PMDX-111

Parallel Port Monitor

User's Manual

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1.0 Overview

This document describes the configuration and operation of the PMDX-111 Parallel Port Monitor. This document pertains to the following versions of the PMDX-111:

Circuit Board Revision: PCB-489A (marked on the bottom of the board)

1.1 Important Safety Information

The PMDX-111 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-111 is not guaranteed to be fail-safe. The system into which the PMDX-111 is installed should provide fail-safe protection and emergency stop capability.

The PMDX-111 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 adequate 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-111 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.

This product may not be used in life support or other critical safety applications.

1.2 Warranty Summary

The PMDX-111 is warranted against failure due to defective parts or workmanship for 90 days from the date of sale. Refer to Appendix A for complete warranty details.

> ***NOTE:*** If you have an item requiring service, please see the "Warranty and Repairs" page on the PMDX web site (http://www.pmdx.com) for return instructions.

In general, the purchaser must pay shipping to send the unit to PMDX. For repairs covered under warranty and with return shipping to a USA address PMDX will ship the repaired unit back to you via ground transportation at our expense. Repairs are normally completed within 10 business days. See Appendix A for our complete warranty details. ***Please see the "Warranty and Repairs" page on our web site (http://www.pmdx.com) for full details of our repair and shipping policies.***

1.3 Trademarks

The following product names used in this manual are the trademark, tradename or registered mark of the respective companies:

Product Names	***Company***
SmoothStepper	Warp9 Tech Design, Inc. (http://www.warp9td.com/)
PMDX-122, PMDX-126	PMDX/Practical Micro Design, Inc. (http://www.pmdx.com)

1.4 Features

The PMDX-111 has the following features:

- LED Indicators for every input and output on the PC's parallel port
- All signals are buffered to drive the internal LEDs to minimize loading on PC parallel port
- One pulse detector that can monitor any parallel port signal
- Dedicated pin 17 pulse detector to monitor charge pump signal
- Accepts DC power from +7 to +12 VDC or AC power from 9 to 12 VAC
- Can be powered from a USB port

1.5 Updates to this Manual

Check the PMDX web site for revisions or updates to this manual (http://www.pmdx.com). The latest revision of this manual is available on the PMDX-111 page (follow the links from the main page).

2.0 Operation

The PMDX-111 is a parallel port monitor when connected in-between a PC (or any controller that presents a PC-compatible parallel port, such as a SmoothStepper) and some device (such as a PMDX-122 or PMDX-126 break-out board or motor driver board). The PMDX-111 passes through all of the signals (unbuffered) between the PC's parallel port and the target device. It also buffers each signal to drive the PMDX-111's on-board LEDs and pulse detectors.

2.1 Parallel Port Connectors

The PMDX-111 provides three parallel port connectors:

- J1 (a male 25-pin "D" connector)
- J2 (a 26-pin ribbon cable header).
- J4 (a female 25-pin "D" connector)

Any connector may be used to connect to a PC, SmoothStepper or your equipment (i.e. there is no "input" and "output" connector). When using 25-pin "D" to 25-pin "D" cables, the pin-out should be "straight through" (i.e. pin 1 to pin 1, etc.). Do not use a 25-pin "null modem" cable. The ribbon header pin-out is compatible with ribbon to 25-pin "D" cables and with ribbon-to-ribbon cables for use with a Smooth Stepper or other device that uses ribbon headers with the standard pin-out for PC parallel ports.

2.2 Power Supply

The PMDX-111 may be powered from several different power sources.

> ***WARNING:*** ***Only one of these power sources can be used at a time. Connecting a power source to more than one of these power inputs may damage the PMDX-111.***

Power Source	***Voltage***	***Connector***
Unregulated AC or DC	9 to 12 VAC or +7 to +12 VDC	J5, a 2.1mm coaxial jack ***NOTE that for DC inputs, the center pin is positive and the sleeve is ground*** ***-- or –*** J6 screw terminal connector
USB Power	+5V DC	J3, the USB connector

Table 1 – Summary of PMDX-111 Power Sources

2.3 Edge/Pulse Detector

The PMDX-111 provides a general-purpose edge/pulse detector, which can monitor any signal on the parallel port. The detector's LED (labeled DS19, to the right of the jumper field) will flash whenever the PMDX-111 detects a rising edge, falling edge or pulse. To select which signal to monitor, install the jumper clip on the pins below parallel port pin number. For example, in figure 1, the detector is set to monitor parallel port pin 15.

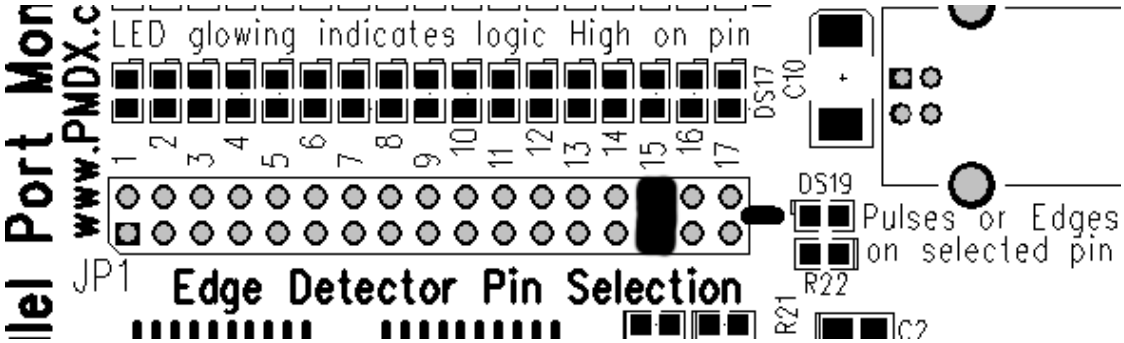

Figure 1 - Pulse Detector

2.4 Charge Pump

The PMDX-111 contains a second pulse detector that is dedicated to parallel port pin 17, which often is used as a "charge pump" signal. If there is activity on pin 17 (usually a square wave higher than 100 Hz), then the "Charge Pump OK" LED will turn on. This can be used to verify that the software you are running on the PC is generating a valid charge pump signal for use with other PMDX break-out boards.

2.5 Parallel Port Pin Monitor

The PMDX-111 contains circuitry that allows you to see the current state of each parallel port signal. For each signal on the parallel port, the PMDX-111 has an LED that indicates the current state of the signal (the LED is on for logic "1" or "high", and off for logic "0" or "low").

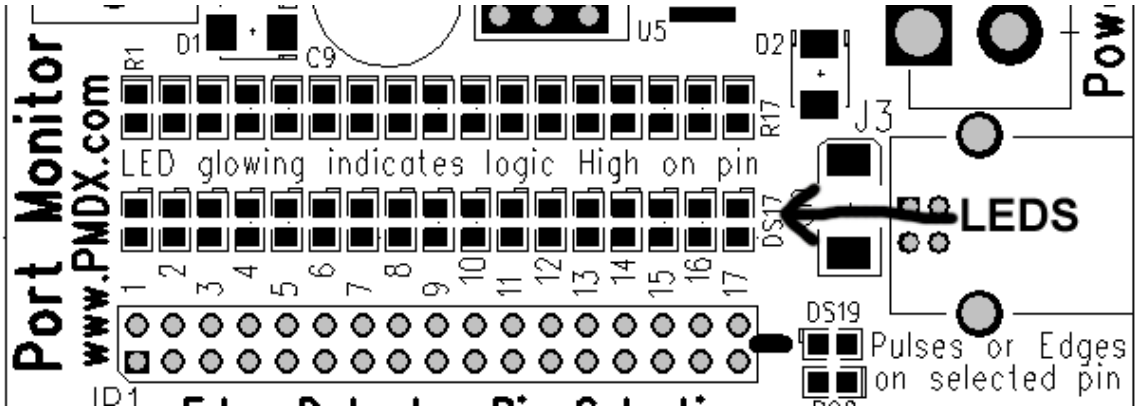

Figure 2 – Parallel Port Monitor LEDs

3.0 Mechanical Specifications

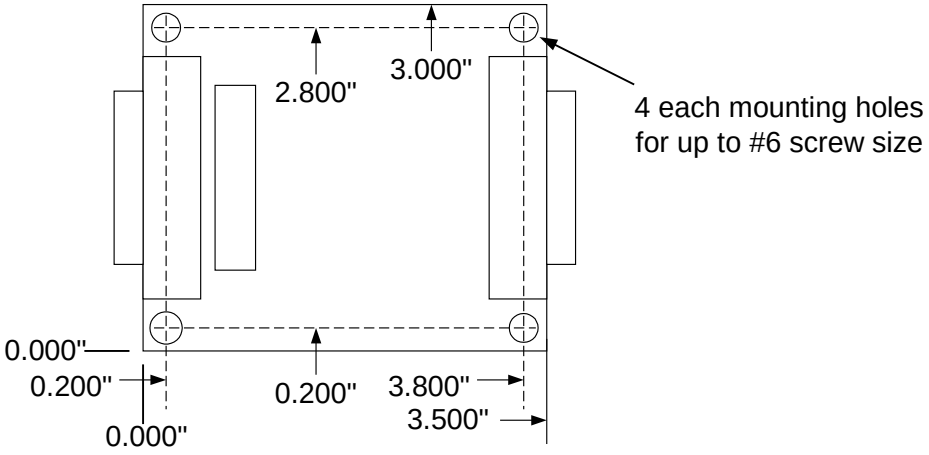

Figure 3 - PMDX-111 Dimensions and Mounting Holes

4.0 Electrical and Environmental Specifications

Power:
Main Power: +7 to +12 VDC ***or*** 9 to 12 VAC input, ***TBD*** mA (input via J5 or J6)

-- OR --

USB Power: +5V DC, ***TBD*** mA (optional power source as alternate to the main power)

Note 1: According to the USB specification, a USB hub supplies only 100mA to an un-initialized device (which is how the PMDX-111 appears to the hub). However, most self-powered USB hubs, including those built into PCs, provide sufficient current to power the PMDX-111.

Note 2: Self-powered USB hubs use some sort of external power supply, such as a "wall wart" supply, whereas bus-powered hubs do not. Only connect the PMDX-111 to self-powered USB hubs or directly to a PC's USB port. ***Do not attempt to power the PMDX-111 from a bus-powered USB hub. Do not daisy-chain PMDX-111 boards when powered from a USB port.***

Logic Inputs (on connectors J1, J2 and J4):
Min. input "high": 2.0V (referenced to a "GND" terminal)
Max. input "low": 0.8V (referenced to a "GND" terminal)
NOTE: The PMDX-111 has a 10K ohm resistor to ground on each parallel port signal

Pulse Detector: Minimum detectable pulse width is TBD ns***.***

Environmental: Temperature: 0° to +55° C
Relative Humidity: 20% to 80% relative humidity, non-condensing

Appendix A – Warranty

Statement

Practical Micro Design, Inc. (PMD) warrants that this hardware product is in good working condition, according to its specifications at the time of shipment, for a period of 90 days from the date it was shipped from PMD. Should the product, in PMD's opinion, malfunction within the warranty period, PMD will repair or replace the product without charge. Any replaced parts become the property of PMD. This warranty does not apply to the software component of a product or to a product which has been damaged due to accident, misuse, abuse, improper installation, usage not in accordance with product specifications and instructions, natural or personal disaster or unauthorized alterations, repairs or modifications.

Limitations

All warranties for this product, expressed or implied, are limited to 90 days from the date of purchase and no warranties, expressed or implied, will apply after that period.

All warranties for this product, expressed or implied, shall extend only to the original purchaser.

The liability of Practical Micro Design, Inc. in respect of any defective product will be limited to the repair or replacement of such product. Practical Micro Design, Inc. may use new or equivalent to new replacement parts.

Practical Micro Design, Inc. makes no other representations or warranties as to fitness for purpose, merchantability or otherwise in respect of the product. No other representations, warranties or conditions, shall be implied by statute or otherwise.

In no event shall Practical Micro Design, Inc. be responsible or liable for any damages arising
(a) from the use of the product;
(b) from the loss of use of the product;
(c) from the loss of revenue or profit resulting from the use of the product; or
(d) as a result of any event, circumstance, action or abuse beyond the control of Practical Micro Design, Inc.

whether such damages be direct, indirect, consequential, special or otherwise and whether such damages are incurred by the person to whom this warranty extends or a third party.