

Digilent PmodCON3™ Servo Connector Reference Manual

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Overview

The Digilent PmodCON3 Servo Connector Module Board (the CON3™) makes it easy to drive up to four servo motors from any Digilent system board.

The CON3 conveys signals between a 6-pin header and one of four servo-motor connectors. A terminal block and jumpers are provided so that an external motor power supply can be used.

Features include:

- a 6-pin header connector
- four servo motor connectors
- flexible power delivery to servo motors
- small form factor (1.00" x 0.80").

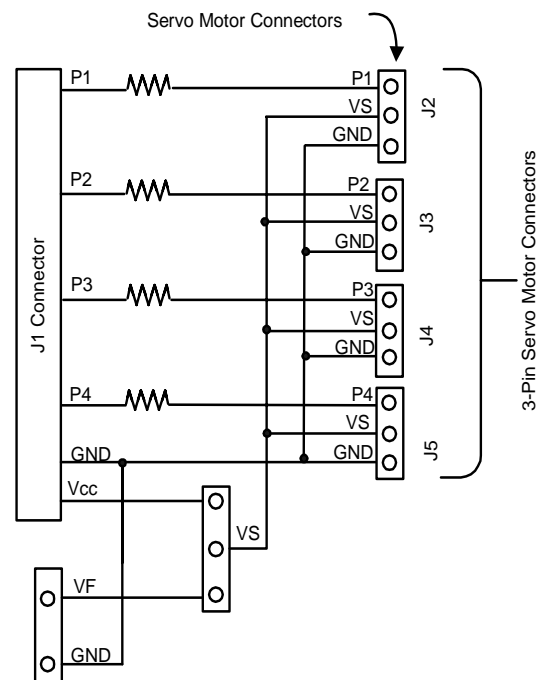
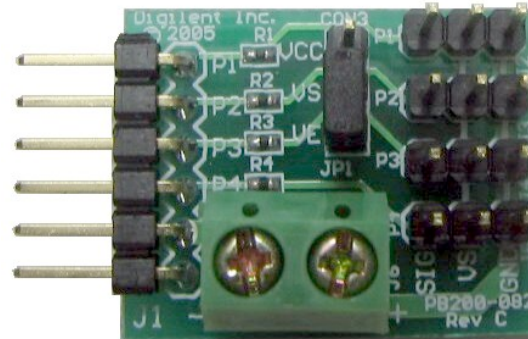
Functional Description

The CON3 can drive up to four servo motors like those used in radio controlled airplanes and cars. The servo motors can be powered by 4.5V to 6V sources, while being controlled with TTL-level logic signals.

The CON3 can be used in conjunction with Digilent system boards and embedded controller boards for robotics and distributed systems.

The CON3 can be used with most servo motors including those that deliver anywhere from 50 to 300 ounce/inches of torque.

Servo motor power can come from a system board (for low power applications) or from an external power source (for higher-power applications). A jumper setting determines the power source.



CON3 Circuit Diagram

Servo motors attached to the CON3 can be driven individually or in groups of two or more.

Servo motors are used in a number of robotic applications, including steering, movement, and rotation. Servos are designed to move to a precise desired position and then stop.

Servo Control

A servo is composed of a control board, motor, sense potentiometer, and gears that connect the motor and output shaft. A digital signal is sent to the control board which then drives the motor until the sense potentiometer verifies that the output shaft is in the correct position.

A pulse width modulation signal controls the direction and degree of rotation. A pulse signal ranging from 1ms to 2ms is sent to the servo's control board, which recognizes the pulse and begins the process of turning the servo's output shaft. A pulse of 1ms causes the servo to turn all the way in one direction, a pulse of 2ms causes the servo to turn all the way in the other direction, and a pulse of 1.5ms causes the servo to turn to the center or to a neutral position (see the diagram.)

To avoid problems with the servo, the pulse signal should be sent at a period of 30-60 pulses per second. The pulse width (1.5ms, 1ms, or 2ms) controls the direction.

While different manufacturers produce servos, all servos are made to the same pulse signal specifications. A pulse signal between 1ms-2ms is the safe range for a servo. Most servos will function outside of this range but the amount varies depending on the manufacturer and the servo. A signal that is either too narrow or too wide for a servo will cause the servo to try to go beyond its rotational range and can damage the servo. Always check the manufacturer's instructions for a servo's rotational range.

Using the CON3

The CON3 can be used with small servo motors requiring 50-70 ounce/inches of torque and large servo engines requiring 200-300 ounce/inches of torque.

The CON3 has a power jumper that routes power to the servo motors through either the 6-pin header or a screw terminal (when using an alternate power source). When the power jumper is in the VCC position it routes power

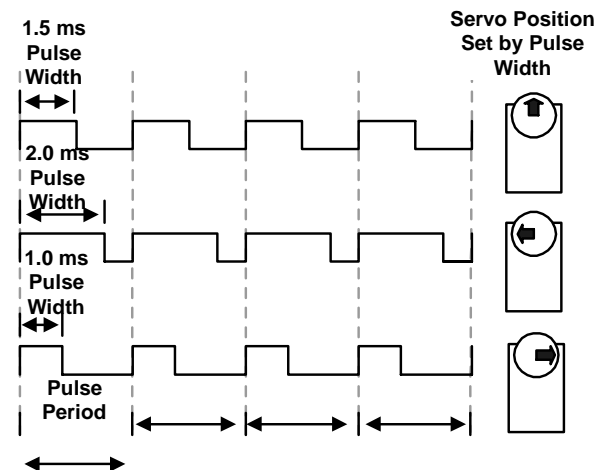
through the 6-pin header. When the power jumper is in the VE position it routes power through the screw terminal.

When plugging a servo motor into the CON3's servo connector, the white or yellow wire of the servo should connect to the signal portion of the connector, and the black wire should connect to the ground portion of the connector.

The CON3 has a 6-pin header for easy connection to a Digilent system board. For example, some system boards like the Digilent Pegasus board have a 6-pin header that can connect to the CON3 with a 6-pin cable.

To connect the CON3 to other Digilent system boards, a Digilent Modular Interface Board (MIB) and a 6-pin cable are needed. The MIB plugs into the system board, and the cable connects the MIB to the button module.

For more information see www.digilentinc.com.



Servo Control Diagram