National Semiconductor Corporation

LM628 Precision Motion Controller

General Description

The LM628* is a dedicated processor for motion control. It can fully manage a position servo loop including quadrature feedback decoding, desired profile generation, comparison of desired position with actual position, compensation filtering of resulting error signal, and finally output of appropriate control signal to power amplifier driving the motor. Motor position is sampled and outputs generated at programmable intervals of 256 μs to 4096 μs. The LM628 has a digital programmable PID (proportional integral derivative) filter for compensating motor response. Output data is available as either 8 or 12 bits wide and is sent to a DAC via an 8-bit DAC-port. Commands and data are sent to the LM628 via an 8-bit host-port. The host can also use this port to read information from the LM628. The LM628 can be programmed to interrupt the host processor when error conditions occur and send back information about itself and the motor. All programming is done with commands that relate specifically to motion control, making the LM628 easy to use.

Features

- Programmable sample period (256 μs to 4096 μs)
- Internal trapezoidal velocity profile generator
- 12-bit or 8-bit DAC output data
- Programmable digital PID filter with 16-bit coefficients
- 32-bit position register
- 32-bit velocity register
- 32-bit acceleration register
- Quadrature incremental shaft encoder interface
- 8-bit parallel asynchronous host communication
- Operates at 8 MHz clock frequency
- TTL Compatible
- Filter coefficients can be updated during motion
- Velocity and target position can be updated during motion

Block Diagram
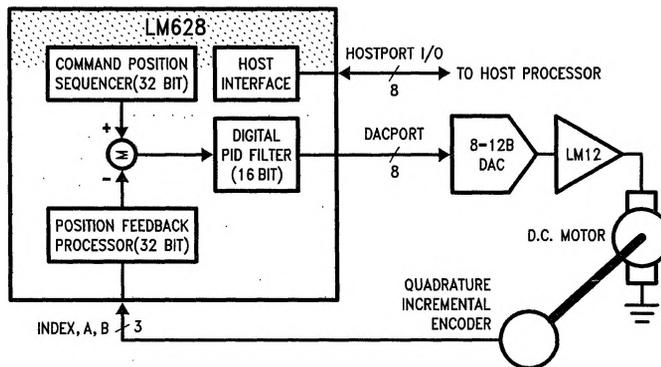
*LM628 incorporates the SDA core processor and SDA cells designed by SDA Systems

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