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 supports the MC2xxx series of PMD motion processors.

Instructions Summary by Functional Category

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

AxisActlCountsPos	Upload actual encoder counts position.
AxisActlPos	Upload actual linear position.
AxisActlCountsPosError	Upload the actual encoder counts position error.
AxisActlPosError	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.