MotionMaster 3000

LabVIEW 3.01 for Windows

Motion Control Virtual Instruments

IEEE-488 Version

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Introduction

The MotionMaster 3000 is a command driven system. The command set consists of a series of two letter ASCII characters which direct the motion of each axis, set operating parameters, and obtain real-time system status. The two letter command is usually preceded by an axis designator to direct the command to that axis. The normal axis designations are 1,2,3, and 4. In addition, the command may be followed by a numerical parameter which specifies the desired value for the operation, for example, the velocity, the displacement, etc.

Two low level drivers are provided, one to send commands to the MotionMaster 3000 and one to receive responses from the MotionMaster 3000. The are named SendCommand.vi and ReadResponse.vi, respectively. In addition to these two, we are also supplying a collection of higher level virtual instruments which enable you to perform typical motion control functions, for example, set velocity, set acceleration, set displacement, initiate move, obtain system status. The high level virtual instruments simply call on the low level SendCmd.vi to send the appropriate command to the MotionMaster 3000 to carry out the desired function. They also call on the low level ReadResponse.vi to obtain a response from the MotionMaster 3000 after a response-type command is sent to the MotionMaster 3000.

MotionMaster 3000 Virtual Instruments Description

All the virtual instruments need the MotionMaster 3000 IEEE-488 Address as input. The address is in <u>string constant</u> format.

Some of the VI's also take an axis designator as input. The axis range is 1 to 4.

Some of the VI's also take a numerical parameter as input. For example, the velocity value, the displacement magnitude, etc.

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MotionMaster 3000 Virtual Instruments Quick Startup

This section will describe the basic requirements to quickly create motion control with the MotionMaster 3000. The procedure will describe the steps for DC motors and stepping motors.

The first step is to determine the motor module configuration on the MotionMaster 3000 carrier card. Run the MM3000 Tell Configuration VI. Note which axis is DC, which is stepper, and which is not used.

For DC Motor axes:

Create a sequence procedure which executes the following VI in this order:

Sequence 0:   MM3000 SetDCFilterParms

Set Axis to the desired axis for motion.
If the DC motor is connected directly to the fanout box (flat, gray box) then set KP to 1500, set KD=KI=IL=0 and set FE=1000.

If the DC motor is connected to a motor drivers, for example, the MD4, then set KP to 100, set KD=KI=IL=0 and set FE=1000.

Sequence 1:   MM3000 SetSlewVelocity and MM3000 SetAcceleration

Set Axis to the desired axis for motion.
For small DC motor (i.e. KP=1500), set Velocity = 1000, Acceleration = 50000.

For the bigger DC motors (i.e. KP=100), set Velocity = 50000, Acceleration = 100000.

Sequence 2:   MM3000 Position Relative

Set Axis to the desired axis for motion.
Set Displacement = 10000.
Observe motion at the execution of the VI.

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For Stepping Motor axes:

Create a sequence procedure which executes the following VI in this order:

Sequence 0:   MM3000 SetSlewVelocity and MM3000 SetAcceleration

                    Set Axis to the desired axis for motion.
                    Set Velocity = 20000, Set Acceleration = 75000.

Sequence 1:   MM3000 Position Relative

                    Set Axis to the desired axis for motion.
                    Set Displacement = 10000.
                    Observe motion at the execution of the VI.

Once you have successfully created motion control with the above procedures, experiment with the other VI's on your diskette and refer to the User's Manual for a complete description of the MotionMaster 3000 and it's command set.

MM3000 DCMotionProfile VI

The MM3000 DCMotionProfile.vi helps you to obtain the best response from your DC motor driven system. The DC motor operates on the principle of a closed loop servo system. The servo loop has three parameters which must be adjusted to obtain the best response. The MM3000 DCMotionProfile enables you to input varying filters parameters (KD, KI, and IL) and then shows graphically the response of your system as compared to the ideal response. Please refer to Chapter 3 of the User's Manual for a description of servo system, the tuning procedure, and recommended starting values for your type of DC motor.

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