

# Servo 300

3-Axes,High-speed Servo Motor Control Board



## Functional Description

Servo-300 is a 3-axis, command-type, servo motor control board. The embedded CPU of servo-300 performs the motion command transferred from host-PC via a 2K bytes FIFO. It also sends the position and status to host-PC via another 2K bytes FIFO. This buffer provides time buffer and it is very suitable for windows operating system. This board provides DOS, windows 95 and windows NT drivers.

## Features

- 3-axis V-command servo motor board
- command-type , totally 42 commands
- Simulation / open loop / close loop mode.
- Embedded CPU
- DOS, Windows 95, Windows NT driver
- Linear interpolation, circular interpolation
- Direction configuration
- 2500 points / axis pitch error compensation
- 8 digital input, 7 digital output
- Two limit switches, One home switch per axis
- Limit switch auto protection
- Can detect the hardware failure
- Software / hardware emergency stop
- 2500Vrms optical couple

## Option

DB-200 : 9-pin and 25-pin Screw Terminal Board  
DB-8R : 8-channel Power Relay & 8-channel Isolated Digital Input Daughter Board

## Specifications

### Software DDA

For precise control and adjustable speed, the Software DDA will divide the command into several equal delta commands. The maximum command is 2040 pulse, so the maximum speed is :

$$2040 / (0.0022 * \text{DDA}) * 60 / \text{ENCODER}.$$

For example, DDA=5, ENCODER=4000 pulse/rev.delta command =  $2040/5 = 255$  pulse  
speed =  $2040/(0.0022*5)*60/4000 = 2781$  rpm  
Therefore it is very important to select a proper DDA value to your system

## Open loop mode

In open loop mode, user can directly output a constant voltage to servo driver. The constant value can be set by MSERVO3\_CALV() command. This mode can be used to tune the velocity loop gain or to drive the inverter.

To tune velocity loop gain, user can set a small voltage for a short time. The position and velocity can be received from MSERVO3\_GET\_CARD (cardNo) command in a timer interrupt(~10ms).

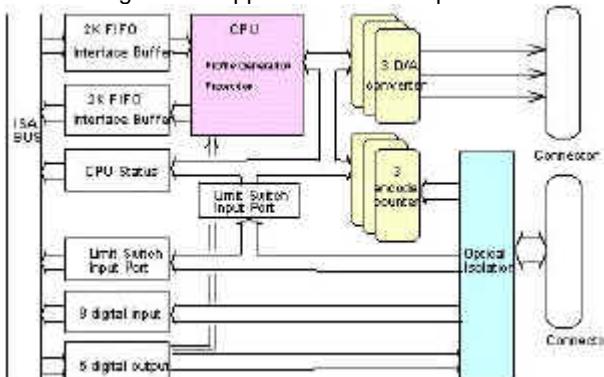
## Close loop mode

In close loop mode, the servo board performs the PD controller. It also executes the following function.

1. Pitch error compensation
2. Limit switch auto-protection
3. Hardware failure detection

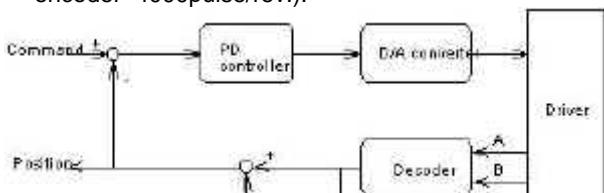
The related information of the servo board can be received from MSERVO3\_GET\_CARD (cardNo) command using timer interrupt, please refer to chapter 3 software.

SERVO-300 is a microprocessor based and 3- axis V-command type Servo motor control board. It contains a 2Kbytes-FIFO to receive motion command from host PC, and it also sends the position and status to host-PC via the other 2K bytes FIFO. The motion profile is generated by microprocessor. This microprocessor also handles auto-protection function. Each Digital I/O supports 2500Vrms optical isolation.



## The Control System

The sampling time is 2.2ms for 3-axis control system. The control loop includes a PD controller and a pitch error compensator. The gain parameter, Kp and Kd, of PD controller can be set from host PC. The pitch errors are recorded in a size 2500 table which can be set by user. The compensating pitch is 256 pulse, so the compensation range is  $2500 * 256 = 640000$  pulse. (about 800mm, if screw pitch=5mm, encoder=4000pulse/rev.).

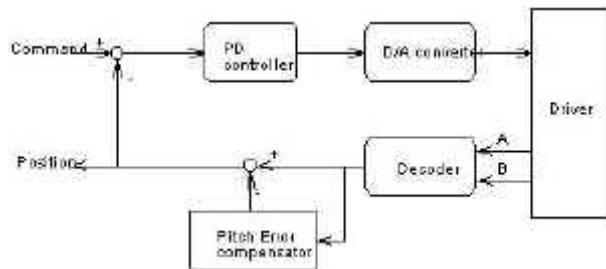


### The Operating Mode

For easily developing your system, SERVO-300 board provides three operating mode:  
simulation mode / open loop mode / close loop mode. Please refer to  
`MSERVO3_SET_CONTROL_MODE()` command.

#### Simulation mode

In simulation mode, the SERVO-300 board will simulate the motion profile. This profile is generated by user's motion commands and send the position back to host PC. The servo board will not output V-command to control motor.  
It is very cost-effective and efficient in the design phase. The simulation mode can be operated off-line. The user can debug and develop his software previously. And if you have the daughter board, you can also simulate the digital input/output like as a machine.



#### Software

- Toolkit for DOS
- Toolkit for Windows 95/98
- Toolkit for Windows NT/2000

### Ordering Information

SERVO-300	3-Axis V-command Servo motor board
Include : 9-pin D-sub connector x 2 25-pin D-sub connector x 2	