

PIO-12 Data Acquisition Board Design

Introduction

CAUTION

This PIO-12 is a slightly different design than earlier production PIO-12s. This change occurred in all PIO-12s manufactured after November 1996, as a result of a change by the manufacturer of the 8255 to the 82C55 chip with C-MOS technology. Newer production boards incorporating this change can be easily identified by the 82C55 part number on the main IC on the board. (The older design contains an 8255A or a 71055C part as the main IC.) The primary effect of this change is that in some applications some devices (such as relays) connected to the outputs may be turned “ON” when the board is first powered up. After the board is initialized and the ports are configured as inputs or outputs and set to the desired state, the board will operate in the same manner as previous version production boards. If an “ON” condition prior to initialization presents no problems or hazards or if the system is designed such that no such condition occurs, the current PIO-12 board can be used in applications designed to use the original PIO-12. Refer to the following paragraphs for technical details regarding the potential “ON” condition.

If the potential “ON” condition during power-up cannot be tolerated, we recommend the use of the PIO-24, which does not exhibit this circuit behavior. The PIO-24 has the same pinout as the PIO-12. Refer to Figure 1.

Note

The PIO-24 does not support modes 1 and 2 of the 8255, which is required in some special applications.

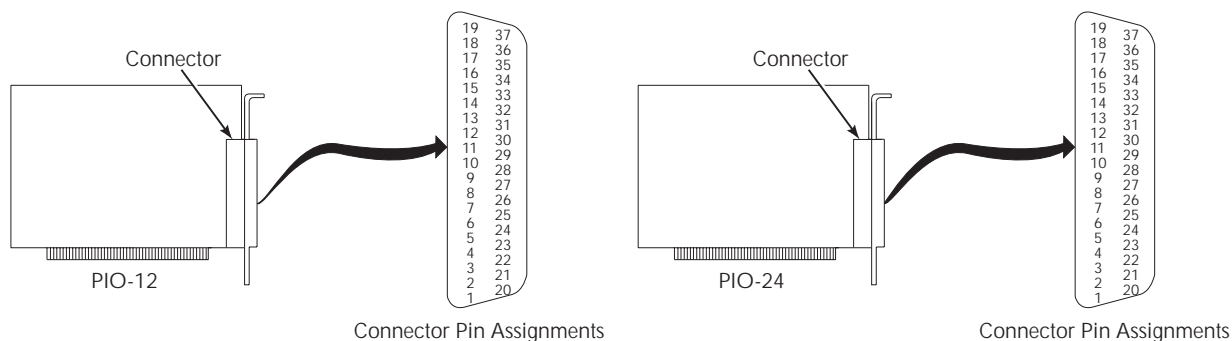


Figure 1
Models PIO-12 and PIO-24

Technical details

The PIO-12 (original design) I/O ports are tri-state designs as shown in Figure 2. At power up, all I/Os are set to a high impedance mode as inputs. Relays, transistors, etc. connected to these pins will remain in an “OFF” state during power-up and board initialization. The outputs will then be controlled by their software program. Whether “HI” or “LO” is considered, “ON” depends on the circuit connected to the output.

The PIO-12 (newer production) I/O ports, as shown in Figure 3, incorporate an internal pull-up to +5V DC on each pin. This circuit can source as much as 400µA whenever 5V DC is applied to the board. As shown in Figure 4, this can energize low power

relays, some solid state relays, and transistors (such as input transistors on an ERB-24 relay board), turning such devices to an “ON” state during power-up. Once the board is initialized, any I/O port set to an output state will go to appropriate “HI” or “LO” state and act in the same manner as an original design PIO-12. Note, as show in Figure 5, output devices connected to the PIO-12 in a “LO = ON” configuration will not experience problems during the PIO-12 power-up sequence. Also note that the SSIO-24 board contains circuits that permit the use of any PIO-12 version (original design or new) without experiencing problems during the PIO-12 power-up sequence.

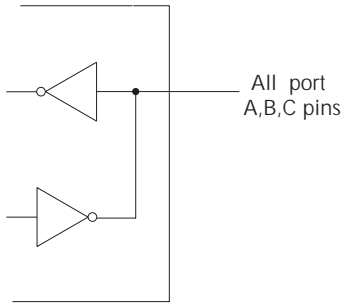


Figure 2
Original PIO-12 I/O stage (with 8255)

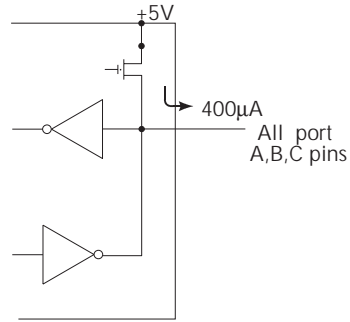


Figure 3
New production PIO-12 I/O stage (with 82C55)

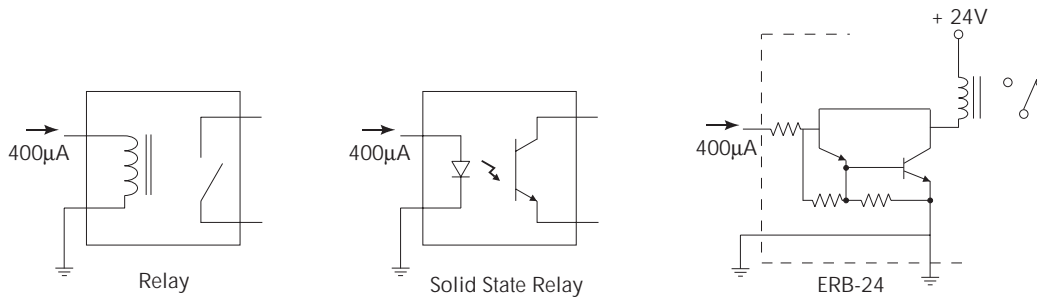


Figure 4
Examples of output devices and configurations that can be turned “ON” by a PIO-12 during board initialization

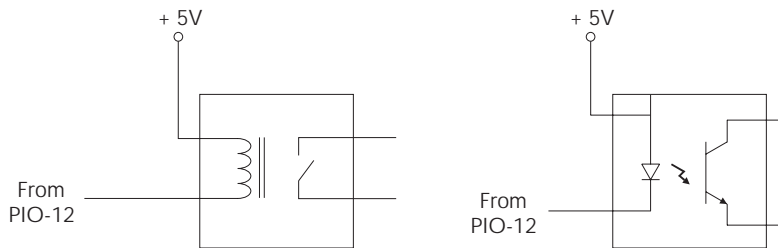


Figure 5
Examples of output devices and configurations that will not be turned “ON” by a PIO-12 during board initialization