C-MotionPlus Functions Library

C-MotionPlus library is written in ANSI C/C++ language. It contains low level motion functions that directly communicate with the PMD MC2xxx series of motion processors. The functions are also down compatible with the MC1xxx processor series.

The library routines can be used in MS Windows, DOS or Linux environments. Based on these functions the user can develop a set of sophisticated procedures for an advanced motion system. However, with these functions alone one can already perform basic motion control.

The C-MotionPlus routines are organized by categories. They perform a direct axis motion parameter setup, download and upload servo filter gains, provide motion processor performance status and control many other functions of brush, brushless, stepper and microstepper processor types.

Instructions Summary by Functional Category

Breakpoints and Interrupts

ClearInterrupt	Reset interrupting line
GetBreakpoint	Get breakpoint type
GetBreakpointValue	Get breakpoint comparison value
GetInterruptAxis	Get the axes with pending interrupts
GetInterruptMask	Get interrupt mask
SetBreakpoint	Set breakpoint type
SetBreakpointValue	Set breakpoint comparison value
SetInterruptMask	Set interrupt mask

Commutation

GetCommutationMode	Get the commutation mode
GetNumberPhases	Get the number of phases
GetPhaseAngle	Get current commutation phase angle
GetPhaseCommand	Get the motor output command for a given phase A, B or C
GetPhaseCorrectionMode	Get phase correction mode
GetPhaseCounts	Get number of encoder counts per commutation cycle
GetPhaseInitializeMode	Get phase initialization mode
GetPhaseInitializeTime	Get the time parameters for the algorithmic phase initialization
GetPhaseOffset	Get phase offset value
GetPhasePrescale	Get phasing prescaler
InitializePhase	Perform phase initialization procedure
SetCommutationMode	Set the commutation mode (Hall-based, sinusoidal or microstepping)
SetNumberPhases	Set the number of phases (1, 2 or 3)
SetPhaseAngle	Set current commutation phase angle
SetPhaseCorrectionMode	Set phase correction mode (on or off)
SetPhaseCounts	Set number of encoder counts per commutation cycle
SetPhaseInitializeMode	Set phase initialization method (Hall-based or algorithmic)
SetPhaseInitializeTime	Set the time parameters for algorithmic phase initialization
SetPhaseOffset	Set phase offset value
SetPhasePrescale	Set commutation prescaler mode (enable or disable)

Digital Servo Filter

ClearPositionError	Set position error to 0
GetAutoStopMode	Get auto stop mode
GetDerivative	Get the derivative of the error signal
GetDerivativeTime	Get derivative sampling time
GetIntegral	Get integrated position error value
GetIntegrationLimit	Get integration limit
GetKaff	Get acceleration feedforward gain
GetKd	Get derivative gain
GetKi	Get integral gain
GetKout	Get servo filter output scaler
GetKp	Get proportional gain
GetKvff	Get velocity feedforward gain
GetMotorBias	Get motor output bias
GetMotorLimit	Get motor output limit
GetPositionError	Get actual position error
GetPositionErrorLimit	Get position error limit
SetAutoStopMode	Set auto stop on position error (on or off)
SetDerivativeTime	Set derivative sampling time
SetIntegrationLimit	Set integration limit
SetKaff	Set acceleration feedforward gain
SetKd	Set derivative gain
SetKi	Set integral gain
SetKout	Set servo filter output scaler
SetKp	Set proportional gain
SetKvff	Set velocity feedforward gain
SetMotorBias	Set motor output bias
SetMotorLimit	Set motor output limit
SetPositionErrorLimit	Set maximum position error limit

Encoder

GetActualPosition	Get the actual encoder position
GetActualVelocity	Get the actual encoder velocity
GetCaptureSource	Get capture source
GetCaptureValue	Get current axis position capture value and reset the capture
GetEncoderModulus	Get the full scale range of the parallel-word encoder
GetEncoderSource	Get encoder type
GetEncoderToStepRatio	Get encoder count to step ration
SetActualPosition	Set the actual encoder position
SetCaptureSource	Set capture source (home or index)
SetEncoderModulus	Set the full scale range of the parallel-word encoder
SetEncoderSource	Set encoder type (incremental or 16-bit parallel word)
SetEncoderToStepRatio	Set encoder count to step ratio

External RAM

GetBufferLength	Get the length of a memory buffer
GetBufferReadIndex	Get the buffer read pointer for a particular buffer
GetBufferStart	Get the start location of a memory buffer
GetBufferWriteIndex	Get the buffer write pointer for a particular buffer
ReadBuffer	Read a long word value from a buffer memory location
SetBufferLength	Set the length of a memory buffer
SetBufferReadIndex	Set the buffer read pointer for a particular buffer
SetBufferStart	Set the start location of a memory buffer
SetBufferWriteIndex	Set the buffer write pointer for a particular buffer
WriteBuffer	Write a long word value to a buffer memory location

Motor output

GetCurrentMotorCommand	Read the current motor command value
GetMotorCommand	Read buffered motor output command
GetMotorMode	Get motor loop mode
GetOutputMode	Get output mode
SetMotorCommand	Set direct value to motor output register
SetMotorMode	Set motor loop mode (on or off)
SetOutputMode	Set motor output mode (PWM sign-magnitude, PWM 50% or DAC)

Profile Generation

GetAcceleration	Get acceleration limit
GetCommandedAcceleration	Get commanded (instantaneous desired) acceleration
GetCommandedPosition	Get commanded (instantaneous desired) position
GetCommandedVelocity	Get commanded (instantaneous desired) velocity
GetDeceleration	Get deceleration limit
GetGearMaster	Get electronic gear mode master axis and source
GetGearRatio	Get command electronic gear rate
GetJerk	Get jerk limit
GetPosition	Get destination position
GetProfileMode	Get current profile mode
GetStartVelocity	Get start velocity
GetStop	Get stop command: abrupt, smooth or none
GetVelocity	Get velocity limit
MultiUpdate	Multiple axis immediate parameter update
SetAcceleration	Set acceleration limit
SetDeceleration	Set deceleration limit
SetGearMaster	Set the master axis and source (actual or target-based)
SetGearRatio	Set command electronic gear ratio
SetJerk	Set jerk limit
SetPosition	Set position limit
SetProfileMode	Set profile mode (S-curve, trapezoidal, velocity-contouring or electronic gear)
SetStartVelocity	Set start velocity
SetStop	Set stop command: abrupt, smooth or none
SetVelocity	Set velocity limit
Update	Immediate parameter update

Servo Loop Control

GetAxisMode	Get axis mode
GetLimitSwitchMode	Get limit switch mode
GetMotionCompleteMode	Get the motion complete mode
GetSampleTime	Get servo loop sample time
GetSettleTime	Get the axis-settled time
GetSettleWindow	Get the settle-window boundary value
GetTime	Get current chipset time (number of servo loops)
GetTrackingWindow	Get the tracking window boundary value
SetAxisMode	Set axis operation mode (enabled or disabled)
SetLimitSwitchMode	Set limit switching (on or off)
SetMotionCompleteMode	Set the motion complete mode (actual or target-based)
SetSampleTime	Set servo loop sample time
SetSettleTime	Set the axis settled-time
SetSettleWindow	Set the settle-window boundary
SetTrackingWindow	Set the tracking-window boundary

Status register and AxisOut Indicator

GetActivityStatus	Get activity status
GetAxisOutSource	Get axis out signal monitor source
GetEventStatus	Get event status word
GetSignal	Get the current axis Signal Status register
GetSignalSense	Get the interpretation of the Signal Status bits
ResetEventStatus	Reset bits in event status word
SetAxisOutSource	Set axis out signal monitor source
SetSignalSense	Set the interpretation of the Signal Status bits

Traces

GetTraceCount	Get the number of traced data points
GetTraceMode	Get the trace mode
GetTracePeriod	Get the trace period
GetTraceStart	Get the trace start condition
GetTraceStatus	Get the trace status word
GetTraceStop	Get the trace stop condition
GetTraceVariable	Get a trace variable setting
SetTraceMode	Set the trace mode (rolling or one-time)
SetTracePeriod	Set the trace period
SetTraceStart	Start the trace
SetTraceStop	Stop the trace
SetTraceVariable	Set variable (i.e. data) to be traced

Miscellaneous

GetDiagnosticPortMode	Get the diagnostic port valid instruction mode
GetHostIOError	Get the most recent I/O error mode
GetSerialPort	Read serial-port configuration data
GetVersion	Get chipset software version information
NoOperation	Perform no operation, used to verify communications
ReadIO	Read user defined I/O value
Reset	Reset chipset
SetDiagnosticPortMode	Set the diagnostic port valid instruction mode (limited or full)
SetSerialPort	Set serial-port configuration data
WriteIO	Write user defined I/O value