# SERVOMOTIVE

# MC-1100

# Single Axis PC Based Servo Motion Controller



# Features

- Half-sized expansion card for ISA Bus PCs
- Closed-loop high performance position and velocity control of DC brush, DC brushless and step motors
- Programmable digital compensation filter with a grain, pole and zero
- Programmable sample timer allowing a loop sample time from 64 microseconds to 2.048 milliseconds
- Programmable position and velocity profile control with velocity and acceleration limits
- 24-bit position counter
- Encoder feedback selectable for single or differential inputs
- 20 kHz PWM output, pulse and sign
- Motor commutator for DC brushless or step motors, with programmable phase overlap and phase advance
- Four digital output bits, 2 optically isolated and 2 TTL levels
- Four digital input bits, 2 optically isolated and 2 TTL levels
- High speed interface to PC uses only five registers in PC I/O space
- Register write time 1 microsecond
- Register read time 2.1 microsecond
- Control and Demonstration software provided in C, MCBasic and a menu based point and click "Motion Control Center" interface using Microsoft Windows 3.1 with DLLs

#### **Overview**

The MC-1100 motion controller is an IBM PC/XT/AT (ISA Bus) compatible application board designed around the Hewlett Packard HCTL-1100 motion controller ASIC. The MC-1100 provides one axis of closed loop motion control. The axis has two Position Control modes and two velocity control modes. In addition, the MC-1100 also provides four digital output bits and four digital input bits. Two of each of these are optically isolated, and the other two of each are TTL level.

All that is needed for a one axis closed loop servo system is an ISA Bus PC computer, an MC-1100 with optional cable and connector board, one servo motor power amplifier, one servo motor with incremental optical encoder and a motor power supply. These components and their basic interrelationship is illustrated in Figure 1.

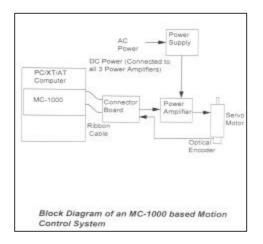
The MC-1100s most attractive feature is its high-speed interface to the PC enabling efficient communications with the PC. The MC-1100 also provides the necessary extras to enable a complete motion control system solution including an industrial quality incremental encoder interface with differential of TTL level inputs and noise filtering, and a generous amount of uncommitted digital I/O to allow sensing limit switches, or controlling amplifier enables, or other user required I/O functions.

#### **Programming the MC-1100**

The MC-1100 controller provides three approaches to user programming, including an MCBasic interpreter, a Windows based point and click menu of motion commands and separate Dynamic Link Libraries (DLL), and a set of "C' programming language source code libraries allowing integration of the MC-1100 motion control commands with a user supplied "C" language compiler to produce user application programs.

### **Graphic Tuning Utility**

Each MC-1100 controller includes graphic tuning software utility providing very simple and easy to use initializing and setup aid.



Block Diagram of the MC-1100 Motion Controller

#### **MC-1100 Control Modes**

The control modes provided by the MC-1100 are the same as MC-3000:Proportional VelocityIntegral VelocityPositionTrapezoidal ProfileInit Mode:Integral Velocity

Direct access to DAC and PWM Output for low level control software applications.

#### **Uncommitted Digital I/O**

4 Digital Inputs: 2 TTL and 2 Optically Isolated

4 Digital Outputs: 2 TM and 2 Optically Isolated

## WINDOWS GUI Setup Utility

The MC-1100 Comes with a Windows 3.1 Based Graphical User Interface (GUI) , and Dynamic Link Libraries (DLLs) to Support User Written Windows Applications.

MC1000 Controller Interface Rev. 1.0		STATUS	
MODE		X Pos = -23014	X Vel = 63216
		DO: 0	DI: 11
Select Mode Position Mode	Stop Motion	COMMAND VALUE EDITOR	
Trapezoid Pos Mode		Command>	Value
Proportional Vel Mode	ACCELEBATION		
Integral Vel Mode	Set Acc/Dec Absolute	Last Command Entered	
Initialization/Idle Mode	Get Acc/Dec Absolute	L	
		OUTPUTS	COMMUTATOR
POSITION	DIGITAL 1/0	Set DAC Out	Align
Set Command Position	Get Digital Inputs	Set PWM Out	Open Loop Comm
Set Final Position	Set Digital Outputs	Set Bipolar DAC	Closed Loop Comm
Get Command Position		Set Unipolar DAC	Set Comm Bing
Get Final Position	STATUS	Set Sign Reverse	Set Comm X
Get Actual Position	Set Status	Get DAC Out	Set Comm Y
Clear Actual Position	Get Status	Get PWM Out	Set Comm Offset
astronomen (	The summary services of	a second a second second	Set Max Advance
VELOCITY	COMPENSATION	MISCELLANEOUS	Set Comm Vel Timer
Set Max Velocity	Set Gain	Reset Axis	Set Comm Count
Set Proportional Vel	Set Pole	Clear Emergency Flags	Set Number of Phases
Set Integral Vel	Set Zero	Quit	Get Comm Ring
Get Max Vel	Set Timer	State and the second second	Get Comm X
Get Proportional Vel	Get Gain	CONFIGURATION	Get Comm Y
Get Integral Vel	Get Pole	Set Base Address	Get Comm Offset
Get Actual Velocity	Get Zero	Set Home Digital Inputs	Get Max Advance

### **General Motion Specifications**

Position Range

24 bits (16, 777, 216 [quadrature counts])

31 – 32\*10 [quadrature counts/sec]

Velocity Range

Acceleration Range	2 – 2000 [quadrature counts/sec2]
Loop Sample Time	64 – 2048 [microseconds]
Maximum Encoder Frequency	312.5 [kHz]
PWM Modulation Frequency	20 kHz

#### **Ordering Information**

The MC-1100 is available with one axes of control standard. Other options include a connector board and cable set for convenient connection of the user signals to the MC-1100. Two and three axis versions of this controller are available with expanded I/O and optional multi-axis software to allow coordinated linear and circular interpolation using EIA-274D "G" and "M" code commands

#### **Part Number and Descriptions**

Part Identity	Description
MC-1000	One axis MC-1000 Motion Controller
MC-1000CB	MC-1000 Connector Board
MC-1000CA	MC-1000 Cable Set

#### Warranty

Servomotive Corp. warrants the MC-1000 against defects in workmanship and materials for a period of one year after the date of shipment.

## **Contact Information**

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