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ModIO™ MP-01 Modbus Handheld Pendant Quick Start Guide

Mach3 Rev: 3.0 onward

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Andy Wander - Andy has taken it upon himself to provide front line support for the ModIO, usually being the first to address questions and problems as they appear on the Yahoo ModIO and Mach User Groups. Andy has also been a great help during the development of the MP-01 Modbus Handheld Pendant.

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Introduction

Thank you for purchasing Homann Designs' *ModIO™ MP-01 Modbus Handheld Pendant*. The MP-01 provides a general purpose interface unit with a Modbus RS-232 and RS-485 serial interface for communication with a Modbus Master.

This document is a User's Guide that describes the *ModIO™ MP-01 Modbus Handheld Pendant*. The document contains information on how to use and integrate the board into your own systems.

Contents

The box received when ordering the *ModIO™ MP-01 Modbus Pendant* contains the following:

- The *ModIO™ MP-01 Modbus Pendant*
- A MA-02 Pendant breakout board for interfacing the pendant to a PC

Features

Homann Designs' *ModIO™ MP-01 Modbus Pendant* lets you quickly and simply add additional I/O functionality to your CNC system. The MP-01 provides the following;

- Serial Communications
 - Modbus Protocol Stack
 - RS-485 Full Duplex Interface
 - 115,200 or 57600 baud rate
- 1 Manual Pulse Generator (MPG) 100 pulses / 360°
- 2 Rotary switches
 - 8 position for Axis selection
 - 4 position for step size
- Status indicator LED output
- 1 Potentiometer Analog input with 10-bit resolution (1024 steps)
- 4 momentary switches
- 2 dead-man enable switches
- Emergency Stop Switch
- Power Supply Input
 - +16 to +24 Vdc (100mA max, excluding breakout board)
- Other Features
 - Curly cord cable (extends to 15ft)
 - Inbuilt magnets for mounting to metal surfaces
 - Splash proof to Nema 6(Short time immersion).
 - Breakout board
 - RS-232 to RS-485 full duplex converter.
 - Switch mode 5V/ 1A regulator.
 - Pluggable 3.81mm connectors.
 - Power indicator LED
 - RX and TX communications activity indicator LEDs on Breakout Board
 - 4mm mounting holes + standoffs.

The ModIO™ MP-01 Pendant can be used with any controlling software supporting the Modbus RS-485 standard. In this manual we will use the Modbus Master software mbReader when we need to illustrate the master side of the Modbus interface. The mbReader software can be downloaded from : <http://www.artsoft.ca>

Quick Start Guide

This section is intended to allow you to set up your new ModIO™ pendant to use Mach3 to read the pendant's state and to control the output status LED of the pendant. When you have successfully done this you will have experience which will help you understand the information in subsequent chapters.

We cannot too strongly advise you to follow these simple tests if you have not used a ModIO™ Pendant before. Its neat appearance belies a complex piece of equipment. Every effort has been made to try and make the interfacing of the pendant as simple as possible. In addition you must ensure that the software in the PC (the master) and the ModIO™ Pendant (the slave) are compatibly configured. The serial communications cannot be simply diagnosed with a multi-meter or logic probe in the way that the connections between parallel port and breakout board can. If you do encounter any difficulties then an understanding of what you are aiming to do and a systematic set of testing steps will ensure your success.



This manual contains many diagrams, but if you have difficulty in understanding them you are strongly advised to seek assistance from someone with electronics experience. Incorrect connections could damage the ModIO™ and/or the equipment to which you are interfacing.

What you need

To get started you need:

- a ModIO™ MP-01 Handheld Pendant
- a MA-02 Breakout Board
- a power supply (e.g. wall-wart aka plug-top transformer) delivering 16 to 24 volts DC
- a lead with a D9 Male connector at one end (the ModIO™) and a D9 Female connector at the computer end
- a PC with a serial (COM) port available and mbReader installed on it

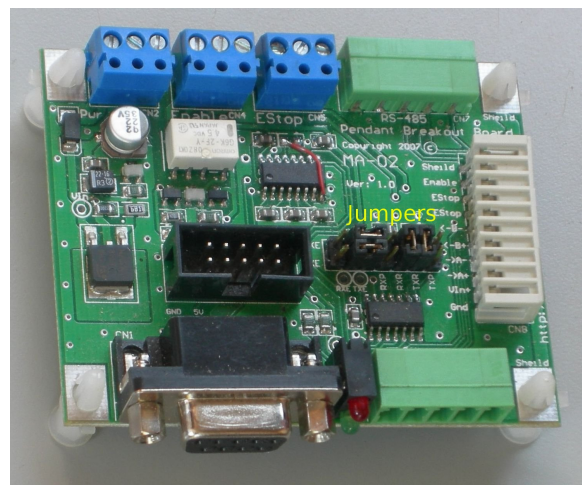


Figure 2.1 – Default Jumper Settings

With the power to PC and MA-02 breakout board switched off connect the MA-02 breakout board to the PC by the serial cable. This plugs into CN2 on the breakout board.

Connect the MP-01 pendant to the breakout board by plugging the connector on the pendant curly cable into the matching connector MA-02 breakout board CN8

Check that the jumpers are in their default positions as shown in figure 2.1 Notice that the jumpers and pins have been highlighted for clarity of illustration.

Connect the power supply to CN1 on the MA-02 breakout board.

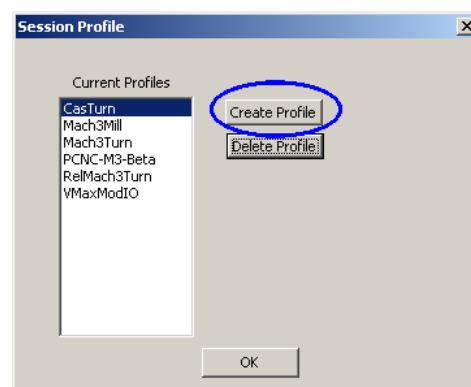


Figure 2.2 – Creating new Profile

Configuring Mach3

Turn on the computer and MA-02 Breakout board power supply. The yellow power LED on the MA-02 breakout board, should light

Next you need to tell Mach3 about your ModIO™ Pendant

In this chapter we give you a recipe that works for a single ModIO™ Pendant.

Configuring Mach3

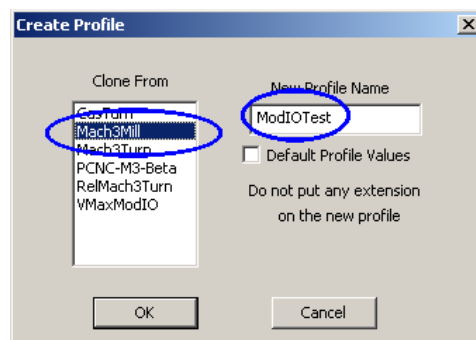


Figure 2.3 – Naming and cloning

Double click the Mach3 icon – not Mach3Mill. Click Create Profile. And fill in the new name and highlight that you want it cloned from Mach3Mill. If you have another profile you normally use then you can clone from this. See figures 2.2 and 2.3.

You can either create a new shortcut for your profile (see *Using Mach3Mill* manual) or run Mach3.exe and select from the list of profiles

In this manual we will assume that you are using the standard 1024.set screens. The Pendant will however work with any screen set.

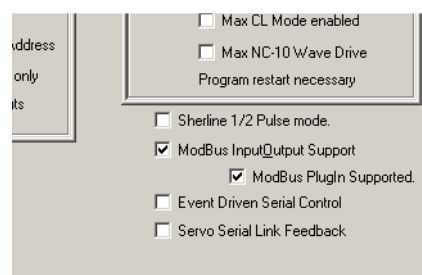


Figure 2.4 – Enabling ModBus I/O

You do not need to have your machine tool connected to it and can work in the *Offline* mode to be able to clear the EStop condition.

On Config>Ports and Pins, Port Setup & Axis Selection tab, check *ModBus Input/Output Support* and *ModBus Plugin Supported*. (see figure 2.4) Close Mach3 and reload it with your ModIOTest profile



Figure 2.5 – A default Modbus configuration in Mach3

Open the dialog from the Config>Setup ModBus Control menu. It will look like figure 2.5

This complex looking screen allows Mach3 to be used with virtually any Modbus device – e.g. a custom programmed PLC. All that you need to set is the information about your serial port.

It is assumed that you are plugged into COM1 on your PC. The baud rate and async parameters need to be set to 115200 and 8-1-N which is the ModIO™ Pendant default. Use RTS is only relevant to half-duplex RS-485 operation and the serial timeout is best set to 100ms.

At this stage no activity will be seen on the Pendant as we have not configured the plugin driver.



Figure 2.6 – Modbus Test Screen

Click on the Test Modbus button on the top right hand corner of the menu. It will look like figure 2.6.

Set the port to 1, if that's what you are using. Set the Baud rate to 115200, the Slave address to 27. The start to register 1150 and the Num regs to 7. Then press the Open button to open the port. Then press the read button, you should now see the data read from the pendant as shown in figure 2.6. If you move the slider to the right, the registers will be continuously read.

When you press the read button or move the slider you should see the red and green LEDs on the

breakout board flash, indicating that communication is occurring.

There is no point in going further if you cannot get the regular red/green flashing when the Pendant is connected to your running Mach3. Recheck connections, that the ModBus Control dialog looks correct.

If all is well you can close the test menu window and the Modbus configuration window and move on to using the plugin.

Setting up the Plugin

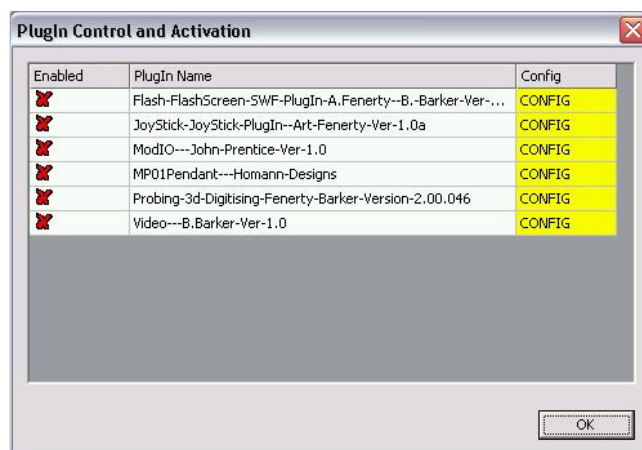


Figure 2.7 – Mach Plugin Control

The ModIO™ Pendant plugin, MP01Pendant.dll need to be placed in the Mach3 Plugin directory, C:\Mach3\PlugIns.

Open the Config->Config Plugins dialog. It will look like Figure 2.7. Tick the X for the “MP01Pendant---HomannDesigns” plugin and it should change to a green tick.

You will then need to press OK, exit Mach3 and restart it. Open the Plugin config menu as shown in Figure 2.7. Press the yellow CONFIG for the MP01Pendant, and the dialog as shown in Figure 2.8 will open.



Figure 2.8 – MP-01 Pendant Plugin Config

Press the New Pendant button to create the configuration. Then press the Configure Pendant button to bring up the configuration screen for the pendant. It should look like Figure 2.9

You can leave the configuration as shown, or alter the values. The check box that is ticks forces you to press the yellow enable buttons to do most operations. Uncheck this if you don't require the extra safety feature. Press OK to close the screen and finish the configuration.

Press Done to close the Pendant Plugin Config Screen.

Press OK co close the Plugin Control Screen.

Exit Mach3 and restart.

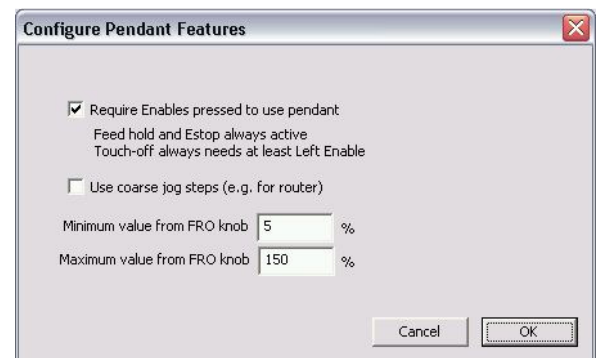


Figure 2.9 – MP-01 Pendant Plugin Config

Revision data

Version	Date	Change record
0.1	10 Janurary 2008	Initial issue of Quick Start manual

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