output. Not possible when using FIFO mode (continuous)**

It is not possible to use FIFO mode at the same time for output and for data acquisition. Please change the acquisition mode in the experiment setup.



**Output channels are not allowed to be asynchronous. Please change them to synchronous.**

The output channels are synchronous fast channels. Therefore the output mode is not allowed to be set to asynchronous mode. Please change the setting before proceeding.

**Singleshot and Continuous mode are only allowed if output is enabled.**

The both modes singleshot and continuous are pure output modes. Therefore these modes can only be used if the board is used as an output mode. They cannot be used with acquisition mode or mixed mode.