LVVI

LabVIEW VI's for DAQ systems of bmcm

Measurement & Control.
With LabVIEW™ VI's.

Acquisition and processing of measurement data with LabVIEW™: BMC Messsysteme GmbH introduces LVVI, a collection of VI's (Virtual Instruments) allowing the use of data acquisition systems and measuring cards of bmcm with
LabVIEW™ 2009 (32-bit version).

LabVIEW™.
Graphical Programming System.

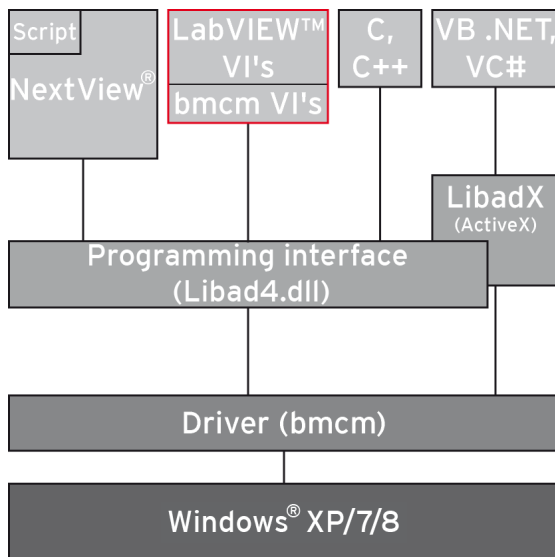The software LabVIEW™ of National Instruments widely-used in measurement technology uses a graphical programming language ("G") based on the data flow model. The VI's serve as function blocks or

Functional diagram

(sub)routines. The data flow is defined by connecting the VI's with wires.

LIBAD4.DLL
Programming Interface.

The VI's are based on the programming interface LIBAD4 of bmcm. Being the connection between LVVI and the bmcm data acquisition hardware it provides functions and data formats, which can be called and processed by the VI's. The DLL is automatically installed together with LVVI.

Measurement Hardware.

The LabVIEW™ VI's are provided for all USB, PCI(e) and LAN data acquisition systems of bmcm that are supported by the LIBAD4. Of course, this comprises the currently available DAQ hardware of bmcm.

Windows®. That's it.

The VI's can be used on Windows® XP/7/8/10. They are available on the homepage of bmcm to download for free.

Programming Examples.
How to Do it.

Various programming examples demonstrating the integration of the bmcm LabVIEW™ VI's provide support. When installing LVVI, the examples will also be included.

1 Start-up procedure

All available software and documentation for the LabVIEW™ VI's are located on www.bmcm.de/lvvi-en under **LABVIEW - Virtual Instruments.**
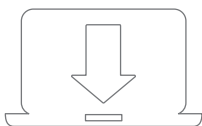
1. Step: Installation device driver

Install the latest driver package in order to use LabVIEW™ VI's. You will find the package on www.bmcm.de/lvvi-en under **LABVIEW - Virtual Instruments.** Open the manual device drivers on www.bmcm.de/man-driver for more information.
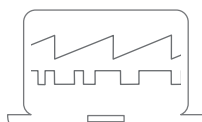
2a. Step: Measuring with NextView

To be able to use NextView, you just need to download and install the latest version of NextView on www.nextview.de/download. In case you did not buy NextView, request a free of charge trial version when first starting NextView. Find more information about NextView and its installation on www.nextview.de or in the manual on www.bmcm.de/man-nextview.

2b. Step: Measuring with API

In case you want to use the measurement device without NextView, you need to download and install the free of charge programming interface LIBAD4. You can find this on www.bmcm.de/libad-en under **LIBAD - Programming Interface (API)**, too. Find more information on www.bmcm.de/libad-en or directly in the manual www.bmcm.de/man-libad.

1.1 Installation

Start the setup program "LVVI" on the product page of the "Software Collection" CD for your device. During installation, you will be prompted to choose the desired program group to open the programming examples of the VI's via the Windows® Start menu, and the directory path, in which the VI's are to be installed.

After successful installation and if using default settings, the VI's and the programming examples together with the relevant documentation will be available as follows:
- Windows® Start Menu: All Programs / BMC Messsysteme VI's 2009
- Windows® Explorer: C:\Program Files\BMC Messsysteme\LabView 2009 VI's\BMC Messsysteme VI's

1.1 Integration in LabVIEW™

We recommend to copy the folder "BMC Messsysteme VI's" containing the VI's and the programming examples into the directory "user.lib" (Program Files/National Instruments/LabVIEW 2009/user.lib).
In LabVIEW™, the bmcm VI's, programming examples and control elements are directly available now in the "User Libraries" of the function palette of a block diagram or in the "User Controls" of the control palette of a front panel.
If the icon "BMC Messsysteme GmbH" is clicked, they will be listed to be integrated in the block diagram or the front panel.
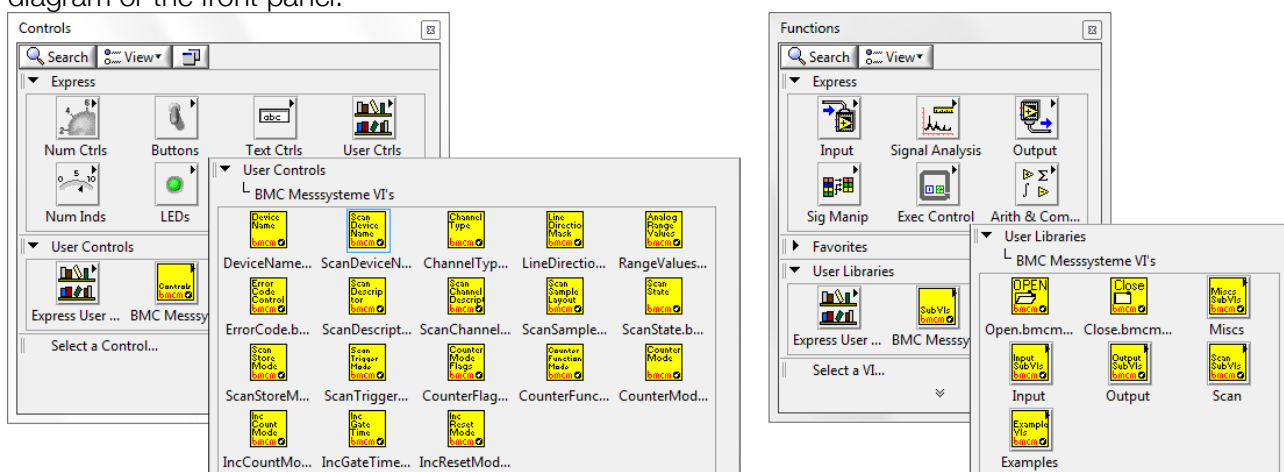
In a short overview, the context-sensitive help (open in the "Help" menu) demonstrates the use of the VI's, if the mouse pointer is moved over a VI icon in the block diagram. Further information is provided by the LIBAD4 help, which can be opened via the link "Detailed help" in the window of the "Context Help".
In addition, the LIBAD4 programming guide (PDF) is installed in the same directory as the bmcm VI's. All VI's mentioned in the following provide an error input and an error output. If an error occurs in one of the SubVI's, the error code of the LIBAD4 will be returned.

2 Quickstart

Measurement hardware of bmcm must be opened with **`Open.bmcm.vi`** and be closed with **`Close.bmcm.vi`** always. The bmcm VI's communicating with measurement hardware need the *DeviceHandle* required by **`Open.bmcm.vi`**.

The following example demonstrates in a simple way how to read an analog input value of a DAQ system. The device name, the range number and the channel number have to be entered. This device-specific information is provided in the chapter "Data acquisition systems" of the LIBAD4 documentation, which is open via the link "Detailed help" of the context-sensitive help (also see chapter 3).
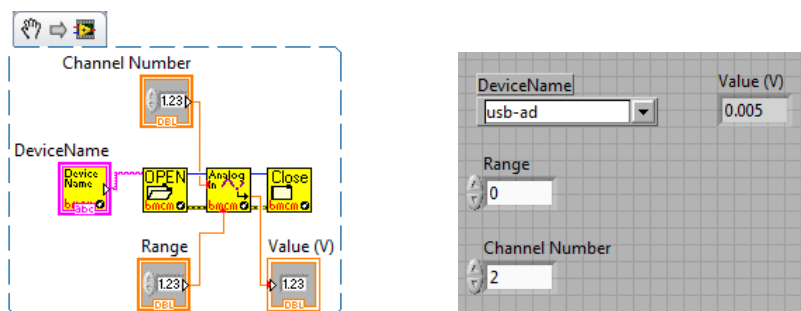
- **To get access to the bmcm measurement hardware, the device driver must have been installed. Driver package and installation manual are provided on the "Software Collection" CD.**

- **The VI's have been created with LabVIEW™ 2009 and can only be used with a 32-bit version. They have not been tested with any earlier or later versions so that problems with other versions are not known.**

- **If using an older LabVIEW™ version, install the "LabVIEW™ 30-Day Trial" of the version 2009 and ported open the bmcm VI's. Choose "Save for Previous Version…" to use them with an older version.**

3 Supported bmcm Measurement Hardware

The bmcm measurement hardware listed below is supported by the LabVIEW™ VI's. The device name is the name used in the VI's to open the hardware.

DAQ System	Device Name	DAQ System	Device Name
iM-AD25(a), iM3250(T), AMS42/84-LAN	`im:<IP-Adresse>`	PCIe-BASE, PCI-BASEII, PCI-PIO, PCI-BASE300/1000	`pcibase`
LAN-AD16f, LAN-AD16fx AMS42/84-LAN16f(x)	`lanbase:<IP-Adr.>`	USB-AD16f, AMS42/84-USB	`usbbase`
meM-AD	`memadusb`	USB-AD14f	`usbad14f`
meM-ADDA	`memaddausb`	USB-AD12f	`usbad12f`
meM-ADf	`memadfusb`	USB-AD	`usb-ad`
meM-ADfo	`memadfpusb`	USB-OI16	`usb-oi16`
meM-PIO, meM-PIO-OEM	`mempiousb`	USB-PIO, USB-PIO-OEM	`usb-pio`

- **If using a DAQ system of the iM or LAN series, please make sure to enter the IP address of relevant device (e.g. `lanbase:192.168.1.1` opens the LAN device with the IP address 192.168.1.1).**
- **By entering the serial number with the device name, you can open several devices (PCI(e), USB) of the same type in parallel (e.g. `usb-ad:@123` opens the USB-AD with the serial number 123).**
- **For further device information (e.g. channels, measuring ranges and constants), see chapter "Data acquisition systems" of the LIBAD4 manual, which is installed in the same directory as the VI's.**

4   Programming Examples

The programming examples demonstrate basic applications of the bmcm LabVIEW™ VI's. They can be opened via the Windows® Start Menu in the defined program group in the folder "Examples".

Name (*.example.bmcm.vi)	Description
`AnalogIn`	retrieves a measuring value as float every 100msec and shows them in a graphic display; device, channel number and range number must be entered
`AnalogOut`	sets or resets the analog output of a bmcm DAQ system; the output value is either entered numerically or by means of a slider, device and channel number must be selected
`DeviceInfo`	shows the key data of the selected DAQ system, such as product name, serial number, number of channels, firmware version etc.
`DigitalIO`	sets digital port A of the selected device to input and digital port B to output; the received values of port A are represented in a graphic display, the output of port B can be turned on or off
`FindRange`	returns the measuring range constant (RangeNumber) of the suitable measuring range encompassing the specified maximum and minimum; in addition to the device, the channel type has to be specified also
`MDA2Generator`	demonstrates how to use an MDA16-2i/4i/8i analog output generator
`MemInc`	shows how to use the meM-INC; the pulses at the counter input A are graphically represented, the counter can be reset, in frequency mode, the number of pulses relating to the selected gate is displayed
`Scan`	records two channels for the specified time period and returns the measuring values; setting to be made are e.g. device name, scan duration, sampling rate, channel type and number, measuring range number
`ScanContinuous`	records two channels until the STOP key is pressed; setting to be made are e.g. device name, sampling rate, channel type and number, measuring range number

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. Rev. 4.6 **02/10/2020**

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