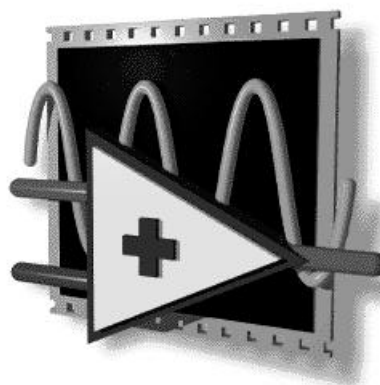


LabView™
Virtual Instrument Libraries
for
C-842 DC Motor Controllers
under Windows 95/98



National Instruments
LabVIEW™ 5.1

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1. Introduction
































C-842 DC-Motor Controllers are 4-channel, precision motion controllers for DC-motors using incremental encoder feedback. The device offers ISA bus communication and can be operated under any PC operating system.

This motor control chipset has a command set which enables the user to instruct the controller to perform typical motor control tasks. The user sends the command and associated parameters as a series of data bytes to the PC I/O address.

Details and format of commands are described in User Manuals MS 45E and MS 46E.

The C-842 LabView driver vi library is provided to shield the user from the complexity of programming the C-842 directly in native mode. Direct, native mode requires detailed knowledge of the C-842 handshaking and data transfer modes. The LabView drivers provide a simple user interface.

Most commands can be accessed via VIs that can be implemented in your LV program. Connecting the icons with the desired parameter values and function attributes, LV applications using the C-842 are very easy to accomplish.

-  C842_autodetect.vi
-  C842_AutoFindRef.vi
-  C842_Axis_Installed.vi
-  C842_Axis_select.vi
-  C842_Board_installed.vi
-  C842_Example1.vi
-  C842_Example2.vi
-  C842_get_AxisStatus.vi
-  C842_get_BoardStatus.vi
-  C842_get_DIN.vi
-  C842_get_Limit.vi
-  C842_get_LimitAxis.vi
-  C842_get_pos.vi
-  C842_get_PosErr.vi
-  C842_get_RefSignal.vi
-  C842_InitAxis.vi
-  C842_InitBoard.vi
-  C842_InitStage.vi
-  C842_MoveA.vi
-  C842_MoveR.vi
-  C842_moving.vi
-  C842_set_acc.vi
-  C842_set_amplifier.vi
-  C842_set_pid.vi
-  C842_set_pos.vi
-  C842_set_vel.vi
-  C842_SetBaseAddress.vi
-  C842_translate.vi
-  C842_waitStop.vi
-  for Win95-98.txt
-  QFLW500.dll

2. vi Overview

LabView Driver Library Version: 6.00

This vi collection is based on the library QFLW500.DLL for Windows 95/98.

VI Name	Function
Board and Axis Initialization	
C842_SetBaseAddress.vi	selects one board if more than one is installed in the PC. Possible addresses are 0x210, 0x214, 0x218, 0x21C
C842_Board_installed.vi	checks whether a C-842 is installed with the active address
C842_Axis_installed.vi	returns the number of axes available on the board
C842_InitBoard.vi	initializes the board by setting the board function register
C842_InitAxis.vi	initializes the specified axis with default motion parameters
C842_InitStage.vi	This vi can be used alternatively to the C842_InitAxis.vi.
C842_Axis_select.vi	makes one axis active. This vi is normally not used because all vis with axis input terminals have their own axis select function.
C842_autodetect.vi	reads the current setting of the travel limit sensor lines and activates them.
General Communication	
C842_translate.vi	This vi offers the general access to more than 100 QFL sub functions. With the translate function you can set parameters, define trajectories and start moves. See MS 45E user manual for a detailed function reference.
Perform Moves	
C842_MoveA.vi	move to an absolute position
C842_MoveR.vi	move relative a number of counts
C842_moving.vi	determines the current moving status
C842_waitStop.vi	waits until the motor has terminated a move. The condition is the end of trajectory flag.
C842_AutoFindRef.vi	starts a search for the reference position with the option to start into the right direction towards the sensor.
Set Parameters	
C842_set_pid.vi	set p-i-d terms. The integration limit is set to 2000 as default when calling this vi.

C842_set_vel.vi	sets the velocity for moves
C842_set_acc.vi	sets the acceleration in the same units as used by WinMove, that is 2500 c/s/s
C842_set_amplifier.vi	select the amplifier output mode, PWM or analog
C842_set_pos.vi	assigns a new position value to the current position
Limit and Reference Signal Handling	
C842_autodetect.vi	determines the current limit sensor levels and defines the limit sense register
C842_get_Limit.vi	reads the current limit status of all axes
C842_get_LimitAxis.vi	reads the current limit status of the indicated axis
C842_get_RefSignal	reads the current state of the reference line
Digital I/O	
C842_get_DIN.vi	reads the current input signals
C842_set_DOUT.vi	outputs a voltage pattern at the 8 digital output lines
Reporting	
C842_get_AxisStatus.vi	reads the current axis status word
C842_get_boardStatus.vi	reads the board status register
C842_get_pos.vi	reads the current motor position in counts
C842_get_posErr	reads the current position error in counts

3. Programming C-842 using Virtual Instruments

The first step in a motion control program is to initialize the C-842 and to set the servo control parameters. These steps have to be performed every time the PC is powered up. Afterwards these values are kept stored until the board is reset or the PC is shut down.

Sequence of vis to be called for normal setup:

C842_SetBaseAddress only if more than one C-842 is installed or the address is not 0x210.

C842_Board_Installed check whether a C-842 is installed at the specified address.

C842_InitBoard Initialize the board with the parameter 9.

C842_InitStage Initialize one or multiple axes for a class of stages. Use the mode (class) parameter for these mechanics:

- 1 : M-22x DC-Mikes
- 2: M-227
- 3 : C-136 and standard .DG stages
- 4 : M-5x1.PD stages
- 5 : M-5x1.DD stages with brake ON
- 15 : M-5x1.DD stages with brake OFF

C842_MoveR make a move

3.1. Synchronization of moves

The C-842 maintains an open communications channel during move execution. This means that it will accept new commands while a move is in progress. This is good in most cases because it enables you to change velocity and PID filters 'on the fly', for example. However, in some cases this situation may produce unexpected results. If you send two positioning commands one after the other, the first position will never be attained. It will simply go to the second position. This is because the C-842 allows position change 'on the fly'. To prevent this situation, you must explicitly wait for the first move to complete before initiating the second one. The sequence of VI execution, for a relative move, is:

MoveR.vi

waitStop.vi

MoveR.vi

3.2. Programming Example

Example of a vi sequence that checks the availability of a board, initializes it and then initializes for axis 1 the stage of class 3 (standard stage with gear head and 3-Watt motor). Finally, the last vi starts a move.

