

PCIe Precision Timer Relay Board (PTRBe)



Specifications & Installation Guide



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Read Me First: Safety and Electromagnetic Compatibility

This chapter contains safety instructions and electromagnetic compatibility (EMC) information for the hardware it accompanies. This chapter is a supplement to the hardware documentation. Read this chapter before installing and using the scanner.

Safety Information

This section contains important safety information that you **must** follow when installing and using the hardware.

Do not operate the hardware in a manner not specified in this document and in the user documentation. Misuse of the hardware can result in a hazard. You can compromise the safety protection if the hardware is damaged in any way. If the hardware is damaged, return it to LaserLinc for repair.

Do not substitute parts or modify the hardware except as described in this document. Use the scanner only with the accessories and cables specified in the installation instructions or specifications. You must have all covers installed during operation of the scanner.

Do not operate the scanner in an explosive atmosphere or where there may be flammable gases or fumes.

Prior to connecting or disconnecting external devices from the hardware, ALWAYS first disconnect the power cord from the Precision Timer Relay Box.

Contents

Read Me First: Safety and Electromagnetic Compatibility	iii
Safety Information	iii
Configuration (Must Be Used With PCIe-DIO24-CTR12 Card).....	1
Preface	2
Compliance.....	3
Electromagnetic Compatibility Information.....	3
FCC/DOC Radio Frequency Interference Class A Compliance	4
Federal Communications Commission.....	4
Notices to User	4
Canadian Department of Communications.....	5
Conventions.....	5
Intended Use Of The Equipment	5
Installation And Configuration	6
PTRBe—Safety Considerations	6
Specifications	7
Timer Relay—Control Loop Output Specifications:.....	7
Alarms—Digital Output specifications	8
Digital Isolated Inputs.....	8
Encoder Inputs	9
User Voltage	9
Physical/Electrical	9
Precision Timer/Digital I/O Specification/Installation	10
Description	10
Configuration	10
Configuration—Total Vu Hardware Mapping.....	12
User Configuration Jumper Diagram	15

Configuration—Total Vu Hardware Mapping—Silk Screen.....	16
Installation Procedure Quick Start	18
Installing A PCIe I/O Card And PTRBe Box.....	18
Setup In Total Vu.....	22
Wiring Procedure.....	23
Digital Input.....	23
Using An External Voltage Source	23
Connecting the two wires to the digital input terminal.	24
Methods of providing a switched voltage source.....	24
Using An Internal Voltage Source (PTRB only).....	28
MOP Connections.....	30
Counter (Encoder) Inputs.....	30
Testing Procedure	32
Testing Alarms.....	32
Testing Digital Inputs.....	32
Testing Closed Loop Control (Relays)	33
Testing Closed Loop Control (MOP)	34
Example Configurations.....	36
Digital Inputs.....	36
Configuring Digital Inputs in the Properties Tab.....	37
Reset Footage Counter Footage Example	39
Using Digital Input To Trigger An Action.....	40
Configuring Digital Inputs in the Properties Tab.....	41
Configuring Digital Inputs in the On Actions Tab	42
Using Digital Input To Trigger an Alarm	43
Using Digital Input To Trigger A Relay (Digital Output).....	44
Record Digital Input in Process Tracker	46
Record Digital Input As Flaw Detection Event	49
Record Digital Input In A Data Log File.....	51
Attributes and Actions for Data Logging	51
Data Log Setup	53
Actions and Buttons Needed for Data Logging	54
Switch Between Digital Input Associated Actions Using A Button.....	55

Configuration (Must Be Used With PCIe-DIO24-CTR12 Card)

_____ (1-6 Loops) P/N 7000-3319-03e— μ Linc

_____ (1-6 Loops) P/N 7000-3319-03e—Enclosure

_____ Alarms (8-12)

_____ Digital Inputs (8-12)

_____ Encoder Inputs (8-12)



Figure 1. Enclosure Box Configuration (left), μ Linc Configuration Terminal Blocks (right).

Preface

This manual is intended for any user, or potential user, of LaserLinc's Precision Timer Relay Box (PTRBe). It is a supplement to Total Vu™ software manual and other hardware manuals. The goal of this manual is to cover only items and features specific to the PTRBe. For general features and operation, refer to the Total Vu software manual.

Included is a PTRBe Quick Start Guide. This may allow you to get your PTRBe up and running quickly, especially if you are an experienced PTRBe user. It may also be used to answer some questions quickly. But the Quick Start Guide is not intended to replace the full manual and will not address every application.

At LaserLinc, software development is always ongoing. You may encounter a feature in your version of Total Vu that appears to differ from the description in this manual. If you encounter such a feature and have a question about it or an issue with it, please contact LaserLinc directly for an answer or clarification. Contact information is available at the beginning of this document, or at <http://www.LaserLinc.com>.

Compliance

Electromagnetic Compatibility Information

This hardware has been tested and found to comply with the applicable regulatory requirements and limits for electromagnetic compatibility (EMC) as indicated in the hardware's Declaration of Conformity (DoC)*. These requirements and limits are designed to provide reasonable protection against harmful interference when the hardware is operated in the intended electromagnetic environment. In special cases, for example when either highly sensitive or noisy hardware is being used in proximity, additional mitigation measures may have to be employed to minimize the potential for electromagnetic interference.

While this hardware is compliant with the applicable regulatory EMC requirements, there is no guarantee that interference will not occur in a particular installation. To minimize the potential for the hardware to cause interference to radio and television reception or to experience unacceptable performance degradation, install and use this hardware in strict accordance with the instructions in the hardware documentation and the DoC.

If this hardware does cause interference with licensed radio communications services or other nearby electronics, which can be determined by turning the hardware off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the antenna of the receiver (the device suffering interference).
- Relocate the transmitter (the device generating interference) with respect to the receiver.
- Plug the transmitter into a different outlet so that the transmitter and the receiver are on different branch circuits.

*The Declaration of Conformity (DoC) contains important EMC compliance information and instructions for the user or installer.

Operation of this hardware in a residential area is likely to cause harmful interference. Users are required to correct the interference at their own expense or cease operation of the hardware. Changes or modifications not expressly approved by LaserLinc could void the user's right to operate the hardware under the local regulatory rules.

FCC/DOC Radio Frequency Interference Class A Compliance

This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual, may cause interference to radio and television reception. Classification requirements are the same for the Federal Communications Commission (FCC) and the Canadian Department of Communications (DOC). This equipment has been tested and found to comply with the following two regulatory agencies:

Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at user's expense.

Notices to User

Changes or modifications not expressly approved by LaserLinc could void the user's authority to operate the equipment under the FCC Rules.

This device complies with the FCC rules only if used with shielded interface cables of suitable quality and construction. LaserLinc used such cables to test this device and provides them for sale to the user. The use of inferior or non-shielded interface cables could void the user's authority to operate the equipment under the FCC rules.

If necessary, consult LaserLinc or an experienced radio/television technician for additional suggestions. The following booklet prepared by the FCC may also be helpful: *Interference to Home Electronic Entertainment Equipment Handbook*. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402.

Canadian Department of Communications

This Class-A digital apparatus complies with Canadian ICES-001

Cet appareil numérique de la classe-A est conforme à la norme NMB-001 du Canada

Conventions

— This icon denotes a caution, which advises you of precautionary measures to avoid injury, data loss, or a system crash. When this symbol is marked on the product, refer to the [Read Me First: Safety and Electromagnetic Compatibility](#) section of this manual for precautions to take.



— This icon denotes a caution, risk of electrical shock, which advises you of precautionary measures to avoid injury. When this symbol is marked on the product, refer to the [Read Me First: Safety and Electromagnetic Compatibility](#) section of this manual for precautions to take.

Intended Use Of The Equipment

The Precision Timer Relay Box (PTRBe) is an input/output device used in conjunction with LaserLinc's micrometers and ultrasonic measurement systems and provides dry contact switches to perform alarming, input indicators, and closed loop control. Common connections would include AC or DC lights, audible alarms, switch closures from other devices such as Programmable Logic Controllers (PLC) or extruders.

Installation And Configuration

PTRBe—Safety Considerations

The PTRBe must be placed in a location where it is easy for the operator to disconnect the power cord from either the PTRBe or from where it is plugged into in case of an emergency.

This equipment may contain voltage hazardous to human life and safety, and is capable of inflicting personal injury. To completely remove all power, ALL users' wires entering the PTRBe must be removed. This is easily accomplished using the pluggable terminals contained within.



— Caution: Before undertaking any maintenance procedure, carefully read the following caution notices.

- Explosive Atmosphere—Do not operate the box in conditions where flammable gases are present. Under such conditions, this equipment is unsafe and may ignite the gases or gas fumes.
- Part Replacement—Only service this equipment with parts that are exact replacements, both electrically and mechanically. Contact LaserLinc for replacement part information. Installation of parts with those that are not direct replacements may cause harm to personnel operating the PTRBe. Furthermore, damage or fire may occur if replacement parts are unsuitable.
- Modification—Do not modify any part of the PTRBe from its original condition. Unsuitable modifications may result in safety hazards.

Specifications

Typical for 25°C unless otherwise specified.

Timer Relay—Control Loop Output Specifications:

Number of Loops (when used with PCIeDIO24-CTR12 Digital I/O & Counter Timer Board)	6 Pulse Width 4 Pulse Count
Contact Configuration	Control—FORM A (SPST), NO and Common available at connectors 1A-5D
Contact Rating	5 amperes (A) @ 250 volts AC (VAC) or 28 volts DC (VDC) resistive
Number of Supported Motorized Potentiometers (MOP)	6
Contact Resistance	100 milliohms max
Operate Time	5 milliseconds (ms) max
Release Time	2 ms max
Bounce Time	1ms typ. at nom. voltage
Vibration	10 to 55 hertz (Hz) (Dual amplitude 1.5 millimeters (mm))
Shock	10 G (11 ms)
Dielectric Isolation	500 V (1 minute)
Life Expectancy	15 million mechanical operations, min
Switch Rate	360-ops/hr. max at rated load
Power on RESET State	Not energized. NC in contact to Common, open circuit: NO—Common

Alarms—Digital Output specifications

Number of Outputs	8 Standard 12 Optional (factory configured)
Alarms	FORM C (SPDT), NO, NC and Common available at connectors 1C-4D
Contact Configuration	(12) FORM C (SPDT) NO, NC and Common available at connector
Contact Rating	5 amperes (A) @ 250 volts AC (VAC) or 28 volts DC (VDC) resistive
Contact Resistance	100 milliohms max
Operate Time	5 milliseconds (ms) max
Release Time	2 ms max
Bounce Time	1ms typ. at nom. voltage
Vibration	10 to 55 hertz (Hz) (Dual amplitude 1.5 millimeters (mm))
Shock	10 G (11 ms)
Dielectric Isolation	500 V (1 minute)
Life Expectancy	15 million mechanical operations, min
Switch Rate	360-ops/hr. max at rated load
Power on RESET state	Not energized. Open circuit: NO—Common

Digital Isolated Inputs

Number of Inputs	12 Max 8 Conditioned, Non Polarized, \pm 2-30 VDC 4 Non Conditioned, Polarized, TTL / 5VDC
Isolation	500 volts (V)
Resistance	1.5K ohms
Input Range	\pm (2–30) VDC max

Encoder Inputs

Number of Inputs	12 Max 8 Conditioned, Non Polarized, \pm 2-30 VDC 4 Non Conditioned, Polarized, TTL / 5VDC
Isolation	500 volts (V)
Resistance	1.5K ohms
Input Range	\pm (2-30) VDC max

User Voltage

+5VDC @ 50ma / Ground—available at TP31 (blue push button connector)

Physical/Electrical

10" L (254mm) x 8" W (203mm)	Without MOP connectors
14" L (356mm) x 8" W(203mm)	With MOP connectors
Weight	4lb (1.8kg)
Power	PCIe-DIO240CTR12 card (P2 & P3) 5VDC @ 0.5A
Ambient Temperature	45F-110F, relative humidity 10%-90% non-condensing

Precision Timer/Digital I/O Specification/Installation

Description

The Precision Timer Relay Board (Express Version designation—PTRBe) integrates the functions of closed-loop control, digital I/O (alarms and user inputs), and latent encoder inputs into one compact package for use with Total Vu software. The PTRBe has no intelligence and must be used in conjunction with the PCIe-DIO24-CTR12 card. It is NOT compatible with previous control boards such as the PCI CTR-05 or USB 430x I/O & Counter cards.

External alarms and user-supplied input switches allow users a method of connecting external devices such as audible or visual alarms, cutters, sprayers, footswitch inputs, etc.

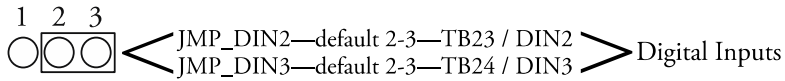
For closed-loop control, precision timed, pluggable, FORM A, 5 AMP relay contact closures are provided for Jog-up and Jog-down functions. Optionally, LaserLinc's MOPs may also be connected (MOPs not included). For alarming, pluggable, FORM C, 5 AMP relay contact closures are provided. For encoder and user inputs, \pm 2-30 VDC, non-polarized, and polarized TTL/5VDC, pluggable, terminal contacts are provided.

Configuration

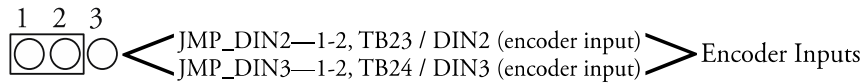
The PTRBe is highly-configurable, however, not all options are user-configurable. JMP_DIN2 & 3 allows the user to switch between standard digital inputs or encoder inputs.

STANDARD CONFIGURATION

Control	2 control loops—pulse <i>width</i> or pulse <i>count</i>
Alarms	8 Alarms—FORM C relays
Inputs	8 3-28V conditioned inputs 4 TTL inputs



Encoder Conditioned	2 3-28V/12Khz max, latent encoder inputs (field configurable ¹)
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Encoder TTL	4 TTL latent encoder inputs
MOP	2 MOP connections

EXTENDED CONFIGURATION (FACTORY CONFIGURED)

Control	6 control loops—pulse <i>width</i> or pulse <i>count</i>
Alarms	12 alarms—8 FORM C relays; 4 ² FORM A relays
Inputs	8 3-28V conditioned inputs 4 TTL inputs
Encoder Conditioned	2 3-28V/12Khz max, latent encoder inputs (field configurable)
Encoder TTL	12 TTL latent encoder inputs
MOP	6 MOP connections

1 If using these inputs, only 6 conditioned inputs are available.

2 If using alarms 8–12, only 4 control loops are available.

Configuration—Total Vu Hardware Mapping

Control Relays			Alarms	
Relay Form A	Loop #	CTR #	Relay Form C	Digital Outputs
1A	1	A1	1C	Port B_PB0
1B	1	A2	1D	Port B_PB1
2A	2	B1	2C	Port B_PB2
2B	2	B2	2D	Port B_PB3
3A	3	C1	3C	Port B_PB4
3B	3	C2	3D	Port B_PB5
4A	4	D1	4C	Port B_PB6
4B	4	D2	4D	Port B_PB7
5A*	5	A0	5A*	Port C_LO_PC2
5B*	5	B0	5B*	Port C_LO_PC3
5C*	6	C0	5C*	Port C_LO_PC0
5D*	6	D0	5D*	Port C_LO_PC1

*Optional Alarms 8–12. Factory configured for control loops 5&6

DIGITAL INPUTS			
Digital Input	Digital Inputs	Input Type	MOP # Auto/Manual Switch
DIN0	Port_A_PA0	Conditioned 3-28V	-
DIN1	Port_A_PA1	Conditioned 3-28V	-
DIN2	Port_A_PA2	Conditioned 3-28V	-
DIN3	Port_A_PA3	Conditioned 3-28V	-
DIN4	Port_A_PA4	Conditioned 3-28V	-
DIN5	Port_A_PA5	Conditioned 3-28V	-
DIN6	Port_A_PA6	Conditioned 3-28V	5
DIN7	Port_A_PA7	Conditioned 3-28V	6
TB33.1	Port C_HI_PC4	5V	3
TB33.2	Port C_HI_PC5	5V	4
TB33.3	Port C_HI_PC6	5V	1
TB33.4	Port C_HI_PC7	5V	2

ENCODER / COUNTER INPUTS			
Terminal Block	Function	CTR # /	Digital Inputs
TB29.1	Counter – 5V	A0	-
TB29.2	Counter – 5V	A1	-
TB29.3	Counter – 5V	A2	-
TB29.4	Counter – 5V	B0	-
TB30.1	Counter – 5V	B1	-
TB30.2	Counter – 5V	B2	-
TB30.3	Counter – 5V	C0	-
TB30.4	Counter – 5V	C1	-
TB31.1	Counter – 5V	C2	-
TB31.2	Counter – 5V	D0	-
TB31.3	Counter – 5V	D1	-
TB31.4	Counter – 5V	D2	-
TB32.1	GND	-	-
TB32.2	GND	-	-
TB32.3	GND	-	-
TB32.4	GND	-	-
TB33.1	Digital In	-	Port C_HI_PC4
TB33.2	Digital In	-	Port C_HI_PC5
TB33.3	Digital In	-	Port C_HI_PC6
TB33.4	Digital In	-	Port C_HI_PC7

User Configuration Jumper Diagram

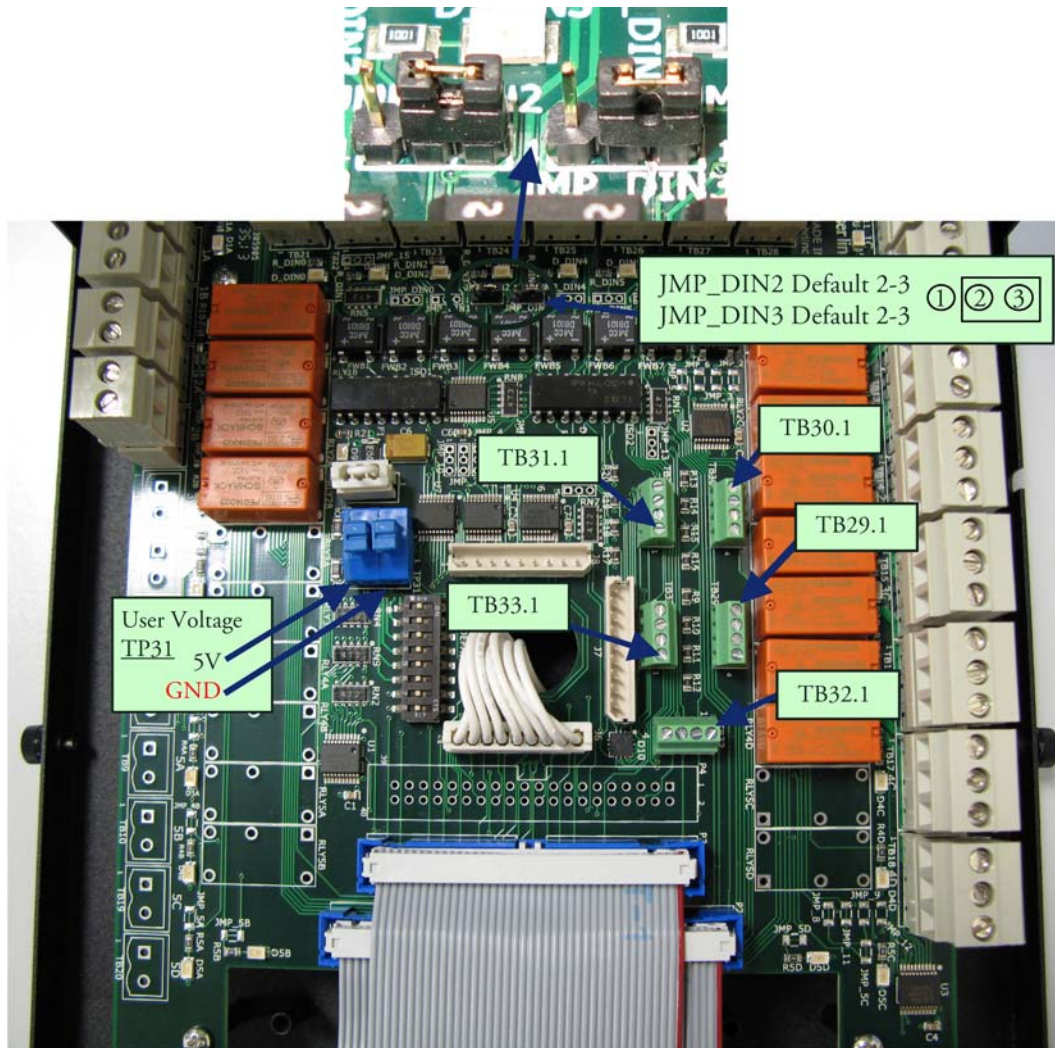


Figure 2. Configuration Diagram.

Configuration—Total Vu Hardware Mapping—Silk Screen

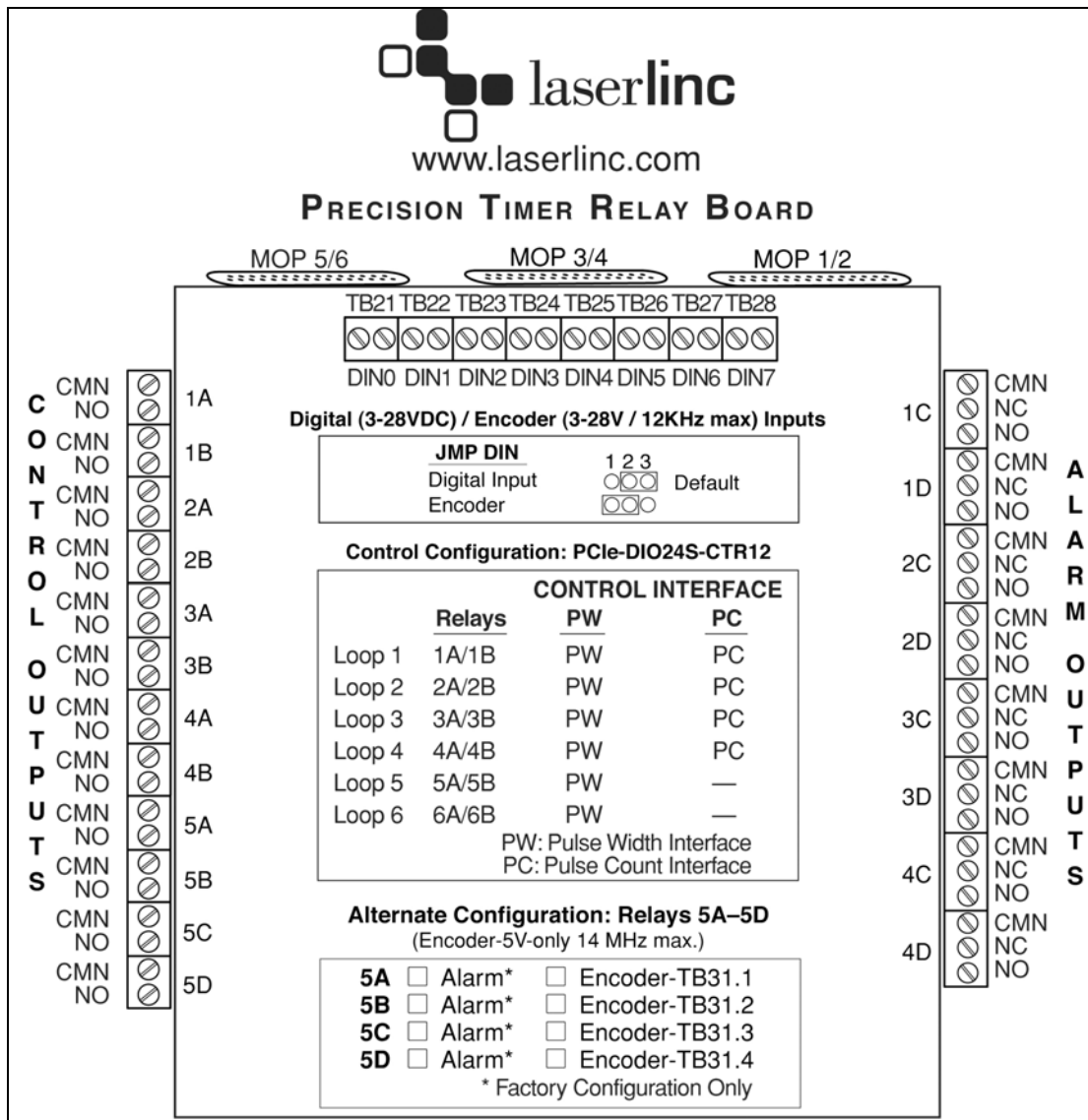


Figure 3. Connection Guide—Found Inside Enclosure Lid.

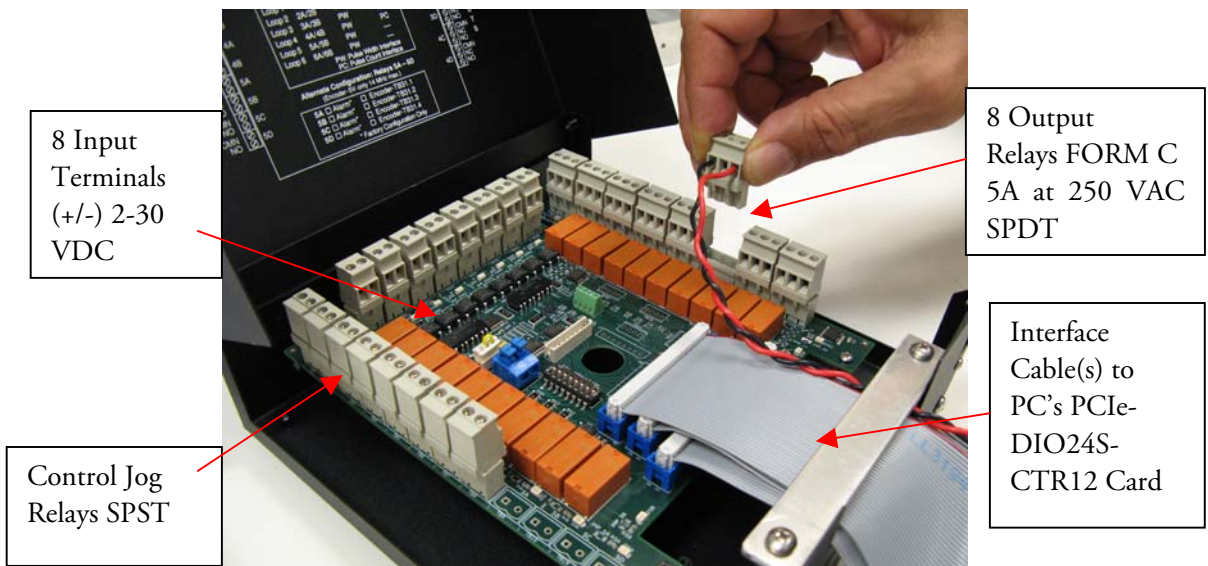


Figure 4. Hardware Configuration.

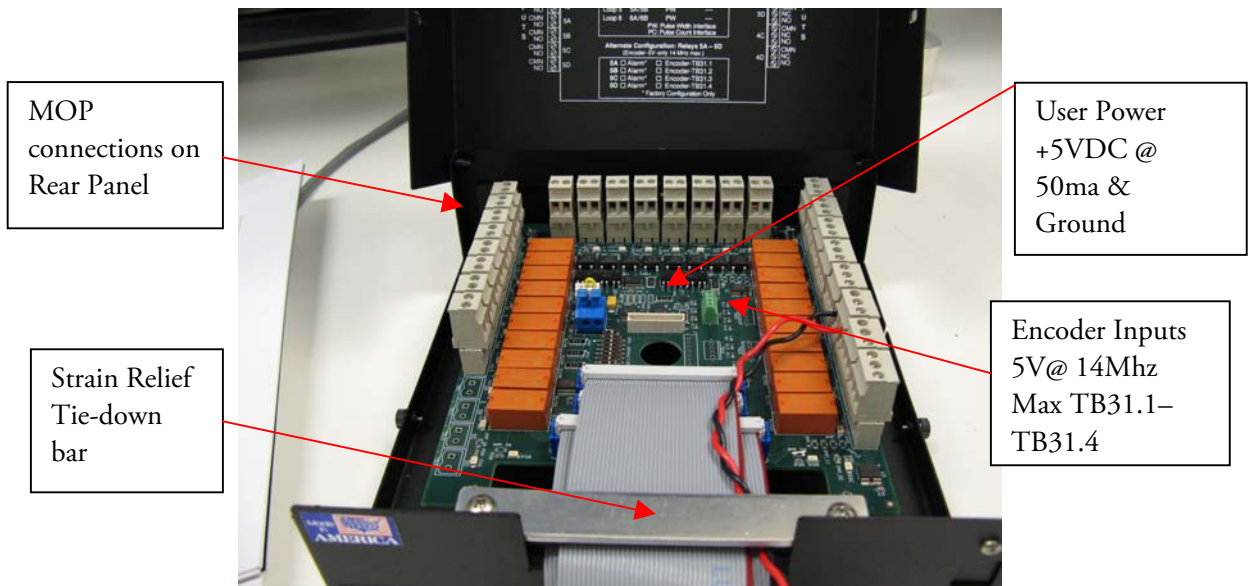


Figure 5. Hardware Configuration (continued).

Installation Procedure Quick Start

This chapter is a reproduction of Quick Start Guide 15. It presents the installation of a PCIe DIO24s-CTR12 I/O card in a Total Vu measurement system. You should already have completed all previous quick starts.

Installing A PCIe I/O Card And PTRBe Box

If you have Total Vu 5.13.8.13 or later installed, PCIe drivers are already loaded. If you have an earlier version, proceed with installation.

1. Determine whether you have a 32 or 64 bit operating system.
2. Download the setup file here: <http://public.laserlinc.com/PCleDriverSetup.zip>.
 - 2.1 Execute the PCIeDriverSetupxx.exe that is appropriate for your system (32 or 64 bit).
- 3 Prepare the computer.
 - 3.1 Shut down the PC.
 - 3.2 Disconnect the power cord from the computer.

It is not necessary to disconnect all cords and cables from the PC, but you may find that it simplifies this step.

- 3.3 Remove the panel to access the motherboard.
- 3.4 Remove the cover from an open PCIe slot.

Any open PCIe slot is okay.

4. Feed ribbon cables from PTRBe Box one-at-a-time through PC's back panel cover.
5. Nest the cables as shown in Figure 5.

Cables must be nested before connecting them to PCIe card.

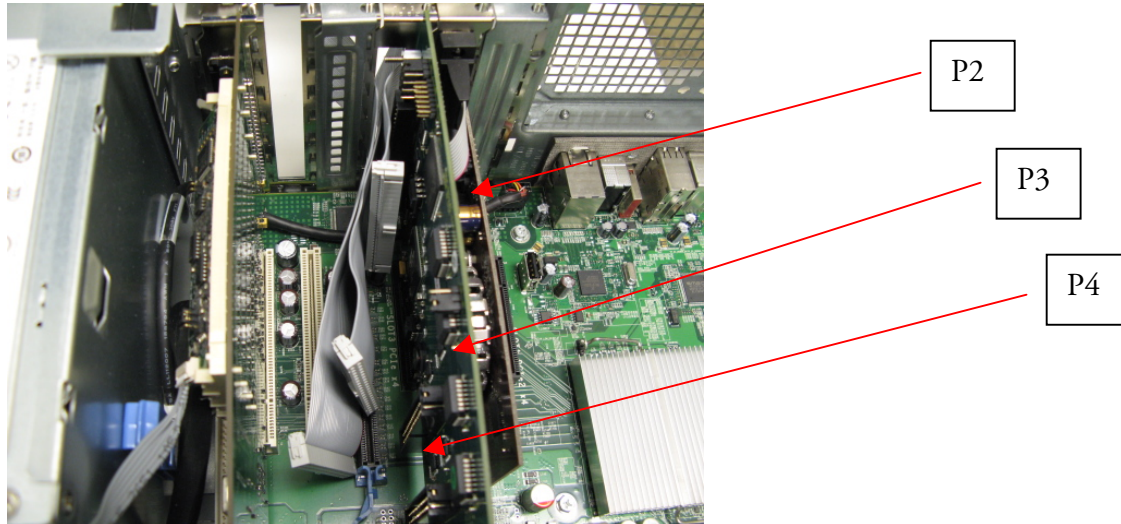


Figure 6. Nested cables in back panel of PC.

6. Remove strain-relief from PCIe card (see Figure 6).

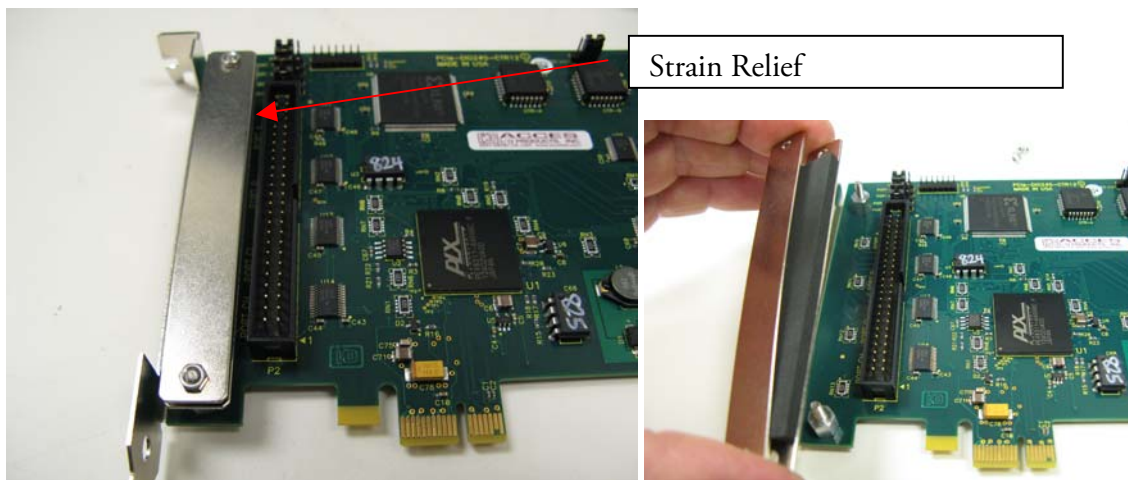


Figure 7. Strain-relief.

7. Prior to inserting PCIe card into slot, plug ribbon cable(s) P2, P3, and P4 into same connectors on PCIe card.

(P3 & P4 are optional depending on your configuration).

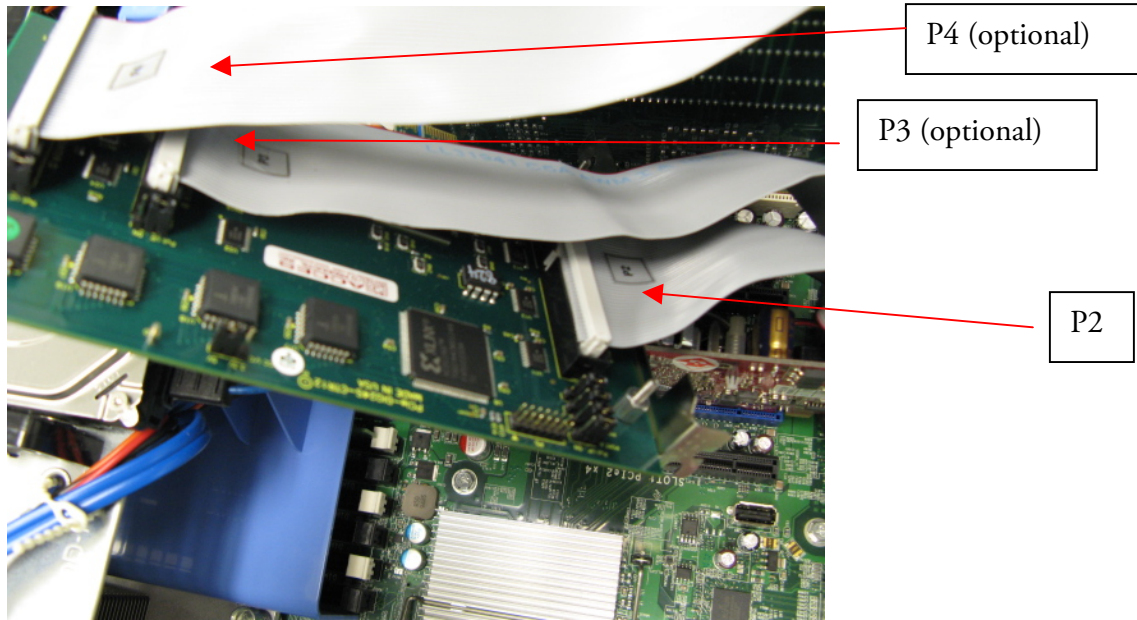


Figure 8. Optional connections.

8. Install Strain-relief with foam piece on bottom (shown in Figure 8).

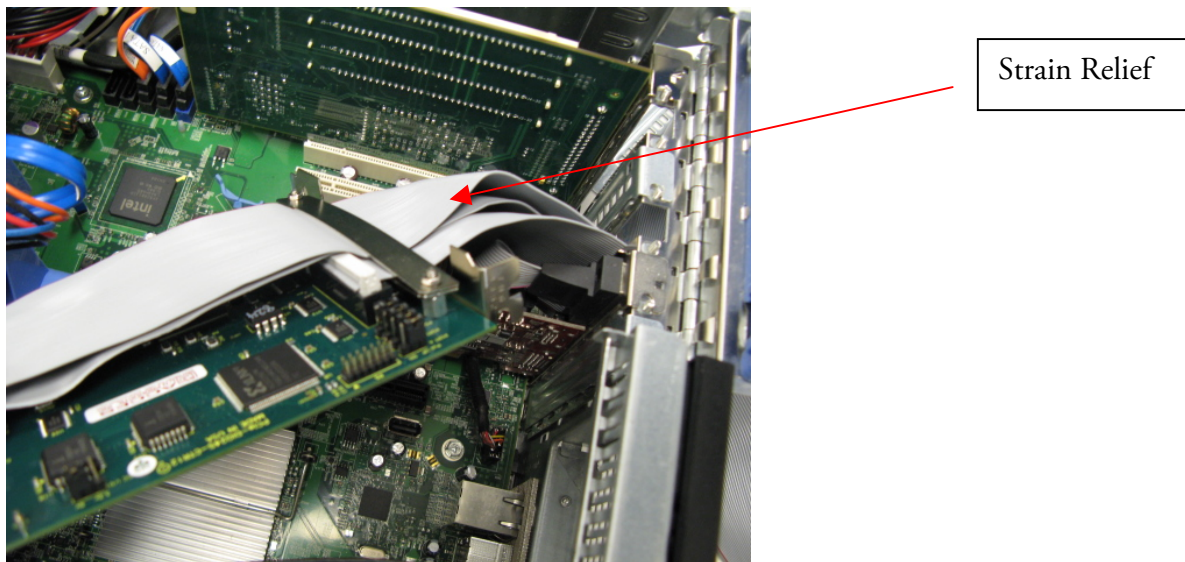


Figure 9. Strain Relief.

9. Install the Add-on Card in the slot, seating it fully in the slot on the motherboard and securing it to the back panel with a screw (See Figure 9).



Figure 10. Final Installation.

The card should gently snap into place. Some gentle force may be required, but if there is significant resistance, remove the card and look for obstructions. In most cases, you should use the screw that previously held the back panel slot cover to secure the card in place. In some PC chassis, there is no screw—another mechanism (e.g. a snap-down bar securing all cards) will secure the card.

10. Reinstall the side cover on the computer.

- 10.1 Plug into the power source.

- 10.2 Boot the PC.

Installation of PCIe card is Plug-N-Play, no further action should be required. If unsure, check *Device Manager* entry (See Figure 10).

If not already present, you may need to enable additional Total Vu options such as DIO or Control. Please contact LaserLinc tech support.

Setup In Total Vu

1. Open Total Vu.
 - 1.1 Enter *Full Configuration* (Total Vu/Full Configuration).
 - 1.2 Check that the icon for PCIe-CTR12-0 is present.

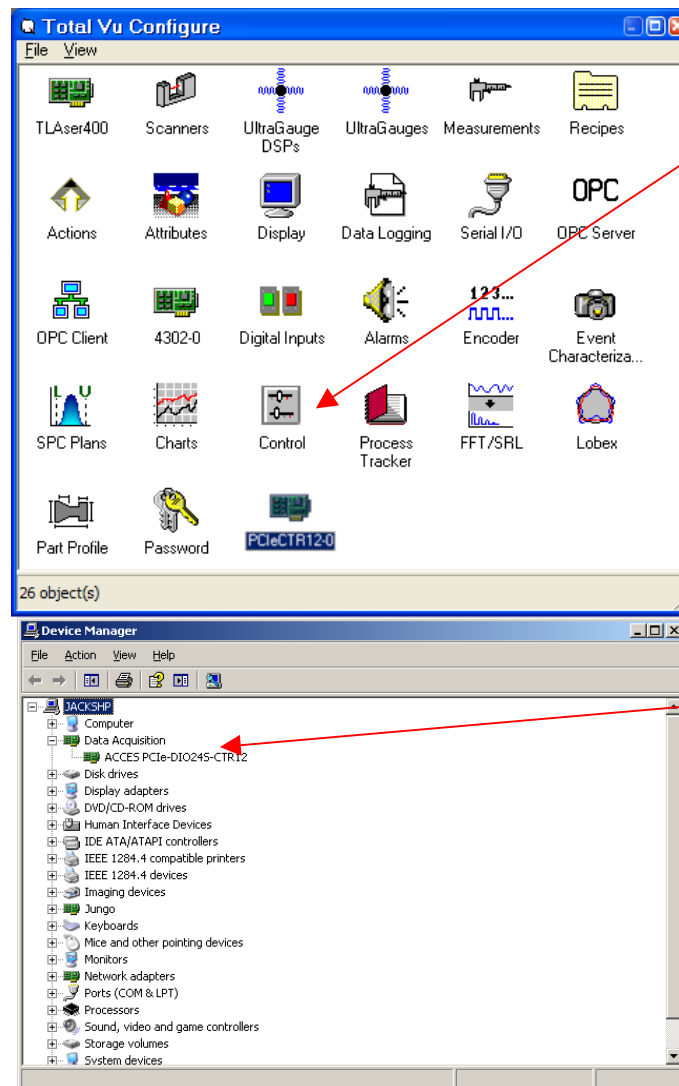


Figure 11. Total Vu Full Configuration window (top) and Windows Device Manager.

You may now configure Total Vu for alarms, digital inputs, encoder inputs, or control loops. The Total Vu configuration wizard will show the hardware connections

Wiring Procedure

Digital Input

Both the PTRB and the PDIS08 have eight digital input terminals. In order for these devices to receive a digital input the voltage difference between the two contacts on one of the terminals needs to change by a specified amount. There are two methods of producing this change in voltage difference for the PTRB as described in the sections Using An External Voltage Source and Using an Internal Voltage Source. The PDIS08 is only able to use the option described in Using An External Voltage Source.

Using An External Voltage Source

To transmit a digital signal, you must create a complete electrical circuit. To make this connection easier, we provide two contacts on each digital input terminal. Two separate wires are needed to make an electrical connection between these two contacts on the terminal and the voltage source provided by the customer. The two leads on a voltmeter can be used to measure the voltage difference between these two wires. For digital applications, the voltage difference between these two wires can either be *equal* (Voltage = 0 V) or *different* (Voltage = 2-30 V). It is the change between these two states that transmits the digital signal. Within this simple change in voltage are three variables that potentially can be reversed. In this product, each variable is *reversible*. You may connect the wires to the terminal in any order you prefer (polarity does *not* matter). You can also set the ON signal to trigger on either the change to equal voltage (0 V)(negative logic) or on the change to a difference in voltage (2-30 V)(positive logic). Lastly, you can configure only an ON action (Momentary) or an ON and an OFF action (Maintained). At this point, all you need to know is that as long as you involve only one terminal, you can connect these two wires in any order you desire.

Connecting the two wires to the digital input terminal.

1. Select one of your eight inputs (DIN0–DIN7) (PTRB) or (IP0–IP7) (PDIS08).
 - 1.1 With a screwdriver, turn the screw shown in Figure 11 counterclockwise until opening below for the wire is all the way open.
 - 1.2 Strip the last 0.25 inch of insulation from the wire.
 - 1.3 Insert the bare portion into the opening.
 - 1.4 Turn the screw clockwise until the opening is closed and snug.
 - 1.5 Give each wire a small tug to ensure they are not going to slip out.

You now have two methods of providing a switched voltage source on the other end of your wires. The method you choose is dependent on the device you plan to receive the digital signal from.

Methods of providing a switched voltage source.

1. Signal source with its own internal power supply.
 - 1.1 Connect your two wires directly to the signal output of the device.

If the signal source is only supplying one signal wire connection, the return wire may need to connect to the device's ground.
 - 1.2 Using documentation and/or a voltmeter, check that the source signal is +/- 2-30 V DC.
2. Dry contact switch closure provided as source signal.

This method will work with both the PTRB and the PDIS08. This method consists of wiring the dry contact switch and a voltage source in *series* between your two wires.

- 2.1 If you do not have a voltage source, find a DC power supply from any household electronic.

The DC power supply is identified by a distinctive box shape either midway (for laptops) or at the plug end.

- 2.2 Look on the box and verify it indicates a voltage between 2 and 30 V DC.

Just about any power rating (W) will suffice.

2.3 Cut the end off, and you will have your two wires with voltage source included.

The PDIS08 also has a power-out plug identical to the power-in plug for the device power supply. This power out plug may be used for your voltage source as shown in Figures 13 and 14.

If you are using a dry contact switch with a PTRB and do not have a voltage source, please see the section [Using an Internal Voltage Source](#) for information on using the device's internal power supply.

The following figures illustrate the second method of wiring a voltage source and a dry contact switch in series between your two signal wires first for the PTRB (Figure 11) and then for the PDIS08 (Figure 12).

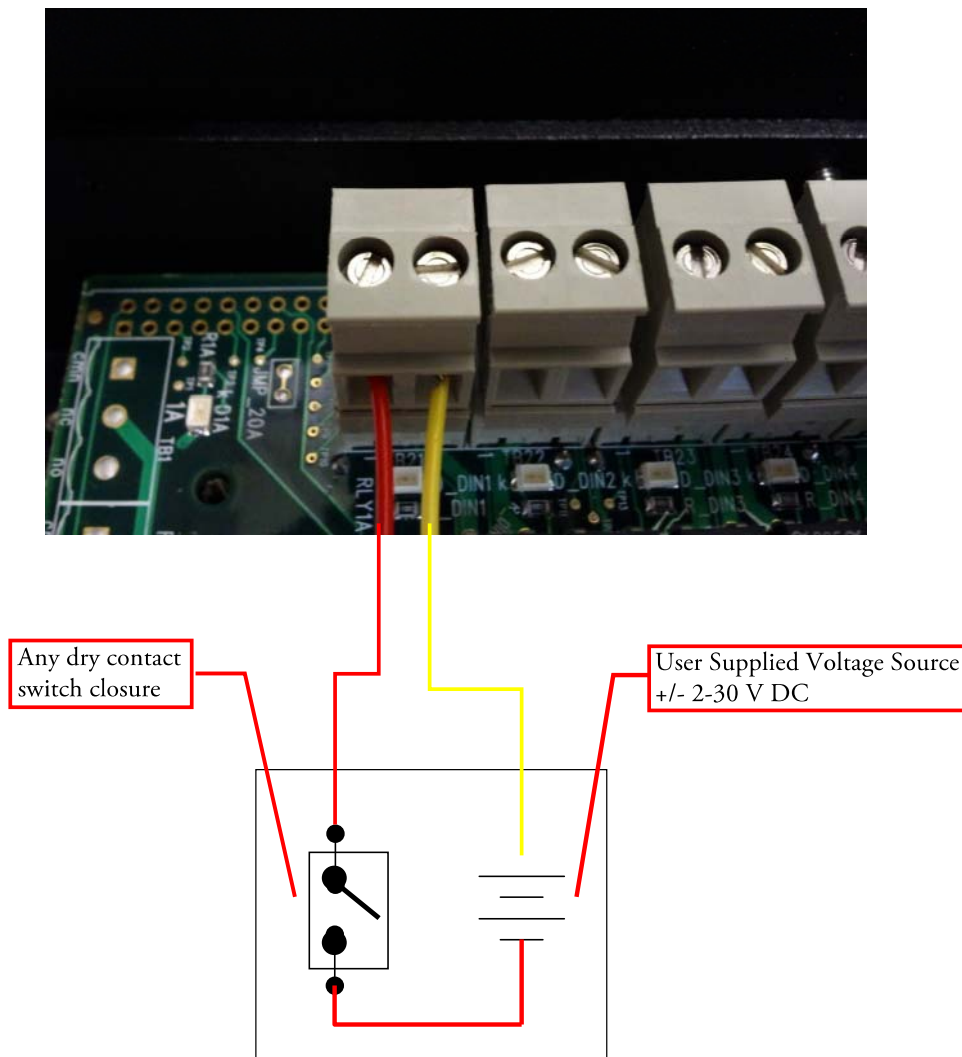


Figure 12. PTRB with connection to DIN0 Connected to Voltage source and dry contact switch closure.

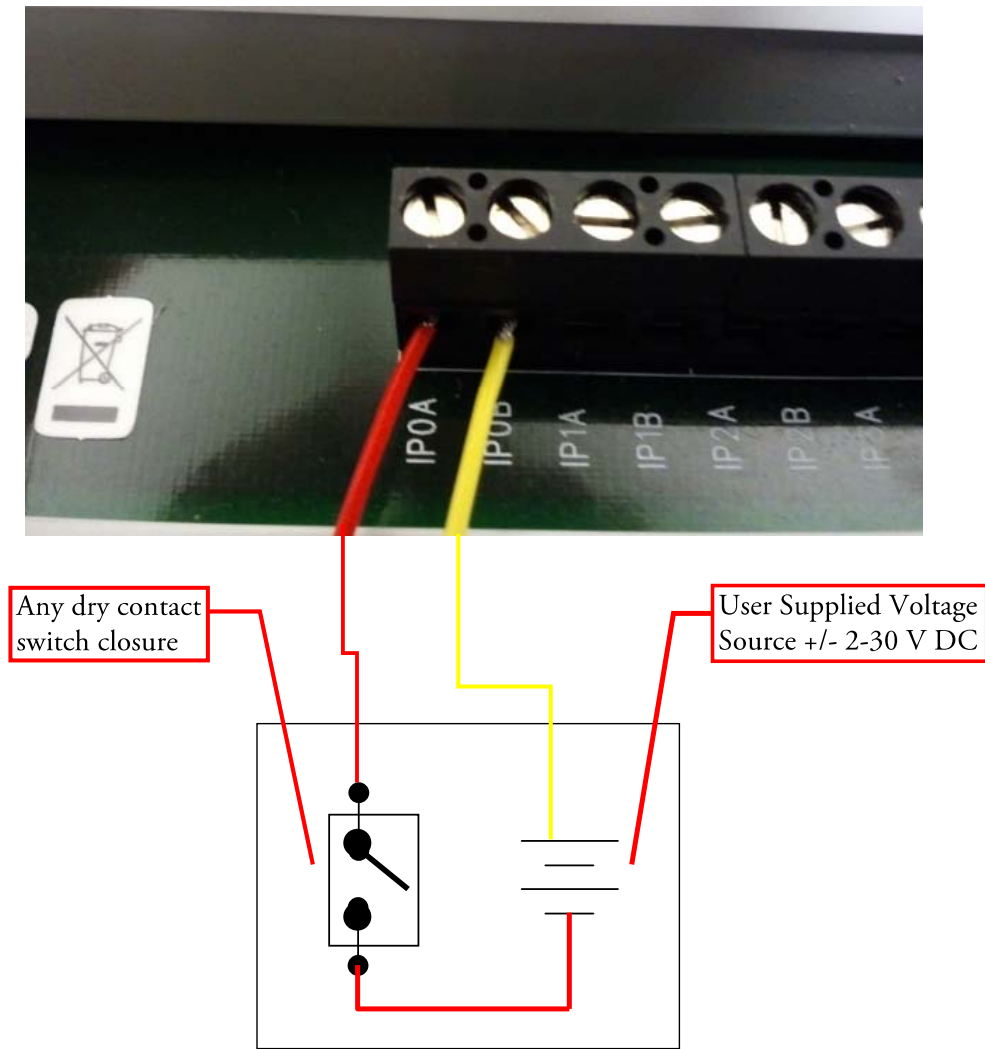


Figure 13. Illustration showing PDIS08 with connection to IP0 connected to voltage source and dry contact switch closure.

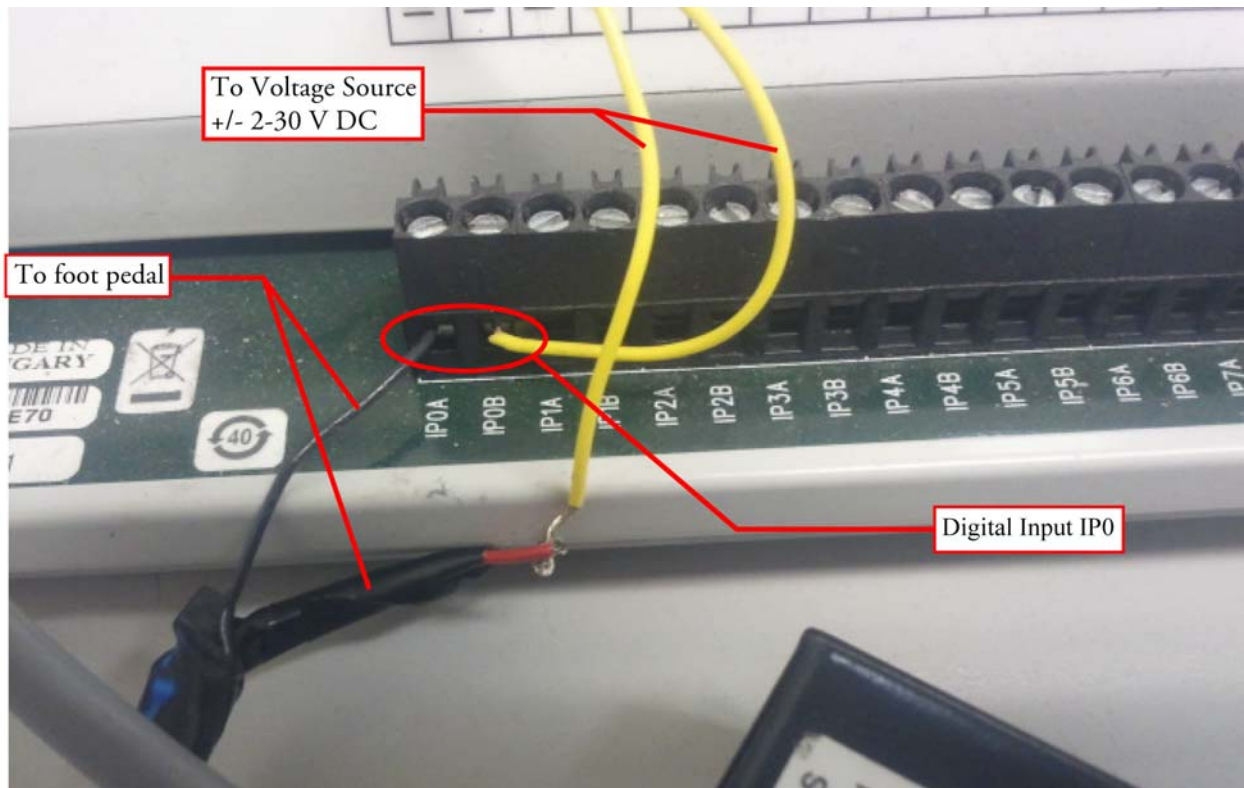


Figure 14. PDIS08 Showing use of Power Out and Foot Pedal.

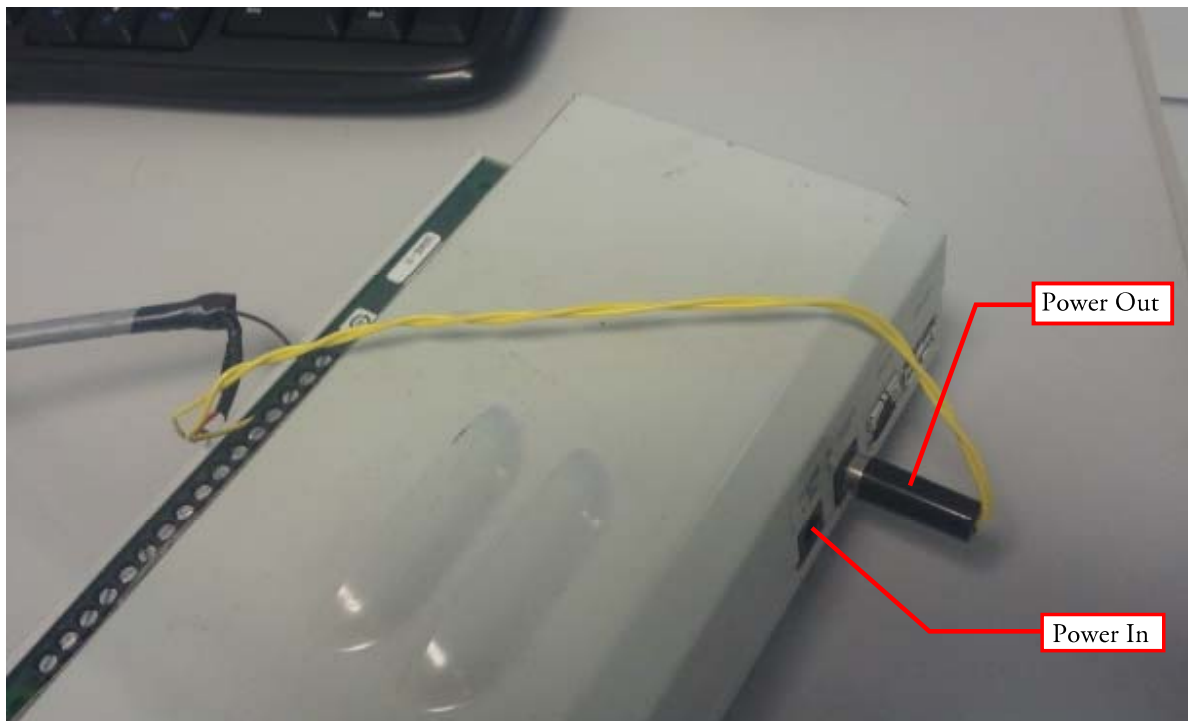


Figure 15. (what caption?).

Using An Internal Voltage Source (PTRB only)

An external voltage source is no longer required; the unit comes pre-wired with an internal voltage source. One pole of this internal voltage source has been connected through a DIP switch to the left contact on each of the eight terminals. The other pole is connected to the box ground. This means that if the DIP switch is turned on, the left contact of each terminal has the necessary voltage difference with respect to the box ground. To place this voltage difference across a terminal, all that is needed is a connection between the right terminal contact and box ground.

A digital input signal is generated by making or breaking this contact. As shown in Figure 15, the right contact of DIN0 is connected to a foot pedal and then to box ground. It can be connected in series with any electrical switch that is able to make and break electrical contact.

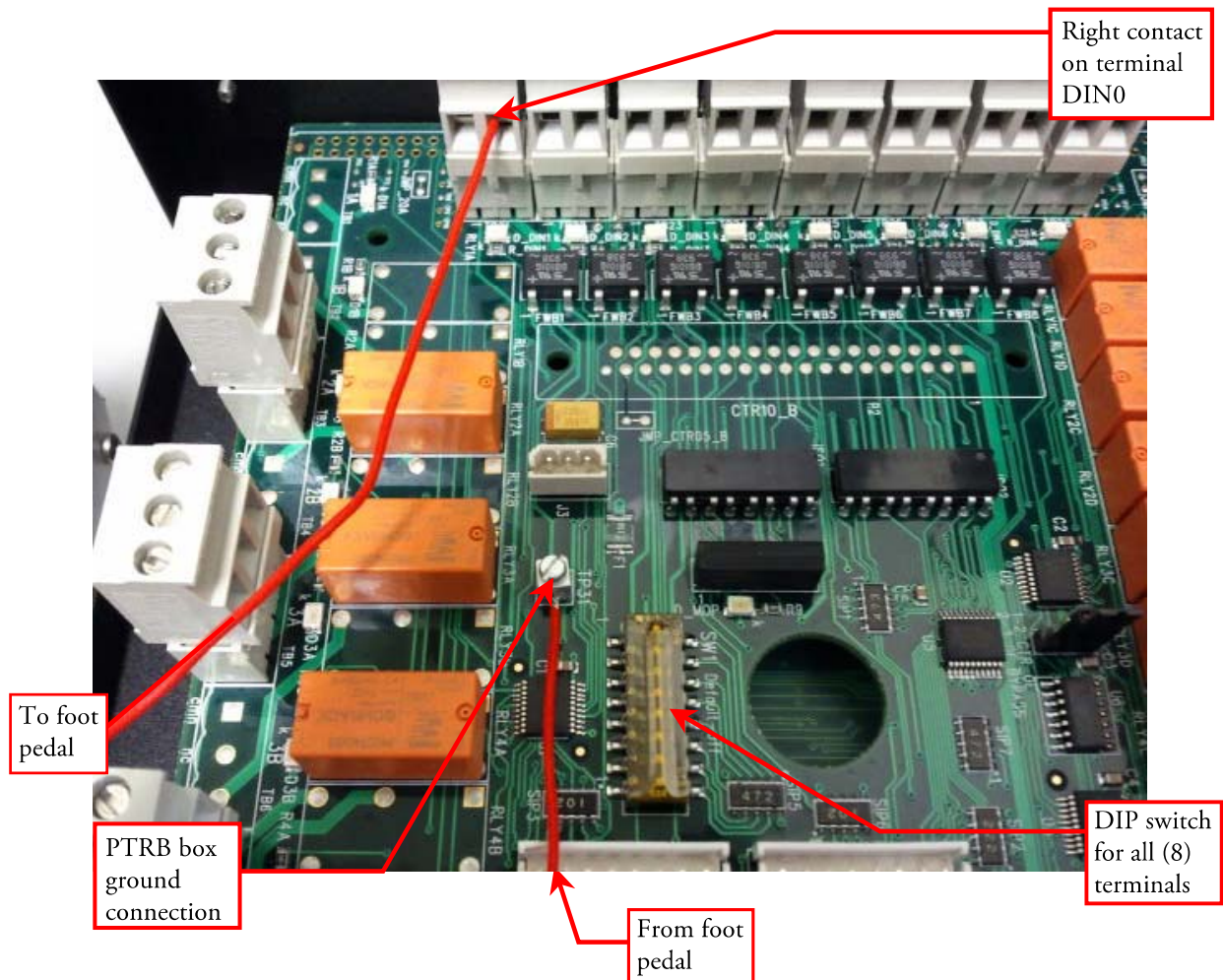


Figure 16. PTRB showing box connections necessary for dry contact switch

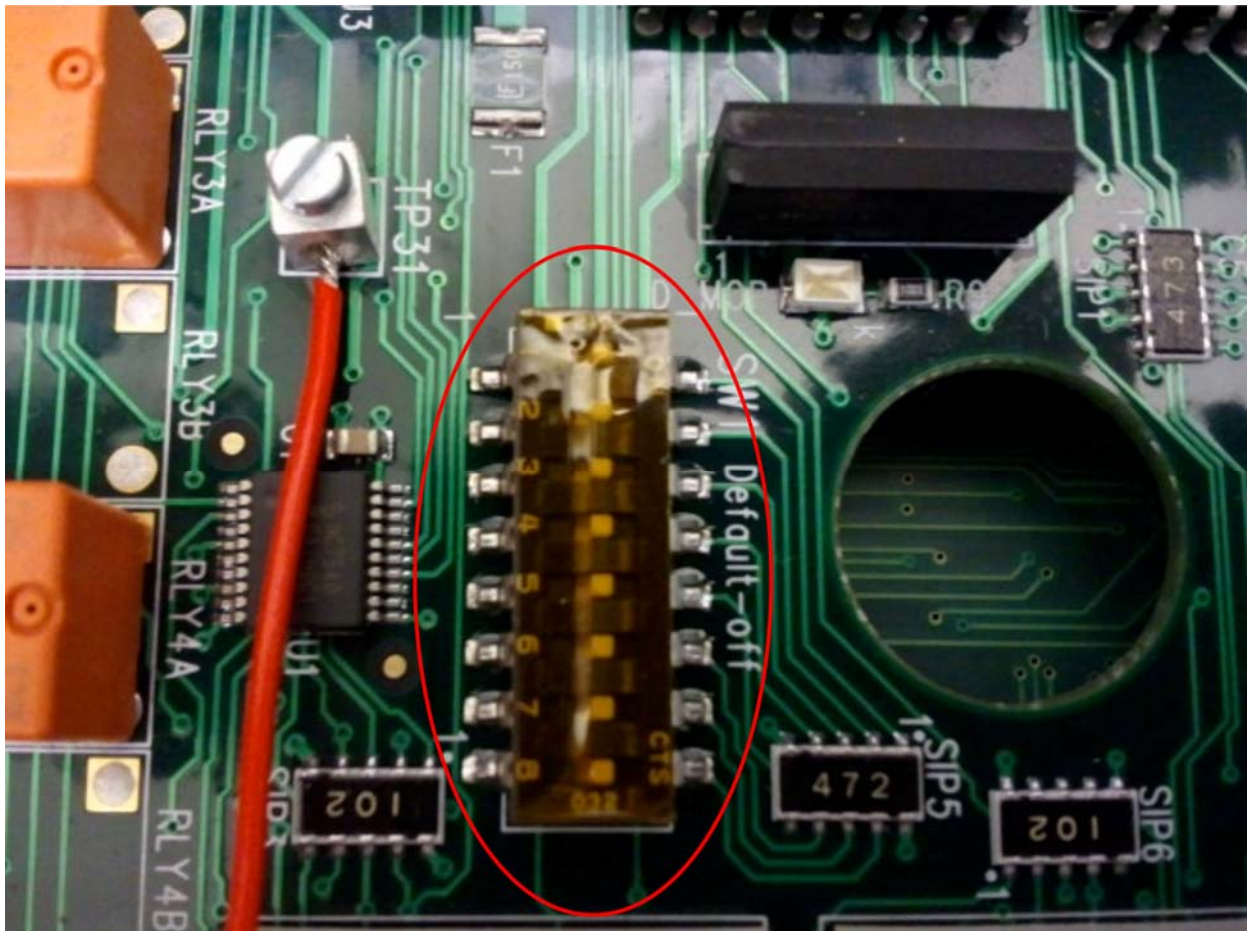
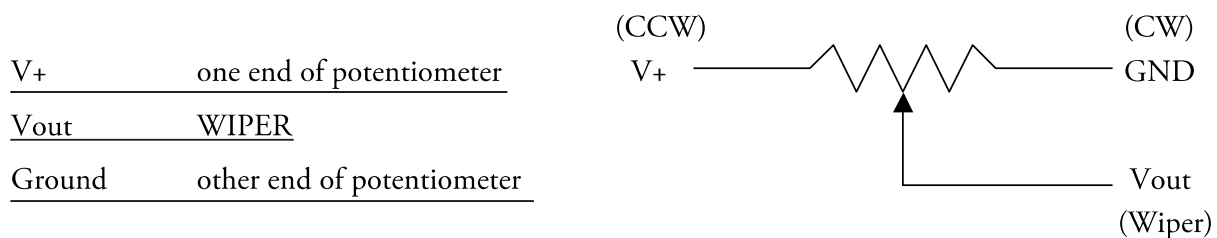


Figure 17. Closeup of DIP switch (all on) showing switches 1 through 8 for DIN0 through DIN7 respectively

For instructions on how to configure the software to use a digital input refer to the chapter [Configuring Digital Inputs](#) in the Total Vu manual.

To test your digital input, refer to the section [Testing Digital Inputs](#) in the [Testing Procedure](#) chapter. For examples of digital input configurations, see the chapter [Example Configurations](#).

MOP Connections



Resistance will increase when the dial is turned CW between Vout and Grd

Figure 18. MOP terminal strip's three connections.



Figure 19. Motorized Potentiometer (MOP)—Rear View.

Total Vu will pre-define the AUTO/MANUAL switch and assign to Digital Input 6 (MOP1) and Input 7 (MOP 2).

Counter (Encoder) Inputs

Using the counters, a standard PTRB will only have Digital Inputs, Digital Outputs, and Process Control Outputs. A custom PTRB can be wired to have one or more of the digital input terminals

make use of the Process Control counters. This modification is signified by an orange connector in place of one of your Digital Inputs (DIN0-DIN7). Wire your encoder signal wires to the orange Digital Input terminal as shown for a standard digital input in the Digital Input section.

Testing Procedure

Testing Alarms

Configure an External Alarm and force an on condition by right-clicking on the alarm icon you have just defined

For more information, refer to the Alarms chapter in the Total Vu manual. Select Turn-On/Turn Off. Ensure the corresponding LED within the PTRB turns-on/off for the selected alarm.

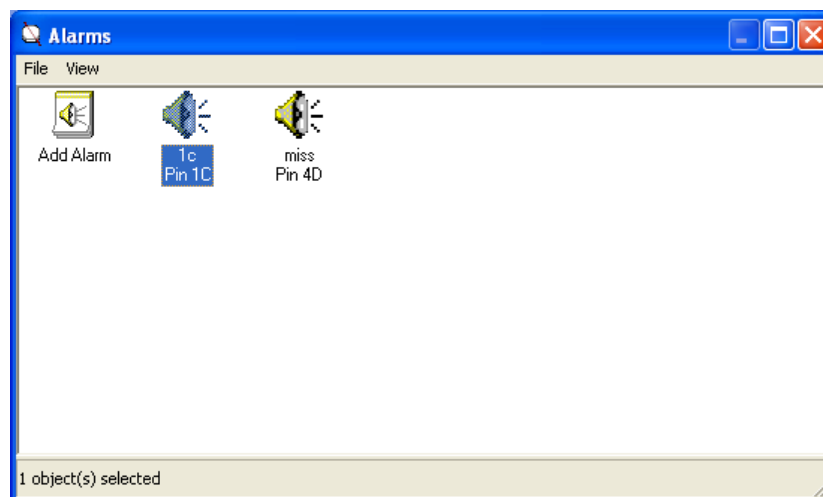


Figure 20. Alarms configuration window in Total Vu.

Testing Digital Inputs

Configure a Digital Input to perform a Start/Stop action. For more information, refer to the Actions chapter in the Total Vu manual.

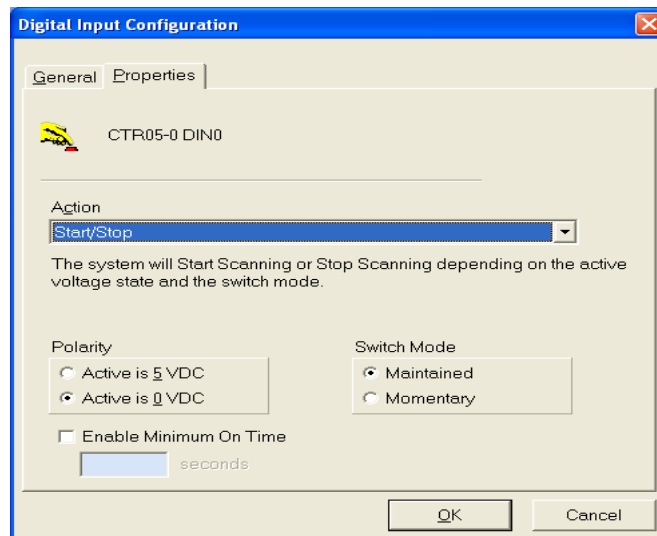


Figure 21. Digital Input configuration panel.

Apply a voltage differential of between two and 30 volts DC between the terminals of the selected input. Ensure that the Start/Stop *F2* icon toggles between Red and Green to indicate that the input is working.

Testing Closed Loop Control (Relays)

Configure a Control Loop and associated actions and Jog buttons. For more information, refer to the Control chapter in the Total Vu manual.

Activate the Jog buttons and ensure the corresponding LEDs within the PTRB turn on/off for the selected control loop.

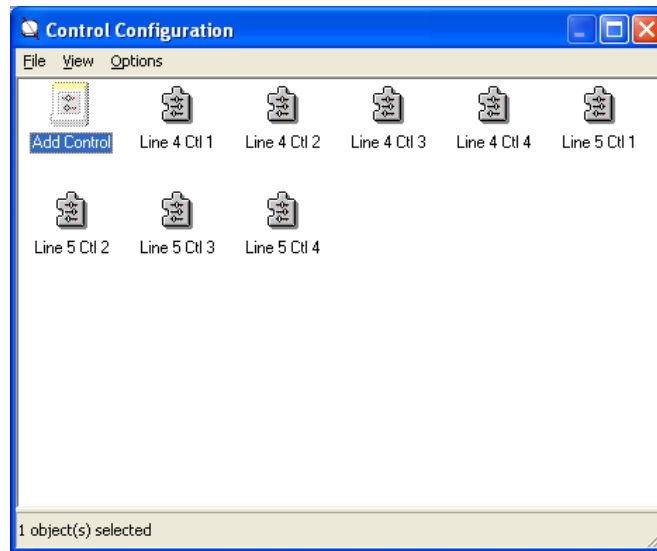


Figure 22. Control Configuration window in Total Vu.

Testing Closed Loop Control (MOP)

1. Power down PC.
2. Remove the AC power adapter from the PTRB.
3. Plug the first MOP interface cable into the PTRB connector labeled MOP 1/2.
4. Plug the other end into MOP 1 connector labeled From Computer.
5. Perform the steps for configuring a Control Loop as detailed in the section Counter (Encoder) Inputs.
6. Re-power the PC and PTRB box, activate the JOG UP & JOG DOWN buttons.

The dial on MOP 1 should move CW & CCW per your configuration in TotalVu. MOP 2 plugs into Next Device connector on MOP 1. MOP 3 plugs into the PTRB connector labeled MOP 3/4, the other end into MOP 3 connector From Computer. MOP 4 plugs into Next Device connector on MOP 3.

Configure control loops accordingly.



Figure 23. PTRB Rear View—MOP Connectors



Figure 24. Motorized Potentiometer (MOP)—Front View

Example Configurations

Digital Inputs

The following section applies to all digital input examples, illustrated by a generic Digital Input configuration. In these examples several buttons and attributes will appear on the main program window workspace. It is up to the user to decide how to arrange them for most efficient use.

1. Identify to which input terminal you have connected your digital input signal (i.e. DIN0, IP3).
2. Open Total Vu Configure (Ctrl-C).
3. Double click the Digital Inputs icon to open the Digital Inputs window (shown Figure 23).

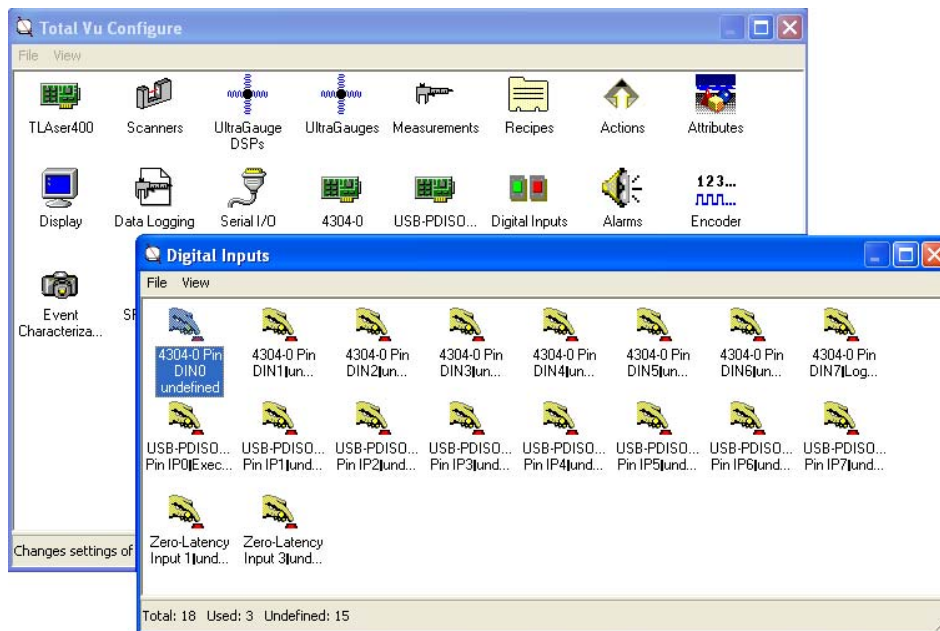


Figure 25. Digital Inputs window.

The inputs are labeled in order of device, input terminal and action.

4. To find your specific terminal, identify your device (4302 or 4304 for PTRB and PDIS08-1 or USB-PDIS08-1 for PDIS08) and your terminal pin.

For this example, the digital input is connected to a 4304 PTRB on DIN0.

5. Double click the icon for the Digital Input terminal pin.

This will open the Digital Input configuration panel, as shown in figures 24, 26 and 27. The panel has four tabs, General, Properties, On Actions, and Off Actions.

6. Define an action to be triggered (Actions chapter of the Total Vu Manual).

Configuring Digital Inputs in the Properties Tab

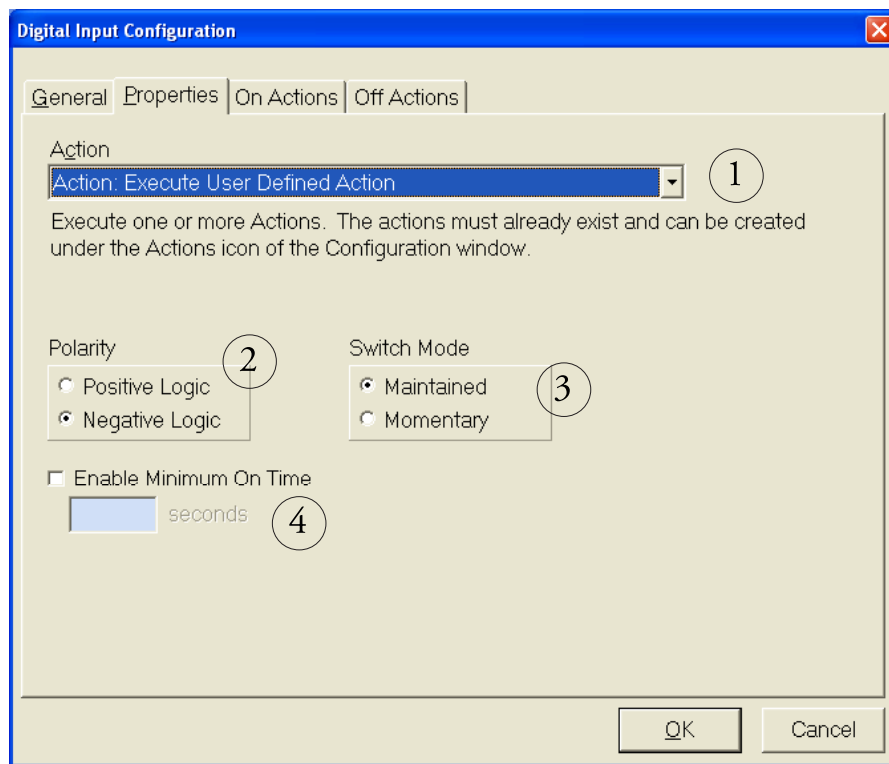


Figure 26. Digital Input Configuration panel.

1. With the Digital Input configuration panel open, select the Properties tab.
 - 1.1 From the Action drop-down list, select your desired Action (*Part 1 in Figure 24*).

Note: These Actions must previously have been configured, using the Actions configuration panel in the Total Vu Full Configure window.

2. Polarity (*Part 2 in Figure 24*).

- 2.1 If you want the action to occur when the voltage difference between your input wires is *different* select Positive Logic.
- 2.2 If you want your action to occur when the voltage difference between your input wires is *equal* select Negative logic.

3. Switch Mode.

If your desired action consists of an on event and a possible off event, you will have a Switch Mode choice. The Switch Mode will specify when the off event occurs (*Part 3 in Figure 24*).

- 3.1 If you want the Switch Mode to occur when the on logic is no longer valid, select the radio button for Maintained.
- 3.2 If you want the Switch Mode to happen immediately (or if you want to set a time for relays), select the radio button for Momentary.

4. Determine how long your signal needs to be sustained before the signal is considered valid (Minimum On Time) (*Part 4 in Figure 24*).

- 4.1 If you want the action to fire with any detected signal (minimum of about 180 milliseconds, depending on system), leave the checkbox next to Enable Minimum On Time blank.
- 4.2 If you want it to wait until the action receives a signal of a certain length, check the box and input this amount of desired signal length, in seconds.

Reset Footage Counter Footage Example

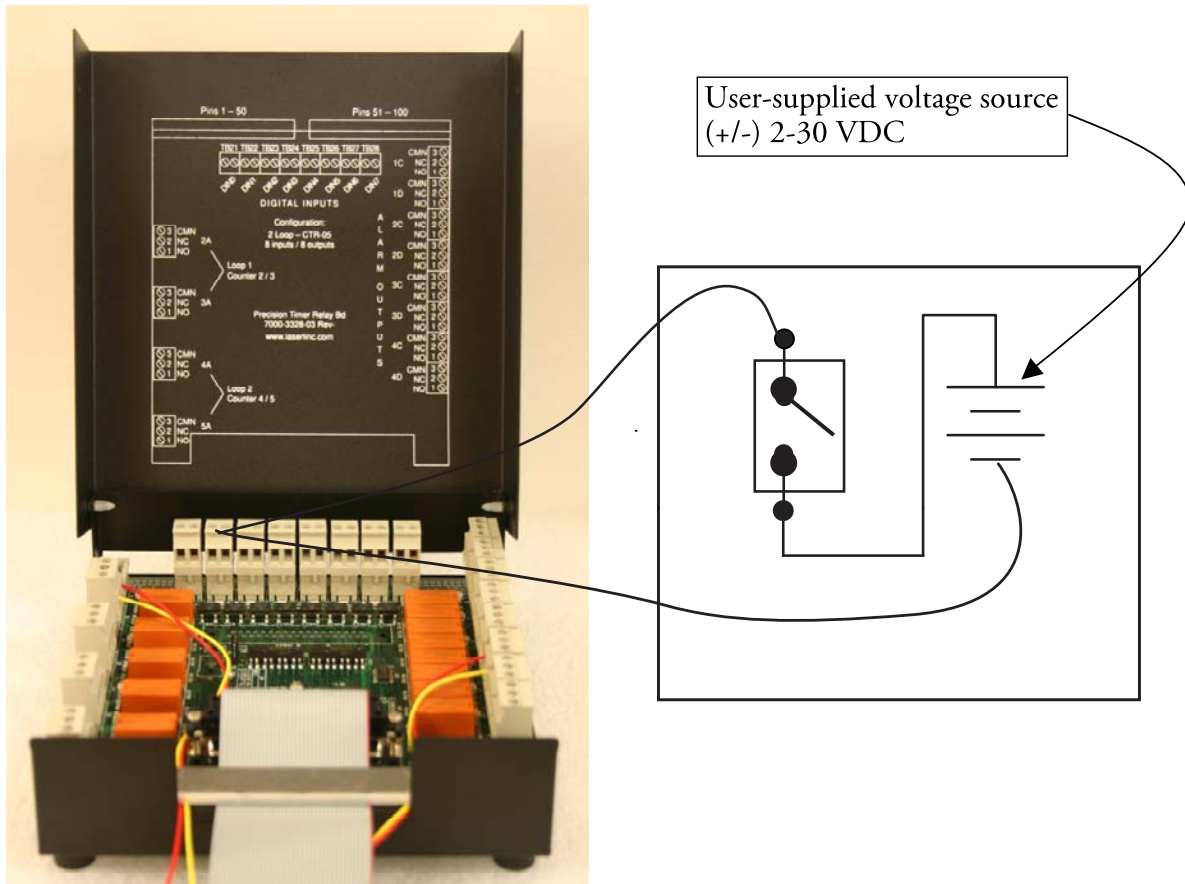


Figure 27. Wiring example.

1. Wire per Figure 25.
2. Open Total Vu software.
 - 2.1 Select Total Vu/Full Configuration.

The Total Vu Configure window will open.
3. Double-click the Digital Inputs icon to open the Digital Inputs window.
 - 3.1 Double-click any input.

For this example, we will use DIN1 undefined.

4. Follow the setup wizard to assign Reset Encoder to this input pin.
5. Activate switch.

The encoder count should reset to zero

Using Digital Input To Trigger An Action

1. Define an action to be triggered (Actions chapter of the Total Vu Manual).

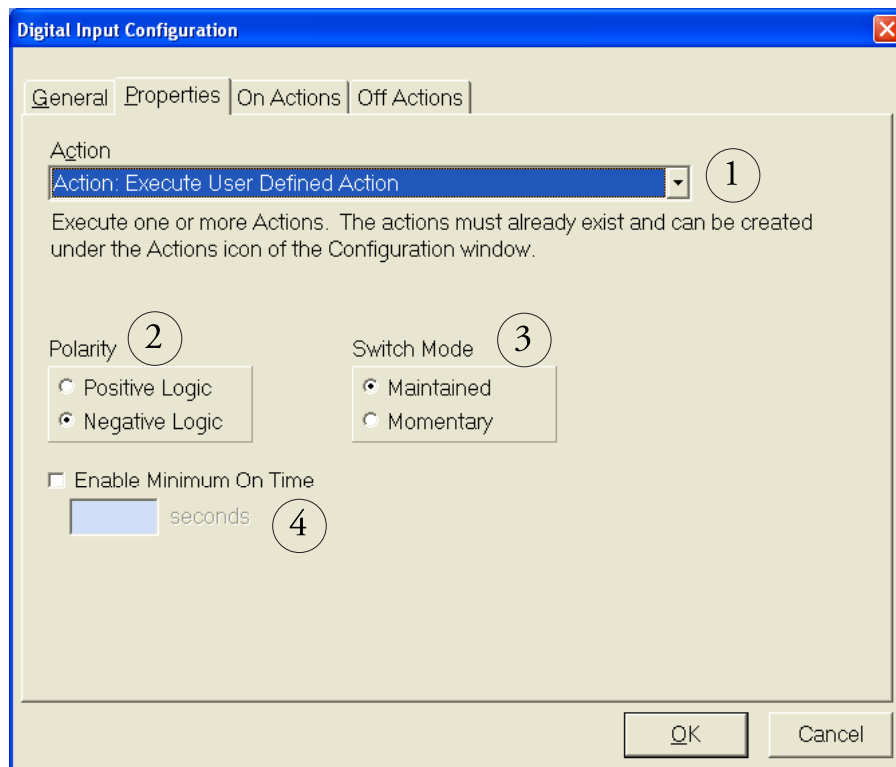


Figure 28. Digital Input Configuration panel—Action triggering setup.

2. Bring up the Digital Input Configuration for this digital input (as described in the [Digital Inputs](#) section at the beginning of this chapter).

The Digital Input Configuration panel has two tabs, General and Properties. Tabs for On Actions, Off Actions, and Set Digital Output will appear, depending on what you select in the Action section. Also, the Switch Mode Section (*Part 3 in Figure 26*) will appear depending on what you select in the Action section.

2.1 Select the Properties tab.

Configuring Digital Inputs in the Properties Tab

1. From the dropdown menu under Action, select the previously-defined action (*Part 1 in Figure 26*).
2. Polarity (*Part 2 in Figure 26*).
 - 2.1 If you want the action to occur when the voltage difference between your input wires is *different* select Positive Logic.
 - 2.2 If you want your action to occur when the voltage difference between your input wires is *equal* select Negative logic.
3. Switch Mode (*Part 3 in Figure 26*).
 - 3.1 If you want only one action to occur (On action), select Momentary.
 - 3.2 If you want two actions to occur (On action and Off action) select Maintained.
4. Determine how long your signal needs to be sustained before the signal is considered valid (Minimum On Time) (*Part 4 in Figure 26*).
 - 4.1 If you want the action to fire with any detected signal (minimum of about 110 milliseconds, depending on system), leave the checkbox next to Enable Minimum On Time blank.
 - 4.2 If you want it to wait until the action receives a signal of a certain length, check the box and input this amount of desired signal length, in seconds.

Note: This setting only works for the On action; the Off action will always fire when the on conditions are no longer met.

Configuring Digital Inputs in the On Actions Tab

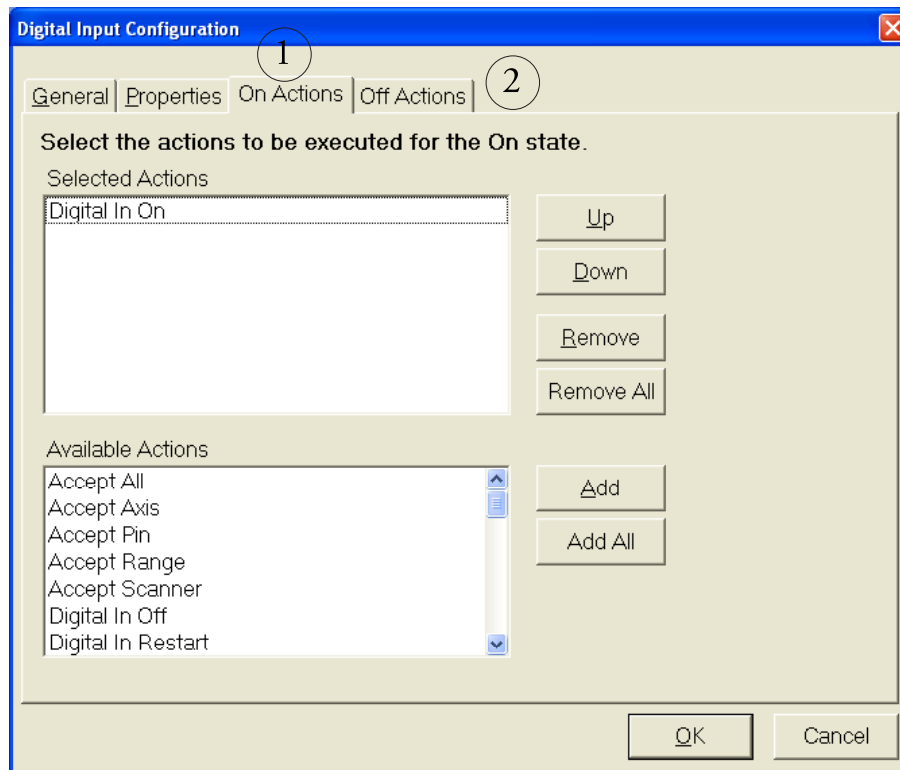


Figure 29. Digital Input Configuration panel—Action triggering setup.

1. Select the On Actions tab and select your desired On Action(s) in the list of available actions (*Part 1 in Figure 27*).
2. Off Actions tab (*Part 2 in Figure 27*).

If you specified a Switch Mode of Maintained, the Off Actions tab will appear. This tab enables the user to choose the action to be fired when the On conditions are no longer met.

Be sure to exit all configurations before testing your newly-configured action triggering digital input.

Using Digital Input To Trigger an Alarm

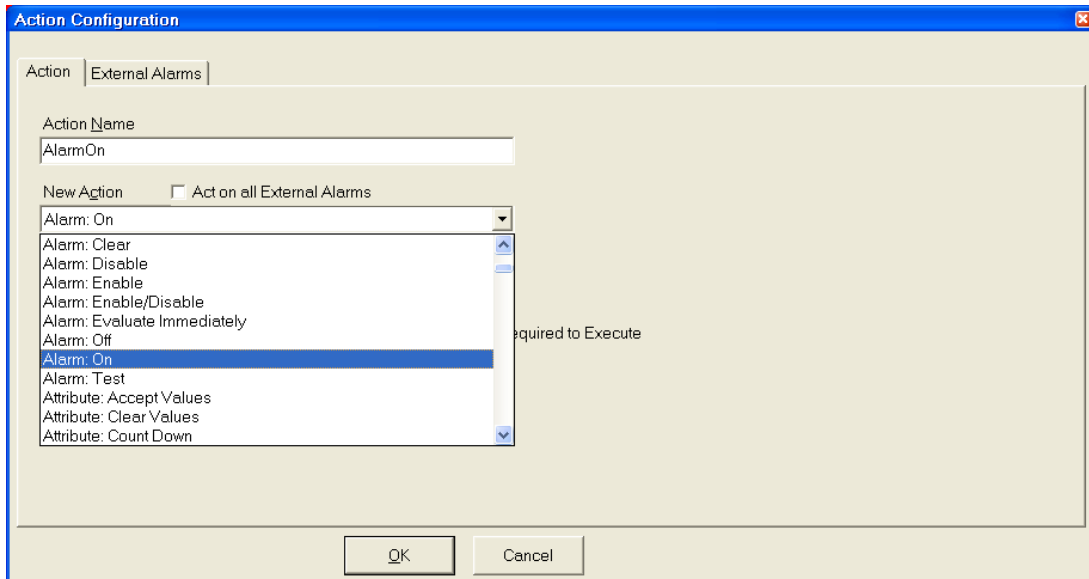


Figure 30. Action—Alarm: On.

1. Configure an alarm (Alarms chapter of the Total Vu Manual).
 - 1.1 If you want the alarm to remain active until the user clears it, set this preference within this alarm configuration.
2. Configure an action (Actions chapter of the Total Vu Manual).
 - 2.1 For your action, choose Alarm On (see Figure 28).
3. Select the External Alarms tab.
 - 3.1 From the list of available external alarms, select the alarm you would like to trigger.
4. If you want the digital input to clear the alarm, create another action Alarm: Clear.
 - 4.1 Under the External Alarms tab, select the same alarm from section 3.1.
5. Set up your digital input according to the section Using Digital Input to Trigger an Action.
 - 5.1 For your On action, select the action created for Alarm: On.
 - 5.2 If you want the digital input to clear the alarm, select the action Alarm: Clear for your Off action.

Note that any minimum on time as specified in the alarm configuration will not be followed.

Using Digital Input To Trigger A Relay (Digital Output)

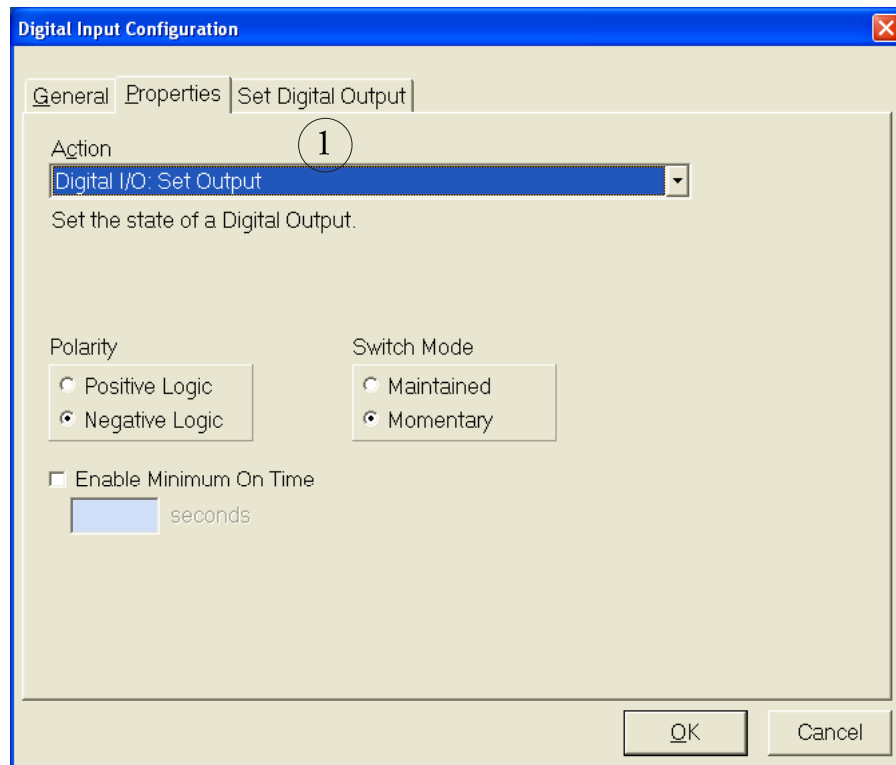


Figure 31. Digital Input Configuration panel—Digital I/O: Set Output

1. Bring up the Digital Input Configuration for this digital input (as described in the [Digital Inputs](#) section at the beginning of this chapter).

The Digital Input Configuration panel has two tabs, General and Properties. Tabs for On Actions, Off Actions, and Set Digital Output will appear, depending on what you select in the Action section. Also, the Switch Mode Section will appear depending on what you select in the Action section.

1.1 Select the Properties tab.

1.2 For action select Digital I/O: Set Output (*Part 1 in Figure 29*).

2. Select the Set Digital Output tab.

- 2.1 In the I/O Device section, select the device containing the relay you would like to trigger (*Part 1 in Figure 30*).

For this example, 4302-0 or 4304-0 for PTRB and PDIS08-1 or USB-PDIS08-1 for PDIS08.

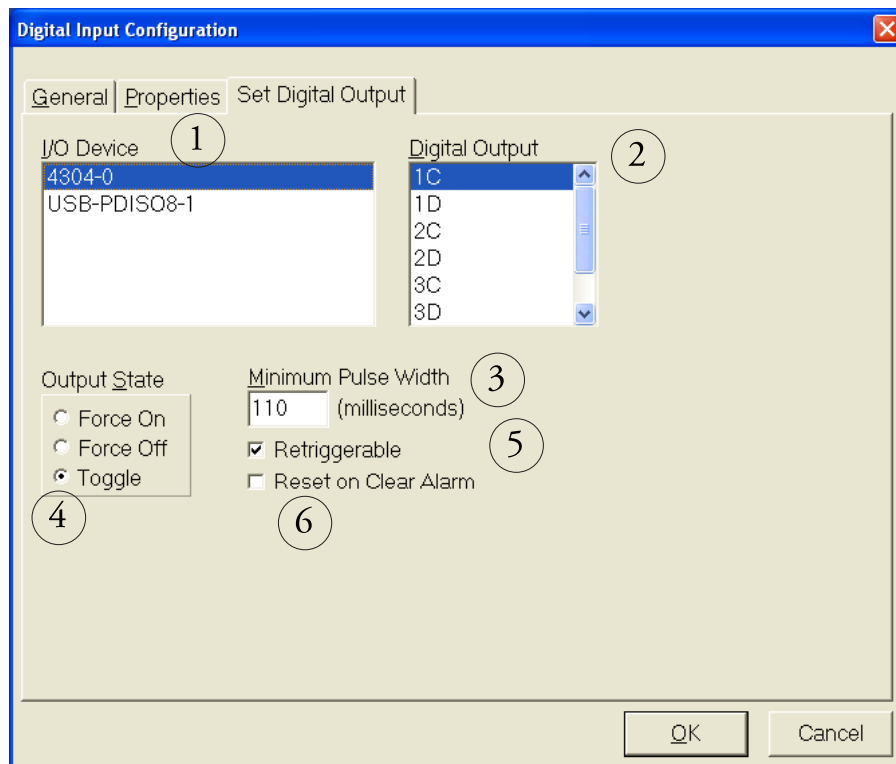


Figure 32. Digital Input Configuration panel—Set Digital Output

3. In the Digital Output section, select the relay of the eight that you would like to trigger (*Part 2 in Figure 30*).

For this example, (1C – 4D) for PTRB or (0 – 7) for PDIS08.

4. If you would like the relay to remain triggered for a minimum amount of time, enter the amount of time (in milliseconds) (*Part 3 in Figure 30*).
5. Determine what you need for the Output State (*Part 4 in Figure 30*).
- 5.1 If you want the relay to activate when the digital input is valid, select Force On.
- 5.2 If you would like the relay to deactivate when the digital input is valid, select Force Off.

5.3 If you selected Momentary on the previous tab you will also see an option for Toggle.

A choice of Toggle will activate the relay followed by deactivation at a minimum of 50 ms as specified by the Minimum Pulse Width.

6. If you want the program to ignore all further digital inputs on the selected terminal until the specified Minimum Pulse Width time has expired, leave the checkbox for Retriggerable blank (*Part 5 in Figure 30*).

If the checkbox for Retriggerable is checked, another trigger will reset the elapsed time.

7. If you want an action to be able to reset your relay, check the box for Reset on Clear Alarm (*Part 6 in Figure 30*).

To use this option, you will have to configure an action for Alarm: Clear.

Record Digital Input in Process Tracker

1. Configure a new action (Actions chapter of the Total Vu Manual).

1.1 Under New Action, specify Process Tracker: Log Message.

The Message tab will appear.

1.2 Select the Message tab (*Part 1 in Figure 31*).

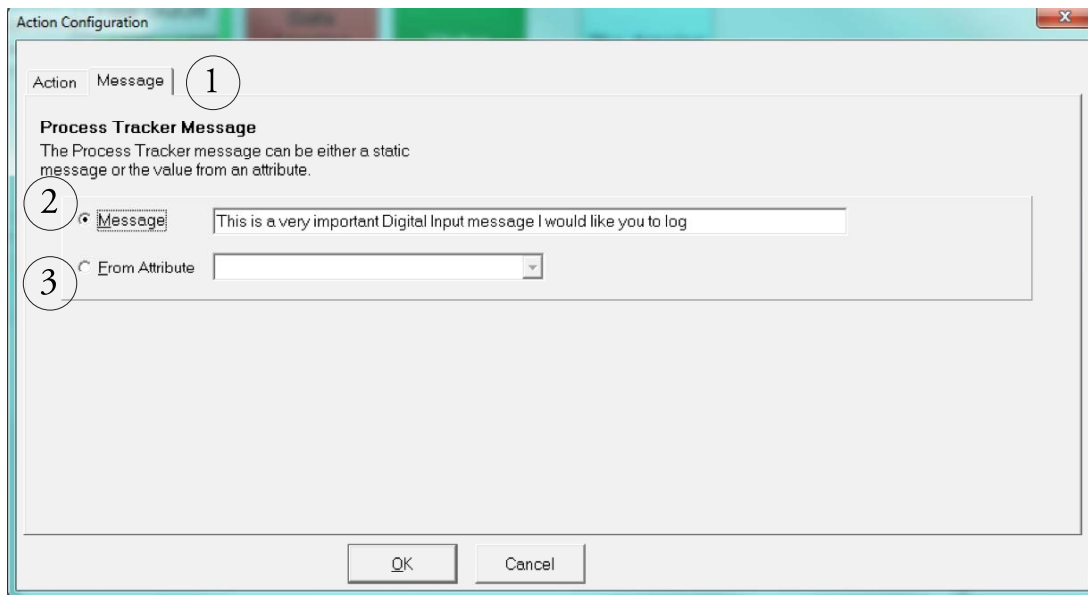


Figure 33. Process Tracker: Log Message.

2. Decide whether with every digital input event you want the system to log the same message, or a customizable message.
 - 2.1 If you want the same message each time, select the radio button for Message.
 - 2.1.1 In the text box, enter the message (*Part 2 in Figure 31*).
 - 2.1.2 Define a digital input as shown in the section [Using Digital Input to Trigger an Action](#).
 - 2.1.2.a Set your logging action as the 'On action'.
 - 2.2 If you want a customizable message, first, you will need to define an Edit Box attribute (Attributes chapter of the Total Vu Manual).
 - 2.2.1 In the Message tab of the Action Configuration, select the radio button for From Attribute (*Part 3 in Figure 31*).
 - 2.2.1.a From the drop-down menu, select your newly defined attribute.
3. Decide whether for each new log message you want to set the attribute's value manually, or define actions to make the changes automatically.
 - 3.1 To learn to set the attribute's value manually, go to the Attributes chapter of the Total Vu Manual.

- 3.2 Customize a digital input according as shown in section [Using Digital Input to Trigger an Action](#).
- 3.3 Add your Message Log action as the On action.

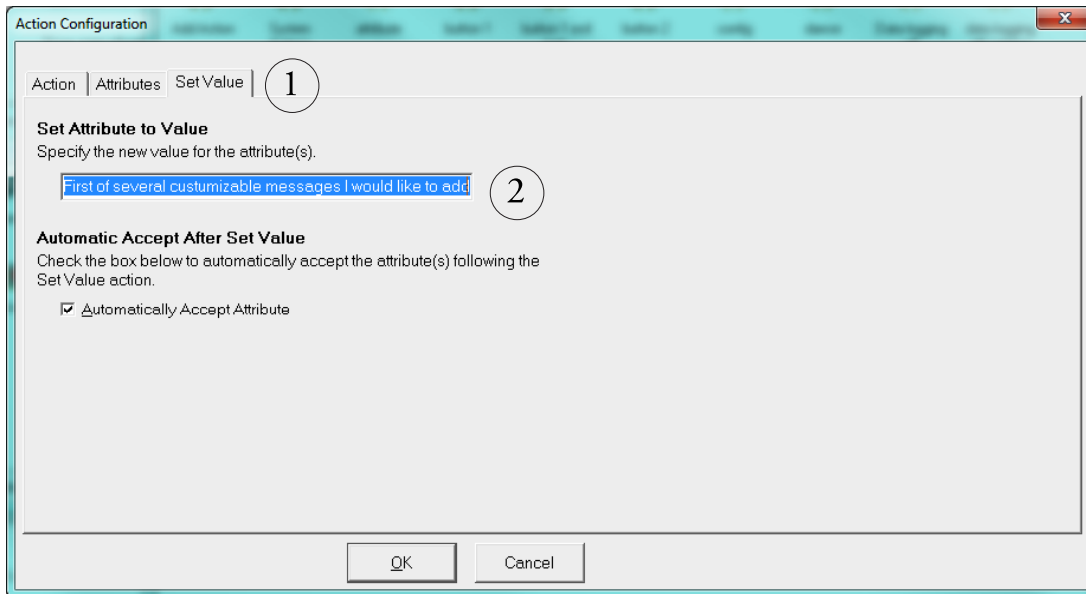


Figure 34. Customizable Message.

- 3.4 For each customizable message, you will need to define an action Attribute: Set Value.

The Attributes and Set Value tabs will appear.

- 3.5 Select the Attributes tab.

- 3.5.1 Select your recently-defined Edit Box attribute.

- 3.6 Select the Set Value tab.

- 3.6.1 Enter a messages for **each** action that you define (*Part 2 in Figure 32*).

- 3.6.2 Select the checkbox for Automatically Accept Attribute.

To change your logged message according to system changes, you can use this action in any of your action macro scripts.

An easy example to make use of this capability is to log one message for a digital high input and another message for a digital low input.

4. To do this, define two macros for each new message using an action Action Macro: Execute List of Actions.
 - 4.1 In the Actions tab, select the set attribute action that contains your desired message.
 - 4.2 From the same list, select your log message action.
 - 4.3 Define a digital input as shown in the section [Using Digital Input to Trigger an Action](#).
 - 4.3.1 Select your high input macro as your On action and your low input Macro as your Off action.

Record Digital Input As Flaw Detection Event

1. Configure a new action (Actions chapter of the Total Vu Manual).
 - 1.1 Under New Action, specify Flaw Detection: Record Event.

The Flaw Event tab will appear.
 - 1.2 Select the Flaw Event tab (*Part 1 in Figure 33*).
 - 1.3 In the box for Flaw Event Description, enter your desired text (*Part 2 in Figure 33*).
 - 1.4 If you want a measurement value to show up in the flaw report next to your triggered flaw event, select it from the drop-down list under Associated Measurement Value (*Part 3 in Figure 33*).

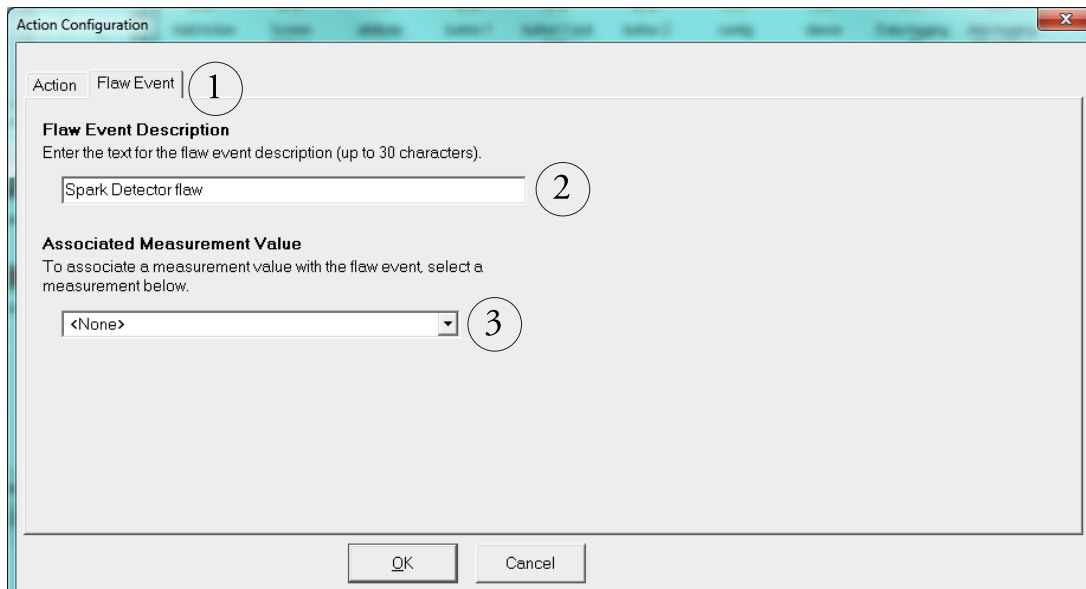


Figure 35. Flaw Detection Event.

2. Configure a Counter attribute (Attribute chapter of the Total Vu Manual).
3. Create a new action, Attribute: Count Up.

The Attribute tab will appear.

3.2 Select the Attribute tab.

3.3 Select your newly-created counter.

4. Create a new action, Action Macro: Execute List of Actions.

4.2 Name the new action Macro: Digital Input Flaw.

The Actions tab will appear.

4.3 Select the Actions tab.

4.4 Select your newly-created FlawEvent action and your CountUp action, in any order.

- 5 Define a digital input as shown in the section [Using Digital Input to Trigger an Action](#).

5.1 If you did not choose a counter, go to the On Actions tab,

5.1.1 Select your FlawEvent action

5.2 If you chose a counter, select Macro: Digital Input Flaw.

The digital input will now be recorded as a Flaw Detection Event and can be added to the flaw report using the following procedure.

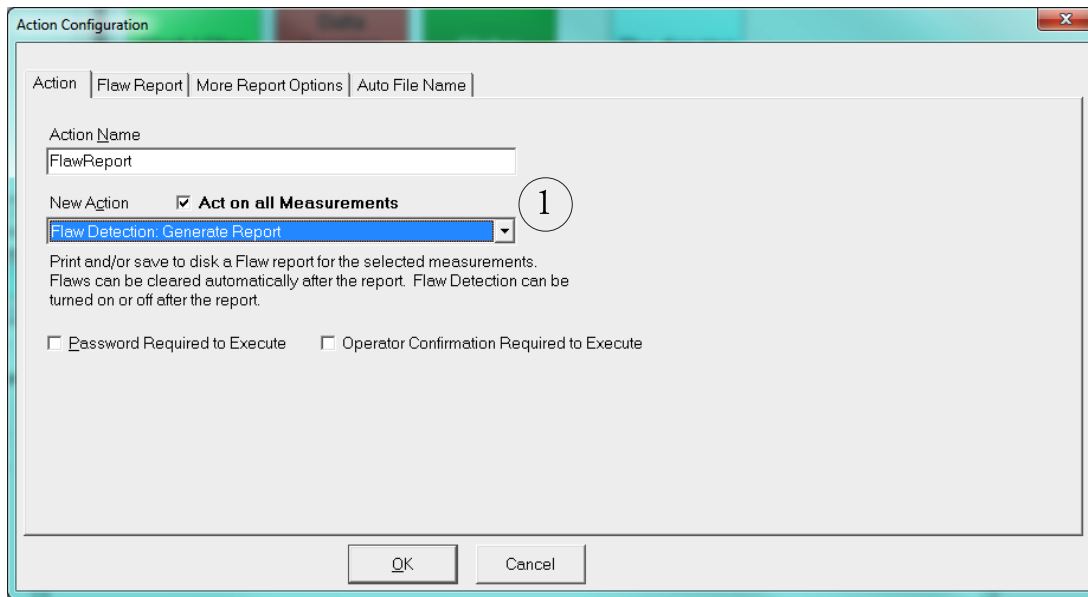


Figure 36. Generate Flaw Report.

6. Define a new action, Flaw Detection: Generate Report.
 - 6.1 Check the box next to Act on all Measurements (*Part 1 in Figure 34*).
 - 6.2 Define the rest of the flaw report (Actions chapter of the Total Vu Manual).
 - 6.3 Create a button for the report (Display Configuration chapter of the Total Vu Manual).

Record Digital Input In A Data Log File

Attributes and Actions for Data Logging

1. Create an Edit Box attribute (Attribute chapter of the Total Vu Manual).
 - 1.1 Name this attribute Digital In.
2. Define a new action, Attribute: Set Value.

Tabs for Attributes and Set Value will appear.

 - 2.1 Name the action Digital Set Start.

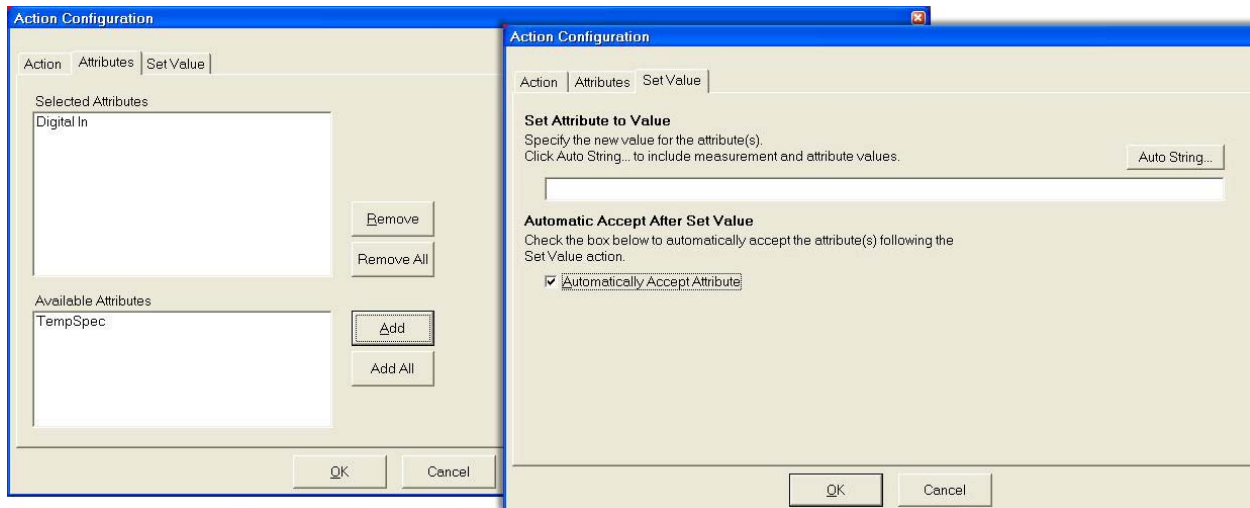


Figure 37. Attributes and Set Value tabs of the Action Configuration panel.

3. Select the Attributes tab.
 - 3.1 From the list of available attributes, select Digital In.
4. Select the Set Value tab.
 - 4.1 In the box for Set Attribute to Value, enter the word Start, followed by the name of the digital signal equipment origin (e.g. Start Spark Tester).
 - 4.2 Check the box for Automatically Accept Attribute.
5. Create another Attribute: Set Value action.
 - 5.2 Name the action Digital Set Stop.
 - 5.3 For for Set Attribute to Value, enter Stop, followed by the equipment name.

Data Log Setup

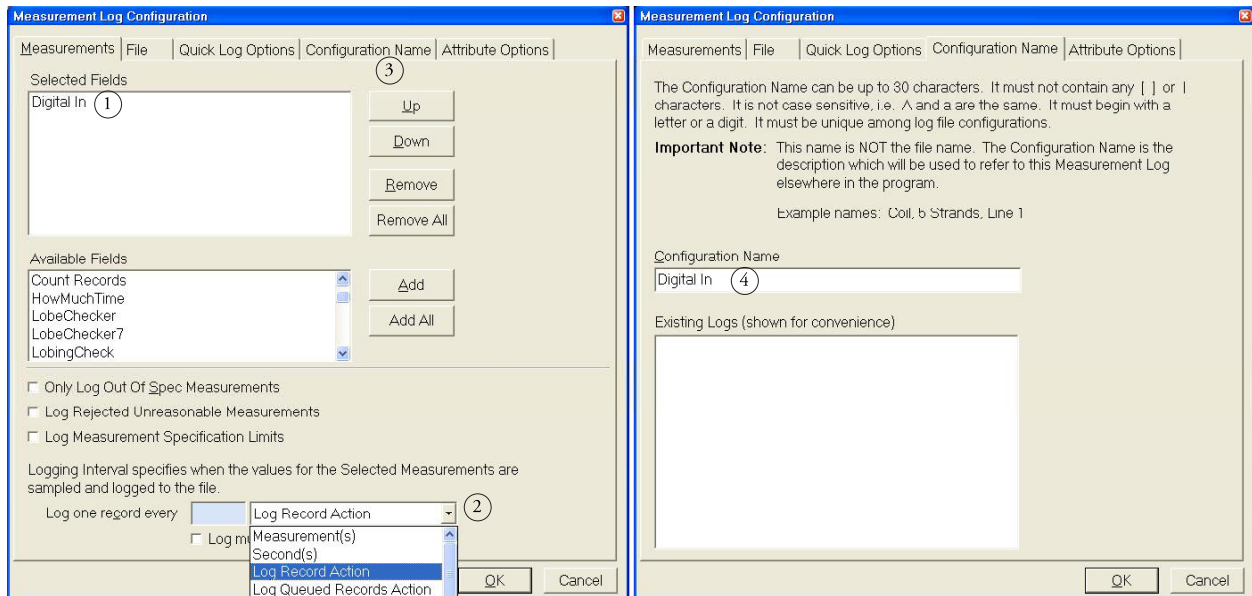


Figure 38. Measurement Log Configurations panel showing Measurements and Configuration Name tabs.

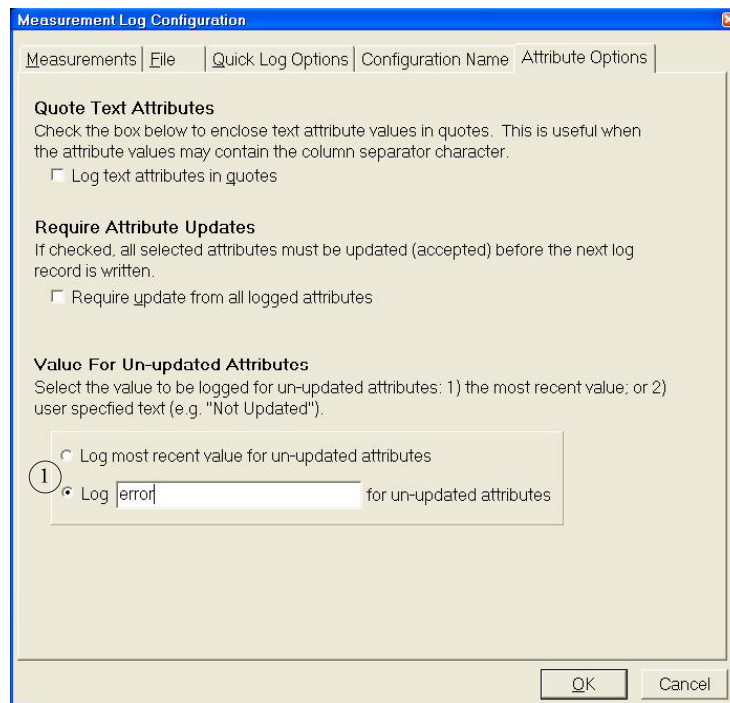


Figure 39. Measurement Log Configurations panel showing Attribute Options tab.

1. Create a Data Log (Data Logging chapter of the Total Vu Manual).

The Measurement Log Configuration panel opens with the Measurements tab selected (Figure 36).

- 1.1 From the list of available fields, select Digital In (*Part 1 in Figure 36*).
- 1.2 From the Log one record every ____ drop-down menu, select Log Record Action (*Part 2 in Figure 36*).
- 2 Select the Configuration Name tab (*Part 3 in Figure 36*).
 - 2.1 In the box for configuration name, enter the Digital In (*Part 4 in Figure 36*).
- 3 Select the Attribute Options tab.
 - 3.1 Select the radio button for Log ____ for un-updated attributes.
 - 3.2 In the box, enter error.

For other tab options, including how to name and place the data log file, please refer to the manual.

Actions and Buttons Needed for Data Logging

1. Create a new action Log: Write Record.
 - 1.1 Name it Log Digital Record.

The Measurement Logs tab will appear.
 - 1.2. Select the Measurement Logs tab.
 - 1.3 From the list of available measurements, select Digital In.
2. Create a new action Log: Start Selected.
 - 2.1 Name it Digital Log Start.

The Measurement Logs tab will appear.
 - 2.2 From the list of available measurements, select Digital In.
3. Create a new action 'Log: Stop Selected'
 - 3.1 Name it Digital Log Stop.

The Measurement Logs tab will appear.
 - 3.2 From the list of available measurements, select Digital In.

4. Create a new action Action Macro: Execute List of Actions.

4.1 Name it Digital In On.

The Actions tab will appear.

4.2 From the list of available actions, select, in order, Digital Set Start and Log Digital Record.

5. Create a new action Action Macro: Execute List of Actions.

5.1 Name it Digital In Off.

The Actions tab will appear.

5.2 From the list of available actions, select, in order, Digital Set Stop and Log Digital Record.

6. Create two new buttons (Display chapter of the Total Vu Manual).

6.1 Assign action Digital Log Start to one button and Digital Log Stop to the other.

These buttons will be used to trigger the actions.

7. Define a digital input as shown in the section [Using Digital Input to Trigger an Action](#).

7.1 Under the On Actions tab select the macro Digital In On.

7.2 Under the Off Actions tab select the macro Digital In Off.

Before you try the new logging feature you must first use your new button to start the log.

Switch Between Digital Input Associated Actions Using A Button

For this example, we switch an input from recording a log in process tracker to recording a log as a flaw event. The example uses IP1 on a USB PDIS08 with actions Flaw Event and Logging to Process Tracker.

1. Create two new buttons (Display chapter of the Total Vu Manual).

1.1 Place them in an identical location.

1.2 Name them Logging As Flaw Event and Logging To Process Tracker.

2. Create a new action Digital In: Assign Action.

The Action tab will appear.

- 2.1 Name the action DInAssignFlaw (*Part 1 in Figure 37*).

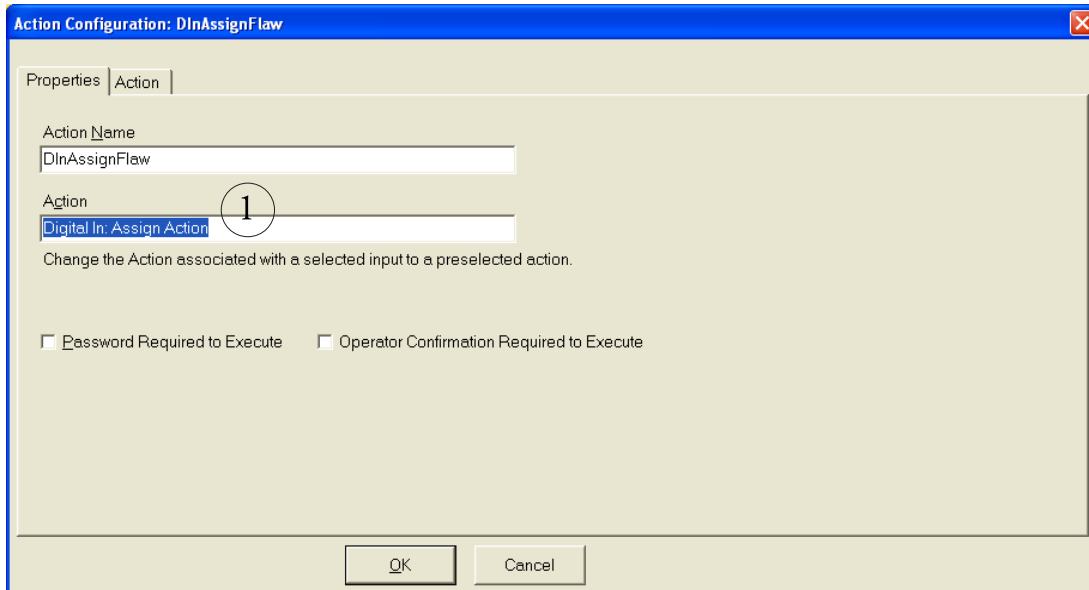


Figure 40. Digital In: Assign Action.

- 2.2 Select the Action tab.
- 2.2 From the Select One Action column, select FlawEvent (*Part 1 in Figure 38*).
- 2.3 From the Select One Digital Input column, select USB-PDISO8-1 Pin IP1 (*Part 2 in Figure 38*).

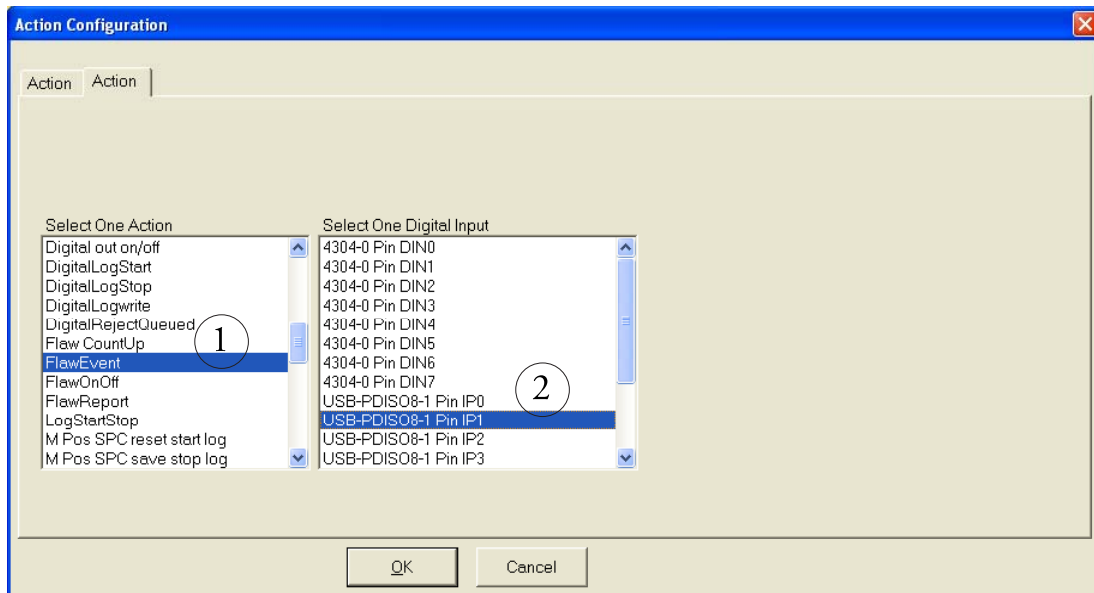


Figure 41. Actions tab.

3. Create another Digital In: Assign Action action.

The Action tab will appear.

- 3.1 Name it DInAssignTracker.

- 3.3 Select the Action tab.

- 3.4 From the Select One Action column, select Process Tracker.

4. Create a new action Button: Show.

The Buttons tab will appear.

- 4.1 Name it Show Flaw On.

- 4.2 Select the Buttons tab.

- 4.3 From the list of available buttons, select Logging As Flaw Event.

5. Create an identical Button: Show action.

The Buttons tab will appear.

- 5.1 Name it Show Tracker On.

- 5.2 Select the Buttons tab.

4.3 From the list of available buttons, select Logging To Process Tracker.

6. Create a new action Button: Hide.

The Buttons tab will appear.

6.1 Name it Hide Flaw On.

6.2 Select the Buttons tab.

6.3 From the list of available buttons, select Logging As Flaw Event.

7. Create an identical Button: Hide action.

The Buttons tab will appear.

7.1 Name it Hide Tracker On.

7.2 Select the Buttons tab.

7.3 From the list of available buttons, select Logging To Process Tracker.

8. Create a new action Action Macro: Execute List of Actions.

The Actions tab will appear.

8.1 Name it Macro: Digital Flaw On.

8.2 Select the Actions tab.

8.3 From the list of available actions, select DlnAssignTracker, Hide Flaw On, and Show Tracker On.

9. Create an identical Action Macro: Execute List of Actions action.

The Actions tab will appear.

9.1 Name it Macro: Digital Tracker On.

9.2 Select the Actions tab.

9.3 From the list of available actions, select DlnAssignFlaw, Hide Tracker On, and Show Flaw On.

10. In the Total Vu Configure window, double-click Display. (Display chapter of the Total Vu Manual).

10.1 Select the button Logging As Flaw Event.

10.2 From the drop-down list under Action to Execute, select Macro: Digital Flaw On.

10.3 Select the button Logging To Process Tracker.

10.2 From the drop-down list under Action to Execute, select Macro: Digital Tracker On.

10.3 In the list of buttons, de-select the checkbox next to Logging To Process Tracker.