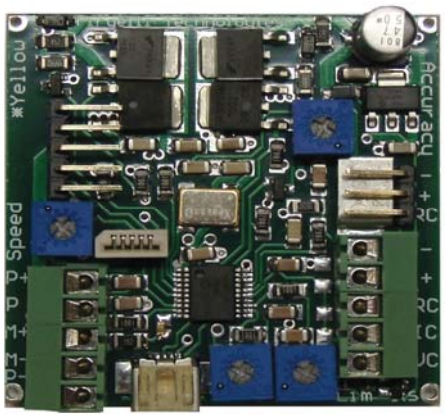
LAC • Actuonix Linear Actuator Control Board

The Linear Actuator Control Board is a stand-alone closed-loop control board specifically designed for Actuonix actuators. The LAC greatly simplifies designs by saving the development time, cost, and processor overhead associated with direct motor control. As little as 1 digital or analog output is required for position control. Supported input signals include USB, Voltage, Current, RC Servo, and PWM. Actuonix motor control IC uses a software based algorithm to optimize position and speed control. This makes the LAC compatible with a wide range of actuators, using only the default settings. Actuonix's Advanced Configuration Program allows full customization of actuator response. A stall detection feature provides a gr eat increase in actuator life for applications that may briefly exceed the rated force.

The LAC can be operated as both an interface board, or as a stand alone controller with the addition of an external potentiometer and power supply.

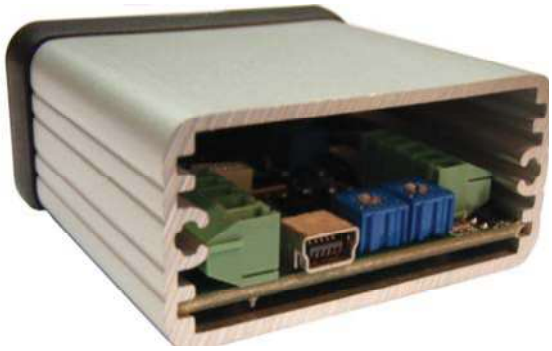
(Accessory kit and housing sold separately)



Specifications

Control input modes	**Digital: USB, RC Servo, 1 kHz PWM** **Analog: 0–3.3 V, 4–20 mA**
Controller	**10-bit Dual Sample Rate Quasi PD**
Compatible actuators	**PQ12 & L12 -P Actuators with position feedback, 6 or 12 volts** **L16, P16 & T16 -P Actuators with position feedback, 6 or 12 volts** **Larger Actuators with position feedback, 12 volts, 24 volts**
Dimensions	**50 mm x 50 mm** (excluding battery holder)
Power	**6–24 VDC, 4 Amps peak current at 10% duty cycle** **Note: Supply voltage must match actuator's rated voltage**
Operating environment	**–10 to +70°C at 10–80% relative humidity**

Operation



When the LAC is powered up, it will repeatedly scan for an input signal that is valid under any of the five supported interface modes (see reverse for External Connections Detail illustration). When a valid signal is first detected, the actuator will self-configure to the corresponding interface mode, and all other interface modes and input leads are disabled until the actuator is next powered on. The sensitivity or accuracy of the actuator control algorithm can be set by adjusting the "Accuracy" trim potentiometer. Turning clockwise will allow the actuator to move in smaller increments and be more accurate. However, due to the differences in actuator types this may cause jittery or unstable behaviour. If this occurs, consider using the USB configuration program to more finely tune the controller for your application. Each time a control potentiometer is adjusted, power must be cycled to the LAC board prior to the new settings taking effect. Adjusting the "Speed" potentiometer will set the maximum actuator speed. The two "Limits" potentiometers allow user settable digital limit switches. These set the minimum and maximum acceptable positions. Control inputs that exceed these limits will cause the actuator to position to the limit.

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External Connections Detail

X1 PQ12 actuator connector

5 pin, 1 mm Pitch FPC connector

X2 L12–P/L16-P/P16-P/T16-P actuator connector

Pin	Function
1	**Potentiometer Reference Negative** (yellow)
2	**Motor Terminal** (black)
3	**Motor Terminal** (red)
4	**Potentiometer Feedback (wiper)** (purple)
5	**Potentiometer Reference Positive** (orange)

X3 Radio control receiver connector

Pin	Function
1	**Ground** (black)
2	**Power** (red)
3	**Control** (white)

X4 Large actuator connector

Pin	Function
1	**Potentiometer Reference Positive** (white)
2	**Potentiometer Feedback (wiper)** (yellow)
3	**Motor Terminal** (red)
4	**Motor Terminal** (black)
5	**Potentiometer Reference Negative** (blue)

NOTE: If the actuator moves to one end then stops, swap pins 3 and 4 to change the motor direction.

X5 Universal Serial Bus (Male Mini-B)

Pin	Function
1	**N/C**
2	**Data**
3	**Data**
4	**N/C**
5	**Ground**

X6 Control interface

Pin	Function
1	**Ground**
2	**6–24 VDC Power**
3	**RC / Hobby Servo input signal**
4	**Current input signal** (4–20 mA)
5	**Voltage input signal** (0–3.3 V) or 1 kHz PWM

P1 Speed Control

Sets maximum actuator speed

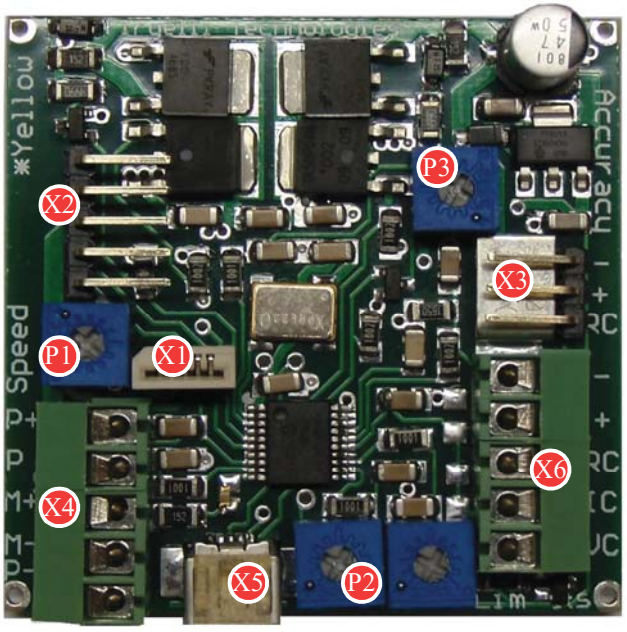
CW Faster
CCW Slower

P2 Limit Controls

Left Potentiometer controls Retract Limit
CW Maximum Stroke
Right Potentiometer controls Extend Limit
CW Maximum Stroke

P3 Sensitivity adjustment

CW Smaller dead-band
CCW Larger dead-band



Connector Pins numbered from Top to Bottom or Left to Right

Control Modes

0–3.3 V Interface Mode: This mode allows an actuator to be controlled with just a battery, and a potentiometer to signal the desired position to the actuator – a simple interface for prototypes or home automation projects. The desired actuator position (set-point) is input to the CIB on connector X6 pin 5 as a voltage between ground and 3.3 V. The set-point voltage must be held on pin 5 to reach and maintain the desired actuator stroke position. The wiper pin of an external potentiometer connects to X6 pin 5. Pins 1 and 5 of X4 can be used as the 3.3V Reference. The other two potentiometer pins connect to these. When a Potentiometer is not used, ensure the control signal ground is connected to LAC ground.

RC Servo Interface Mode: This is a standard hobby-type remote-control digital servo interface, compatible with servos and receivers from manufacturers like Futaba™ and Hi-Tec™. The desired actuator position is input to the LAC on connector X6 pin 3 as a positive 5 Volt pulse-width signal. A 1 ms pulse commands the controller to fully retract the actuator, and a 2 ms pulse signals full extension. Connector X3 can also be used for the RC control signal, and uses the standard 3 pin 0.1" spacing typical on most hobby servo receivers. **Do not connect power to both X6 and X3 at the same time** (If the supply voltages differ, large currents will flow).

4–20 mA Interface Mode: This mode is compatible with PLC devices typically used in industrial control applications. The desired actuator position (set-point) is input to the LAC on connector X6 pin 4 as a current between 4 mA and 20 mA. The set-point current must be held on pin 4
to reach and maintain the desired actuator stroke position.

PWM Mode: This mode allows control of the actuator using a single digital output pin from an external micro controller. The desired actuator position is encoded as the duty cycle of a 3.3 Volt, 1 kHz square wave on LAC connector X6 pin 5, where the percent duty cycle sets the actuator position to the same percent of full stroke extension. 100% duty cycle represents full extension, and 0% duty cycle represents full retraction. This input is 5V tolerant, however the % duty cycle range will differ.

USB Mode: This mode allows control of the actuator using a Computer. In addition advanced settings allow fine control over the controller response. Default settings can be reverted to, using the reset command. When custom settings are turned on, P1, P2, and P3 are ignored. These settings will be saved even when power is cycled. This allows custom configuration for all inputs even when USB is not connected. Details of the DLL are given in a separate document so that custom programs can be created by the customer. An example Labview program is available for download. The Dynamic Link Library(DLL) allows Programming in many windows languages including Labview.