SOLVES-IT! 4 CHANNEL TIMER APPLICATION MODULE

Revision 0 for Software Version 1.0.0.0

PLC on a Chip Patent 7,299,099

A larger format of this manual may be found at http://www.divelbiss.com

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2008011.0

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WARNING!

The SI-APPMOD-TIMES4, as with programmable controllers, must not be used alone in applications which would be hazardous to personnel in the event of failure of this device. Precautions must be taken by the user to provide mechanical and/or electrical safeguards external to this device. This device is NOT APPROVED for domestic or human medical use.

PACKAGE CONTENTS

Whats Included

Qty	Description	Part Number	Location
1	SI-200 with Software Pre-loaded	SI-200	In Box
1	SI-APPMOD-TIMES4 Manual	2008011.X	In Box
1	Din-rail Socket	115-105328	In Box
4	Commutating Diodes	111-101012	In Box

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GETTING STARTED

This section explains how to read this manual and understand the symbols.

HOW TO USE THIS MANUAL

In this manual, the following conventions are used to distinguish elements of text:

BOLD	Denotes labeling, commands, and literal portions of syntax that must appear exactly as shown.
italic	Used for variables and placeholders that represent the type of text to be entered by the user.
SMALL CAPS	Used to show key sequences or actual buttons, such as OK, where the user clicks the OK button.

In addition, the following symbols appear periodically in the left margin to call the readers attention to specific details in the text:

Warns the reader of a potential danger or hazard that is associated with certain actions.

Appears when the text contains a tip that is especially helpful.

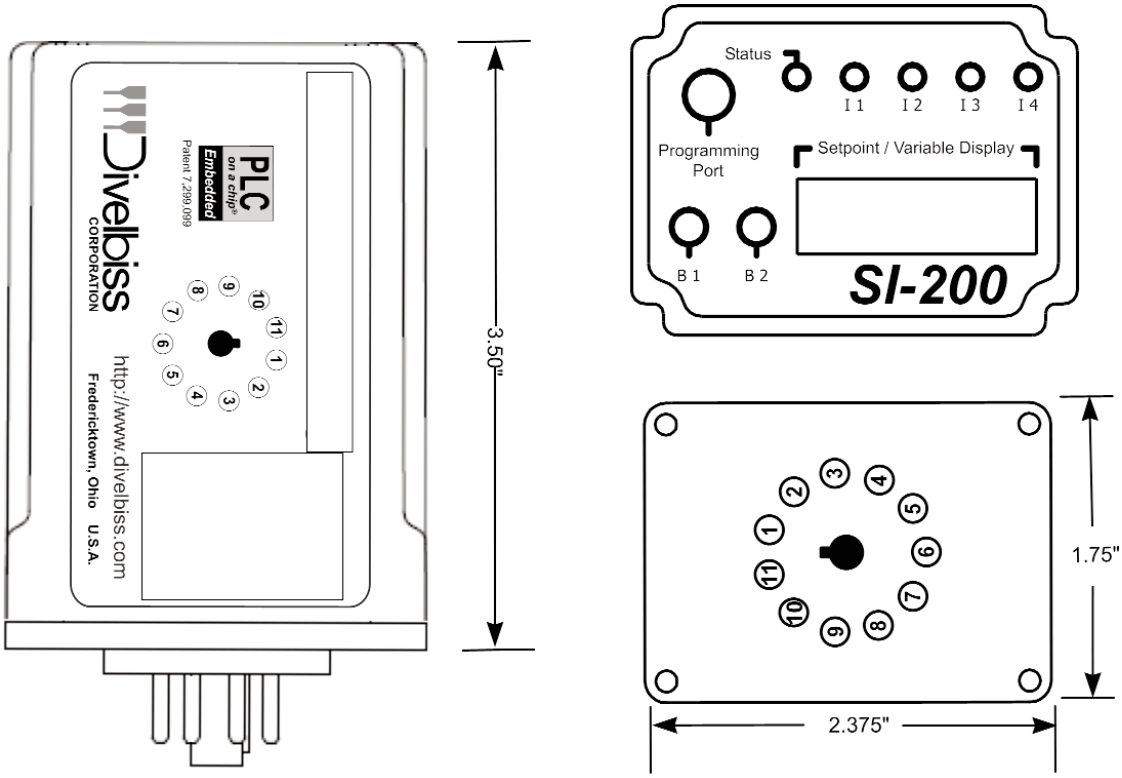
Indicates that the text contains information to which the reader should pay particularly close attention.

All Information and Specifications Subject to Change without Notice

MODULE BASICS

This section describes the SI-APPMOD-Times4 Application Module including input/output assignments and an operational description.

GETTING TO KNOW THE MODULE



The module is connected to external devices via its included mounting socket.

Connector Pin out

Bottom View (Solves-It! Connector)

Pin 1	Channel 2 Output
Pin 2	Channel 1 Output
Pin 3	Timer Channel 1 Enable
Pin 4	Timer Channel 2 Enable
Pin 5	Timer Channel 3 Enable
Pin 6	Timer Channel 4 Enable
Pin 7	Earth Gnd
Pin 8	Input Power Common
Pin 9	10-24.5VDC Input Power
Pin 10	Channel 4 Output
Pin 11	Channel 3 Output

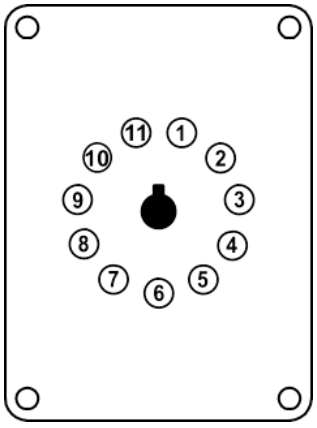


Figure 2.1 - Module Pin-Out

MODULE MOUNTING

The Module mounts to an industry standard 11-pin Octal relay socket. To mount the module, align with the socket and firmly push into position.

MODULE INPUT POWER

The module can be powered with 10-24.5VDC. The input power must be of sufficient supply to drive the module and the outputs (based on the load currents for each) Maximum current for the module is 150mADC and maximum load for each outputs is 300mADC. For the pre-programmed software, 4 outputs are used and may be on at a time. Exceeding a total output load of greater than 1ADC (more than 3 outputs at full load simultaneously) can damage the module.

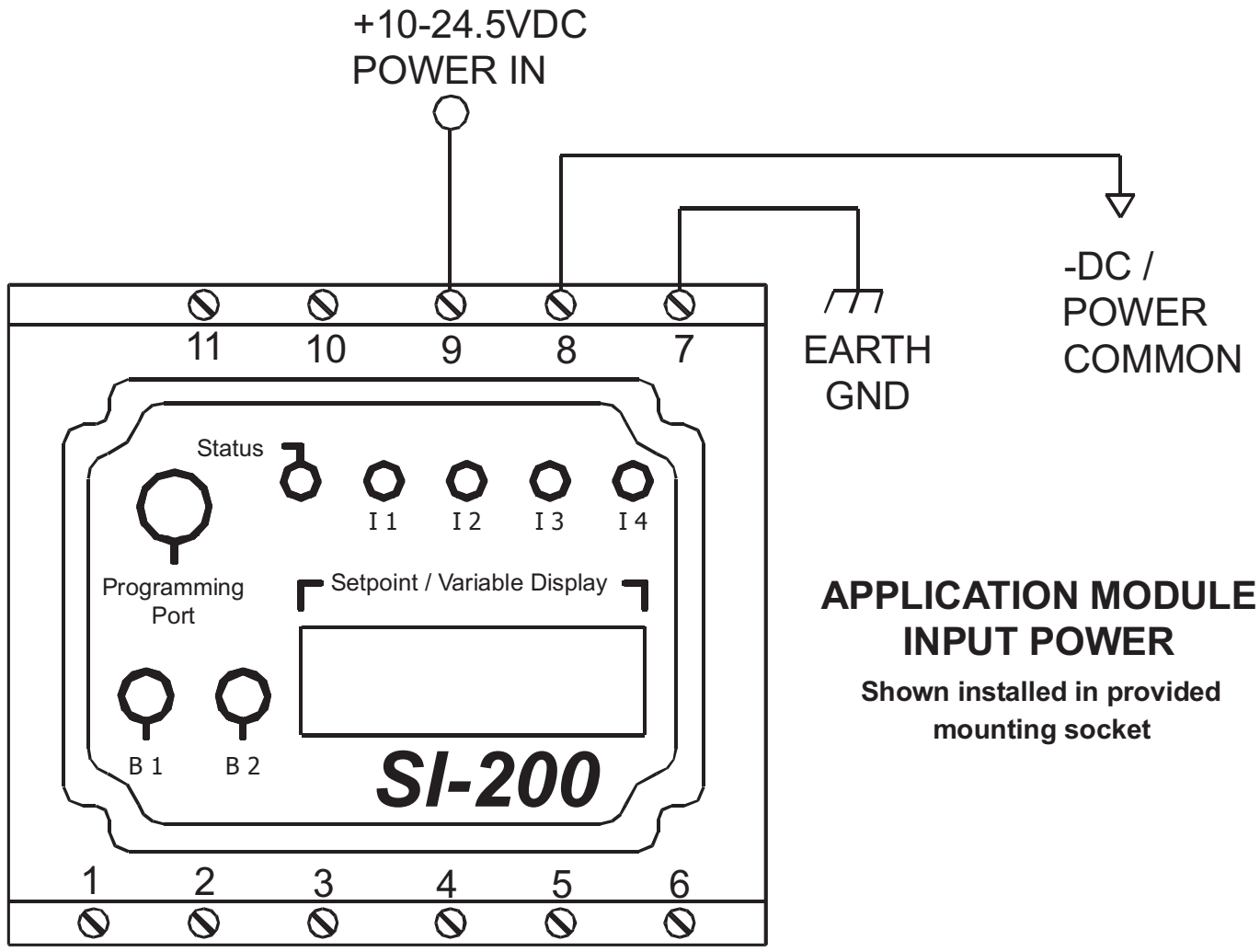


Figure 2.2 - Module Input Power Diagram

MODULE OPERATION

The SI-APPMOD-Times4 module provides four independent timer channels. Each channel may be configured as either an on-delay or off-delay timer. Each channel is controlled by an enable input and has an output. The output functionality is based on the configuration of the timer (on-delay or off-delay).

Each timer channel setpoint can be adjusted from .1seconds to 300 seconds and must be configured as either on-delay or off-delay. The setpoint and timer type are set using the user interface.

ON-DELAY Operation

When the module sees the Enable energize, the timer begin timing. When the setpoint is reached, the channel Output is energized. If at any point the Enable is de-energized, the actual timer value will reset and the Output will de-energize (if energized). On-Delay is the default factory setting.

OFF-DELAY Operation

When the module sees the Enable energize, the Output is energized. When the Enable is then de-energized, the timer begin timing. When the setpoint is reached, the channel Output is de-energized. If at any point the Enable is re-energized, the actual timer value will reset and the Output will energize (if de-energized).

USER INTERFACE

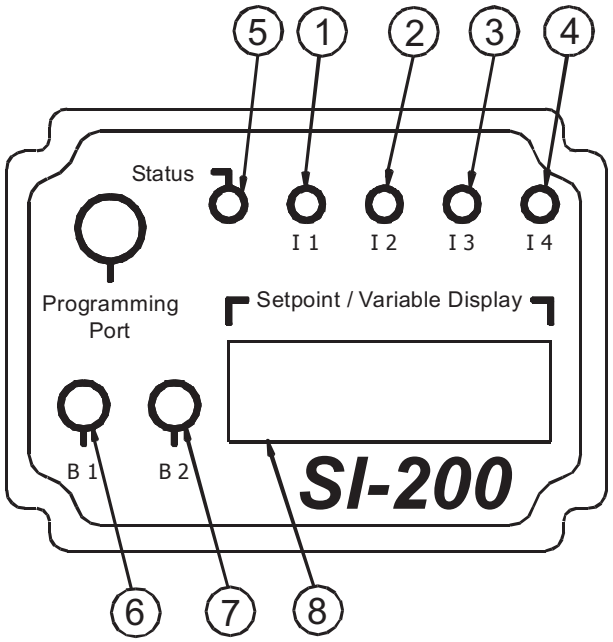
The user interface consists of two push-buttons; labeled B1 and B2, the Setpoint/Variable Display, four LED indicators (I1-I4) and the Status LED indicator.

1. Indicator 1

On-Steady indicates that current elapsed time of Channel 1 is displayed on the Setpoint / Variable Display. When flashing, it is the "1" digit of the binary coded decimal (BCD) indicating which menu item is displayed.

2. Indicator 2

On-Steady indicates that current elapsed time of Channel 2 is displayed on the Setpoint / Variable Display. When flashing, it is the "2" digit of the binary coded decimal (BCD) indicating which menu item is displayed.



3. Indicator 3

On-Steady indicates that current elapsed time of Channel 3 is displayed on the Setpoint / Variable Display. When flashing, it is the "4" digit of the binary coded decimal (BCD) indicating which menu item is displayed.

4. Indicator 4

On-Steady indicates that current elapsed time of Channel 4 is displayed on the Setpoint / Variable Display. When flashing, it is the "8" digit of the binary coded decimal (BCD) indicating which menu item is displayed.

5. Module Status Indicator

Flashing slowly indicates module problem
Flashing quickly indicated module is operating

6. B1 Push-button

Each press will cycle one-step through the module setup menu. The menu # is displayed using the flashing I1-I4 indicators in BCD.

1. **Channel 1 Type - 0=On-delay / 1 = Off-delay**
2. **Channel 1 Timer Setpoint (.1-300s)**
3. **Channel 2 Type - 0=On-delay / 1 = Off-delay**
4. **Channel 2 Timer Setpoint (.1-300s)**
5. **Channel 3 Type - 0=On-delay / 1 = Off-delay**
6. **Channel 3 Timer Setpoint (.1-300s)**
7. **Channel 4 Type - 0=On-delay / 1 = Off-delay**
8. **Channel 4 Timer Setpoint (.1-300s)**

8. Setpoint / Variable Display

View the current elapsed time values, configure the timer channels and setpoints.

7. B2 Push-button

When not in the setup menu (indicator LEDs on-steady), each press cycles through which channel's current elapsed time is displayed. I1-I4 represent channels 1-4 respectively. In the setup menu, this button will either the type of timer channel (0 or 1) or increment the timer value in seconds. Holding the button longer increases the speed which the timer setpoint increments.

Figure 2.3 - User Interface

ENABLE INPUT CONNECTIONS

The Enable inputs for each channel are sourcing; therefore requiring a sinking device be connected. When the input is connected to common (shorted to common), the input is energized. Figure 2.4 provides a sample connection. As shown in Figure 2.4, switches are used to illustrate what is required; although, any device that operates the same may be used.

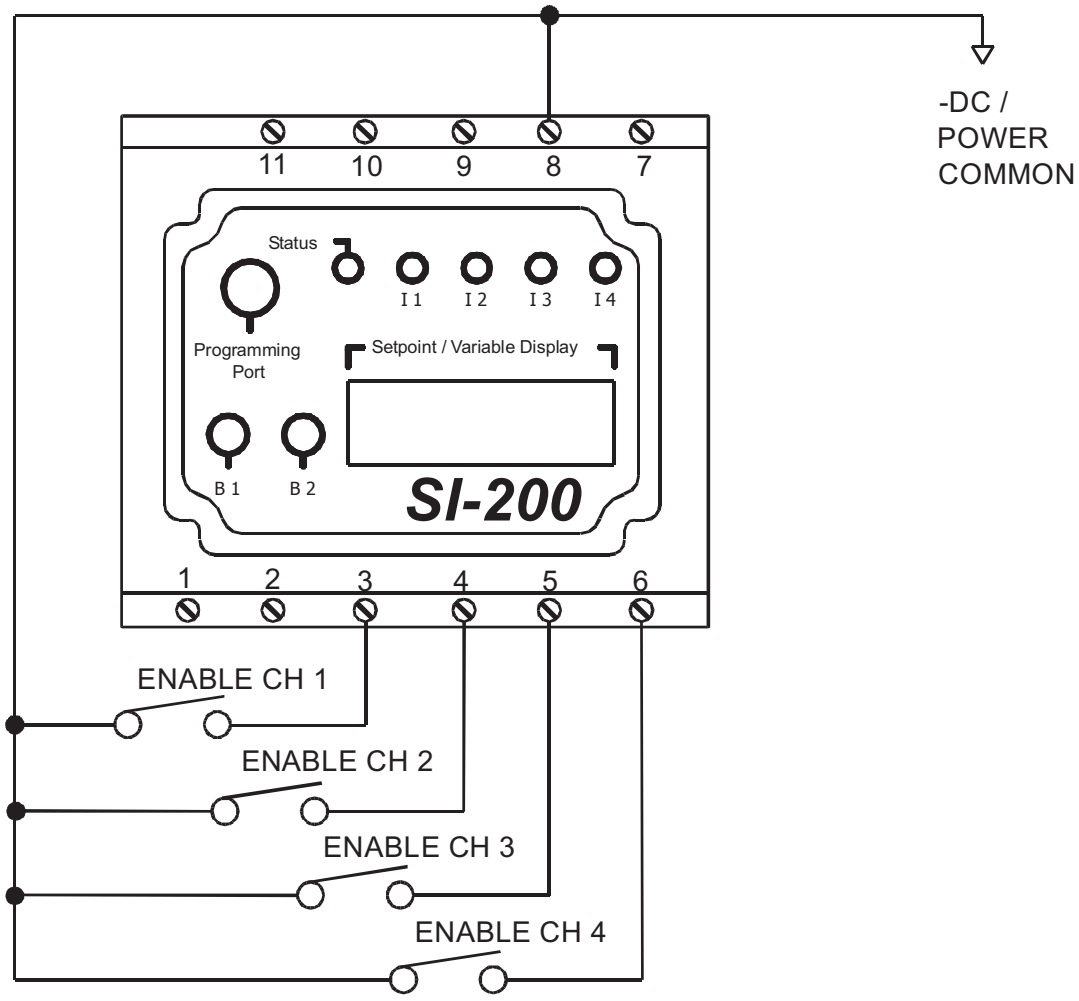


Figure 2.4 - Enable Input Connections

OUTPUT CONNECTIONS

When outputs are energized, the output pin will be sourced with +V (equal to the module input power voltage). Each output can drive a load up to 300mA maximum (resistive). Depending upon the device connected to an output, a minimum load resistor may be required. If the output is energized at all times, connect a 470Ω to 1KΩ load from the output to common. Figure 2.5 is a typical output wiring diagram.

The factory installed software for this module will only allow four outputs to be energized at a time. Max total current for simultaneous outputs is 1ADC. Simultaneous output loads greater than 1A may result in damage to the module. Care must be taken to ensure the loads connected to the outputs if all channels are used does not exceed 1A.

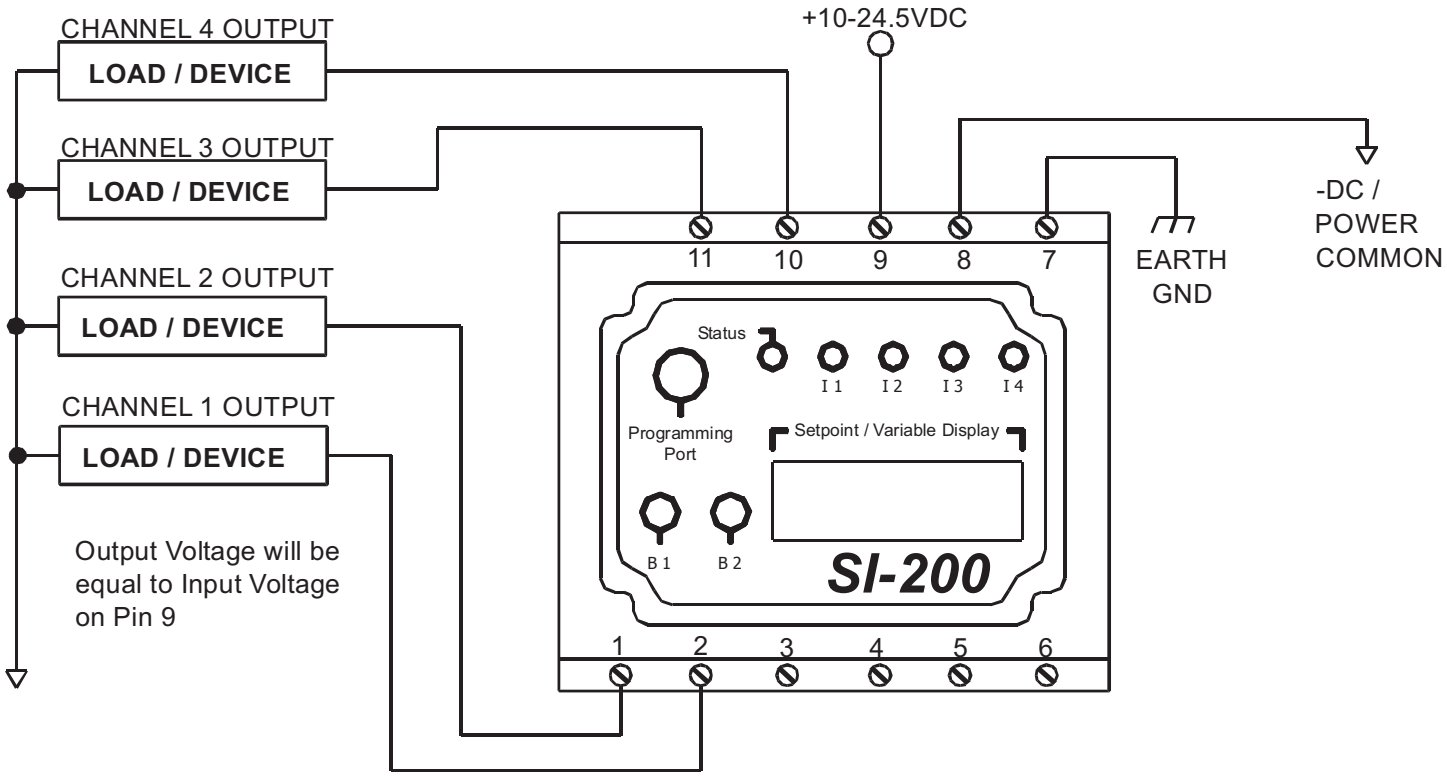


Figure 2.5 - Typical Output Connections

VIEWING ELAPSED TIMER VALUES

Elapsed timer values for each channel can be viewed on the display. As a default on power-up, Channel 1's current elapsed time is shown (I1 is on-steady indicating channel 1). To see other channels, press the B2 button until the correct indicator led is on-steady (I1 on-steady indicates the Channel 1 Timer is displayed, I2 on-steady indicates the Channel 2 Timer is displayed, I3 on-steady indicates the Channel 3 Timer is displayed, and I4 on-steady indicates the Channel 4 Timer is displayed). According to the indicator shown, the corresponding channel's elapsed time will be displayed.

CONFIGURING THE CHANNELS

All channels are configured as on-delay and timer setpoints are defaulted to zero from the factory. Each channel will need to be configured before the module will function properly.

UNDERSTANDING THE INDICATORS

To be able to configure the module channels, you must first understand the configuration menu. Pressing the B1 button will enter the configuration menu. Indicators I1 - I4 will indicate which menu item is currently being viewed/modified. The menu number is displayed on these indicators using Binary Coded Decimal (BCD). When in the configuration Menu, the indicator(s) will flash this BCD. Figure 2.6 illustrates BCD and it's corresponding menu item. Please note, for illustration purpses, the I1-I4 indicators are shown on-steady, but in reality they will be flashing.

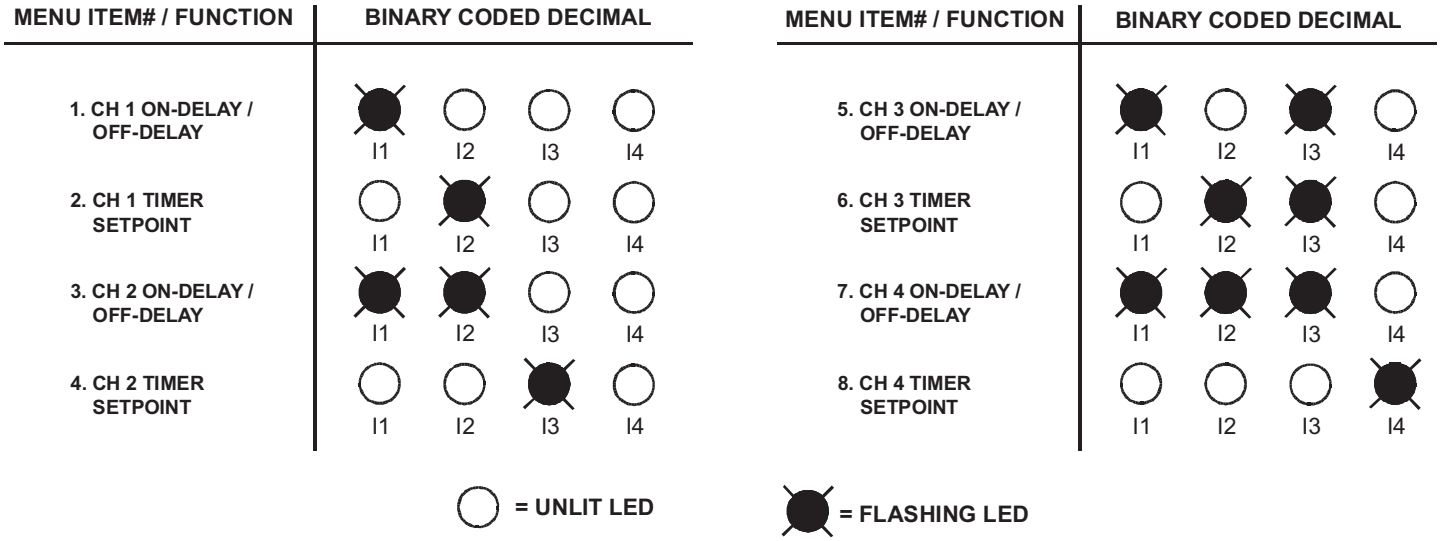


Figure 2.6 - LED Indicator Binary Coded Decimal

If the LED is on-steady, then the module is displaying an elapsed timer value and is not in the configuration menu. In the timer view mode, I1 on-steady indicates the Channel 1 Timer is displayed, I2 on-steady indicates the Channel 2 Timer is displayed, I3 on-steady indicates the Channel 3 Timer is displayed, and I4 on-steady indicates the Channel 4 Timer is displayed

SETTING THE TIMER TYPE - ON/OFF-DELAY

1. Using the B1 button, cycle through the configuration menu until the desired menu item is displayed (1, 3, 5, 7 depending upon channel). Refer to Figure 2.6 for menu items. Verify the correct menu item per the indicator LEDs.

2. The type will either be displayed as a 0, indicating ON-DELAY or 1, indicating OFF-DELAY. Press the B2 button to toggle this setting between 0 and 1. The setting is stored each time the B2 is pressed. Press repeatedly to exit the configuration menu (if all changes have been completed).

SETTING THE TIMER SETPOINT - .1-300 SECONDS

1. Using the B1 button, cycle through the configuration menu until the desired menu item is displayed (2, 4, 6, 8 depending upon channel). Refer to Figure 2.6 for menu items. Verify the correct menu item per the indicator LEDs.

2. Press the B2 button repeatedly to increment the setpoint time in .1 second increments. Pressing and holding the B2 button will cause the rate of the increment to increase. The time will increase to 300 seconds then reset and begin from zero.

EXPANDABILITY / CUSTOMIZATION

As the module is based on the Solves-It!, Model SI-200, the program can be customized and its functionality expanded. Accessories are required. The program that was factory installed can be downloaded from ***http://www.divelbiss.com***. The program can be edited to add additional functionality and logic. To gain functionality of some inputs and/or outputs, it may be necessary to re-assign the I/O that was factory configured. For more information about changing the functionality, download the Solves-It! User Manual and the EZ LADDER User Manual.

The following accessories are required to re-program the module and are included in the SI-APPMOD-PGMKIT:

1. SI-PGM Solves-It! Programming Cable
2. EZLDCD-02 EZ LADDER Lite on CD.

PROGRAMMED FROM FACTORY SPECIFICATIONS

Processor:	Solves-It! Model 200, Based on PLC on a Chip™
Memory:	64K Flash
Outputs:	4 Sourcing SSR Outputs, rated 10-24VDC @ 300mADC Max. each. Max total output load = 1ADC @ 24VDC power input. Output Voltage = Input Power Functionality: Channel 1-4 Output
Power Requirements:	10-24.5VDC @ 150mADC Max
Indicators:	I1-I4 LED Indicator, 1 Status LED Indicator
Digital Inputs:	4 Sourcing Inputs Channels 1-4 Enable
Display:	4 Digit, 7 Segment Programmable LED Display
Push Buttons:	2 Programmable Push Buttons
Operating Temp:	0-60º C
Dimensions:	3.62” Wide x 5.21” Length x 1.21” Tall.
Mounting:	Plugs into Industry standard 11-pin Octal Relay Socket
Type:	Plastic Housing

Limited Warranty

Divelbiss Corporation warrants equipment will be free from defects in material and workmanship for a period of one (1) year from the date of the Divelbiss invoice that the equipment was furnished. Divelbiss Corporation will not be liable for any design furnished by Buyer and incorporated into the equipment.

In no event shall Divelbiss Corporation be liable for anticipated profits, consequential damages or loss of use of equipment or of any installation into which the equipment covered by this order may be put.

Divelbiss Corporation shall not be liable or responsible for any loss, injury, or damage resulting directly or indirectly from the use of software and/or programming in any way associated with the equipment of this order.

Obligations are to be limited to the repair or replacement at the Divelbiss Corporation plant, Fredericktown, Ohio, upon return of the part or component in question, prepaid by Buyer. The return freight charges to be paid by Divelbiss. The part or component is only to be returned to Divelbiss with a Returned Material Authorization number issued by the Divelbiss Service Department. Any warranty service (consisting of time, travel, and expenses related to such services) performed other than at Divelbiss Corporation plant, shall be at Buyer's expense.

Warranty of repaired or replacment products will be limited to ninety (90) days or the remainder of the original warranty whichever is greater.

Warranty is available only if Divelbiss Corporation is promptly notified in writing upon discovery of any alleged defect and examination of the subject product discloses, to Divelbiss satisfaction, that any defect has not been caused by misuse; neglect; improper installation; improper operation; improper maintenance, repair, or alteration; accidents; or unusual deterioration or degradation of the equipment or parts thereof due to physical environment or due to electrical or electromagnetic noise environment.

This warranty is in lieu of all other warranties, expressed, implied, or statutory, including warranties of merchantability or fitness for a specific purpose.