SSI CIR-44
Customer Pulse Interface

Overview and Configuration Instructions

REV. 1.0

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SSI Customer Pulse Interface

SECTION 1: OVERVIEW

The SSI CIR-44 Customer Pulse Interface is an extremely flexible “pulse” device which can be used as a simple isolation relay, pulse scaler (multiply or divide) or be configured as a multi-channel pulse totalizer. The device is fully programmable and can handle a wide range of input and output values. Additional features allow the Customer Pulse Interface to be tailored to the needs of a specific customer’s energy management system.

On each SSI Customer Pulse Interface there are four input channels which accept “pulses” from a Form A dry-contact type closure. Each of the Customer Pulse Interface inputs provides a 12VDC “wetting” voltage. One pulse is counted for each open/close transition and one pulse is counted for each close/open transition. Input channels can be mapped to any or all of the output channels. Each input channel can be assigned a positive or negative (subtractive) pulse value.

The four output channels of the Customer Pulse Interface are bi-directional solid state Form A relays. The relays are rated for 140VAC/200VDC maximum operating voltage and 1/10A maximum operating current with each output channel being protected by a solid state re-settable fuse. Each output channel can be assigned its own individual pulse weight. As with the input channels, the Customer Pulse Interface operationally assumes that each transition (open/close or close/open) represents one pulse. Additionally on each output channel there are programmable negative (subtractive) pulse limits. The negative pulse limit determines the limit to which the Customer Pulse Interface will be allowed to accumulate negative (subtractive) pulses. If negative values are allowed, a value can be set which will set a negative pulse limit below which the Customer Pulse Interface accumulators will not count. You do not need to enter a minus sign for the negative pulse limit. The negative pulse limit should be left at 0.0000 for most applications.

In addition to programmable input/output pulse values, there are two programmable global parameters:

Input De-bounce: Input de-bounce is the value in time (milliseconds) that an input pulse transition must exist before the Customer Pulse Interface will register the input pulse.

Output Pulse Delay: The Customer Pulse Interface can be programmed with an output pulse delay. The output pulse delay sets the minimum time (milliseconds) between output pulse transitions. This delay can be used to keep a customer device connected to the Customer Pulse Interface from being overrun with pulses. The Customer Pulse Interface accumulators are 32-bit allowing a buffer of several billion pulses before overflowing internally.

PROGRAMMABLE PARAMETER RANGES:

Input Pulse Weight Range : 0.0001 to 9999.9999

Output Pulse Weight Range : 0.0001 to 9999.9999

Negative Pulse Limit Range: 0.0000 to 9999.9999 (NOTE: A minus sign is assumed)

Input De-bounce Range: 10 to 9999 milliseconds

Output Pulse Delay Range: 10 to 9999 milliseconds

SSI PULSE DEVICE SOFTWARE INSTALLATION

In order to take advantage of the flexibility of the SSI Customer Pulse Interface, the device can be user configured. The latest version of the SSI CIR-44 Customer Pulse Interface programming utility is available at the following link: CIR-44Programmer.zip

The system requirements for the software are:

Windows 98, NT, 2000 or XP, Windows 7, Windows 10
Use the Device Manager, Ports to identify the COM Port used

PROGRAMMING OVERVIEW

The CIR-44 pulse board is configured using a Windows application program. This application program provides an easy-to-use view of input channels mapping, pulse output options as well as the global parameters. In programming the SOCO Customer Pulse Interface, the desired device configuration is first created with the SOCO Customer Pulse Interface software. Using the software, a communications link is established with the Customer Pulse Interface by connecting to the device via a USB port (which is selected in the software) and logging into the Customer Pulse Interface. Once logged into the device, the desired configuration can be written to the Customer Pulse Interface. The configuration is stored in the Customer Pulse Interface in permanent memory. Once the device is configured the communications link is terminated by logging out of the Customer Pulse Interface. Programming of the device is now complete. If left in program mode for 2 minutes without any communication activity, the Customer Pulse Interface will switch from programming mode back into run mode.

SECTION 2: SSI Customer Pulse Interface Software Operation

USER INTERFACE

Input Pulse Weight Assignment:

The user interface was designed to logically represent how the device operates. **Figure 1** shows the input pulse weight fields. These fields are used to assign a weight to pulses coming into the device. The input values range from 0.0000 to 9999.9999.

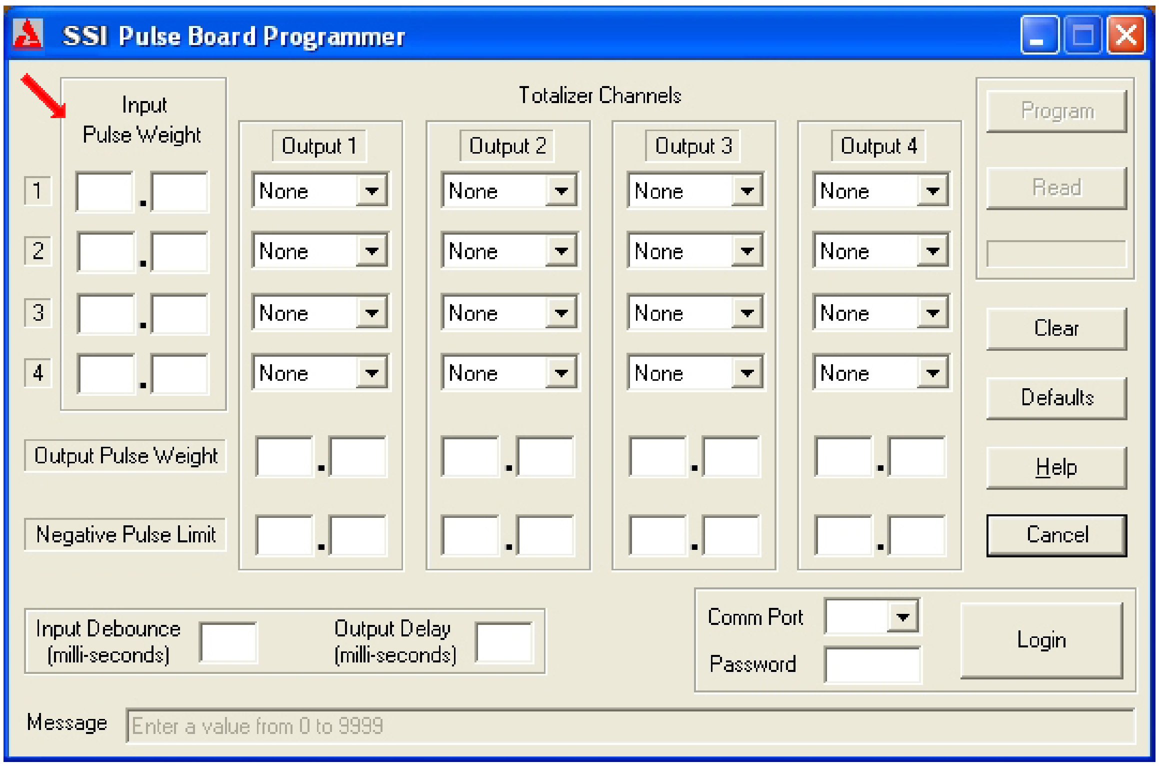

Figure 1

Pulse Routing and Function Assignment:

Figure 2 shows what action is taken when input pulses come in. Each of the 4 inputs channels can ADD, SUBTRACT, or DO NOTHING with the incoming pulses. Each input pulse coming in can have 0 to 4 possible actions taken. The action to be taken for each input is straight across horizontally from the input pulse weight.

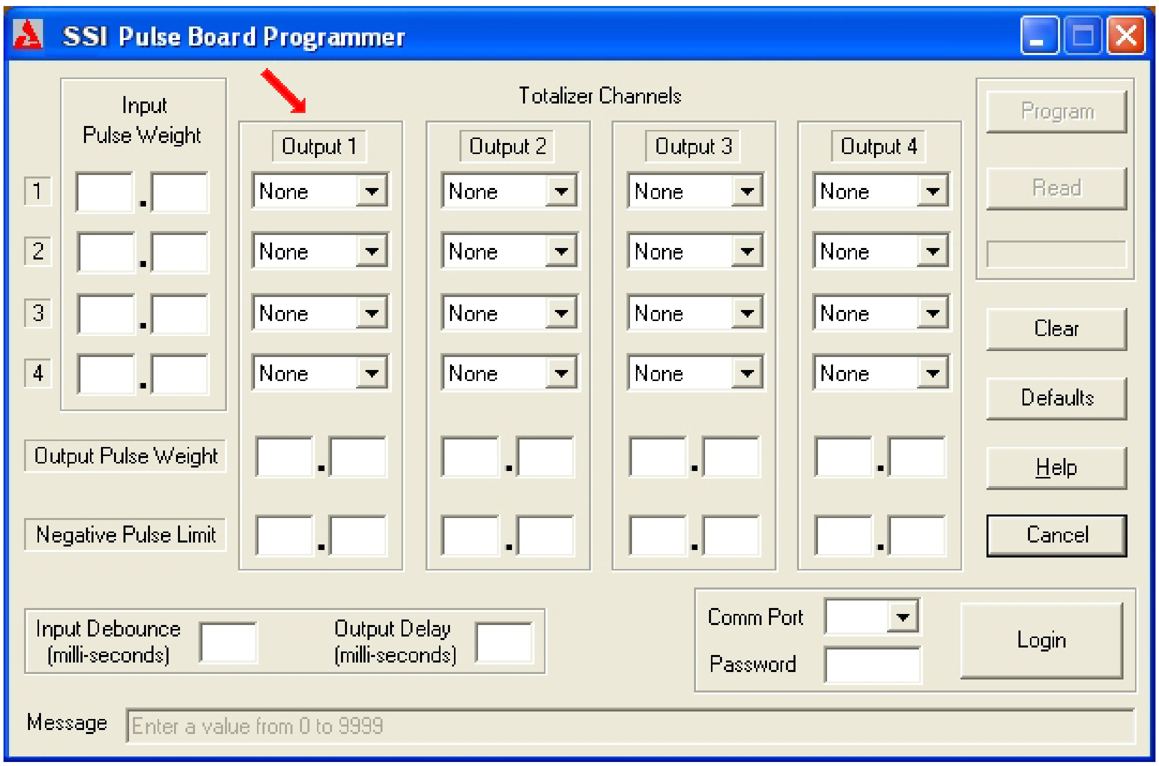

Figure 2

Output Pulse Weight Assignment:

Figure 3 shows the output pulse weight fields. These fields are used to assign a weight to the pulses coming out of the device. The output values range from 0.0000 to 9999.9999. The output pulse weight is the value that the accumulator assigned to it must reach or exceed in order to produce an output pulse.

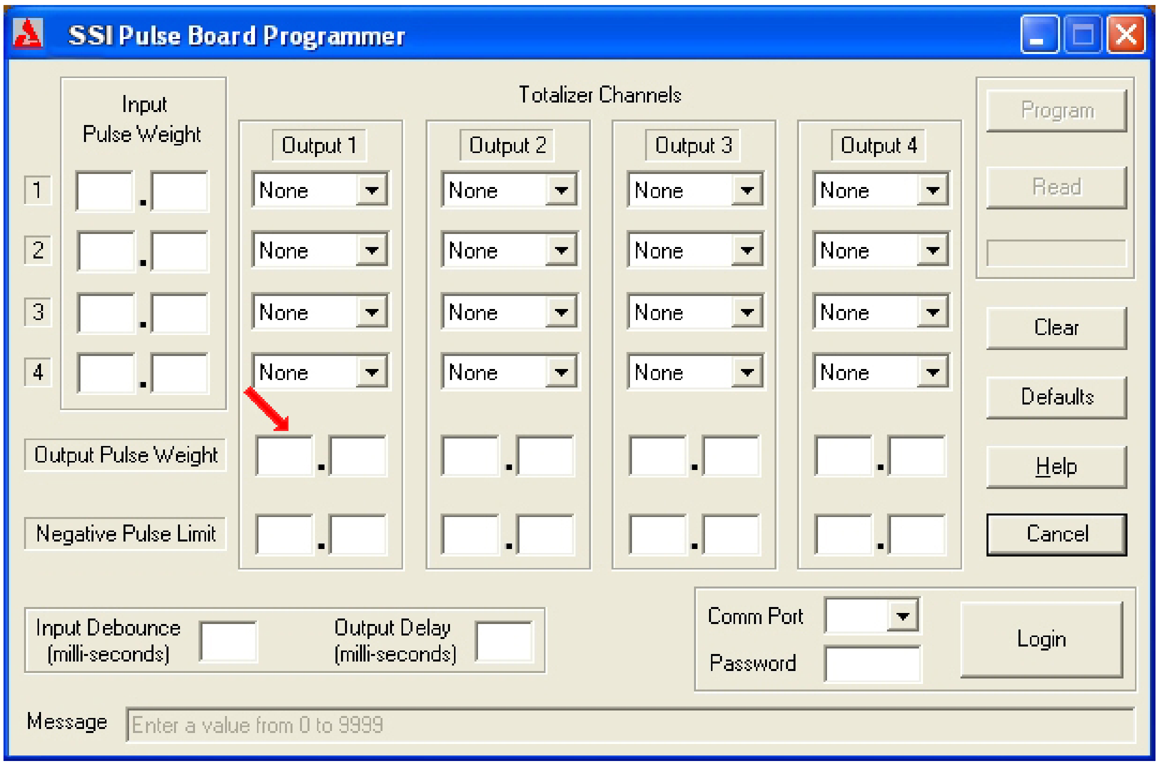

Figure 3

Negative Pulse Limit Assignment:

Figure 4 shows the negative pulse limit. This limit will keep the accumulator from exceeding a set negative limit. Normally this will be kept at 0.0000 to keep the accumulator from going negative. The negative values range from 0.0000 to 9999.9999. The values entered in these fields are assumed to be negative, no minus sign is needed.

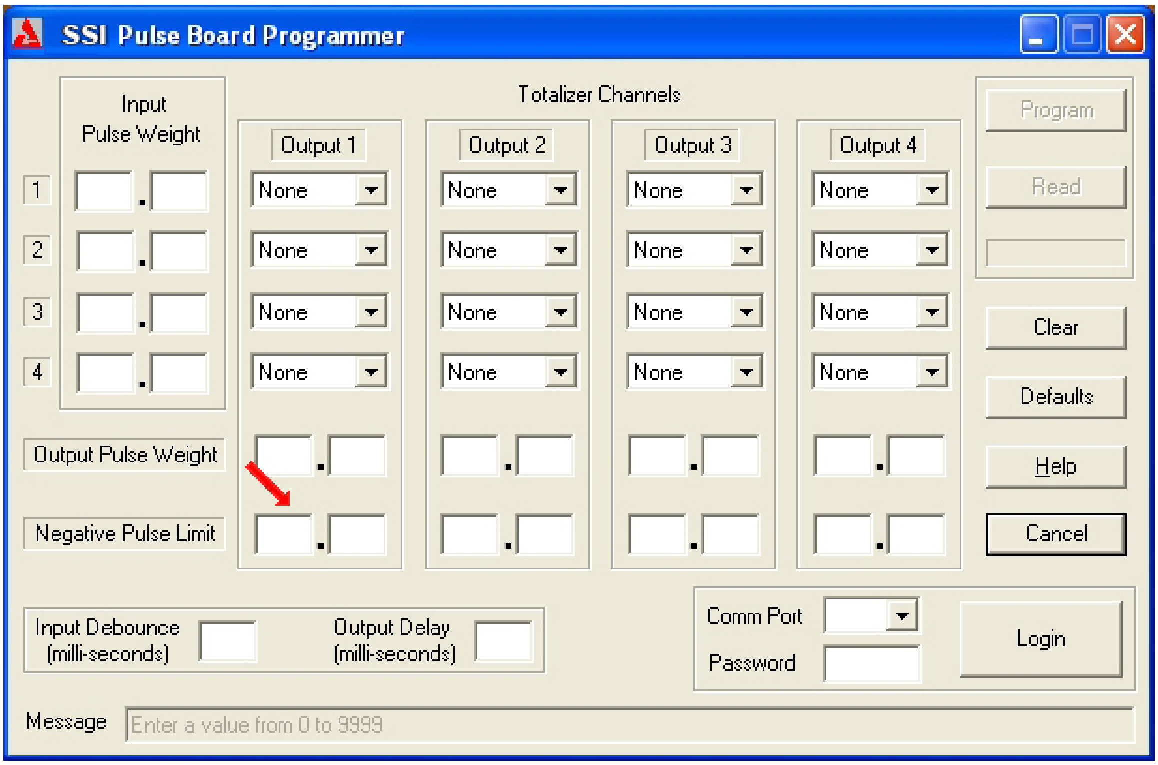

Figure 4

Input Pulse De-bounce Assignment:

Figure 5 shows the input debounce field. The debounce value is the time in milli-seconds that an input pulse must exist before the device will register the pulse. The input debounce values range from 10 to 9999 milli-seconds.

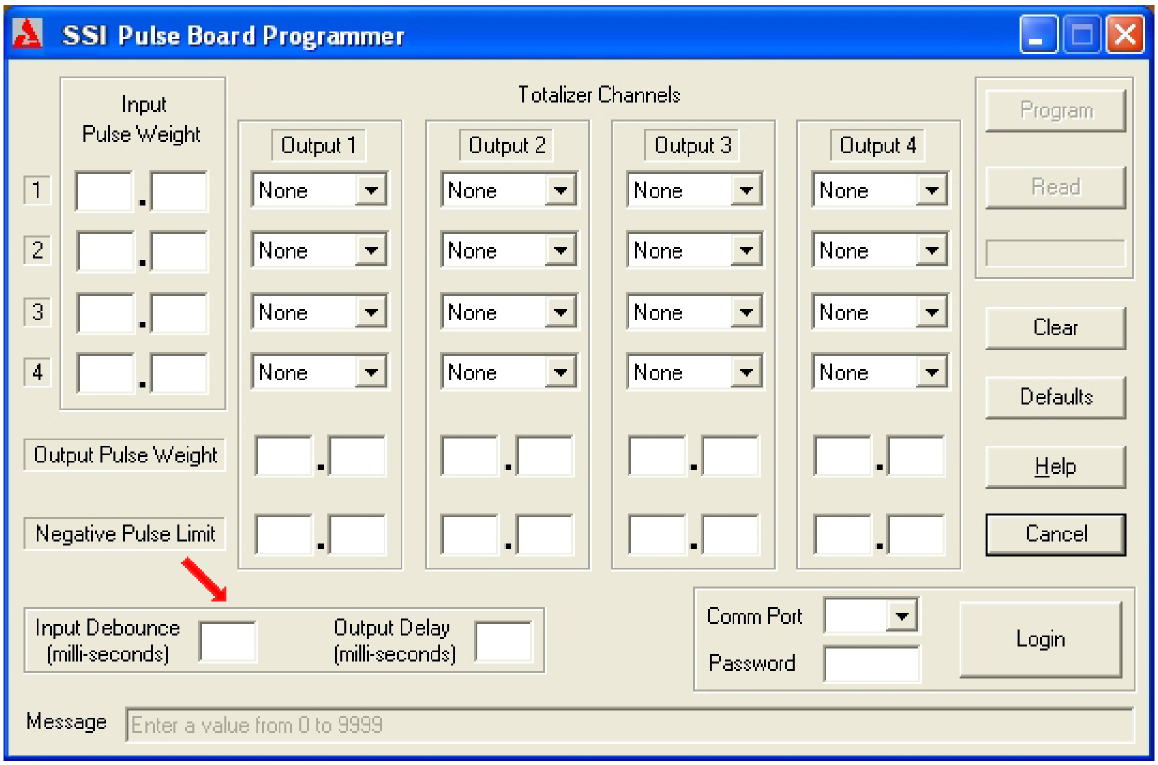

Figure 5

Output Pulse Delay Assignment:

Figure 6 shows the output delay field. This field is used to slow down outgoing pulses. This can be used to add small delays between output pulses to keep the external device from losing pulses. The output delay values range from 10 to 9999 milli-seconds.

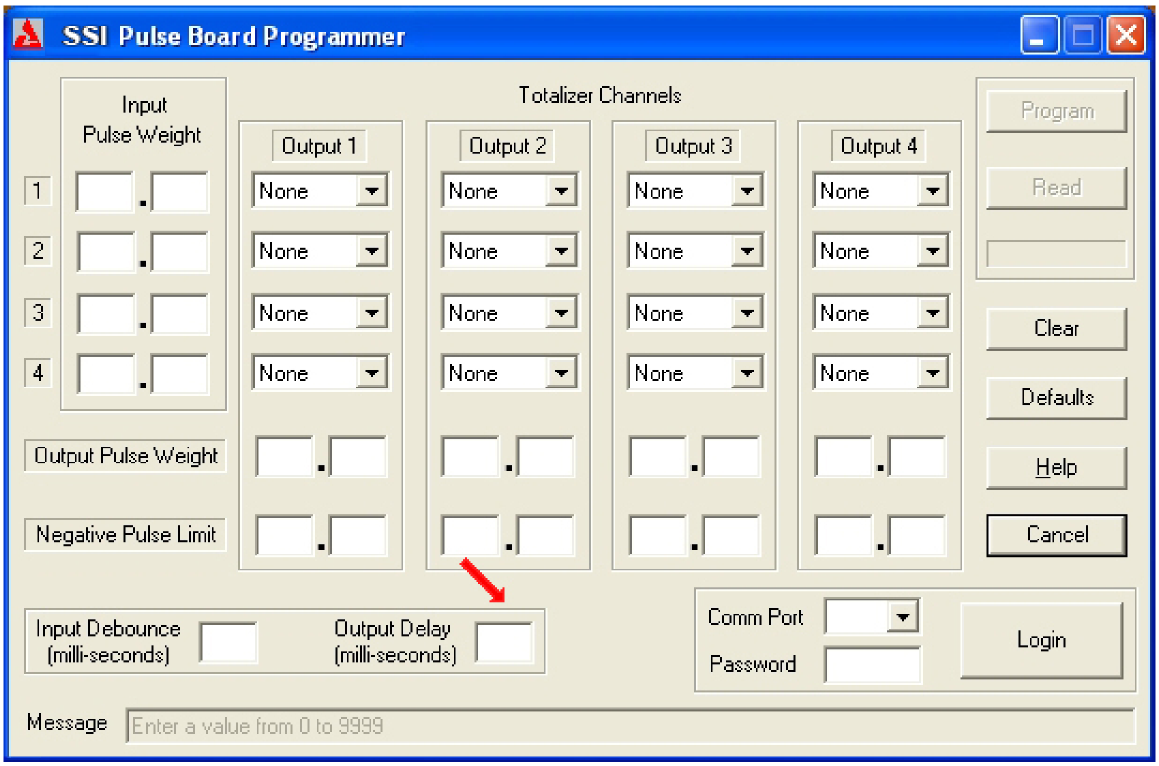

Figure 6

PC/Laptop Communication Port Assignment Field:

Figure 7 shows the login and communication port fields. In order to program the pulse board a communications port must be selected (COM1, COM2 or other) and a password must be entered (password: SOCO). The password is case sensitive.

The Customer Pulse Interface USB port is configured as a standard USB Type B port. No special cabling is required. Connect a USB A to Bl cable between the PC and the pulse board. Press the Login button. If the login was successful, the “POWER” LED on the Customer Pulse Interface should begin blinking fast indicated the device has entered into programming mode. Note: a slow blinking of the “POWER” LED indicates normal operating mode.

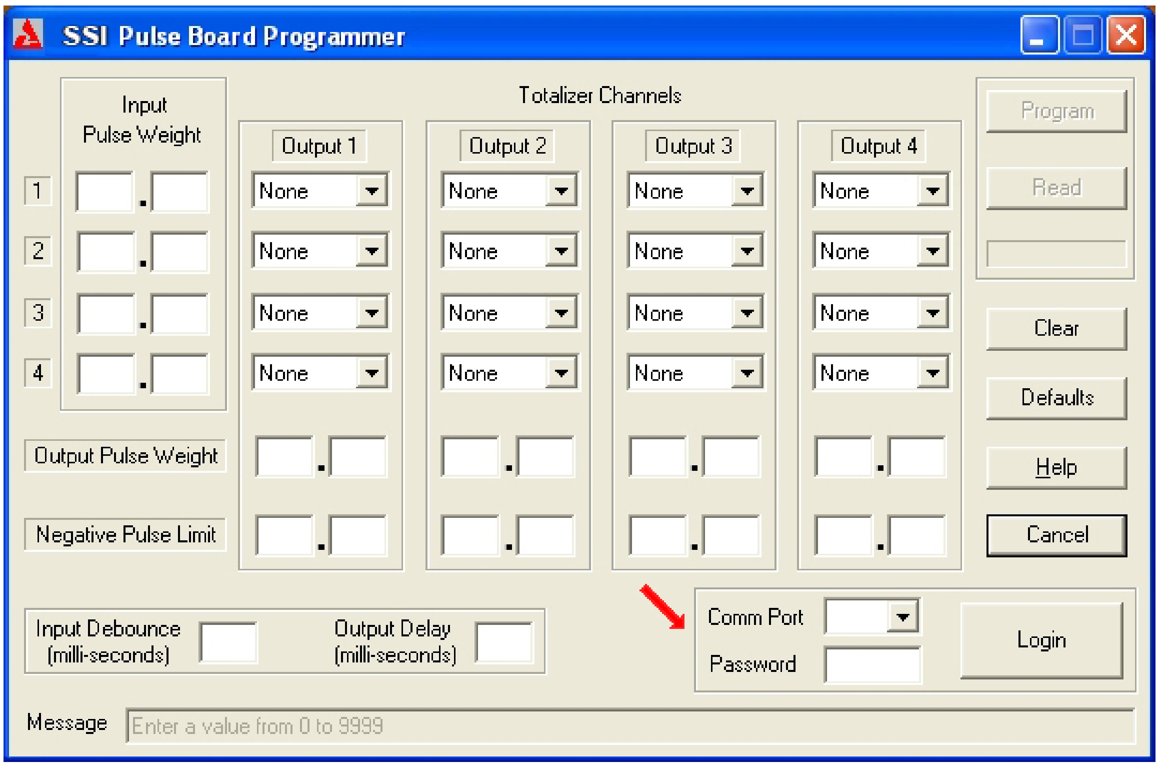

Figure 7

Once the pulse board is in program mode (fast blinking LED), the grayed-out buttons “**Program**” and “**Read**” at the top right of the user screen should be enabled. If you press the “Read” button the pulse board settings will be downloaded. If you press the “Program” button, the configuration settings from the program will be uploaded to the pulse board.

If left in program mode for 2 minutes without any activity, the pulse board will switch back into run mode (slow blinking LED).

MISC BUTTONS/FIELDS

The four buttons on the right side of the user screen perform the following functions:
CLEAR – Clears all settings on the user screen
DEFAULTS – Loads the factory default settings
HELP – Displays a simple help file
CANCEL – Exits the application
MESSAGE FIELD – This field at the bottom of the screen displays helpful information as you move from one field to another.

SECTION 3: PROGRAMMING EXAMPLES

The easiest way to see how the pulse board works is by looking at some examples. First, let's start by looking at the default settings.

Default SSI Customer Pulse Interface Settings:

Figure 8 shows the default settings of the pulse board. The red arrows show the logical flow of pulses in from the left side of the screen into the 4 accumulators and down to the outputs.

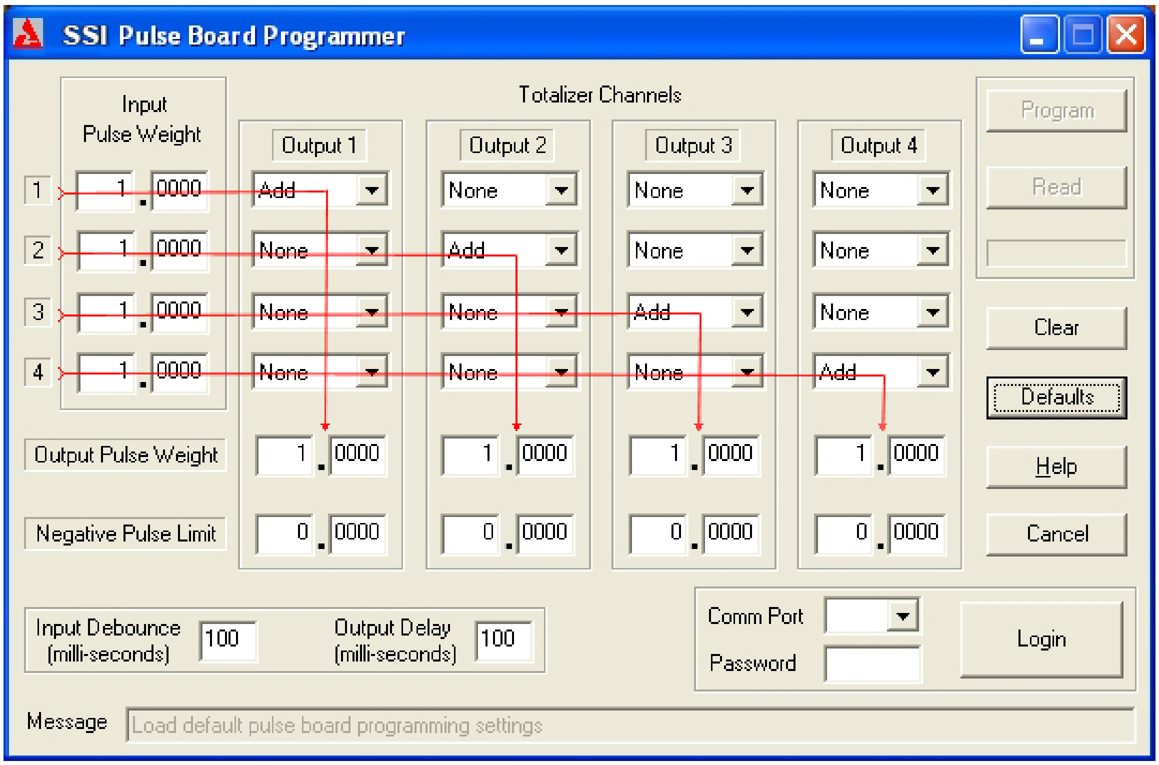

Figure 8

Figure 8 is an example of a 1-to-1 isolation relay with no pulse scaling.   Every pulse that comes in is given an input weight of 1 and placed into an accumulator. If the accumulator is equal to or greater than the output pulse weight, a pulse will be passed through the device.

Assigning a Single Input To Multiple Outputs:

Figure 9 is an example of receiving a single pulse on channel 1 and outputting a pulse on channels 1 and 2. For every pulse that arrives in channel one, a pulse will be sent out on outputs 1 and 2.

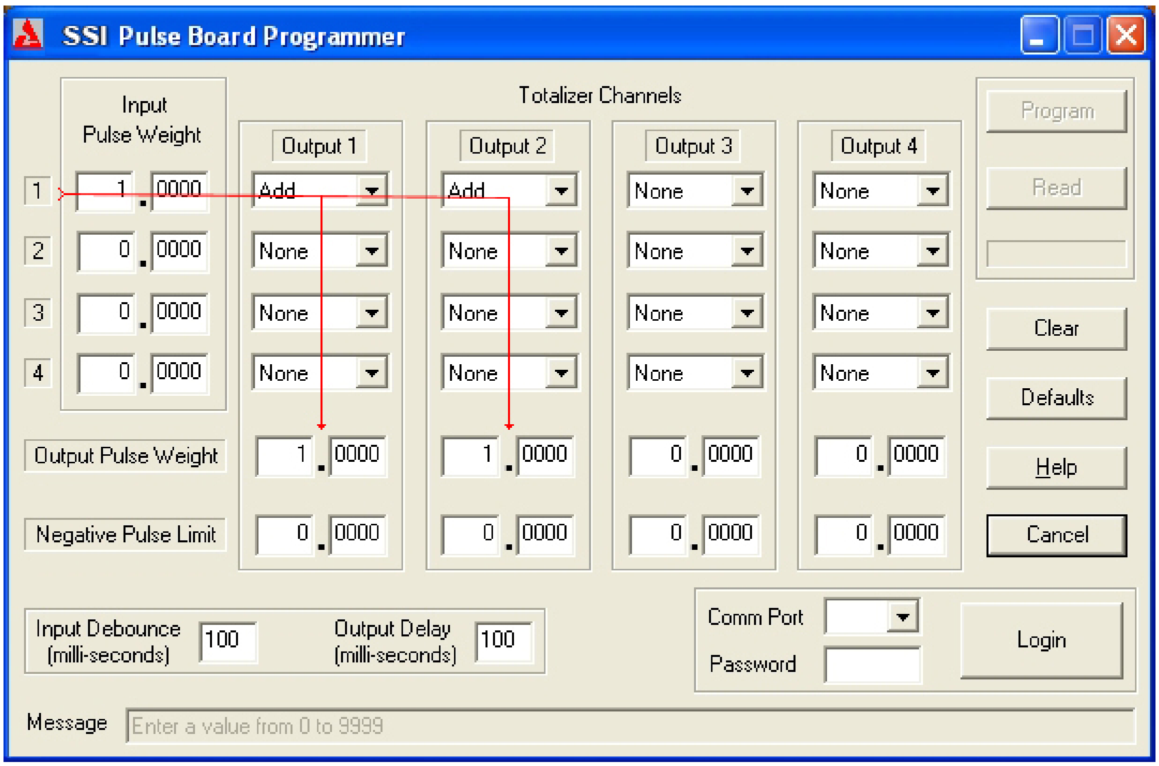

Figure 9

Totalizing Inputs with Output to a Single Channel:

Figure 10 is an example of totalizing two input pulses and producing a single output pulse. In this example, every pulse that comes in on channels 1 and 2, a pulse will be sent out on channel 1. Input pulses can have different pulse weights and totalized into a single or multiple output channel. As each input pulse comes in, the assigned pulse values are added to a channel accumulator. When the channel accumulator reaches the Output Pulse Weight, an output pulse is generated. If the channel accumulator buffers pulses (occurs if the input pulse value is higher than the output or if there is output delay), output pulses will continue to be generated until the channel accumulator value drops below the Output Pulse Weight.

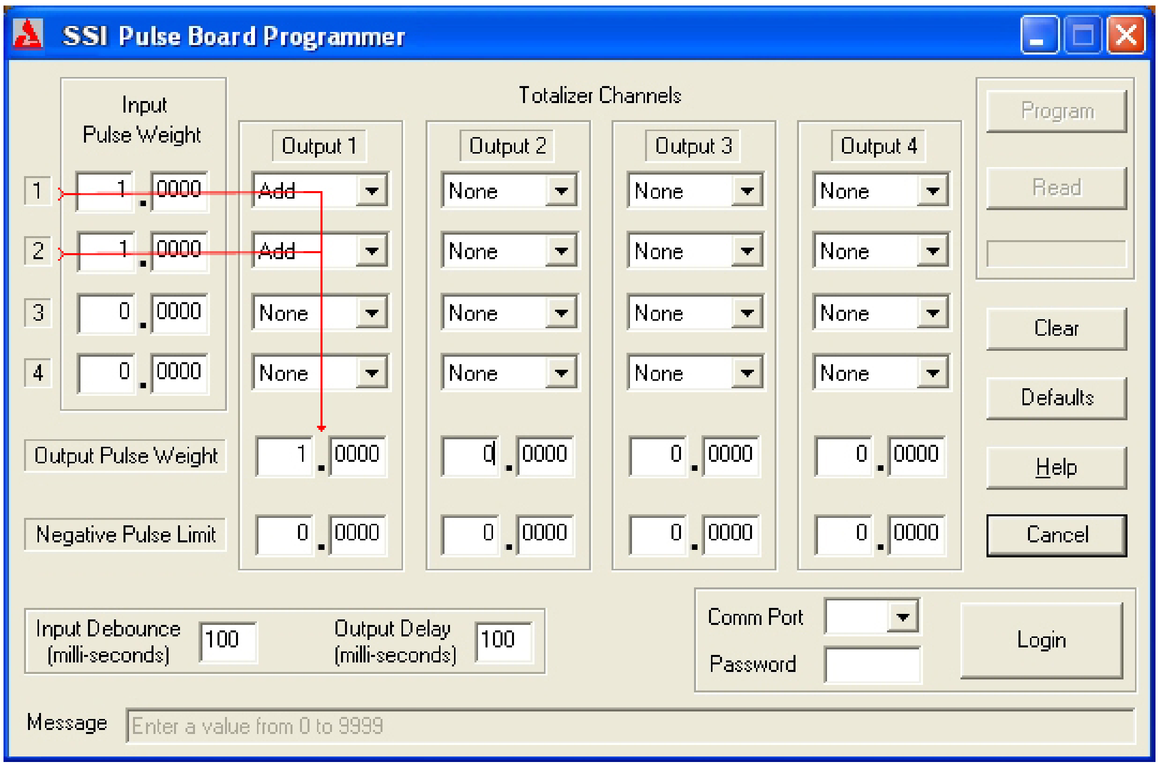

Figure 10

Subtractive Totalizing Inputs to a Single Output Channel:

Figure 11 is an example of subtracting pulses. Pulses that come in on channel 1 add a pulse weight of positive 2 into the accumulator. If five pulses come in without any coming in from channel 2 then a pulse will be sent to output 1. If any pulses come in on channel 2, a pulse weight of 1 will be subtracted from the accumulator, if and only if it has a value of 1 or more stored in it. The accumulator can not go negative because the negative pulse limit is set to 0.0000. If the accumulator is empty and pulses come in on channel 2, the pulses will be discarded. As in positive totalizing (Figure 10), output pulses occur when the channel accumulator value is higher than the Output Pulse Weight.

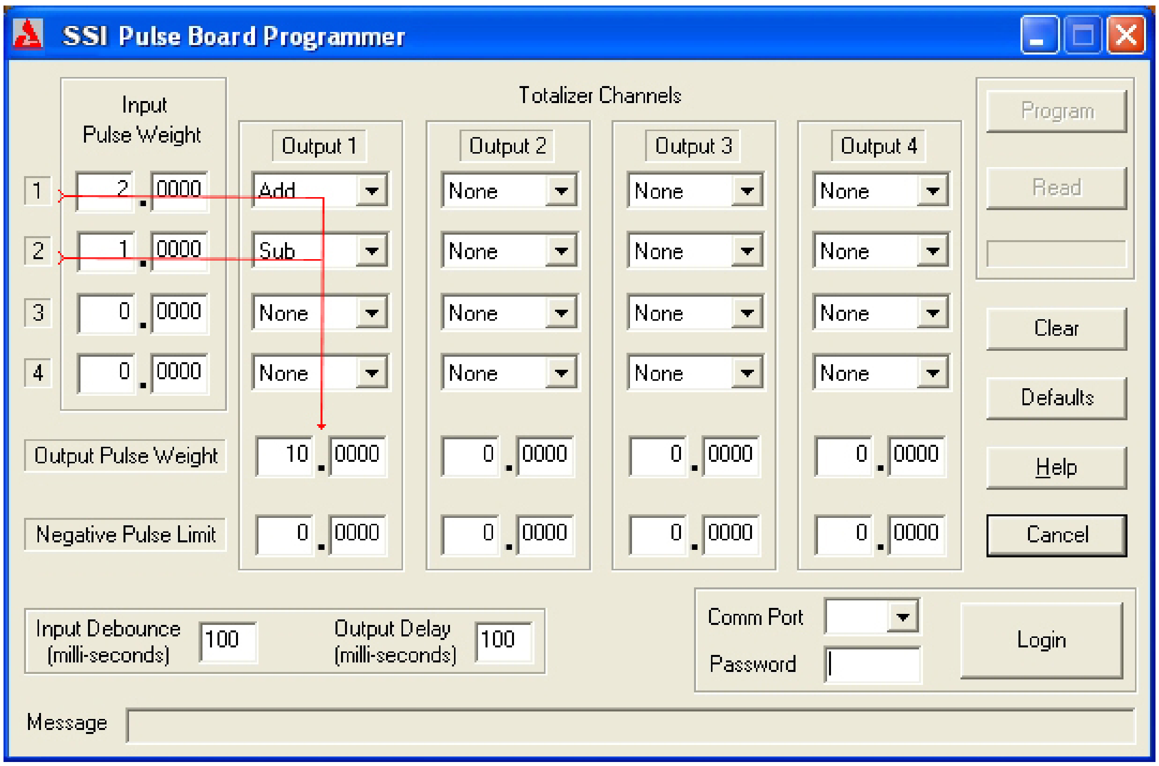

Figure 11