



## MC-3000 Motor Controller for SQL Series SQUIGGLE Motors

The MC-3000 motor controller generates ultrasonic signals to drive the smallest SQL Series SQUIGGLE motors. Use it to quickly and easily evaluate the motors for open-loop or closed-loop operation. The MC-3000 also serves as a reference design for integrating motor control electronics into your OEM system boards or ASICs.

### Driving the motor

An MC-3000 motor controller sends drive signals to a SQUIGGLE motor based on the input from a computer or manual handset.

- **Computer control** – connect the MC-3000 to a PC's USB port. New Scale's user interface and **ActiveX command library** make it simple to operate and evaluate the motor. You can also build custom scripts using the intuitive scripting interface. These scripts and ActiveX commands can be used later, in your embedded system design.

- **Manual control** – use the optional handset to control the motor.

Each MC-3000 drive card can operate up to two SQUIGGLE motors. You can control multiple drive cards simultaneously from a single computer screen using the software provided.

### Open-loop operation

When using the MC-3000 controller in an open-loop configuration, you can calibrate a motor's average step size in response to a number of drive pulses. Position resolution is listed on the motor data sheets.

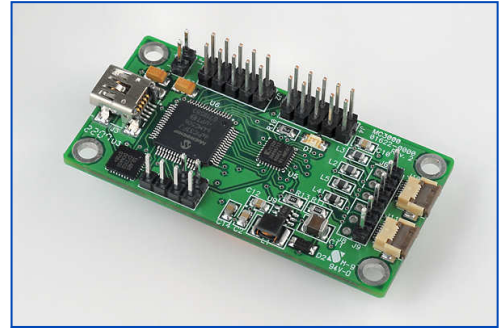
### Closed-loop operation

We recommend closed-loop operation when repeatable step size, absolute position or precise velocity control is needed. The MC-3000 accepts input from remote position sensors for closed-loop motion control. (See the application note, *Creating Closed-Loop Positioning Systems Using SQUIGGLE Motors.*)

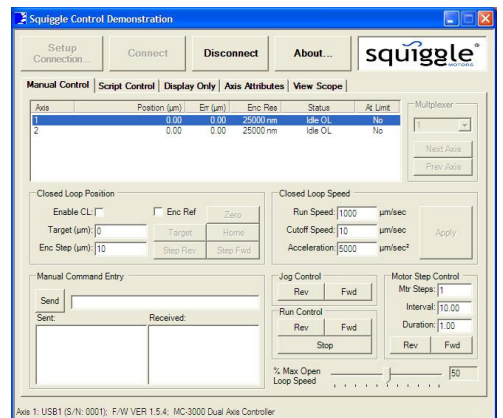
With a digital (incremental) encoder as a position sensor, the resolution is determined by the resolution of the encoder. With an analog position sensor, closed-loop position resolution is determined by the A/D converter, the resolution of the position sensor, and the resolution of the motor. The MC-3000 drive card has a 12-bit A/D converter.

### Configurable control system

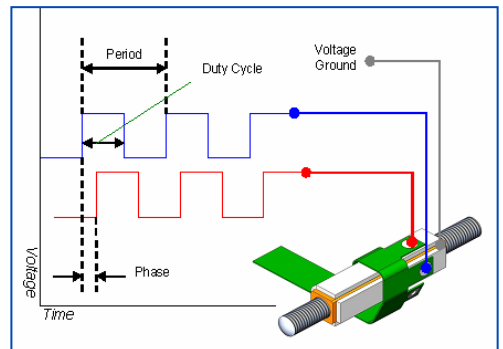
We work with OEMs to customize the MC-3000 motor controller, and provide schematics to assist OEM users in developing application-specific motor controllers including ASIC solutions. We also work closely with OEM customers to develop integrated SQUIGGLE motor systems including position sensors, housings, and controllers.



**MC-3000 Motor Controller** allows OEMs to easily evaluate open-loop and closed-loop performance of SQL Series SQUIGGLE motors. It also serves as a reference design for OEM system development.



**Software** provides point-and-click PC control via the USB port. The **ActiveX** command library includes commands for open-loop and closed-loop operation.



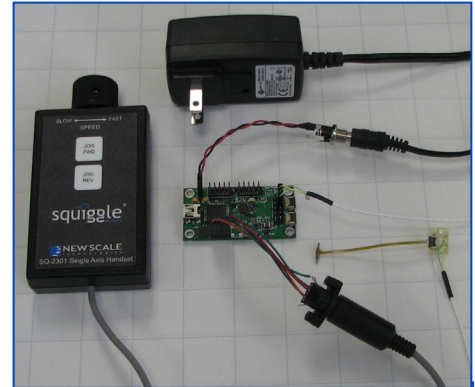
**MC-3000 Motor Controller** generates ultrasonic signals with phase shift to drive the piezo-electric elements of SQL Series SQUIGGLE motors.



## MC-3000 Drive Card for SQUIGGLE Motors

### MC-3000 motor controller specifications

|                                 | with SQL motor   |
|---------------------------------|--|
| <b>Input Power</b>              | 3.5 to 5.5 V DC<br>400 mW  |
| <b>Output Signals</b>           | Motor 1 - Phase 1, Phase 2, Ground<br>Motor 2 - Phase 1, Phase 2, Ground       |
| <b>Computer Control</b>         | Via USB port. Demo software and ActiveX command library included               |
| <b>Position Sensor Input</b>    | Digital or Analog  |
| <b>A/D Converter Resolution</b> | 12 bits  |
| <b>Closed Loop Commands</b>     | 13 commands including Speed, Move to Target, Step, Zero, Enable Reference Mark |
| <b>Open Loop Commands</b>       | 17 commands including Speed, Run, Stop, Timed Step(s)                          |
| <b>Dimensions (l x w x h)</b>   | 1.150 x 2.275 x 0.875 inches<br>(29.21 x 57.785 x 22.225 mm)                   |



**MC-3000 controller** shown with AC power adapter, handset, and SQL Series SQUIGGLE motor.

### SQ-2301 and SQ-2301M optional handset specifications

The optional handset contains a small microprocessor that converts button activations and speed adjustments into ASCII commands and sends them to the MC-3000 controller.

|                          | SQ-2301                              | SQ-2301M                       |
|--------------------------|--------------------------------------|--------------------------------|
| <b>Motors Controlled</b> | Motor 1 only                         | Motor 1 or Motor 2 (switching) |
| <b>Control Knob</b>      | Variable speed                       |                                |
| <b>Buttons</b>           | JOG FWD (forward); JOG REV (reverse) |                                |
| <b>Connection</b>        | 4-Pin RS-485                         |                                |

### Ordering information

| Model           | Description   |
|-----------------|---|
| <b>MC-3000E</b> | Evaluation kit:<br>MC-3000 OEM board, AC power adapter and cables<br>(USB cable NOT included) |