

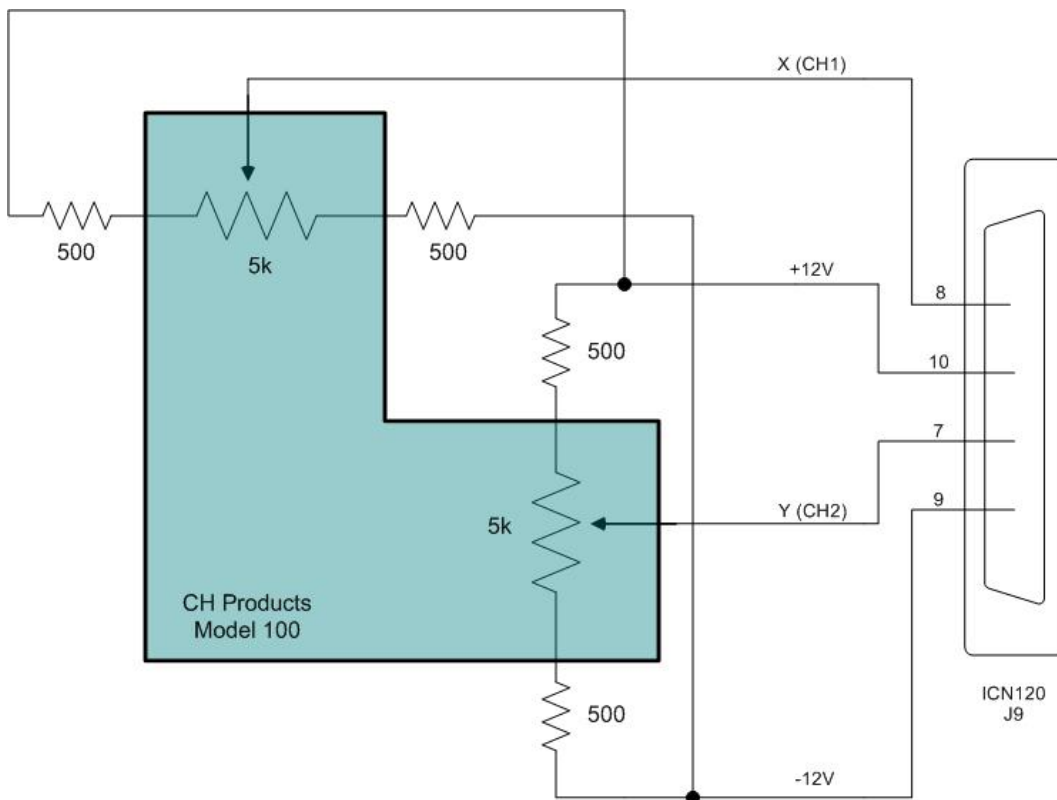
**Title:** MultiFlex ETH 1000 Series Analog Joystick & Jog Mode Support  
**Products(s):** All MultiFlex ETH 1000 Series Ethernet motion controllers with analog input option  
**Keywords:** MultiFlex, MFX, ETH, Ethernet, resistive, analog, joystick, jog mode  
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### Summary

PMC Multiflex ETH 1000 Series Ethernet motion controllers can directly interface to resistive (analog) joysticks providing a simple and inexpensive way to manually jog the motors.

### More Information

The Multiflex ETH 1000 Series controllers feature firmware support as well as a simple hardware interface to resistive (analog) joysticks, providing an inexpensive integrated solution for manual 2-axis motor jogging operations.



**Figure 1. Resistive Joystick Interface Example**

An example application using a CH Products® Model 100 joystick is shown in Figure 1. The internal potentiometers are 5 kOhm, requiring the use of external divider resistors to bring the full-scale input voltage into the range of +/- 10V to be compatible with the controller's analog input ports. All of the necessary connections for the joystick, including the bias voltages, appears on connector J9 of PMC's ICN-120 and ICN-125 plug-on interconnect boards which mate directly to the controller (six other A/D channel inputs are available on connector J9 in addition to those shown.)

The response of the motor to the joystick position can be tailored through the following MCCL controller commands<sup>1</sup>:

<b>aJCn</b>	-	sets joystick analog voltage to A/D channel n
<b>aJGn</b>	-	sets velocity gain of joystick voltage to n
<b>aJAn</b>	-	sets maximum acceleration of motor to n
<b>aJVn</b>	-	sets minimum velocity of motor to n (stepper motor only)
<b>aJBn</b>	-	sets joystick deadband to n
<b>aJOn</b>	-	sets joystick offset to n
<b>aJN</b>	-	jogging mode on
<b>aJF</b>	-	jogging mode off

Before enabling jogging mode and configuring these parameters, the motor must be placed in velocity mode with the **aVM** command. Typical values for acceleration, velocity gain, offset and deadband must be determined experimentally for each motor. When using jog mode on a servo axis, the axis must first be tuned, therefore the PID filter parameters must be determined before entering jog mode. The jogged axis should be tuned in position or velocity mode.

The deadband and offset parameters allow for inconsistencies in joystick center mechanical position and asymmetry in the potentiometer, respectively. While trying to optimize the values for these parameters from the command line, a motor on (**aMN**) must be issued each time any values are changed before they take effect.

The parameters that most strongly influence the motion of the motor are velocity gain and acceleration. The current joystick position is determined from the A/D converter reading, scaled to a +/- 10V range and multiplied by the velocity gain to establish the current desired velocity. Since the motor is essentially in velocity mode, the controller will constantly seek to accelerate and decelerate at the maximum rate to that desired velocity.

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<sup>1</sup> The **a** preceding all MCCL commands identifies the axis number (1-12)