

CyberMotion Functions Library

The CyberMotion library is written in C, and supports the Microsoft Visual C++ development environment. It contains high-level procedures that take advantage of the PMD C-Motion low-level functions.

This library tremendously simplifies the development of user applications. It frees users from having to know the PMD motion processor functions in depth, which are tedious and time-consuming to work with. The library routines can be used in the Windows or DOS environments, and allow the system designer to focus on the graphical user interface. It provides a full set of functions to develop various controlled mechanical systems.

The CyberMotion routines are organized by categories. They perform the floating point calculations necessary for advanced motion of mechanical systems, set various system variables, and provide information about system behavior.

The library is intended to support both the MC1xxx and MC2xxx series of PMD motion processors. A few routines, however, support only one of the processors, since they are not needed for the other.

Initialization Procedures

ResetBoard	Hardware reset.
InitializeMotion	Software system initialization.

System Configuration

SetEncoderCountsPerRev	Set a number of incremental quadrature encoder counts per revolution.
GetEncoderCountsPerRev	Get a number of incremental quadrature encoder counts per revolution.
SetUnits	Set the system of units – English, metric or encoder counts.
GetUnits	Get the currently defined system of units.
UnitsRatio	Define a ratio between encoder counts and linear units.
SetUnitsToCounts	Set a ratio between encoder counts and linear units.
GetUnitsToCounts	Get a ratio between encoder counts and linear units.
CountsVelocity	Download encoder counts velocity calculated from linear units.
CountsAccel	Download encoder counts acceleration calculated from linear units.
SetPitch	Set a pitch or mechanical gear ratio between rotary and linear motion.
GetPitch	Get the currently defined pitch or mechanical gear ratio.

Controller Status

GetChipsetStatus	Get the current axis status.
ClearChipsetStatus	Clear the current axis status.

Motion Status

InMotion	Check if an axis is still running.
AllInMotion	Check if all axes are still running.

Servo Filter Parameters

SetFilterParams	Set servo filter parameters.
GetFilterParams	Get servo filter parameters.
DownloadFilterGains	Download servo filter coefficients to the motion controller board.
UploadFilterGains	Upload servo filter coefficients from the motion controller board.

Filter Feedback Loop

CloseAxisLoop	Clear the motion error and close the feedback loop.
OpenAxisLoop	Open the feedback loop.
ServoOn	Clear the motion error and close the feedback loop for all axes.
ServoOff	Open the feedback loop for all axes.

Axes Control

GetAxesQty	Get a number of axes from the controller board.
SetAxesQty	Set the current number of axes.
GetNewAxesQty	Get the current number of axes.
Axis	Change an axis type from a character to a number.
CharAxis	Change an axis type from a number to a character.

MC1xxx series only

GetCurrentAxis Get the current axis number from the controller.
SetAxis Set the controller's current axis defined by a character.
IntAxis Set the controller's current axis defined by a number.

MC2xxx series only

GetPMDAxis Change an axis type from a number to the C-Motion type.
GetPMDAxisHandle Change an axis type from a number to the C-Motion axis handle.
GetCharAxisHandle Change an axis type from a character to the C-Motion axis handle.

Position Control

AxisActICountsPos Upload actual encoder counts position.
AxisActIPos Upload actual linear position.
AxisActICountsPosError Upload the actual encoder counts position error.
AxisActIPosError Upload the actual linear position error.
ZeroAxis Zero the position, velocity, acceleration and following error.
ZeroAllAxes Zero the position, velocity, acceleration and following error of all axes.

Trajectory Control

SetVelocity Set linear velocity.
GetVelocity Get linear velocity.
SetAcceleration Set linear acceleration.
GetAcceleration Get linear acceleration.

Motion Profile Mode

SetProfileMode Set the motion profile mode.
GetProfileMode Get the motion profile mode.
SynchronizeChipsetProfile Clear the axis following error.
DownloadProfileMode Download the motion profile mode to the controller.

Profiled Moves

MoveToPositionIntrpt Begin a profiled move in counts ended by the interrupt signal.
MoveToPositionPoll Begin a profiled move in counts. Loops while in motion.
MoveOneAxis Begin a profiled move in linear units ended by the interrupt signal.
MoveAxes Begin a profiled move of all axes.
ExecTrapezoidalMove Perform a trapezoidal profile move.
MoveEncoderAxis Move an axis to test the encoder feedback.

Interpolated Moves

CircularIntrpl Execute 2-axis circular interpolated move.
LinearIntrpl Execute 2 axis linear interpolated move.

Jog Moves Control

CountsJogVelocity Download encoder counts jog velocity calculated from linear units.
SetJogContinuous Set the jog mode as non- or continuous.
GetJogContinuous Returns TRUE if the jog mode is continuous.
SetJogBy Set the jog mode as non- or incremental.
GetJogBy Returns TRUE if the jog mode is incremental.
SetJogDestination Set a jog position value.
GetJogDestination Get a jog position value.
SetJogIncrement Set a jog increment value.
GetJogIncrement Get a jog increment value.
SetJogSpeed Set a jog feed rate value.
GetJogSpeed Get a jog feed rate value.
SetJogSpeedOverride Set a percentage change of the jog feed rate value.
GetJogSpeedOverride Get a percentage change of the jog feed rate value.

Jog Moves

STARTJogging Begin a jog move in the given direction.
STOPJogging Stop a jog move.

Stop Motion

CloseMotion Stop the motion, shut off motor outputs and zero motion parameters.
AxisAbruptStop Bring an axis to the immediate stop.

Motion Errors

GetFollowingError Test if an axis move caused the position error.
SetMotionErrorFlag Set the motion error flag for all axes.
GetMotionErrorFlag Get the state of the motion error flag.

Motor Output

GetMotorType Get a motor type controlled by the motion controller.

MC1xxx series only

SetOutputMC1 Send the motor output signal mode to the controller board.
SetOutSignalModeMC1 Set the motor output signal mode.
GetOutSignalModeMC1 Get the motor output signal mode.

MC2xxx series only

SetOutputMC2 Send the motor output signal mode to the controller board.
SetOutSignalModeMC2 Set the motor output signal mode.
GetOutSignalModeMC2 Get the motor output signal mode.

Software Limits

SetSoftLimitMinus Set the negative software position limit.
GetSoftLimitMinus Get the negative software position limit.
SetSoftLimitPlus Set the positive software position limit.
GetSoftLimitPlus Get the positive software position limit.
SetSoftOvertravelMinus Set the logical state of the negative software position limit.
GetSoftOvertravelMinus Get the logical state of the negative software position limit.
SetSoftOvertravelPlus Set the logical state of the positive software position limit.
GetSoftOvertravelPlus Get the logical state of the positive software position limit.
SoftLimits Check if an axis remains within the software limits.

Hardware Limits

SetHighHardLmtMinus Set the active state of the negative hardware limit switch.
GetHighHardLmtMinus Get the active state of the negative hardware limit switch.
SetHighHardLmtPlus Set the active state of the positive hardware limit switch.
GetHighHardLmtPlus Get the active state of the positive hardware limit switch.
SetLimitsSense Set the active state of the hardware limit switches for all axes.
GetLimitsSense Get the active state of the hardware limit switches for all axes.
ActivateLimitSwitches Activate or deactivate axis hardware limit switches.
SetLimitOn Activate or deactivate all axes hardware limit switches.
GetLimitOn Get the limit switches state from the sensing mechanism.
ResetHrdLimits Reset the active state of the hardware limit switches.

Home Inputs

SetHomingInPlus Define a direction of the homing move for the current homing axis.
GetHomingInPlus Returns TRUE when an axis is homing in the positive direction.
SetHomeSwitch Set the homing input to a limit switch or home switch.
GetHomeSwitch Get a switch type used as the homing input.

Homing Parameters

SetHomeOffset Set offset position from the home position.
GetHomeOffset Get offset position from the home position.
SetHomingSpeed Set homing move speed.
GetHomingSpeed Get homing move speed.
SetOffsetSpeed Set offset move speed.
GetOffsetSpeed Get offset move speed.

Homing Procedure

GetHomingMode Check if the system is performing the homing procedure.
HomeAxis Set an axis as the currently homing axis.

SetAxesHomed Set TRUE when the axis homing process is finished.
GetAxesHomed Check if all axes finished the homing procedure.

Counter/Timer

MilisecDelay Define a delay in milliseconds.
GetChipsetSampleTime Upload the servo filter sample rate from the controller.
SetChipsetSampleTime Download the servo filter sample rate to the controller.

CNC Functions

GetAbsolutePosition Get absolute position.
TurnSpindleOff Turn the spindle motion off.
SetSpindleSpeed Set a spindle rpm value.
GetOffset Get offset registers values.
SetOffsetIndex Set an index of the D Registers array.
SetDRegisters Set D Registers values.
GetDRegisters Get D Registers values.
SetToolOffset Set tool offset position.
GetToolOffset Gets tool offset position.
Dwell Dwell for the specified time.

Miscellaneous

SetControllerInstalled Set TRUE if the motion controller board is plugged in.
GetControllerInstalled Returns TRUE if the motion controller board is plugged in.
SetChipsetGen Set the PMD motion processor generation to MC1xxx or MC2xxx.
GetChipsetGen Get the PMD motion processor generation as MC1xxx or MC2xxx.
GetChipsetVersion Get the PMD motion processor version.
GetLibraryVersion Get the CyberMotion library version.

Interrupts

ProcessInterrupts Process the interrupt signal.