

AN125-2 – Using the PMDX-125's Error Input and Restart Output with Gecko Drive Servo Drivers and Mach3 CNC Software

1.0 Overview

This application note describes how to connect the PMDX-125 to the Gecko Drive step servo driver's "ERR/RST" terminal to allow the PMDX-125 to detect a Gecko Drive error (fault) state and to reset the Gecko Drive drivers once they enter a fault condition.



SAFETY WARNINGS:

The PMDX-125 is intended for integration by the purchaser into industrial control systems. It is solely the purchaser's responsibility to assure that the system is configured in a manner consistent with applicable safety requirements. Practical Micro Design, Inc. does not control how this board is integrated into the purchaser's system and cannot be responsible for guaranteeing the safety of your system.

The PMDX-125 is not guaranteed to be fail-safe. The system into which the PMDX-125 is installed should provide fail-safe protection and emergency stop capability.

The PMDX-125 contains circuitry that may be connected to dangerous voltages. Care must be taken that user cannot come in contact with these voltages. An enclosure that allows for modest ventilation, but prevents intrusion by operator's hands and foreign objects, especially conductive byproducts of machining operations, should be utilized with this board. Interlock switches on power circuits should remove power when the enclosure is opened.

Automated machine tools, into which the PMDX-125 may be integrated, can cause injury. Precautions should be taken to assure that operators are trained in their proper operation and safety procedures, and that they are protected from moving parts that may be under remote control and may move unexpectedly.

2.0 Gecko Drive Connections

See Figure 1. The Gecko Drive step servo drivers (models G320, G320X and G340) provide a terminal labeled "ERR/RES". This terminal is both an "error" signal output from the Gecko driver and a "reset" signal into the driver. See the Gecko Drive manuals for more information on the "ERR/RES" signal.

NOTE – The "ERR/RES" signal is referenced to the Gecko Drive's "POWER GND" terminal (motor power) and should not be connected to a signal that is referenced to the PC parallel port ground. The PMDX-125 provides optical isolation on all terminals that are part of the error/restart circuit (see below).

3.0 PMDX-125 Connections

NOTE – The PMDX-125's "ERR", "RST" and "COM" terminals are optically isolated from the PC parallel port ground and from all other signals on the PMDX-125. This keeps the Gecko Drive "ERR/RST" and "ENC +5V" signals isolated from the rest of the PMDX-125 and from the PC parallel port.

3.1 "ERR" Input (J13 pin 4)

See Figure 1. The "ERR" terminal should be connected to the Gecko Drive "ERR/RES" terminals. This allows the Gecko Drive's error signal to trigger an E-Stop on the PMDX-125. When the Gecko Error

AN125-2 – Using the PMDX-125’s Error Input and Restart Output with Gecko Drive Servo Drivers and Mach3 CNC Software

signal goes active, the PMDX-125 will assert the E-Stop signal to the PC for approximately 1 second, and then flash an error code on the Status LED. See the section 9 of the *PMDX-125 User’s Manual* for more information on the Status LED flash codes.

3.2 “RST” Output (J13 pin 5)

See Figure 1. The “RST” (restart) output from the PMDX-125 should be connected to the “ERR” input on the PMDX-125 along with the Gecko Drive “ERR/RST” signal. This allows the PMDX-125 to pulse the Gecko Drive’s error signal to reset the drivers. The “RST” and “COM” terminals are a pair of solid-state relay contacts that are “closed” for approximately 1 second every time the PMDX-125 enables its outputs.

3.3 “COM” Terminal (J13 pin 6)

See Figure 1. The “COM” (common) terminal should be connected to the encoder +5V terminal (ENC +5V) on one and only one of the Gecko Drive drivers. This provides the +5V references needed by the “RST” terminal to reset the Gecko Drive drivers. The “RST” and “COM” terminals are a pair of solid-state relay contacts that are “closed” momentarily every time the PMDX-125 enables its outputs. This restarts the Gecko Drive drivers.

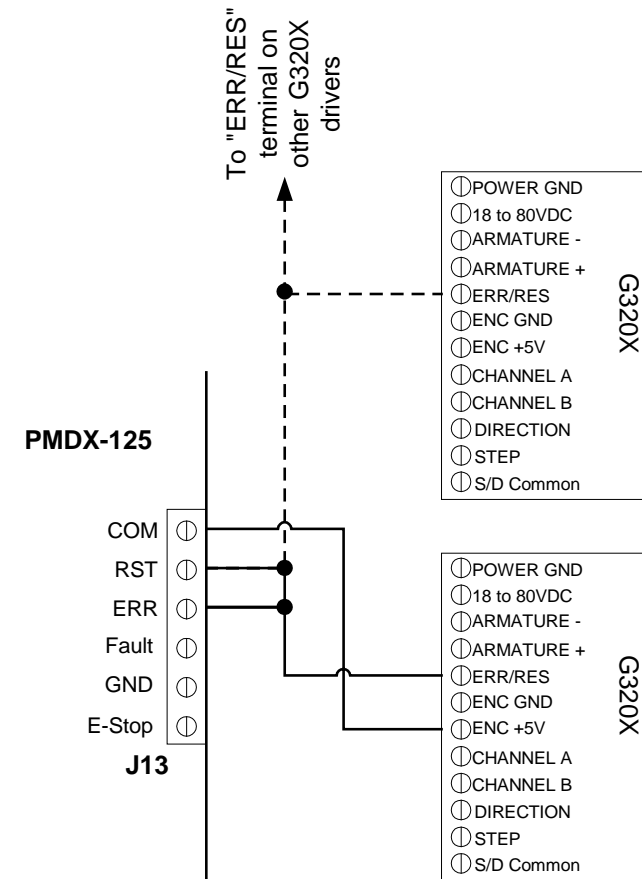


Figure 1 – Sample connections to G320X Servo Drivers

4.0 PMDX-125 Operating Modes and Restart Pulse

The “Restart” output on the PMDX-125 behaves differently depending on which operating mode the PMDX-125 is in. Please see the *PMDX-125 User’s Manual* for a full description of the operating modes which are summarized in Table 1 below

AN125-2 – Using the PMDX-125’s Error Input and Restart Output with GeckoDrive Servo Drivers and Mach3 CNC Software

<i>PMDX-125 Mode</i>	<i>PMDX-125 DIP Switches</i>	<i>Restart Operation</i>
Run in Normal Mode	Config1 closed Config2 closed Config3 closed	The restart output is activated only when the user presses and releases the “Test” button on the PMDX-125. <i>There is no automatic control of the restart output in this mode. PMDX does not recommend operating the PMDX-125 in this mode when using the restart feature.</i>
Run in Normal Mode with Charge Pump	Config1 open Config2 closed Config3 closed	The restart output is activated whenever Mach3 enables its outputs. This is done by having the user click on the flashing “RESET” button on the main Mach3 screen. This causes Mach3 to start generating the “Charge Pump” signal, which the PMDX-125 uses to enable its outputs and activate the restart output.
Run in Expanded I/O Mode	Config1 closed Config2 open Config3 closed	
Run in Expanded Output Mode	Config1 open Config2 open Config3 closed	
Run in Expanded Input Mode	Config1 closed Config2 closed Config3 open	
Do not use	Config1 open Config2 closed Config3 open	Do not use this mode setting
Test Mode (PMDX pin-outs)	Config1 closed Config2 open Config3 open	Restart output is never active
Test Mode (alternate pin-outs)	Config1 open Config2 open Config3 open	Restart output is never active

Table 1 – PMDX-125 Modes and Restart Operation

5.0 Mach3 Configuration

There are two items in the Mach3 configuration that need to be set in order to sense the GeckoDrive’s error signal and to reset the fault condition, as described below.

NOTE – This is NOT a full tutorial on using and configuring Mach3. If you are not already familiar with changing the Mach3 configuration settings please read the ***Mach3 CNC Controller Software Installation and Configuration Guide***, which can be downloaded from <http://www.machsupport.com/documentation.php>.

- (1) Enable the “E-Stop” (emergency stop) input and assign it to port 1 pin 10 with a red “X” in the “Active Low” column (i.e. E-Stop is “active high”)
- (2) Enable the “charge pump” output on port 1 pin 17 with a red “X” in the “Active Low” column.

These settings assure that a GeckoDrive error output will signal an E-Stop to Mach3, and allow the user to restart the GeckoDrives by clicking on the RESET button on the Mach3 screen.

Note that if you are using the PMDX-125 in one of its “expanded” modes, the PMDX-125 Mach3 Plug-In will automatically enforce these settings and the plug-in will override any changes you make to these signals. See the ***PMDX-125 Plug-In Installation Guide*** for more information, which is available at <http://www.pmdx.com/Downloads>.