USER'S MANUAL

Model C1660A/C1661A
Omni10c Alarm Annunciator
User's Manual

DATE	REVISION	COMMENTS
Aug 2006	1	Initial revision
Aug 2006	2	Minor Corrections after internal review
Aug 2006	3	Modbus Address switch settings corrected.

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SCOPE

This User Manual provides information necessary to install, configure and operate your Omni10c product.

This manual covers the following product Model Numbers:

Model	Description
C1660A-1	Omni10c panel mount integral alarm annunciator with 20-60Vdc inputs
C1660A-2	Omni10c panel mount integral alarm annunciator with 90-150Vac/dc inputs
C1661A	Omni10c panel mount integral alarm annunciator with serial only inputs

Introduction

The OMNIFLEX Omni10c family is a range of compact, highly flexible, full function integral alarm Annunciators and displays designed to fulfil all the safety critical monitoring requirements of the modern industrial plant or marine application.

Alarm Annunciators are a key component in the safety of the plant, and these products have been designed with safety integrity in mind. Advanced safety features such as continuous internal self testing provide a product suitable for use in IEC61508 SIL1 safety critical alarm applications.

These products are available “off-the-shelf” with no factory customisation required. Because these units are not built to order, spares holding and maintenance are significantly enhanced.

The high brightness backlit display uses solid state LED display technology to provide low power and long life.

Display legends for the backlit displays are created by the user on any standard laser/inkjet printer using software templates supplied with the product.

All popular configuration options are accomplished by switch settings on the rear of the unit. Software programming can be used to select more advanced options.

Available with a universal power input of 20-60Vdc, these rugged products are designed to fit directly into sub-station and marine applications without the need for external power conditioning or interfacing for the lowest cost system implementation.

Additional options include:

- Fully isolated RS232/422/485 Modbus© compatible serial port to interface to PLC, DCS, or SCADA systems.
- A Software Configuration Utility for more advanced customisation.

The Omni10c Panel Mount 10 point Alarm Annunciator.

Table of Contents

1. GENERAL DESCRIPTION

1.1 Standard Features

- 20-60Vdc Powered
- Compact, panel mounted and easy to use
- 10 Contact Inputs
- Normally Open/Closed Selectable via DIP switch
- 27 Standard Alarm Sequences
- Bright Solid State Backlit Red LED Display
- User printed legends on inkjet/laser
- Four function Group Alarm output contact
- Fully “DIP” Switch Configurable
- Optional Serial Port - Modbus/PLC compatible
- Ability to synchronise flashing between multiple Omni10c’s
- Ability to create single first-out alarm groups across multiple Omni10’s
- Continuous input and logic self test for fail safety
- Dual redundant LED’s in each alarm window for high reliability
- Optically isolated alarm inputs

1.2 Model Options

The following table describes the feature differences between the various models of Omni10c:

Model	Wired Inputs	Input Voltage	Serial Port
C1660A-1	YES	20-60Vdc	Optional[1]
C1660A-1	YES	90-50Vac/dc	Optional[1]
C1661A	NO	-	YES

Note 1: The C1660A can be supplied equipped with the serial port as an optional extra. Specify Serial port interface model C1423A-1 as a separate item when ordering, and this option will then be fitted before delivery.

All other features are identical between these models.

1.3 Front View of showing Alarm Window numbering

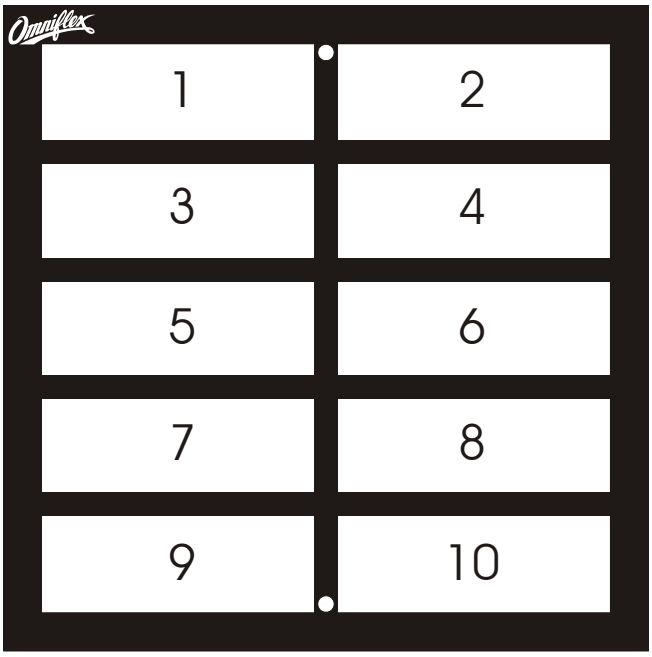


Figure 1-1 – Omni10cFront View showing Window Numbers

1.4 Rear View of Omni10c showing Terminal Layout and Numbering

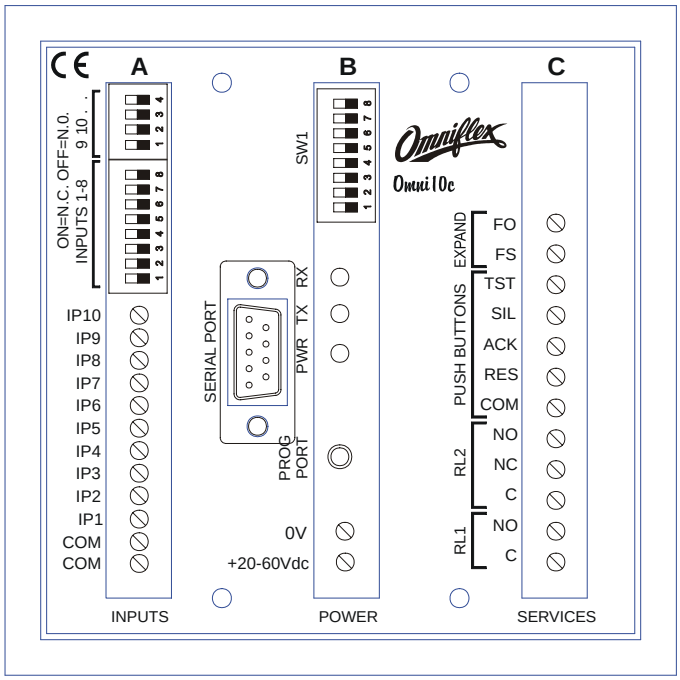


Figure 1-2 – Omni10c Rear View

2. MECHANICAL INSTALLATION

2.1 Mechanical Dimensions

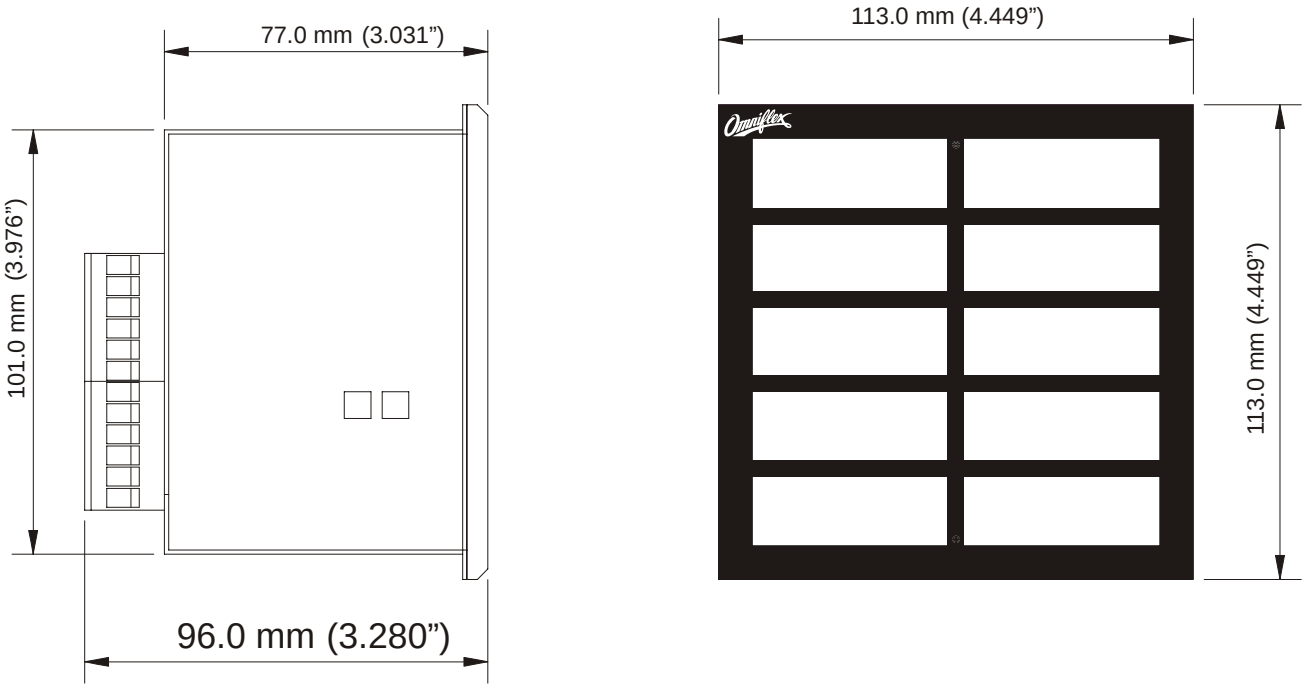


Figure 2-1 –Panel Mount Omni10c Mechanical Dimensions

2.2 Panel Fixing

Fix the Omni-10c into a cut-out in your front panel using the "jacking bars" supplied with the Omni10c.

These jacking bars fit into slots set in the sides of the Omni10c. The location of these slots is shown in Fig 2-1.

The panel thickness should be between 1,6 mm (0,0625") and 5,0 mm (0,354").

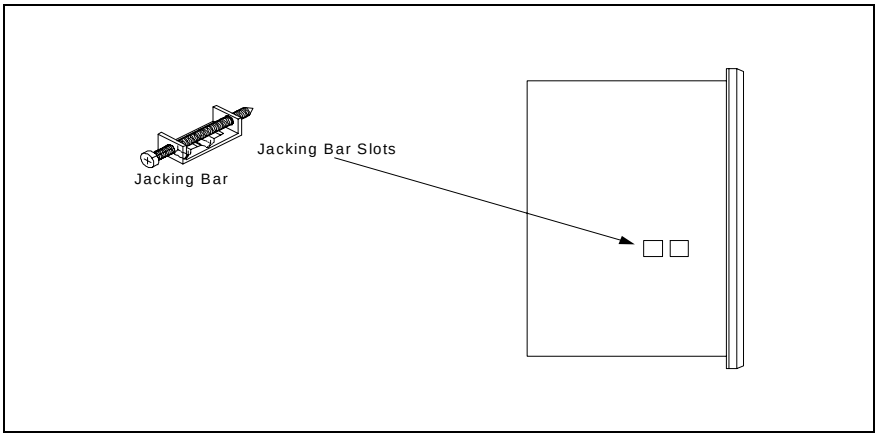


Figure 2-2 –Jacking Bar location slots

2.3 Panel Cut-out

The panel cut-out required to mount a single Omni10c is given below:

	Height	Width
Omni10c	102mm(4”)	102mm(4”)

Table 2-1 Single Unit Mounting Cut-out Dimensions

2.4 Creating Window Legends

2.4.1 Overview

Window legends are created for the Omni10c on a laser or inkjet printer using the Excel Spreadsheet template provided with the product.

2.4.2 Creating the Legend Film

To create the legend film, follow this procedure:

1. Open the template file in Excel from the disk supplied.
2. Fill in your legend details in this template.
3. Print the legends created onto overhead transparency film (the type used for overhead presentations). A sheet is included with the product.
4. Cut to size along the cutting marks printed on the film.
5. Cut the two holes for the mounting screws (This is best done with a hole punch).
6. Insert the legend screen into the Omni10c as described in section 2.5.

Please note that the supplied template has been tested on a wide range of printers. Your particular printer may scale the image slightly differently. While the front grid cutting marks should accommodate this tolerance, in extreme cases you may have to alter the grid spacing on the template file supplied. This needs to be done once only and will then be set for your printer.

The correct overall size for the legend film insert is 100mm high x 100mm wide – the same size as the white diffuser.

2.5 Inserting the Legend Sheet

Assemble the legend sheet into the Omni10c as shown in the following figure:

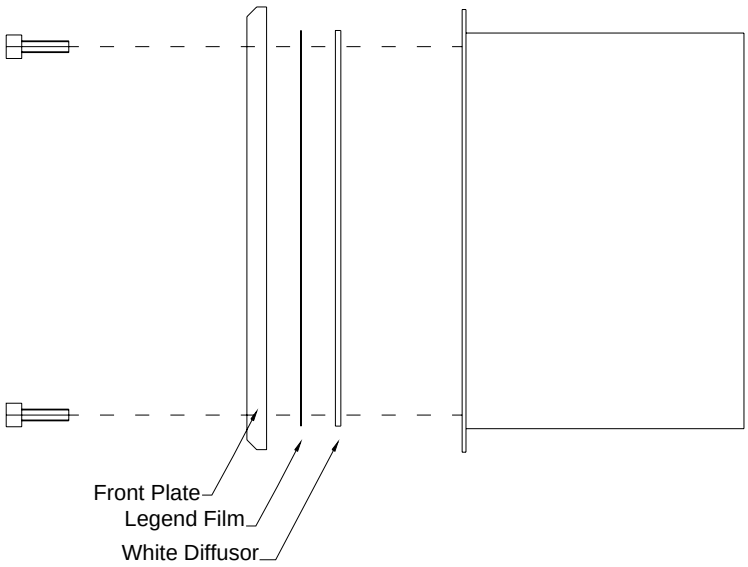


Figure 2-3 Legend Film Order of Assembly

3. ELECTRICAL INSTALLATION

3.1 Introduction

All electrical connections to the Omni10c are made on the rear of the unit on plug-in terminals provided (refer to Figure 1-2).

The following general block diagram provides an overview of the connections required.

Terminal Strip A, comprising the input terminals, is NOT present on the model C1661A.

These connections are described individually in more detail later in this section.

3.2 Omni10c Block Diagram

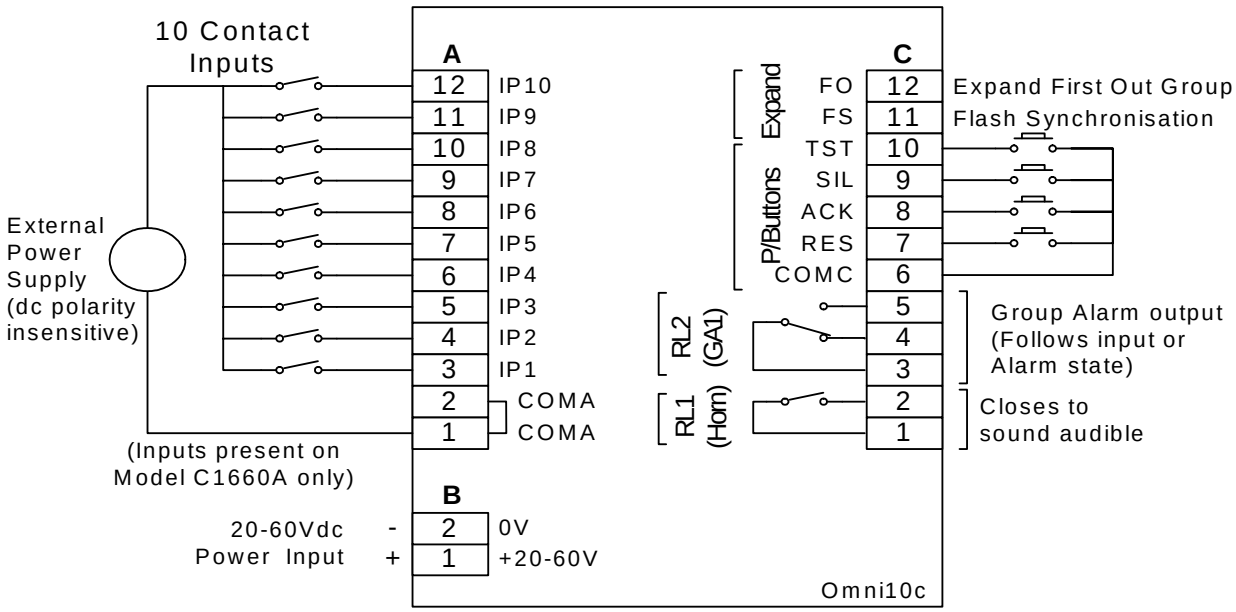


Figure 3-1 –Omni10c Annunciator Block Diagram showing Terminal Numbers

3.3 Omni10c Terminal Schedule

Terminal Number	Terminal Marking	Description
Inputs 1 to 10 (Model C1660A only)		
A-1	COM	Input Common This is the return connection for the inputs. See section 3.6 for further wiring details
A-2	COM	Input Common (connected to terminal A-1)
A-3	IP1	Input 1 Connection
A-4	IP2	Input 2 Connection
A-5	IP3	Input 3 Connection
A-6	IP4	Input 4 Connection
A-7	IP5	Input 5 Connection
A-8	IP6	Input 6 Connection
A-9	IP7	Input 7 Connection
A-10	IP8	Input 8 Connection
A-11	IP9	Input 9 Connection
A-12	IP10	Input 10 Connection
20-60 Volt Power Input		
B-1	+V	+20-60 volt supply to the Omni10c.
B-2	0V	0 volt supply to the Omni10c.
Common Services		
C-1	RL1 - C	Common of Contact from Relay 1. In “Switch-set” mode this relay provides the Horn output, and energises whenever the audible sounds, closing this contact.
C-2	RL1 - NO	Normally Open Contact from Relay 1
C-3	RL2 - C	Common of Contact from Relay 2. In “Switch-set” mode this relay operates as Group Alarm. (Refer Section 4.5 for further details.)
C-4	RL2 - NC	Normally Closed Contact from Relay 2
C-5	RL2 - NO	Normally Open Contact from Relay 2.
C-6	COM	Common Connection for external pushbuttons and expansion connections. If two or more Omni10c’s have their pushbuttons, Flash Sync (FS or First Out Expansion (FO) wired together, then this COM terminal MUST be wired between the units. Keep this connection as short as possible.
C-7	RES	Connection to an external Reset pushbutton.
C-8	ACK	Connection to an external Acknowledge pushbutton

C-9	SIL	Connection to an external Silence pushbutton
C-10	TST	Connection to an external Test pushbutton
C-11	FS	Connect to another Omni10c to synchronise flashing between units.
C-12	FO	Connection to another Omni10c to create a single First-Out Group across more than one unit.

3.4 Omni10c RS232/RS485 Serial Port

3.4.1 Overview

The Serial Port on the Omni10c provides a fully isolated RS232 or RS485 port for communication with another device such as a SCADA computer, PLC or Personal Computer.

This port acts as a Modbus Slave device, and using RS485, allows up to 32 Omni10c devices to communicate with a single Modbus Master. You can read/write all real time values within the Omni10c through this port.

In the Model C1661A, the only way to get inputs to the alarm annunciator is to write these to the Omni10c through this serial port.

NB: When this port is fitted to the unit, the normal programming port is disabled, and all configuration must be done through this port in the normal way. In this case the special programming cable is substituted for a conventional RS232 “cross-over” cable (see 3.4.5 below).

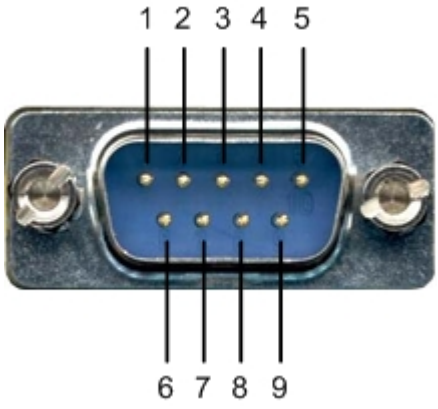
3.4.2 When the serial port is fitted

See section 1.1 to see which models are equipped with the RS232/485 serial interface.

3.4.3 Serial Port Pin Allocation

The Serial Port pin connections are as follows:

DB9M Pin	RS232	RS485
1		RxD+
2	RxD	RxD-
3	TxD	
4		TxD+
5	GND	GND
6	+5V(ISO)	+5V(ISO)
7		
8		
9		TxD-



NB! Once the Serial Port (DB9) Option Board has been fitted the Serial Jack plug facility normally used to configure the annunciator is disabled. Configuration must thus be done through this DB9 Serial Port when it is fitted to an Omni10c.

3.4.4 Connecting the Serial Port

The serial port can be used either with the RS232 connections OR with the RS485 connections. No configuration is necessary when choosing which to use. Selection is made only through the way the port connector is wired.

RS232 can be used when you wish to connect the Omni10c to a single device such as a SCADA computer, PLC or personal computer that is less than 15m (50ft) from the Omni10c

If the device is more than 15m from the Omni10c, or you wish to connect to connect multiple Omni10c's to a single master device, then RS485 connections should be used.

3.4.5 Connections using RS232

When connecting the Omni10c to another device using RS232, then a three wire connection is necessary. The following diagram shows a cable to be used when connecting an Omni10c to a standard Personal Computer serial COM port:

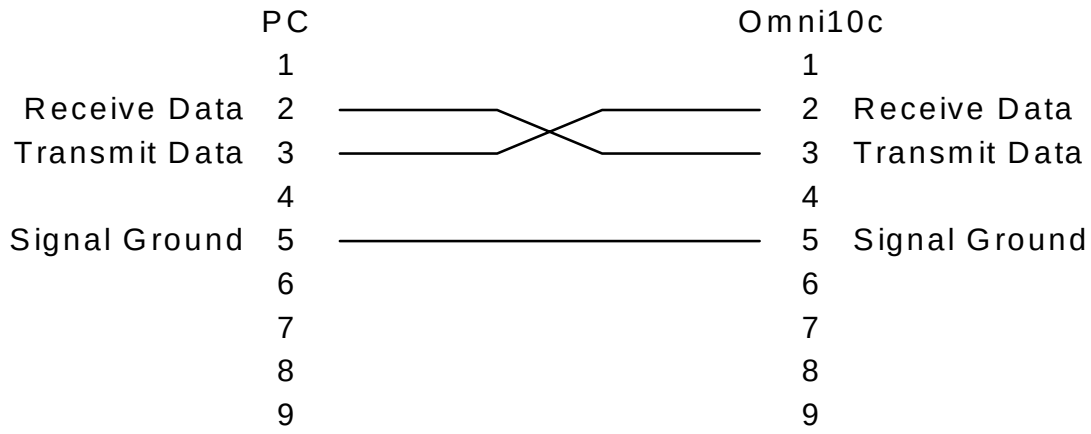


Figure 3-2 - Connecting to a PC using a "cross-over" cable

3.4.6 Connections using RS485

RS485 allows up to 32 Omni10c's to be multi-dropped to a single Modbus master device. (See section 4.9 for details of Modbus slave addressing.)

The serial port can be wired to operate using a two-wire or four-wire connection. All units on the same RS485 network must be wired the same way. The four-wire connection method is the preferred method because it is less susceptible to electrical

interference on the line. The two-wire method can be used where the number of conductors available in the connecting cable is at a premium.

The key to successful communications using RS485 methods is the correct termination of the RS485 network. The following two diagrams show the recommended termination methods when installing two-wire and four-wire RS485 networks. These diagrams show multiple Omni10c Alarm Annunciators connected to a Maxiflex M1580A Dual Serial Network Interface Module.

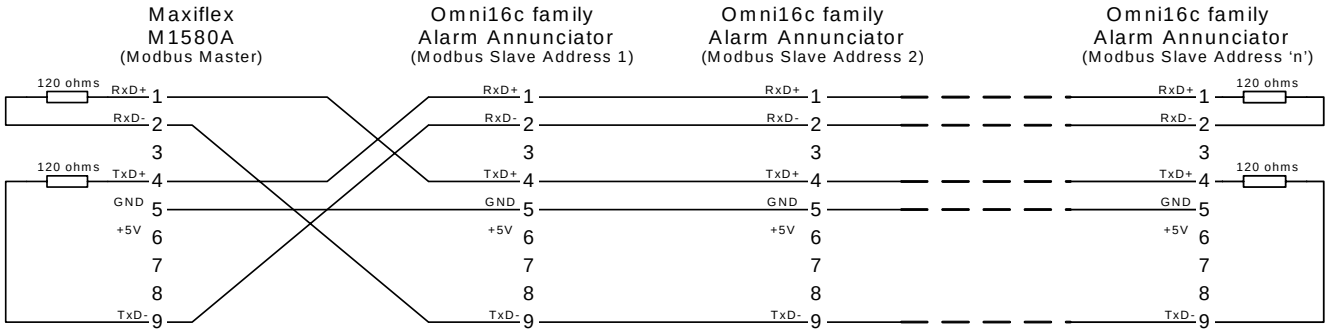


Figure 3-3 - Four-Wire RS485 Network Connections

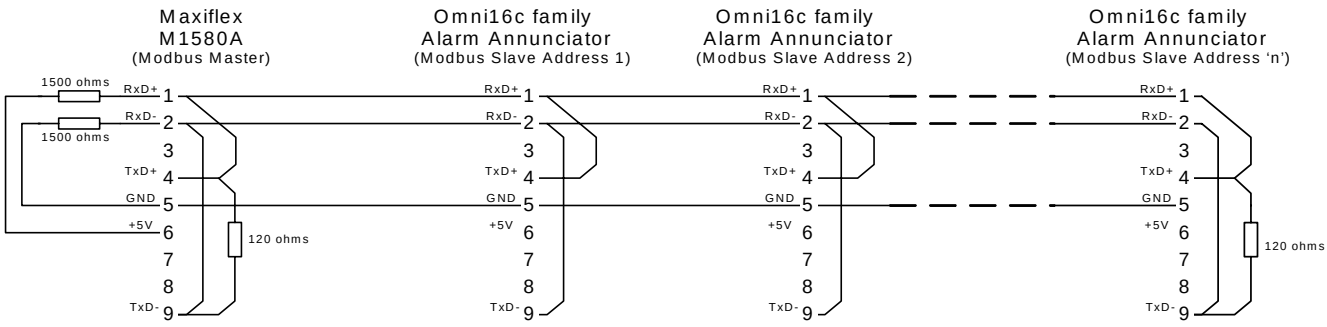


Figure 3-4 - Two-Wire RS485 Network Connections

NOTE: When using two-wire mode, each Omni10c Alarm Unit can hear the reply of every other alarm unit, and needs time to process these replies. If the Modbus Master sends the next Modbus Request before this processing is complete, the Omni10c's will ignore the next request, resulting in timeouts and retries in the system. To prevent this occurring, an inter-poll delay of at least 100ms should be inserted between polls from the Modbus Master device.

3.5 Power Connection and Requirements

The power input must be connected to Terminal Strip B terminals 1 and 2.

The standard Omni10c is powered by a dc supply in the range 20-60Vdc. This allows the Omni10c to be powered by 24Vdc or 48Vdc nominal supplies including battery supplies as found in substations and marine applications. See the specifications for the maximum current required (with all windows illuminated) at each of these nominal voltages.

3.6 Connecting the alarm inputs

The model C1660A Omni10c is equipped with ten hard wired alarm inputs. These inputs are optically isolated from the alarm logic and require external voltage to be applied to energise the inputs.

The Model C1660A-1 has dc inputs that must be powered from an external dc voltage source between 20 and 60Vdc. The inputs are not polarity sensitive, and so the common terminal can be connected to the positive or negative side of the voltage source.

The Model C1660A-2 will take ac/dc inputs in the range 90-150Vac/dc.

The following diagram shows the typical wiring for a 48Vdc input system.

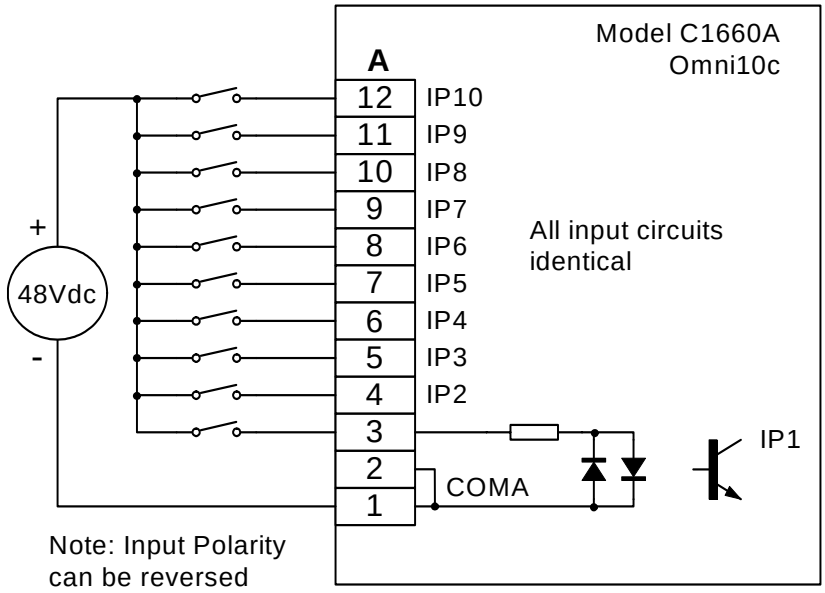


Figure 3-5 Input Connection Diagram showing 48Vdc externally powered inputs

3.7 Connecting the Common Service Relay Contacts

Contacts from two relays are provided as Common Outputs from the Omni10c.

NOTE All relay contacts are described below as being “normally open” or “normally closed”. This refers in all cases to the “rest” state of the contact, with no power on the relay coil.

This is not be confused with the “normal” system operating condition, where the relay coil may be “normally” energised (as in “normal” for the operating condition of the system) causing a “normally open” contact to be closed when the system is functioning “normally”!

3.7.1 Default Relay Operation

The functions of these contacts may vary between “SWITCH-SET” mode and “SOFT-SET” mode. See section 4.2 for more information regarding “soft-set” and “switch-set” modes.

The default functions of these relays in “Switch-Set” mode are predefined as follows:

RELAY	FUNCTION	Description
RL1	Horn	A normally open contact is provided from this relay. This contact will close to sound the audible device. This relay is de-energised with no alarms present and will energise when an alarm occurs causing the audible to be sounded. Pressing Silence or Acknowledge typically causes this contact to open, stopping the audible warning.
RL2	Group Alarm/ "Watchdog"	A change-over contact is provided from this relay. This relay acts as a Group Alarm output for the Omni10c, combined with the hardware watchdog. This relay will be energised (the NO contact closed) when the omni10c is operating normally and no alarms are present. This relay will de-energise if an input or alarm is present (see switch settings), or a fault is detected within the Omni10c by the internal diagnostics. This output can be used in critical applications to monitor the health of the Omni10c.

Table 3-1 Default Relay Operation

3.7.2 Connecting an Audible Warning Device

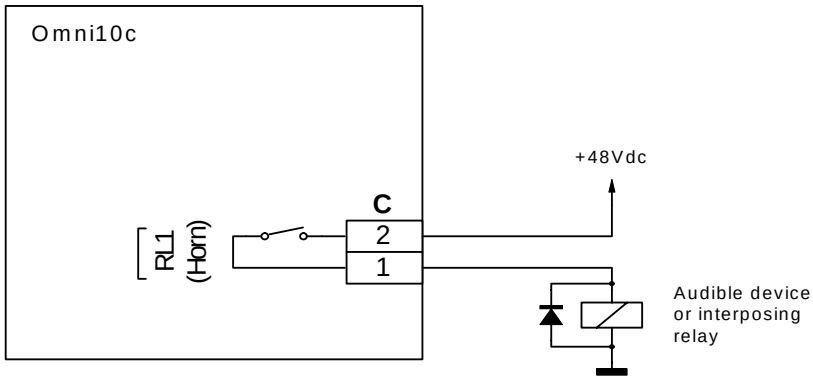


Figure 3-6 - Typical Audible Connection to an Omni10c

Note: The reverse "fly-back" diode across the relay coil is recommended to prevent excessive voltages induced by the inductance of the relay coil when the Horn is turned off.

3.8 Connecting Control Pushbuttons

3.8.1 Controlling a single Omni10c with external pushbuttons

External Test, Silence Acknowledge and Reset pushbuttons must be connected to the Omni10c via Terminals C-6 to C-10 as shown in the following schematic:

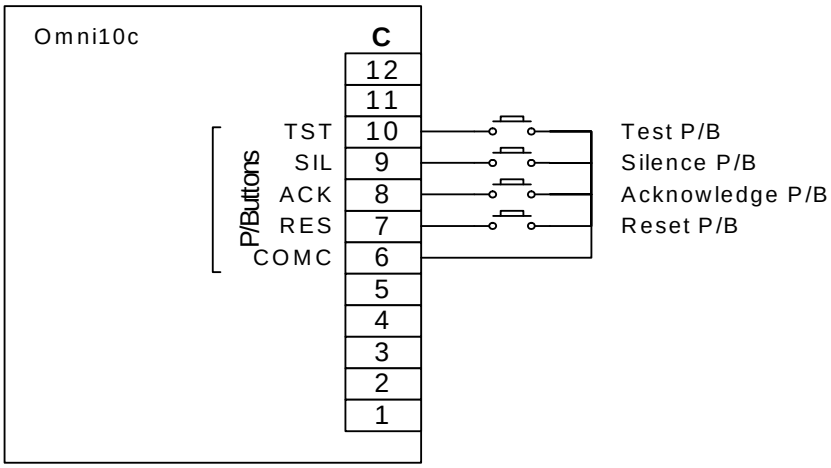


Figure 3-7 External Pushbuttons controlling a single Omni10c

3.8.2 Controlling Multiple Omni10c's from a single set of control pushbuttons

Multiple Omni10c alarm annunciators can be controlled from a single set of external pushbuttons. Simply wire all units in parallel as shown below.

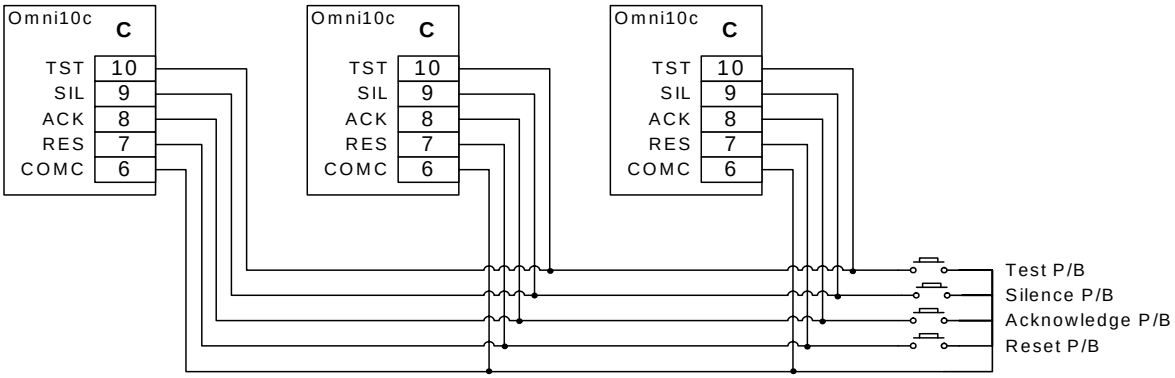


Figure 3-8 External Pushbuttons controlling multiple Omni10c's

Note: If Omni10c's are operated off separate power sources, then it is possible for the switch on of one power source to momentarily activate the pushbuttons on the other alarm annunciators. If this is undesirable then there are three options:

1. Run all Omni10c's off the same power source.
2. Use separate pushbuttons for each group of Omni10c's
3. Use a diode in series with each pushbutton to each group of annunciators to prvent this feedback from occurring.

3.8.3 Connecting the C1415 Remote Pushbutton Station

When operating the Omni10c off a 24Vdc supply, a convenient option is to use the Omniflex Model C1415 Remote Pushbutton Station to control the annunciator.

NOTE: The C1415 Remote Pushbutton Station is ONLY designed to operate from 24Vdc nominal supplies.

Connect the C1415 to an Omni10c as shown below:

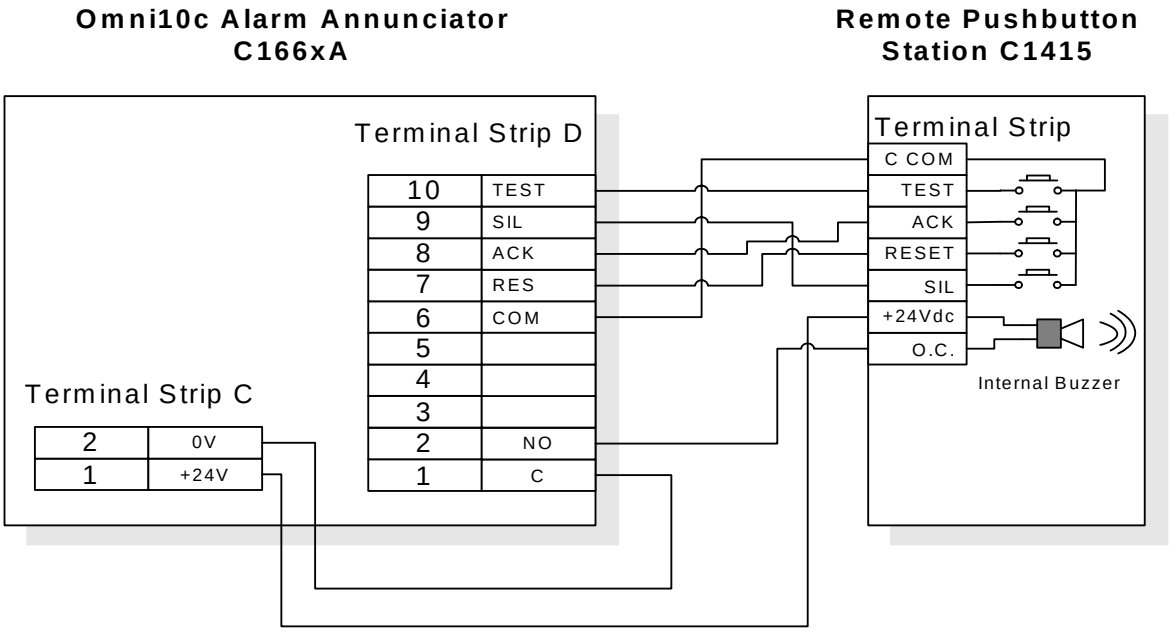


Figure 3-8 Connecting C1415 Remote Pushbutton Station to Omni10c units.

3.9 Synchronising flashing between multiple Omni10c's

Up to 16 Omni10c's may be connected together into a single display system of up to 160 points. In order to synchronise the display flashing in the system Terminal C-12 on all units in the system must be wired together.

All units in the system must share a common power supply reference. Wire Terminal C-6 on all units together to achieve this as shown below:

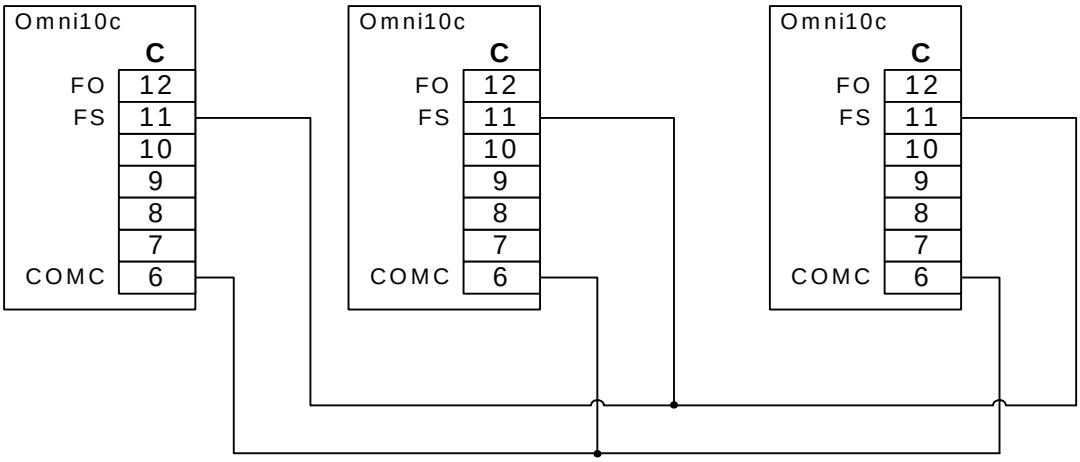


Figure 3-9 Synchronising the Flashing between Omni10c's

3.10 Expanding First-Out Groups between multiple Omni10c's

Some of the alarm sequences selectable in the Omni10c are "First-Out" alarm sequences. This means that the flashing sequence is such that the first alarm to occur in the group will flash differently to all subsequent alarms to allow the operator to identify which alarm occurred first.

Up to 16 Omni10c's may be connected together into a single First-Out group. Wire together Terminal C-12 on all units in the group to accomplish this.

All units in the system must share a common power supply reference. Wire Terminal C-6 on all units together to achieve this.

Different First Out Groups can be created by leaving the FO terminal between groups disconnected.

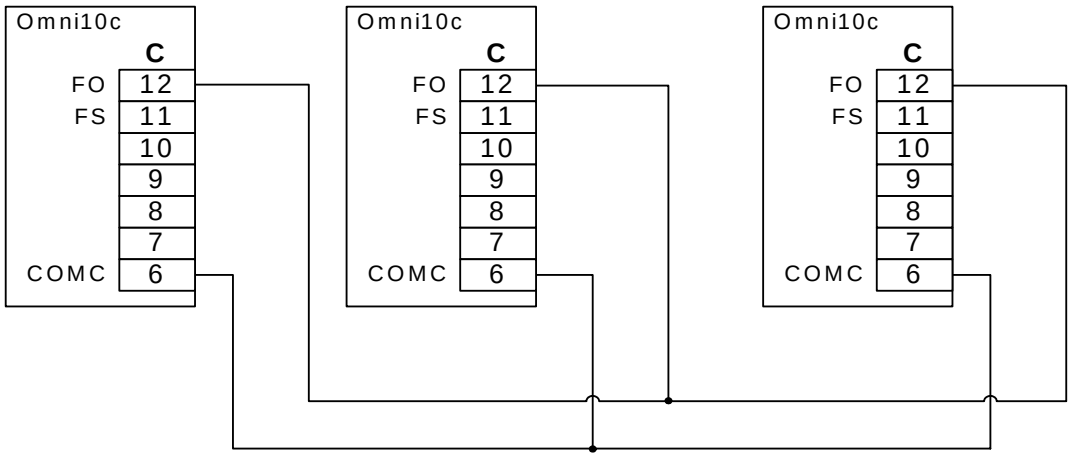


Figure 3-10 Connecting Multiple Omni10c's into a single First Out Group

4. CONFIGURING THE Omni10c FOR OPERATION

4.1 Introduction

The Omni10c is configured by means of “set-up” switches located with the connection terminals on the rear of the unit. The location of these switches can be seen in Figure 1-2.

There are two groups of switches on the rear of the unit:

Input Sense Selection Switches

These switches are located above Terminal Strip A and are used to configure the inputs for “Normally Open” or Normally Closed” operation. See section 4.3 for further information.

Mode Selection Switch

This 8-way switch is located above Terminal Strip “C” on the unit. This switch is marked SW1, and is used to set the operating modes of the Omni10c. See sections 4.2 and 4.4 for further information.

4.2 Modes of Operation

SW1 is used to set the operational configuration of the Omni10c.

The Omni10c can be set into one of two modes of operation:

“**SWITCH-SET**” mode or “**SOFT-SET**” mode.

In “SWITCH-SET” mode, the entire operation of the unit is set by selections on these mode switches.

In “SOFT-SET” mode, the operation of the product is set via the programming port or (serial port if fitted) on the rear of the unit using Omniflex’ Omniset Windows Configuration Utility.

For more detailed SOFT-SET configuration options, see the on-line help in the Omni10c Template supplied with the Omniset Configuration Utility"

The product is put into “SOFT-SET” mode by setting switches 1 to 3 all ON on the mode switch SW1. Any other setting of switches 1 to 3 selects “SWITCH-SET” mode.

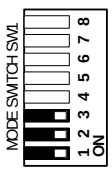


Figure 4-1 Switch Setting for "Soft-Set" Mode

SOFT-SET mode offers the optimum in flexibility with more advanced settings available, whilst SWITCH-SET Mode offers basic reliable operation suitable for most applications. The table below summarises the features of each mode:

Comparison of "SWITCH-SET" Mode versus "SOFT-SET" Mode		
CONFIGURATION OPTION	*SWITCH-SET MODE*	*SOFT-SET MODE*
Input Sense Selection	Unaffected by the mode. Inputs are set to "Normally Open" or "Normally Closed" on the switches above the input terminals.	
Alarm Sequences	All alarm points have the operate the same sequence set on SW1 switches 1 to 4	Each alarm point can be set to a different alarm sequence.
Timers	None – time set to 0	Settable per input
Relay RL1 Operation	Acts as HORN	Settable to any one of the following: 1. Horn 2. Follows Input 3. Follows Alarm 4. Ring-back Horn 5. Multiple Reflash 6. Follows ACK button 7. Comms Monitor
Relay RL2 Operation	If Sw1-5 is OFF: Group Alarm follows Input If SW1-5 is ON: Group Alarm follows Alarm State (Note: The watchdog logic is also connected to this relay. If a fault is detected, then this relay will also de-energise.	Settable to any one of the following: 1. Horn 2. GA Follows Input 3. GA Follows Alarm 4. Ring-back Horn 5. GA Multiple Reflash 6. Follows ACK button 7. Comms Monitor
Select Group Alarm Response	No. Relays are affected by all alarms.	Each relay can set to respond to any alarm point.
Lamp Sense	Always normal.	Each window can be set individually with normal or reversed lamp operation..
First Out Group Split	All Alarms in a single Group	Can be split into two "First-Out" Groups of any size.
Pushbutton Operation	Edge Triggered	Edge or Level Triggered

Comparison of "SWITCH-SET" Mode versus "SOFT-SET" Mode		
CONFIGURATION OPTION	*SWITCH-SET MODE*	*SOFT-SET MODE*
Auto-Acknowledge Marching Sequence on Startup	No On power up, the Omni10c will continue with the marching sequence until an input is in alarm, or the operator presses the Ack. Button.	Settable Yes or No. When selected "Yes", the Omni10c will only perform a single marching sequence before reverting to normal operation even if no inputs are in alarm.

4.3 Selecting the Input Sense

There is a 10 way "set-up" switch associated with the ten inputs. These are used to set the sense of the ten input contacts – normally open or normally closed.

These switches are located directly above the input terminals on the rear of the Omni10c.

There is one switch for each input (marked 1 to 10).

When the switch is OFF, the input is set to NORMALLY OPEN. (i.e. the input will enter the alarm state when the input contact is closed.)

When the switch is ON, the input is set to NORMALLY CLOSED. (i.e. the input will enter the alarm state when the input contact is opened.)

4.4 Selecting the alarm/display logic sequences

The Omni10c alarm annunciator is equipped with a selection of 27 different alarm window flashing sequences. The six most popular sequences can be selected in "Switch-Set" mode on the mode switches SW1-1 to SW1-3. All other sequences an be set in "Soft-Set" mode.

See Table 4-1 for a chart of mode switch settings. Each of the alarm sequences is defined in detail in section 7.

Table 4-1: Sequence Selection and Mode Switch Settings

SEQ. NO.	Mode Switch SW1 1	2	3	4	5	6	7	8	DESCRIPTION	ISA DESIGNATION	TIME DELAY ON...
0	0	0	0						Factory Test Mode		--
1	1	0	0						Lamp Follows Input	--	--
2	0	1	0						Momentary (Fleeting) Alarm, Manual Reset	M-1	INPUTS
3	*	*	*						Alarm Only (No Lock-in), Auto Reset (* Selectable in Soft-Set Mode only)	A-1-4	INPUTS
4	*	*	*						Momentary (Fleeting) Alarm, Manual Reset with Re-Alarm (* Selectable in Soft-Set Mode only)	R-1-10	INPUTS
5	0	0	1						Momentary (Fleeting) Alarm, Manual Reset, First Out Multiple Groups	F2M-1	--
6	1	0	1						Momentary (Fleeting) Alarm, Manual Reset, Auto Reset on Subsequent Alarms, First Out Reset interlock	F3A-1-3	--
7	0	1	1						Momentary (Fleeting) Alarm, Manual Reset, Single Group First Out, First Out Continuous Flash	--	--
8	*	*	*						Momentary (Fleeting) Alarm, Manual Reset, First Out Multiple Groups, No Subsequent Alarms. (* Selectable in Soft-Set Mode only)	F1M-1	INPUTS
9	*	*	*						Momentary (Fleeting) Alarm, Manual Reset, Auto silence after Time Delay	--	HORN
10	*	*	*						Momentary (Fleeting) Alarm, Manual Reset, Re-Alarm after Time Delay if still in Alarm. (* Selectable in Soft-Set Mode only)	--	REFLASH
11	*	*	*						Momentary (Fleeting) Alarm, Manual Reset, Lamps only Fast or Slow Flash (for Motor Alarms) (* Selectable in Soft-Set Mode only)	--	INPUTS
12	*	*	*						Momentary (Fleeting) Alarm, Auto Rest, Time Delay on Return to Normal. (* Selectable in Soft-Set Mode only)	--	RETURN TO NORMAL
13	*	*	*						Pulse monitoring Alarm with Manual Reset. Alarm occurs if input stops pulsing. (* Selectable in Soft-Set Mode only)	--	--
14	*	*	*						Momentary (Fleeting) Alarm, Manual Reset. Fast/Slow flash indicates alarm condition present. (* Selectable in Soft-Set Mode only)		
18	1	1	0						Momentary (Fleeting) Alarm, Auto Reset	--	INPUTS
21	*	*	*						Momentary (Fleeting) Alarm, Auto Reset, First Out Multiple Groups (* Selectable in Soft-Set Mode only)	F2A-1	--
23	*	*	*						Momentary (Fleeting) Alarm, Auto Reset, Single Group First Out, First Out Continuous Flash (* Selectable in Soft-Set Mode only)	--	--
24	*	*	*						Momentary (Fleeting) Alarm, Auto Reset, First Out Multiple Groups, No Subsequent Alarms. (* Selectable in Soft-Set Mode only)	F1A-1	--
25	*	*	*						Momentary (Fleeting) Alarm, Auto Reset, Auto silence after Time Delay	--	HORN
26	*	*	*						Momentary (Fleeting) Alarm, Auto Reset, Re-Alarm after Time Delay if still in Alarm. (* Selectable in Soft-Set Mode only)	--	NO ACTION REALARM
27	*	*	*						Momentary (Fleeting) Alarm, Auto Reset, Lamps only Fast or Slow Flash (for Motor Alarms) (* Selectable in Soft-Set Mode only)	--	INPUT
29	*	*	*						Pulse monitoring Alarm with Auto Reset. Alarm occurs if input stops pulsing. (* Selectable in Soft-Set Mode only)	--	--
31	1	1	1						SOFT-SET MODE. ALL SETTINGS ARE SET VIA SOFTWARE. *(Refer Table 4-2)*	--	--
Follows Input				0					FUNCTION OF GROUP ALARM ON RELAY 2 (SWITCH-SET MODE ONLY)	NOTE: "0" = switch in on position "1" = switch in on position	
Follows Alarm				1							
Default Comms Mode					0	0	0	0	This is compatible with the Omniset configuration utility.(ASCII Mode, 9600baud, 7,n,2, Slave Address 2)		
Slave Address 1					1	0	0	0	Modbus ASCII/RTU Mode, Baud Rate, Data Bits, Parity, Stop Bits all set by software configuration. Default factory settings are ASCII, 9600, 7, n, 2		
Slave Address 2					0	1	0	0			
Slave Address 3					1	1	0	0			
Slave Address 4					0	0	1	0			
Slave Address 5					1	0	1	0			
Slave Address 6					0	1	1	0			
Slave Address 7					1	1	1	0			
Slave Address 8					0	0	0	1			
Slave Address 9					1	0	0	1			
Slave Address 10					0	1	0	1			
Slave Address 11					1	1	0	1			
Slave Address 12					0	0	1	1			
Slave Address 13					1	0	1	1			
Slave Address 14					0	1	1	1			
User Settable Address					1	1	1	1	Slave Address can be set in software in the range 1 to 32. Default setting is Address 15.		

4.5 Selecting the Group Alarm Relay (RL2) Output Function

The Group Alarm (G.A.) relay RL2 offers a changeover contact on Terminal Strip C.

SW1-4 is used to set the “Switch-Set” mode of operation of this relay. The other modes can be set when the Omni10c is in “Soft-Set” mode.

There are six modes to choose from:

1. ***Relay follows input (Switch-Set Mode SW1-4 OFF)***

   The relay is normally energised.

   Any abnormal input will de-energise the relay. The relay will re-energise when all inputs return to their normal states, regardless of the state of the alarm lamps.

   This is useful for tracking the actual state of the inputs. Any abnormal input will cause the relay to be de-energised.

2. ***Relay follows alarm state (Switch-Set Mode SW1-4 ON)***

   The relay is normally energised.

   Any alarm state will de-energise the relay. The relay will return to normal when all alarm states have returned to normal. (i.e. the alarms have been acknowledged by the operator and there are no longer any alarm windows on or flashing.)

   This is useful for tracking the actions of a local operator in clearing the problem. If a ‘fleeting’ alarm sequence is chosen, the relay will remain de-energised until the operator clears the display, even though the input contact may have already returned to the normal state.

3. ***Relay acts as ring-back horn (Only available in Soft-Set Mode)***

   The relay is normally de-energised.

   The G.A. relay will energise when any abnormal input returns to normal. The RESET pushbutton must be depressed to return the G.A. to its normal state.

   (This G.A. type can be used to alert an operator to the fact that an alarm has returned to its normal state).

4. ***Relay acts in Multiple Reflash Mode (Only available in Soft-Set Mode)***

   The relay is energised with all inputs in their normal state.

   The relay is de-energised by the first input changing to the abnormal state.

   Upon each subsequent input changing to the abnormal state, the relay will momentarily energise (for about 1 second), then return to the de-energised state.

   This is useful when the relay contact is used for example to trigger a dial up alarm, and if subsequent inputs going into alarm must also trigger the dial-up alarm.

   See the figure below for an example of RL2 (or RL1) set to operate as Multiple Reflash Output.

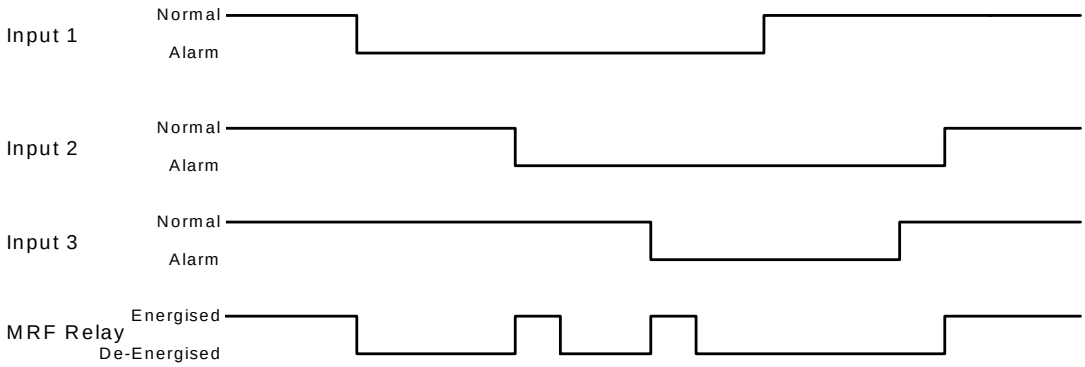


Figure 4-2 Example of Multiple Reflash Operation

4.6 Selecting the HORN Relay (RL1) Output Function *(Only available in Soft-Set Mode)*

The Relay RL1 is preset in “Switch-Set” to operate as the HORN Relay. In “Soft-Set” mode it is possible to set the operation of this relay to any of the common relay functions as per RL2 except the watchdog function which is only available from RL2 (see 4.5)

4.7 Selecting the Lamp Status *(Only available in Soft-Set Mode)*

The lamp status of the display windows may be inverted in “Soft-Set” mode.

NORMAL: lamps OFF when inputs are normal, ON when inputs are abnormal.

REVERSE: lamps ON when inputs are normal, OFF when inputs are abnormal.

4.8 Selecting Time Delays *(Only available in Soft-Set Mode)*

The Omni10c has a timer associated with each alarm point.

Some of the alarm sequences utilise this timer in their operation. See the specific sequences in Table 4-1 and the sequence diagrams in section 7 for the further details of the use of this timer.

4.8.1 Explanation of Timer Operation in a Timer Sequence

With reference to any one of the sequences that use timers in section 7:

When the alarm sequence moves from a state where the timer is stopped to a state where the timer is running, the timer will be started.

When the alarm sequence moves from a state where the timer is running to a state where the timer is also running, the timer is allowed to continue timing.

When the alarm sequence moves from a state where the timer is running to a state where the timer is stopped, the timer is put into the timed-out (stopped) state.

If the timer is set to 0, then the alarm sequence will move straight through the state with the timer running, as if the timer had timed out immediately.

Using Omniset, the timers can each be set in one of two ranges:

FAST RANGE: The timer can be set to between 0 and 12.6s in 0.1s increments.

SLOW RANGE: The timer can be set to count between 0 and 126 ‘tick’ intervals. The timer ‘tick’ interval can be set for the entire Omni10c in the range 0.1s to 25s.

The factory default ‘tick’ interval is 1 second, allowing the timers in SLOW mode to time between 0 and 126 seconds.

4.9 Selecting Serial Port Settings

The serial port settings are configurable using the SW1 mode switches 5 to 8.

With all switches 5 to 8 OFF, the serial port will operate in a default configuration of Modbus ASCII mode at slave address 2; operating at 9600 baud; 7 data bits; no parity; 2 stop bits regardless of any “Soft-Set” settings that may programmed. This default setting is compatible with the Omniset template for this product. By setting switches 5 to 8 all OFF, you are guaranteed to be able to communicate with the Omni10c regardless of any different settings that may have been previously written to the Omni10c memory.

Figure 4-3 Serial Port set to default settings

SW1 Setting				Modbus Slave Address	Communication Port Settings	
5	6	7	8		Soft-Set Mode	Switch-Set Mode
off	off	off	off	2	ASCII 9600,7,n,2[3]	Always ASCII, 9600,7,n,2[3]
ON	off	off	off	1	User settable[2]	
off	ON	off	off	2	User settable[2]	
ON	ON	off	off	3	User settable[2]	
off	off	ON	off	4	User settable[2]	
ON	off	ON	off	5	User settable[2]	
off	ON	ON	off	6	User settable[2]	
ON	ON	ON	off	7	User settable[2]	
off	off	off	ON	8	User settable[2]	
ON	off	off	ON	9	User settable[2]	
off	ON	off	ON	10	User settable[2]	
ON	ON	off	ON	11	User settable[2]	
off	off	ON	ON	12	User settable[2]	
ON	off	ON	ON	13	User settable[2]	
off	ON	ON	ON	14	User settable[2]	
ON	ON	ON	ON	15 (see Note 2)	User settable[2]	

Notes:

1. The following options are available in soft-set mode:
   Modbus ASCII 9600 baud, 7 data bits, no parity, 2 stop bits (factory default)
   Modbus ASCII 4800 baud, 7 data bits, no parity, 2 stop bits
   Modbus ASCII 2400 baud, 7 data bits, no parity, 2 stop bits
   Modbus ASCII 1200 baud, 7 data bits, no parity, 2 stop bits
   Modbus RTU 9600 baud, 8 data bits, no parity, 1 stop bit
   Modbus RTU 4800 baud, 8 data bits, no parity, 1 stop bit
   Modbus RTU 2400 baud, 8 data bits, no parity, 1 stop bit
   Modbus ASCII 1200 baud, 8 data bits, no parity, 1 stop bit
2. In Soft-Set mode, when switches 5-8 are all on, the address can be set in software up to 32.
3. ASCII,9600,7,n,2 = Modbus ASCII Slave Mode at 9600 baud, 7 data bits, no parity, 2 stop bits.

Table 4-2 Serial Port Settings

5. OPERATION

5.1 Power-up Self Test

When power is applied to the Omni10c, the unit commences an automatic, built-in circuit test routine. This results in the unit sounding the audible for approximately half a second followed by the cyclic illumination of each lamp in turn starting at lamp 1 to the last lamp and back to 1 again etc. in a “marching sequence”.

If no internal faults are detected in the unit, then this test mode display continues until the Acknowledge Pushbutton is pressed or until an input changes to the alarm state. This provides a convenient indication of a power loss to the Omni10c.

If an internal fault is detected, then the unit will display a fault indication by continuously flashing one of the lamps. If this occurs, then the unit must be sent for service.

If a new alarm occurs while the Omni10c is in this test routine, the unit will immediately revert to its normal mode of operation and will deal with the alarm state according to the pre-selected alarm sequence.

5.2 Normal Operation

During the normal operation, the Omni10c will deal with any alarm states according to its pre-set alarm sequences. (The instructions for setting-up these sequences are given in section 4.4).

Section 7 provides detailed block diagrams for the function of each alarm sequence.

When an alarm condition occurs on an input, the horn will sound, and the operator should depress the relevant pushbuttons, where necessary, according to the pre-selected alarm sequence.

5.3 Test Functions

5.3.1 Overview of the Test Functions

The Test button operates as a combines lamp test and circuit test function.

No information is lost during the entire test routine, and each alarm display returns to the exact state it was in before the test.

5.3.2 Pressing the Test Button

When the Test button is pressed, the unit checks the results of its regular full circuit test, and if all checks performed pass, then a conventional lamp test is performed, by illuminating all of the lamps while the Lamp Test Pushbutton is held down. When the Test pushbutton is released, the Omni10c reverts to the state it was in before the Test button was pushed.

If the circuit Test fails then the unit enters its “marching sequence” test routine described in Section 5.3.5 and the test failure code will be displayed by flashing one of the lamps continuously.

In this way, the display/annunciator Test button acts both as a Lamp Test and Circuit Function.

If all windows light up steady when the test button is pressed, then the operator can be assured that the unit has passed all its internal circuit tests, and that all windows are operational.

5.3.3 Fault Indication on Circuit Test

If a fault is found in one of the tests performed, then the unit enters its full “marching lamp sequence”, with, in addition, one or more of the lamps flashing continuously to indicate the fault located. This is described in detail in Section 5.3.5

5.3.4 Manually invoking the Circuit Test Function.

As a confidence measure, the unit may be placed in the full “marching sequence” Circuit Test Mode at any time by holding down the Silence button and then pressing the Test Button. See section 5.3.5

5.3.5 The “Marching Sequence” Circuit Test Display

This routine is entered upon the following conditions:

- Upon power up.
- If the Test button is pressed and a fault is detected in the unit.
- By holding down the Silence button and then pressing the Test button manually enters this function.
- Any time during normal operation, if the unit during its regular self-test routines detects a fault.

This test routine begins by activating the horn output circuit for approximately one second.

The operator should therefore check that the horn sounds for this short period.

Immediately after this one second period, if the Omni10c is functioning correctly, the following visual indication will occur:

The display will begin a “marching light” sequence, with each display window illuminating and then extinguishing, one at a time, starting with the display point 1 (top left-hand window) and ending with the bottom right-hand window. All display windows will then remain off for a brief moment.

The “marching” sequence will then begin again, and this procedure of “marching” sequence followed by the brief “blank” display period will be repeated continuously until the ACKNOWLEDGE pushbutton is depressed, or until an input changes state.

This marching sequence indicates that the alarm annunciator has passed all its own internal tests and is functioning correctly. If the lamp display exhibits any other pattern then a fault has been detected, and the unit should be returned for service.

To exit the test mode and begin normal operation, the ACKNOWLEDGE pushbutton should be pressed.

The pushbuttons may also be tested in this mode:

If the SILENCE button is depressed - lamp No. 1 flashes continuously.

If the ACK button is depressed - the annunciator reverts to normal operation.

If the RESET button is depressed - lamp No. 3 flashes continuously.

If the TEST button is depressed - lamp No. 4 flashes continuously.

If any other lamp flashes continuously, then the unit has detected a fault and must be returned to the factory for service.

If a new alarm occurs while the Omni10c is in this test routine, the unit will immediately revert to its normal mode of operation and will deal with the alarm state according to the pre-selected alarm sequence.

It is possible under some circumstances to continue to operate the Omni10c even after a fault has been detected. The table below will assist in diagnosing the fault found.

Table 5-1 Fault diagnosis during Circuit Test

Display Window No.	FAULT SYMPTOM		POSSIBLE CAUSE
1	FLASHING	during “Marching Sequence”	SIL pushbutton held down, or stuck in ON state
	STEADY ON	during “Marching Sequence”, and stays ON during “Blank” display period.	Window No. 1 has lamp output circuit fault.
	STEADY OFF	during “Marching Sequence”, and stays OFF during “Blank” display period.	Window No. 1 has lamp failure or output circuit fault.
2	FLASHING	during “Marching Sequence”	ACK pushbutton held down, or stuck in ON state (this condition must have been present BEFORE the CCT. TEST mode was initiated)
	STEADY ON	during “Marching Sequence”, and stays ON during “Blank” display period.	Window No. 2 has lamp output circuit fault.
	STEADY OFF	during “Marching Sequence”, and stays OFF during “Blank” display period.	Window No. 2 has lamp failure or output circuit fault.
3	FLASHING	during “Marching Sequence”	RESET pushbutton held down, or stuck in ON state.
	STEADY ON	during “Marching Sequence”, and stays ON during “Blank” display period	Window No. 3 has lamp output circuit fault.
	STEADY OFF	during “Marching Sequence”, and stays OFF during “Blank” display period	Window No. 3 has lamp failure or lamp output circuit fault.
4	FLASHING	during “Marching Sequence”	TEST pushbutton held down, or stuck in ON state.
	STEADY ON	during “Marching Sequence”, and stays ON during “Blank” display period.	Window No. 4 has lamp output circuit fault.
	STEADY OFF	during “Marching Sequence”, and stays OFF during “Blank” display period.	Window No. 4 has lamp failure or lamp output circuit fault.
ANY OTHER LAMP	STEADY ON	during “Marching Sequence”, and stays ON during “Blank” display period	Window has lamp output circuit fault.
	STEADY OFF	During “Marching Sequence”, and stays OFF during “Blank” display period.	Window has lamp failure or lamp output circuit fault.
1,2,3,4,6	STEADY ON	During “Blank” display period but OFF during “Marching Sequence”	Fault detected on one of the INPUT logic circuits
1,2,3,4	STEADY ON	During “Marching Sequence”	Fault detected on the SPI bus OR all four pushbuttons stuck ON
1,2,3,4,5,6	STEADY ON	During “Blank” display period but OFF during “Marching Sequence”	Fault detected on the SPI bus
1,2,3,4,7	STEADY ON	During “Blank” display period but OFF during “Marching Sequence”	Fault detected with the on-board EEPROM
1,2,3,4,5,7	STEADY ON	During “Blank” display period but OFF during “Marching Sequence”	Unit is functioning in “Technician Test” mode. (All switches are off).

6. SPECIFICATIONS

SPECIFICATIONS

Power Supply

Voltage Option	20-60Vdc
Max dc Ripple	10% pk. to pk.
Consumption	300mA maximum at 24Vdc 150mA maximum at 48Vdc

Alarm Inputs (Model C1660A-x only)

Model	C1660A-1	C1660A-2
Input Voltage range	19 to 60Vdc	90-150Vdc/ac rms
Isolation Input to Logic	1500V ac rms	1500V ac rms
Isolation Input to Input	None. Inputs share a common return	
Input present	> 12Vdc	>18Vdc/12Vac
Input not present	< 9Vdc	< 9Vdc/6Vac
Input Current	1mA at 24Vdc 2.6mA at 48Vdc	3mA at 110Vac/dc
Quantity and Type	10 inputs	
Input Scan Rate	4 milliseconds	
Wire size	1.5mm2 (17SWG/15.5SWG) max.	
Connections	Via plug-in Terminals	

Operator Pushbutton Controls

Type	4 pushbutton inputs on the rear of the unit
Functions	Silence; Acknowledge; Reset; Test

Alarm Window Display

Quantity	10 Alarm windows (2 Wide x 5 High)
Lamp Type	Bright Red Backlit Solid State (LED)
Window Size	24mmx64mm
Legend Area	21mmx60mm
Legend Type	User printed on film with laser/inkjet using software provided.

Relay Contact Outputs

Contact Type	1 Potential free Form C contact for GA. 1 Potential free Form A contact for Horn.
Contact Rating	2A 30Vdc or 0.5A 230Vac
Isolation	1000Vac from contact to other circuits

Temperature Range

Operating Temperature	0°C – 60 °C (+32°F – 140°F)
Storage Temperature	-10°C – 70 °C (+14°F – 158°F)

Weight

Unpacked	0.8kg approx.
Packed	1kg approx.

Compliance to Standards

Safety	EN 60950:1995
Emissions	EN55011 & EN50081-2:1994 Grp I Class A
Immunity – ESD	IEC 61000-4-2:1995, level 3
Immunity – RF Fields	IEC 61000-4-3:1995, level 3
Immunity – Fast Transients	IEC 61000-4-4:1995 2 kV – DC power port 1 kV – input/output lines
Supply Variations	IEC 61000-4-7:1991, 24 V dc +15% -10%
Vibration	IEC60068-2-6: 1995 10-150Hz. 1g
Compliance	Complies with CEGB EES 1988 and Eskom NWS1819 sub-station specifications. Designed to meet IEC61508 SIL1.

Sequence Options

Seq. No.	Sequence Description
1	LAMP FOLLOWS INPUT
2	MOMENTARY (FLEETING) ALARM, MANUAL RESETALARM ONLY (NON-LATCHING INPUTS) AUTO RESET
3	MOMENTARY ALARM, MANUAL RESET WITH ALARM RINGBACK
4	FIRST OUT, MULTIPLE GROUPS, MANUAL RESET
5	FIRST OUT, MANUAL RESET, AUTO RESET ON SUBSEQUENT ALARMS
6	FIRST OUT, SINGLE GROUP, MANUAL RESET, FIRST OUT CONTINUOUS FLASHFIRST OUT, MANUAL RESET, SUBSEQUENT ALARMS WITHOUT HORN
7	MOMENTARY ALARM, MANUAL RESET, AUTO SILENCE AFTER TIME DELAY.
8	MOMENTARY ALARM, MANUAL RESET, REALARM AFTER TIME IF STILL ABNORMAL.
9	MOMENTARY ALARM, MANUAL RESET, CONSTANT FLASH (FOR MOTOR ALARMS).
10	MOMENTARY ALARM, AUTO RESET, TIME DELAY ON RETURN TO NORMAL.
11	PULSE MONITORING ALARM; MANUAL RESET
12	MOMENTARY ALARM, AUTO RESET
13	FIRST OUT, MULTIPLE GROUPS, AUTO RESET
18	FIRST OUT, SINGLE GROUP, AUTO RESET, FIRST OUT CONTINUOUS FLASH
21	FIRST OUT, AUTO RESET, SUBSEQUENT ALARMS WITHOUT HORN
23	MOMENTARY ALARM, AUTO RESET, AUTO SILENCE AFTER TIME DELAY.
24	MOMENTARY ALARM, AUTO RESET, REALARM AFTER TIME IF STILL ABNORMAL.
25	MOMENTARY ALARM, AUTO RESET, CONSTANT FLASH (FOR MOTOR ALARMS)
26	PULSE MONITORING ALARM, AUTO RESET
27	SERIAL PORT READ ONLY MODE
28	SERIAL PORT READ/WRITEMODE
30	
31	

ORDERING INFORMATION

ORDER CODE	DESCRIPTION
C1660A-1	Omni10c Alarm Annunciator (19-60Vdc inputs) Terminal Strips A, B and C installed
C1660A-2	Omni10c Alarm Annunciator (90-150V inputs) Terminal Strips A, B and C installed
C1661A	Omni10c Alarm Annunciator (Serial Inputs) Terminal Strips B and C installed

ACCESSORIES

To be ordered separately. Will be fitted before delivery where applicable.

Serial Communications Option (Modbus)

C1423A-1	Isolated RS232/485 Serial Port NOTE: This module is fitted standard on the C1661A, but is optional on the C1660A, and should be ordered separately when ordering this model.

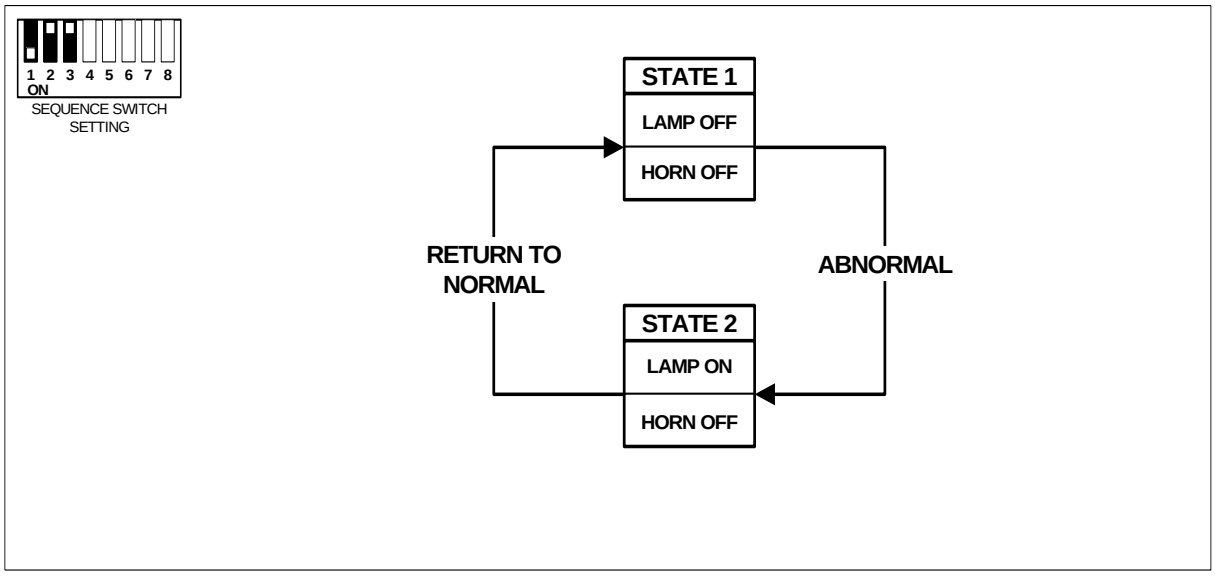
Pushbutton Station

C1415	Remote Pushbutton Station with Audible

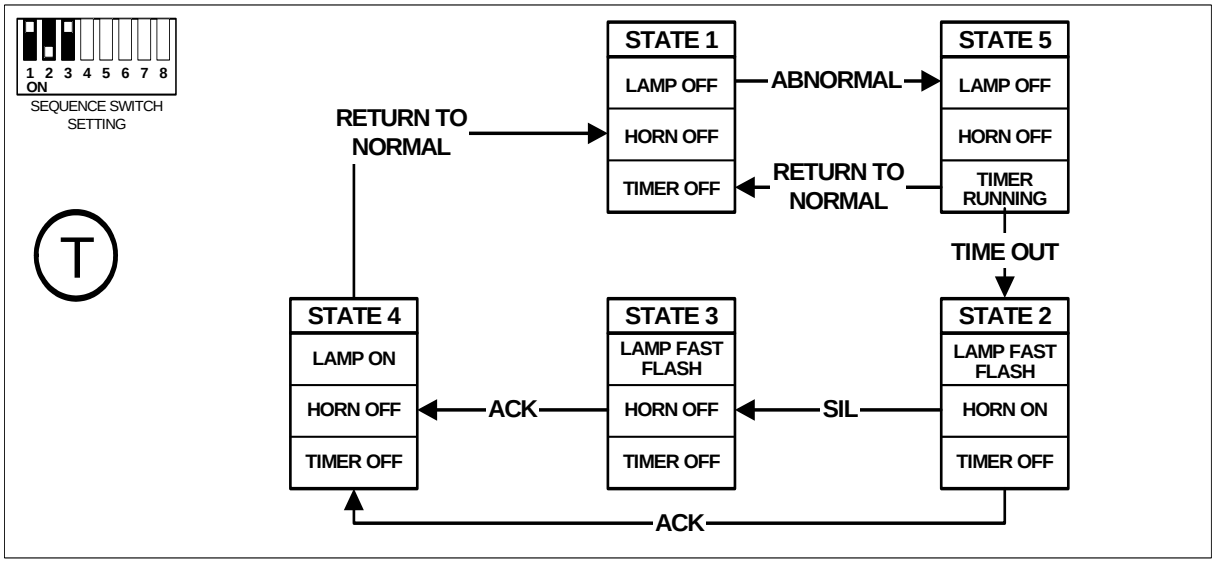
Programming Cable

C1168	OmniSet Programming cable for Prog Port

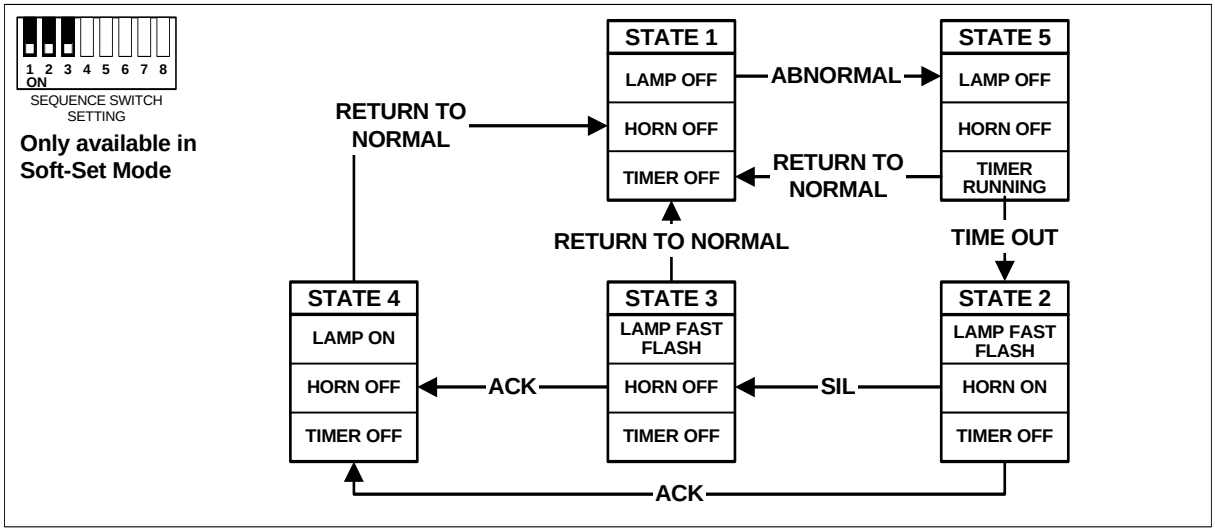
7. ALARM SEQUENCE DIAGRAMS



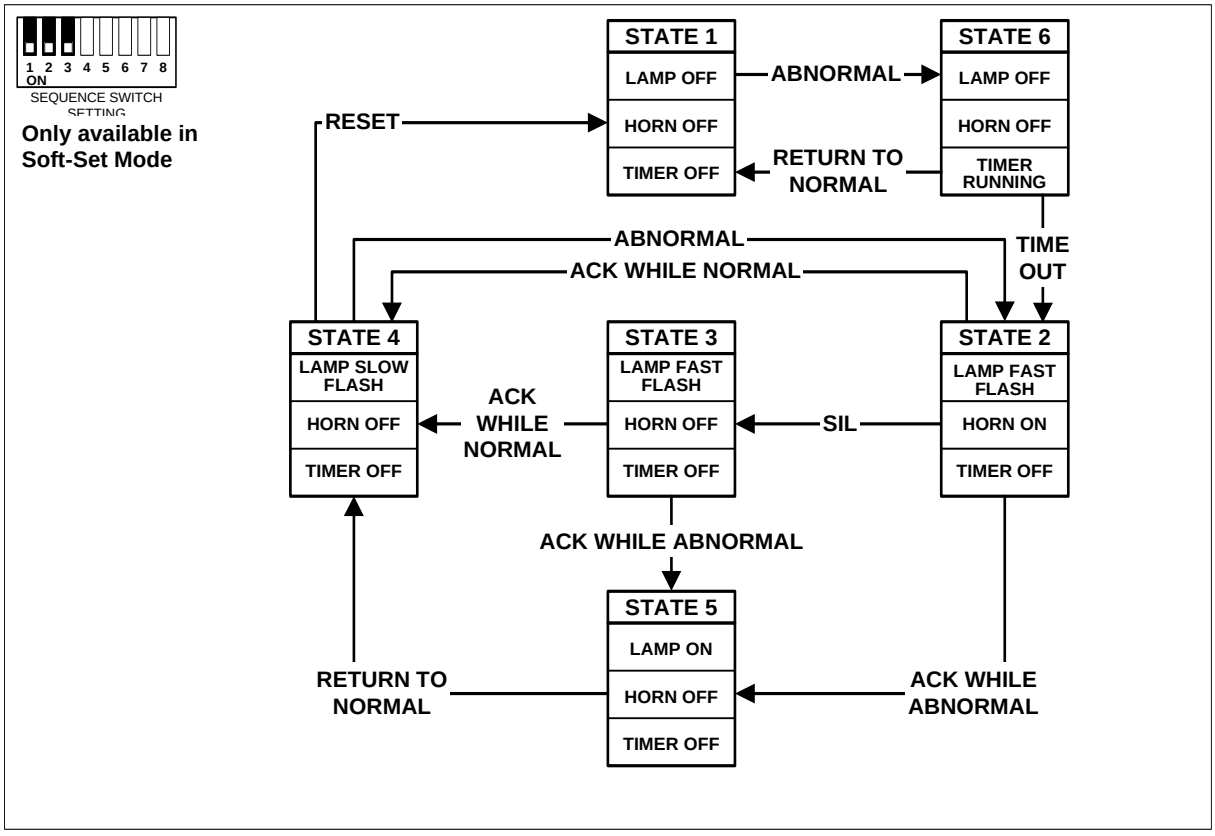
Sequence 1 - Lamp Follows Input



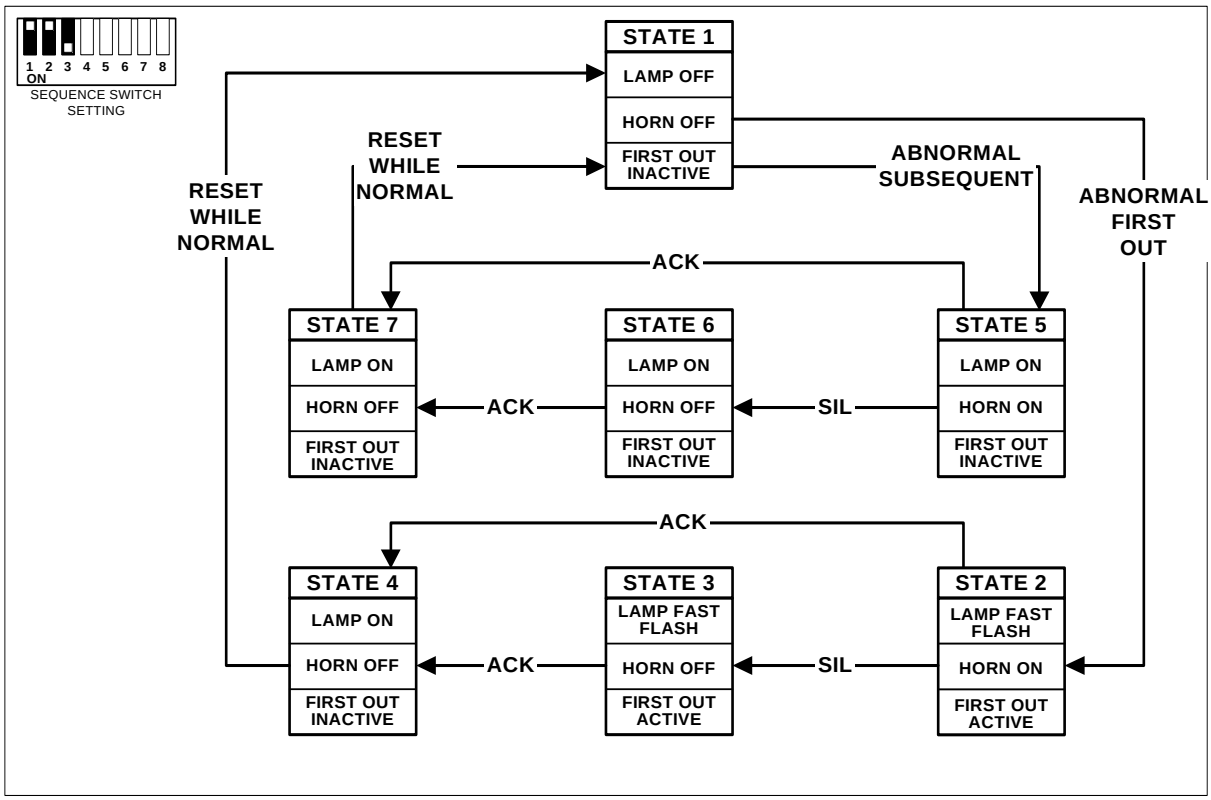
Sequence 2 - Momentary (Fleeting) Alarm Manual Reset with Time Delay on Inputs



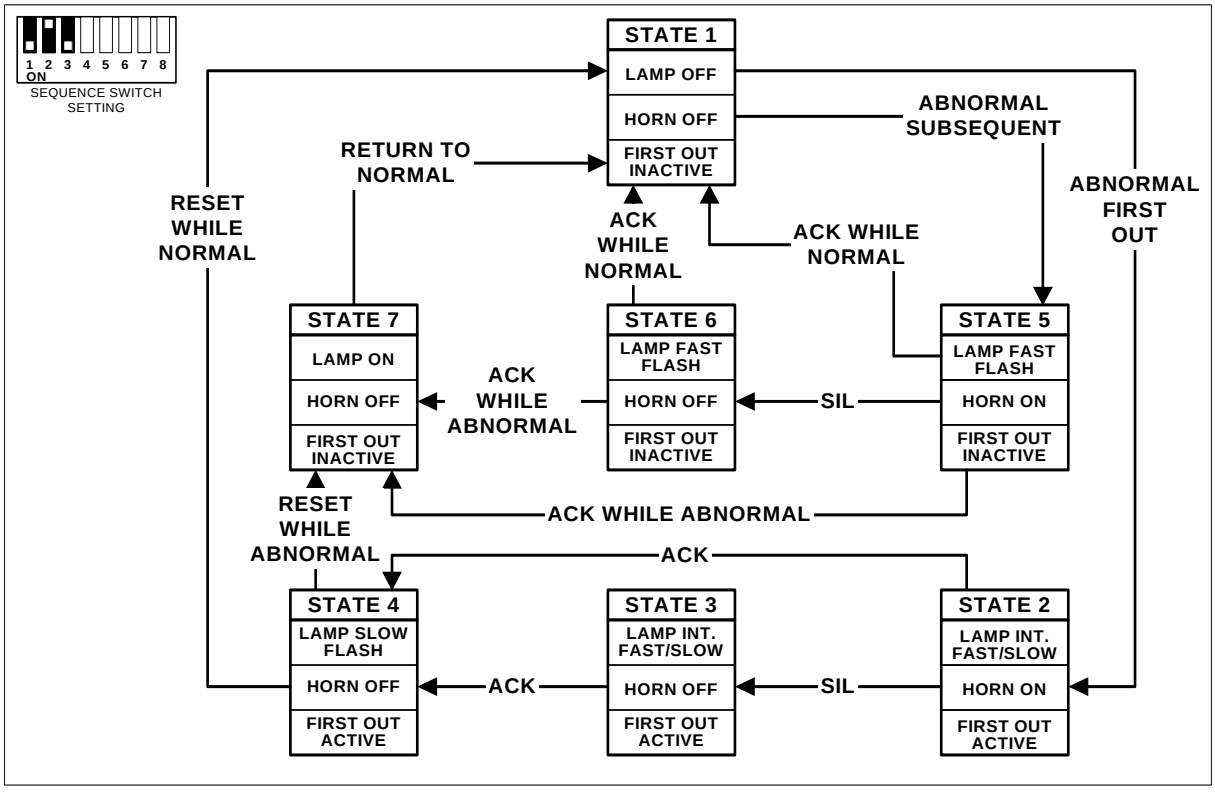
Sequence 3 - Alarm Only (No Lock-in) Auto Reset with Time Delay on Inputs



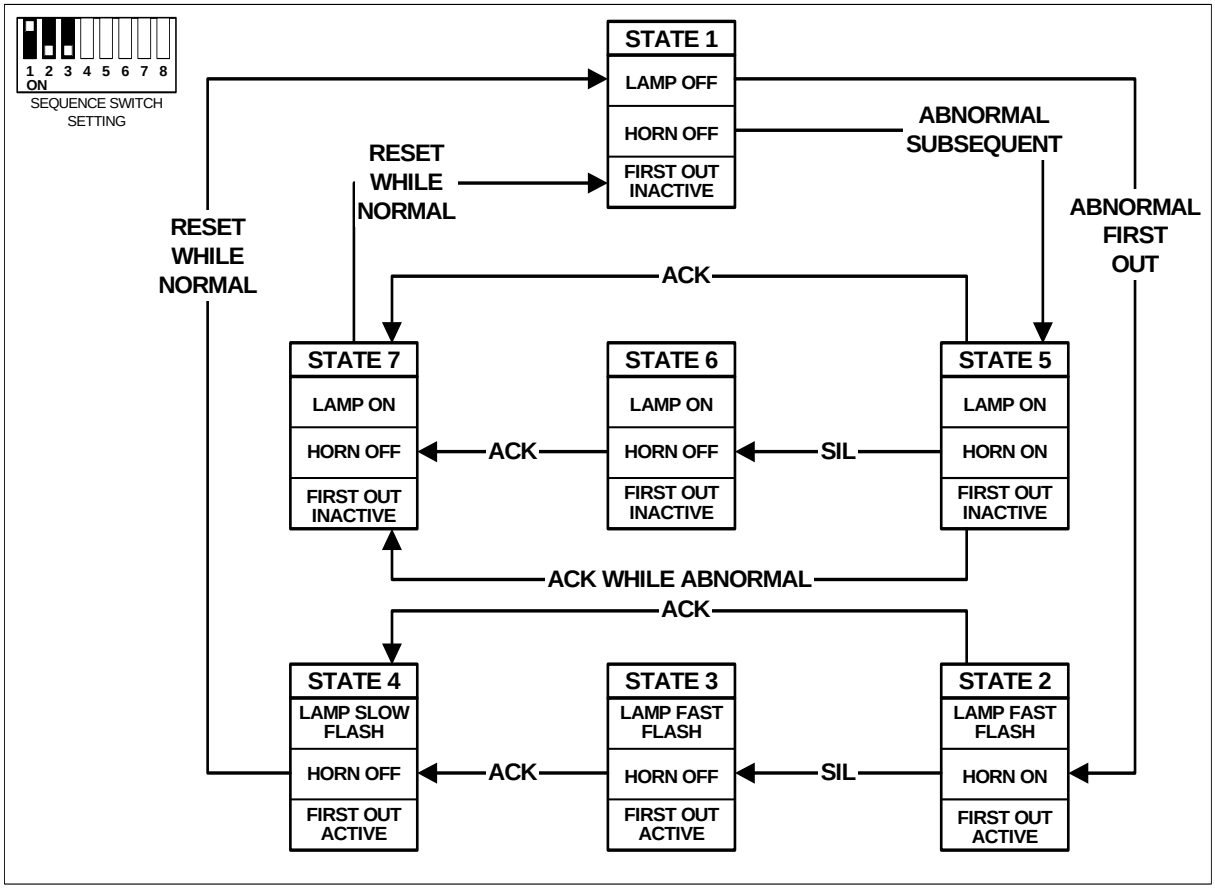
Sequence 4 - Momentary (Fleeting) Alarm, Manual Reset, with Ringback, Timer Delay on inputs.



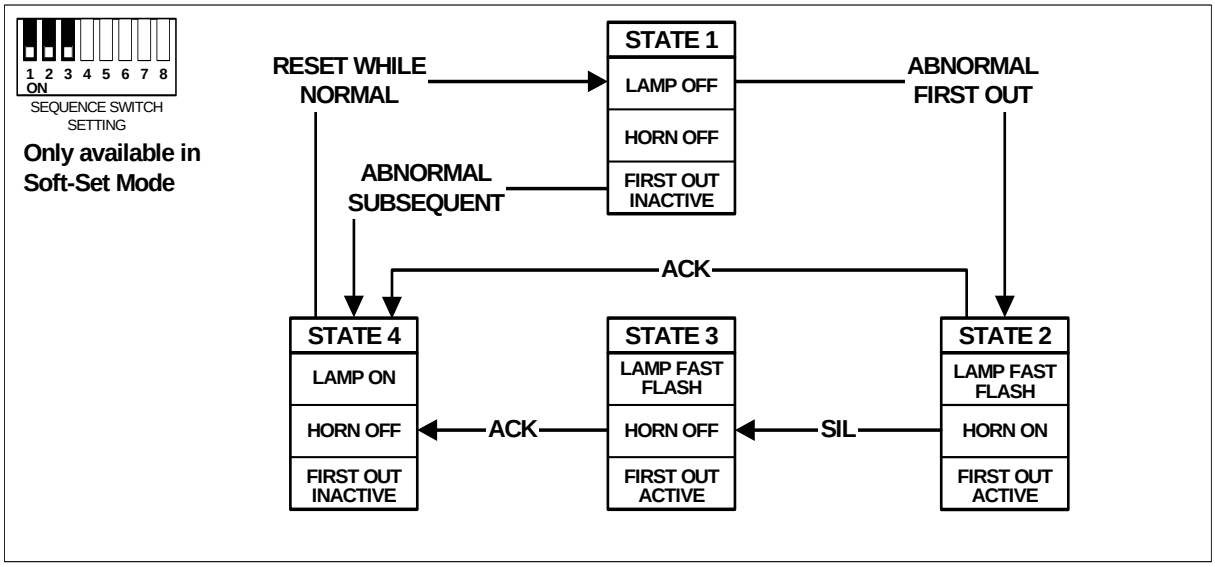
Sequence 5 - Momentary (Fleeting) Alarm, First Out Multiple Groups, Manual Reset, with Ringback.



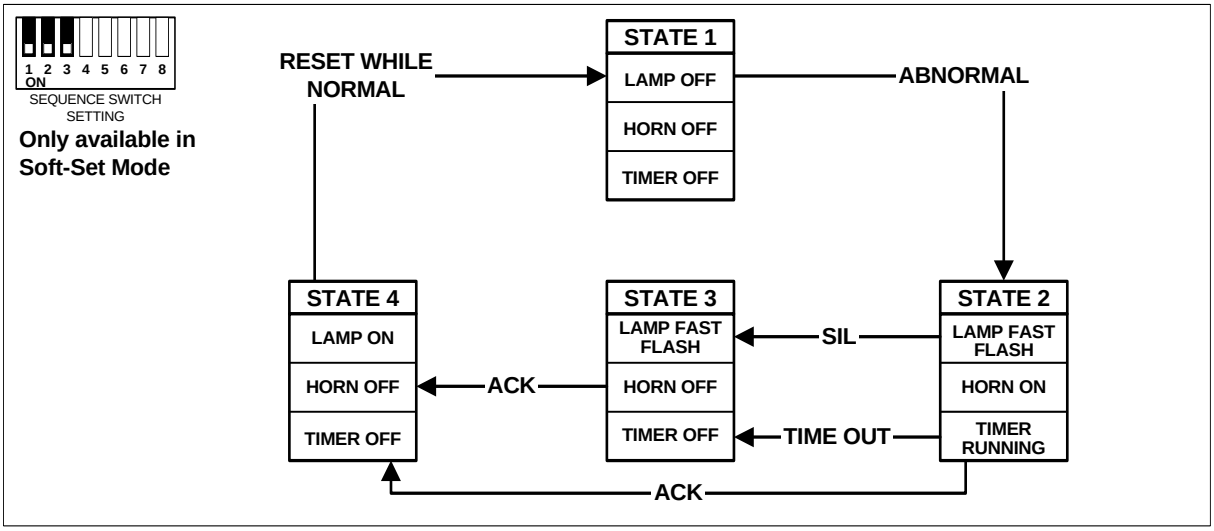
Sequence 6 - Momentary (Fleeting) Alarm, First Out Manual Reset, Auto Reset on subsequent Alarms



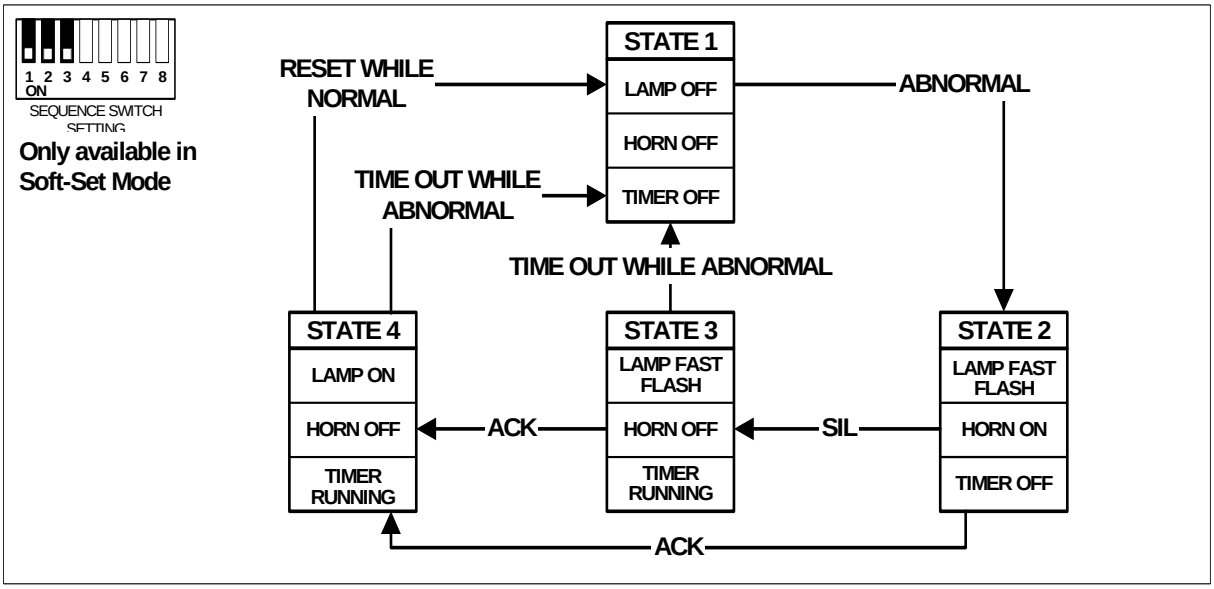
Sequence 7 - Momentary (Fleeting) Alarm, First Out Single Group, Manual Reset, First Out Continuous Flash



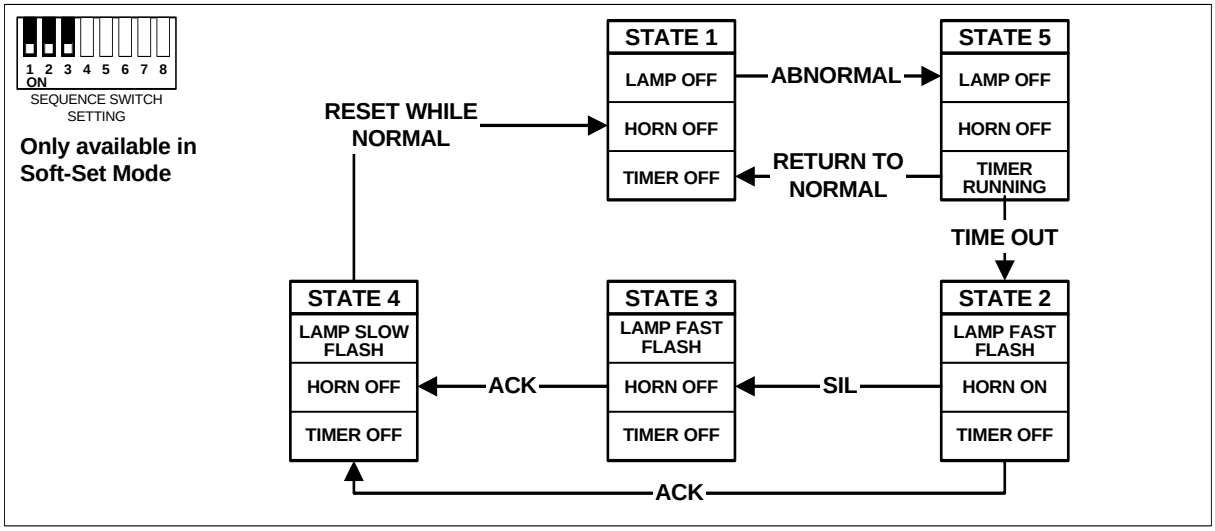
Sequence 8 - Momentary (Fleeting) Alarm; First Out Multiple Group; Manual Reset; No horn for subsequent alarms.



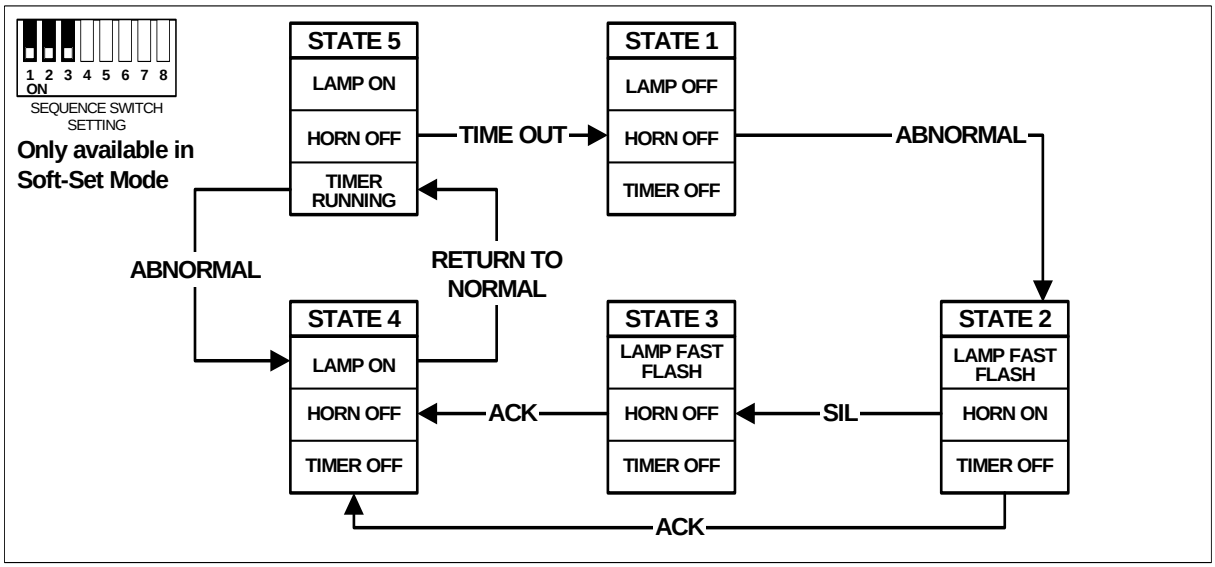
Sequence 9 - Momentary (Fleeting) Alarm; Manual Reset; Auto Silence after Time Delay.



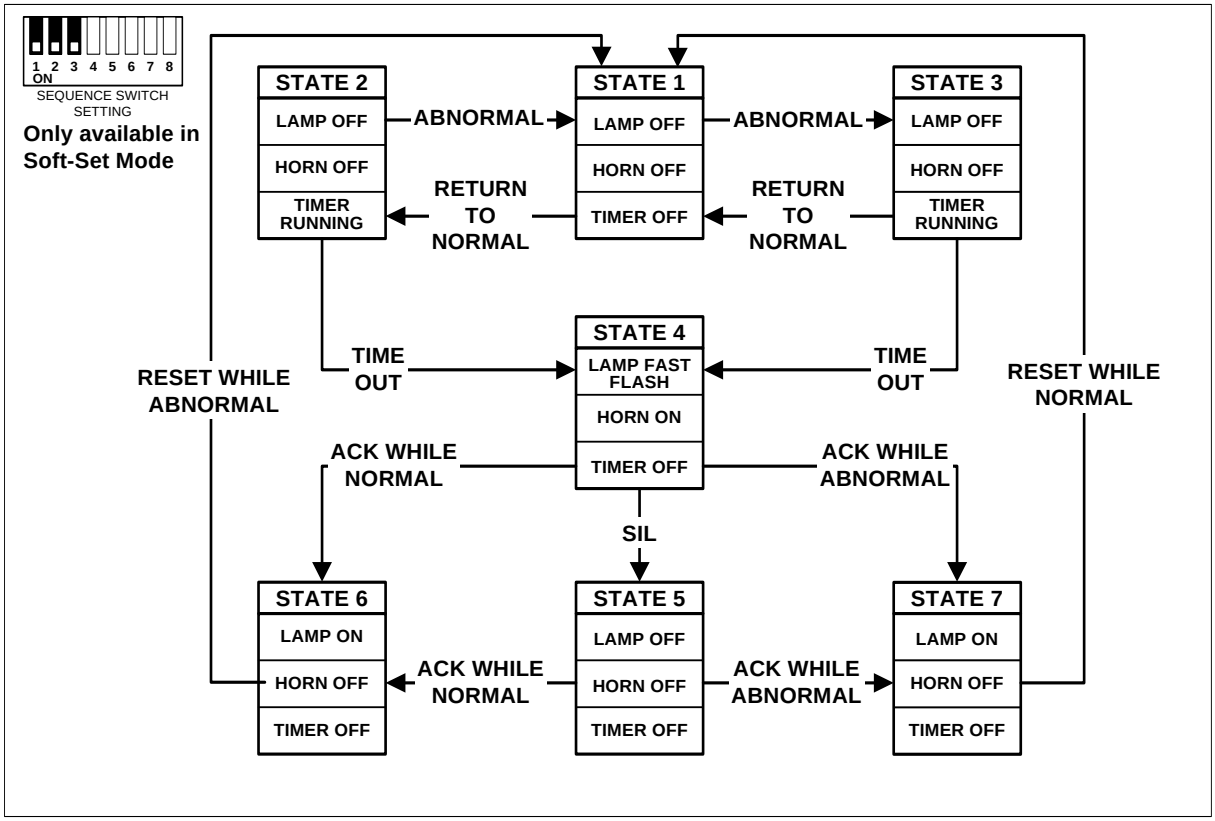
Sequence 10 - Momentary (Fleeting) Alarm; Manual Reset; Re-alarm after time-out if still abnormal.



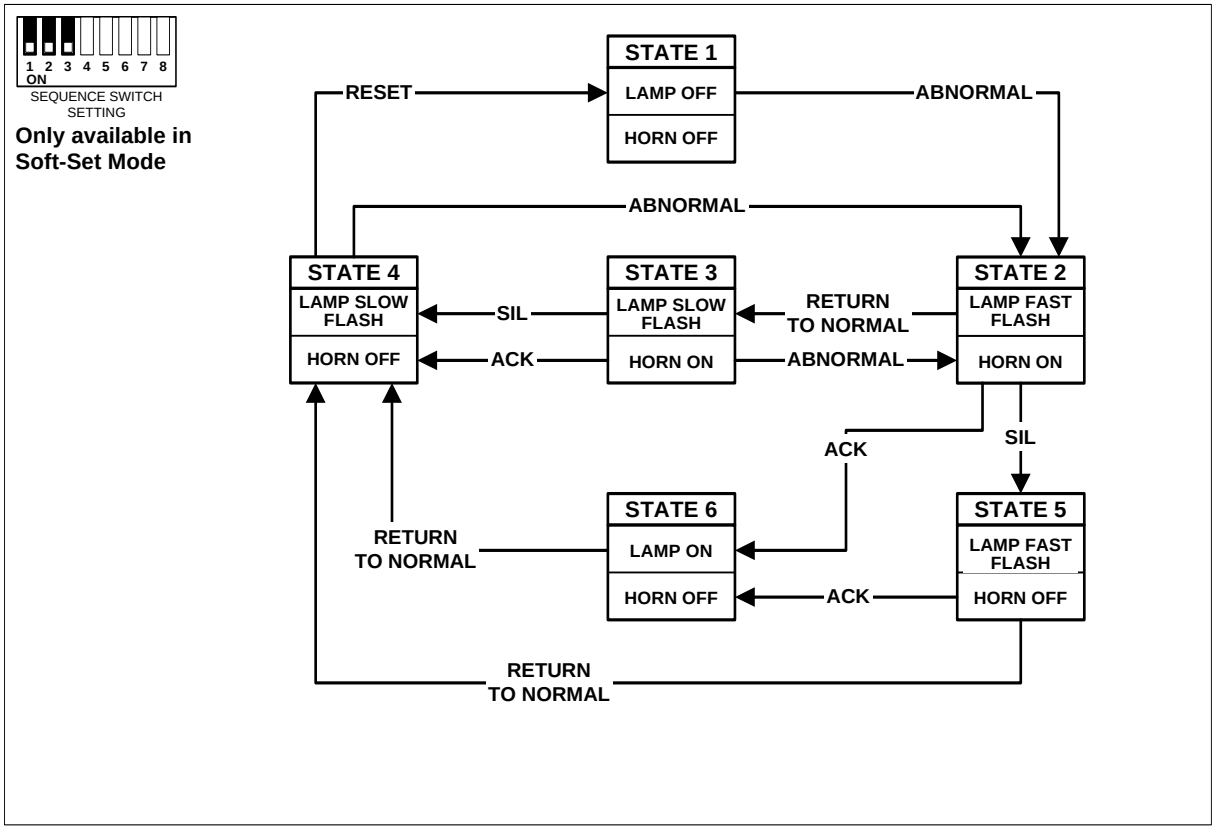
Sequence 11 - Momentary (Fleeting) Alarm; Manual Reset; for Motor Alarms; with Time Delay on Inputs



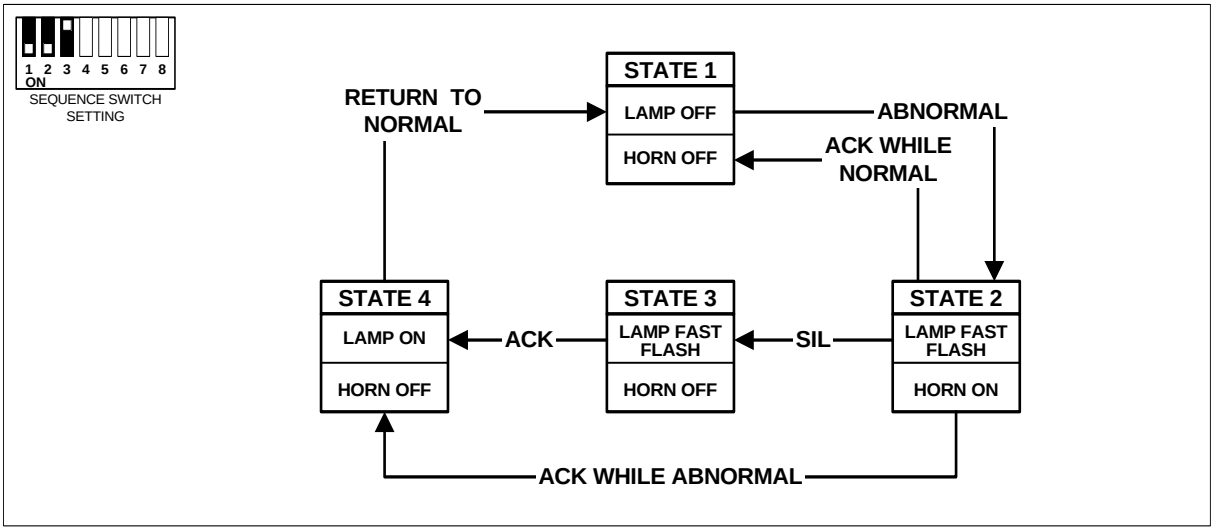
Sequence 12 - Momentary (Fleeting) Alarm; Auto Reset; with Time Delay on Return to Normal.



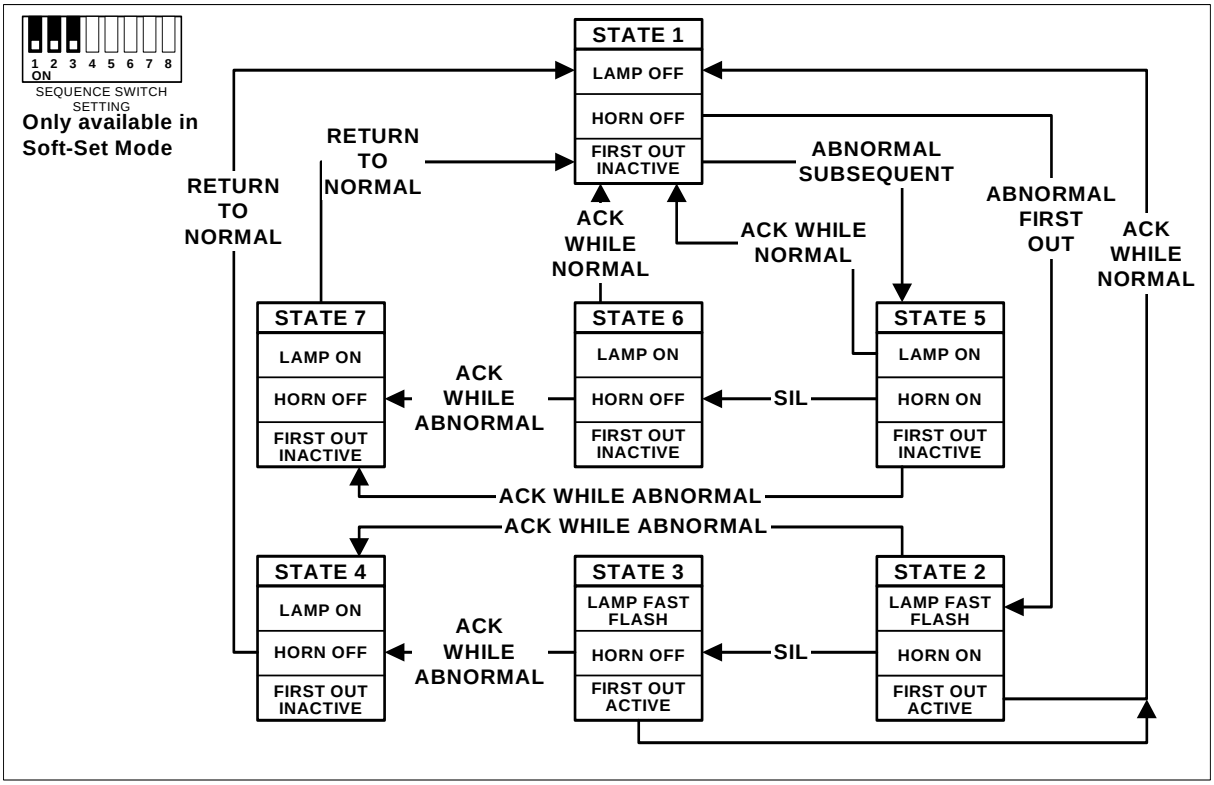
Sequence 13 - Pulse Monitoring Alarm, Manual Reset



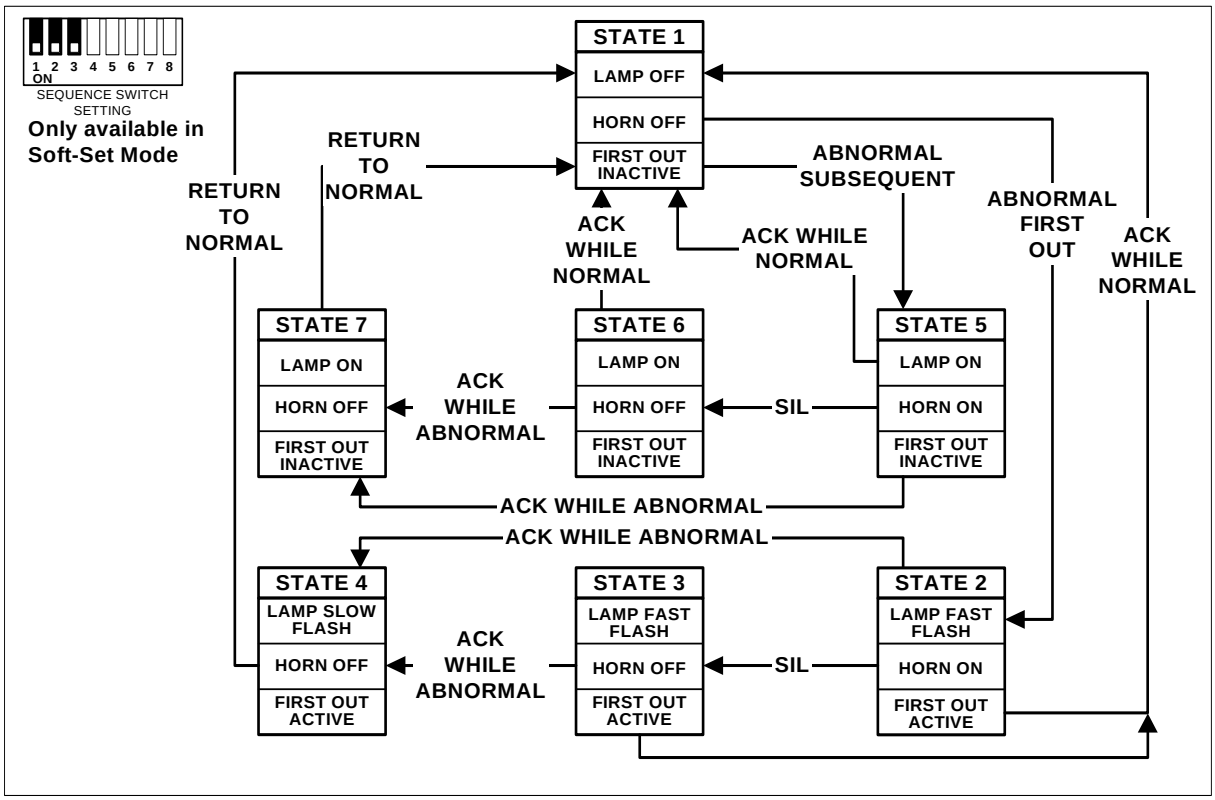
Sequence 14 - Momentary (Fleeting Alarm), Manual Reset, with Ringback.



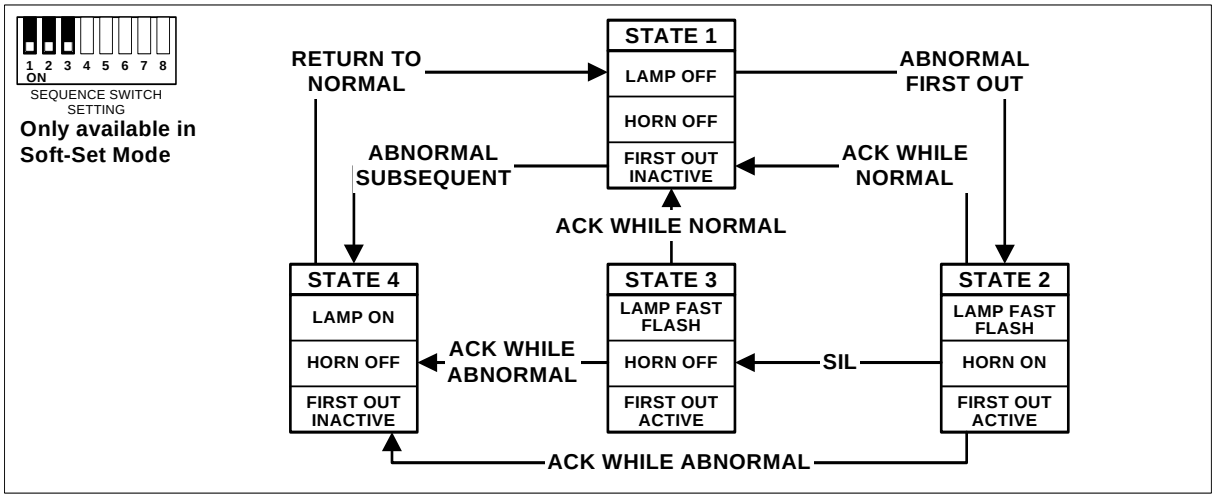
Sequence 18 - Momentary (Fleeting) Alarm, Auto Reset, (Timer option off)



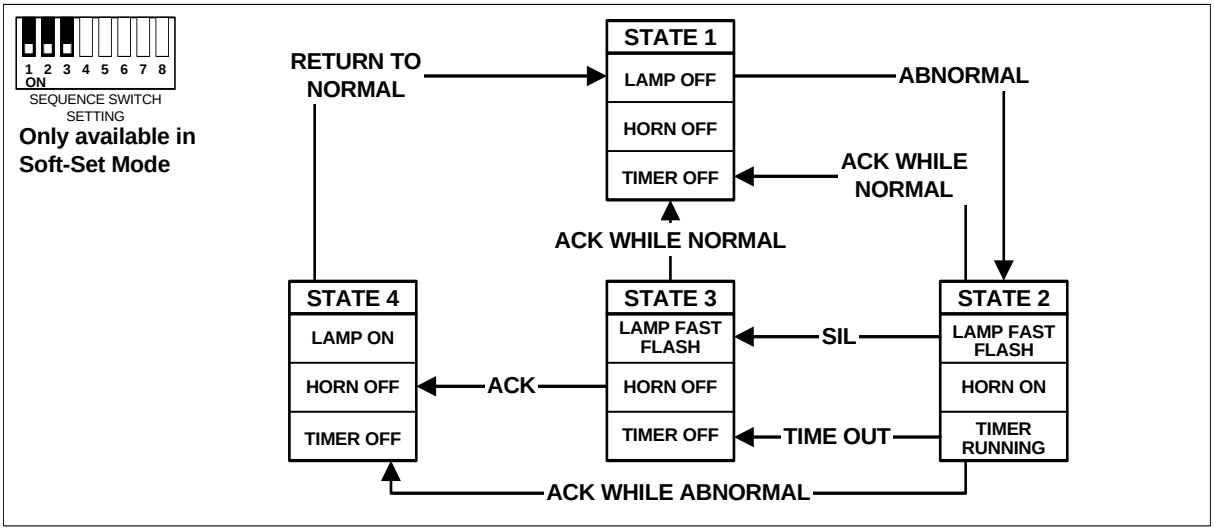
Sequence 21 - Momentary (Fleeting) Alarm, First Out Multiple Groups, Auto Reset.



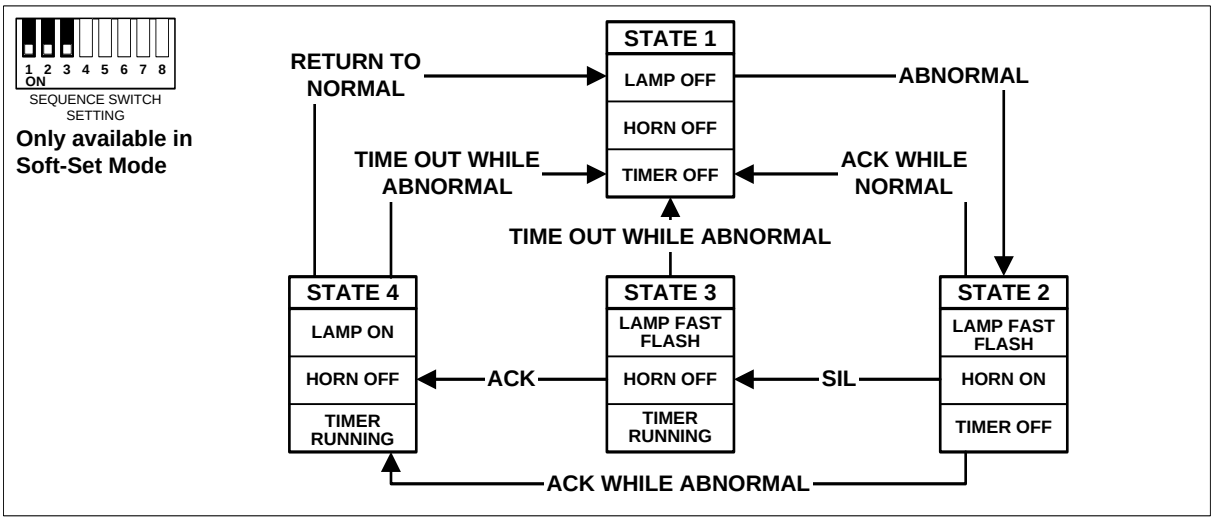
Sequence 23 - Momentary (Fleeting) Alarm, First Out Single Group, Auto Reset, First Out Continous Flash.



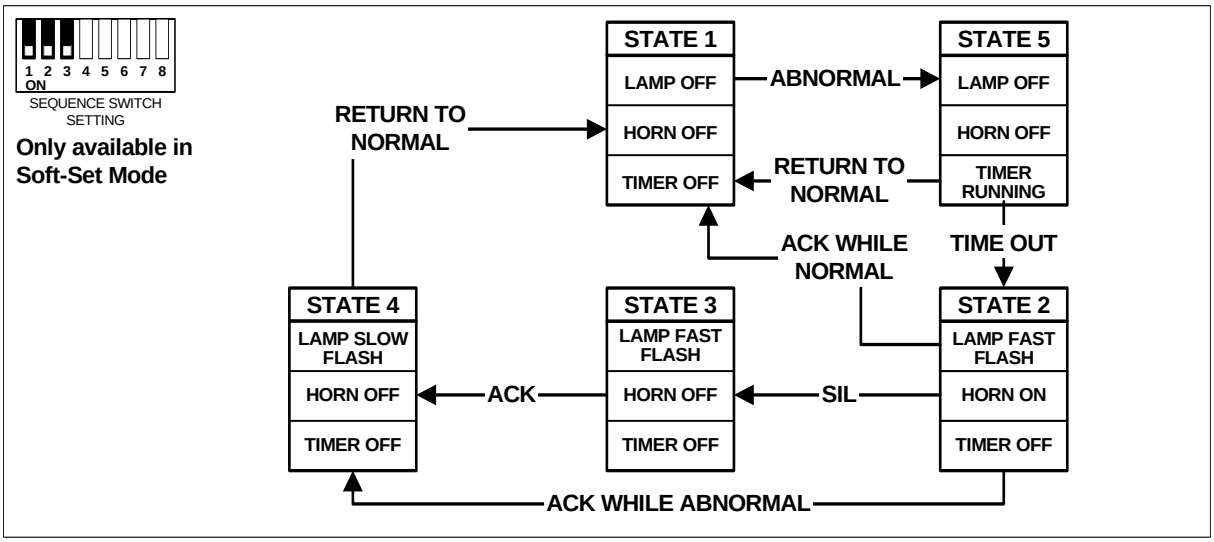
Sequence 24 - Momentary (Fleeting) Alarm; First Out Multiple Group; Auto Reset; No horn for subsequent alarms.



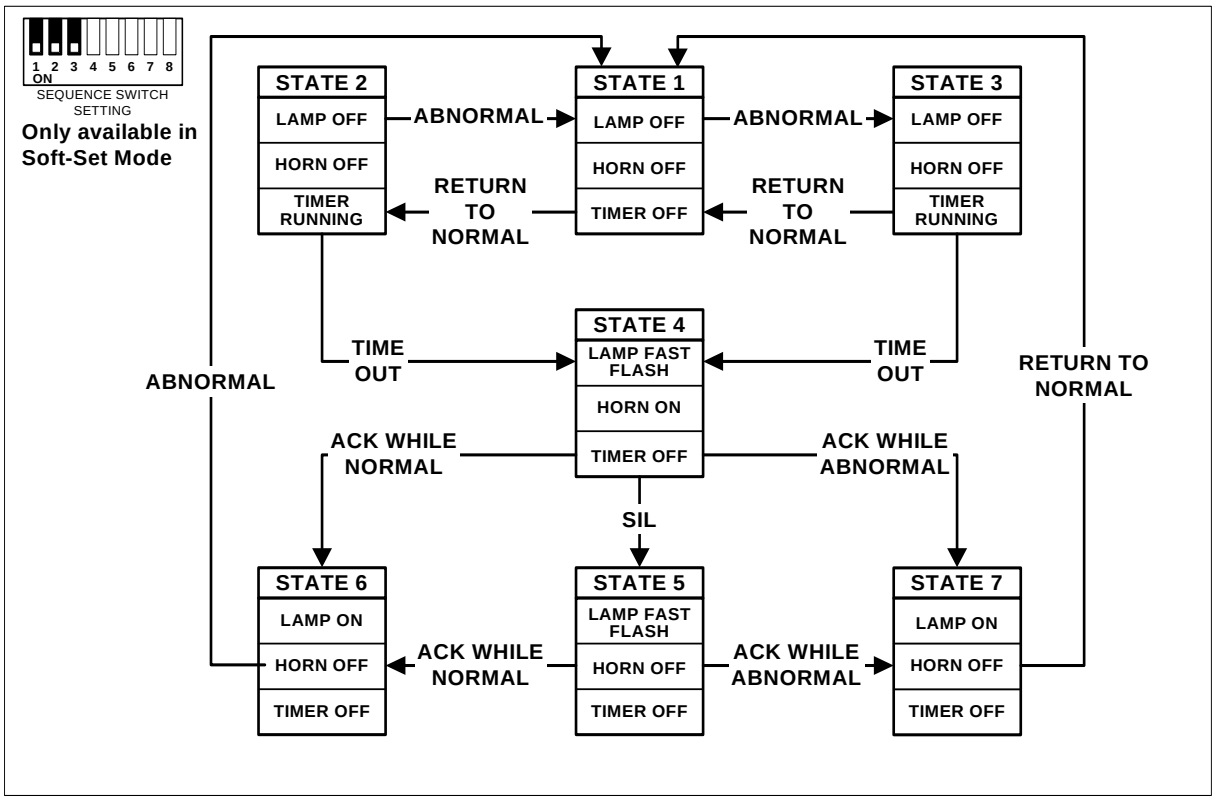
Sequence 25 - Momentary (Fleeting) Alarm; Auto Reset; Auto Silence after Time Delay.



Sequence 26 - Momentary (Fleeting) Alarm; Auto Reset; Re-alarm after time-out if still abnormal.



Sequence 27 - Momentary (Fleeting) Alarm; Auto Reset; for Motor Alarms; with Time Delay on Inputs



Sequence 29 - Pulse Monitoring Alarm - Auto Reset

8. MODBUS REGISTER LAYOUT

The following table provides the contents of the registers available through the programming port and the serial port using the Modbus protocol.

The Omni10c supports the following Modbus functions:

Modbus Function 1 – Read Coil Statuses
Modbus Function 2 – Read Input Statuses
Modbus Function 3 – Read Holding Registers
Modbus Function 4 – Read Input Registers
Modbus Function 5 – Write Single Coil
Modbus Function 6 – Write Single Holding Register
Modbus Function 16 – Write Multiple Holding Registers

Note:

Maximum Number of Holding Registers to read or write: 4

16 coils or input status to be read at a time, starting from positions1,17,33,49 only.

Note that the Table below refers to Modbus Holding registers without any starting offset. If a third party Modbus Master is being used to poll the Omni10c, add the offset for that device to the register addresses below. For example, some Modbus Master devices, Holding registers start at address 40 001. Therefore to read the status of the Omni10c inputs, read Holding register 40101.

(Using the optional Configuration Software, this data is presented in easy-to-use pull-down menus enabling the data to be accessed without needing to know the specific register numbers):

Holding / Input Reg	Coil/ Input Status.	DIT No.	DESCRIPTION	Read/ Write
1-100		0-99	PRODUCT INFORMATION	
1	N/A	0	Product Code Product Code that reflects the product range/ family. For the Omni10c family, the product code is 0511.	R
2	N/A	1	DIT Revision Number Version number of the DIT Layout used by the Omni10c Kernel. The format is BCD with major revision number in the MSB and minor revision in the LSB.	R
3	N/A	2	Kernel Version Number Version number of the Omni10c Kernel. The value is stored in BCD format with major revision number in the MSB and minor revision in the LSB.	R
4	N/A	3	Supported Services Flags This register shows what network related services are supported by the Omni10c Kernel: Bit 0: DIT service Bit 1,2: Reserved Bit 3: Datagram Service Bits 4,5: Reserved Bit 6: Programming Service Bit 7: Presentation Layer Management Service Bits 8-15: Reserved The Omni10c currently supports the DIT service. The value returned is 1.	R
5-8	N/A	4-7	User Tag Name or Model number of the product in ASCII format, 2 characters per register.	R
9 - 23	N/A	8 – 22	Reserved	
24	N/A	23	Alive Counter Counter incremented frequently by the Omni10c Kernel to indicate it is running.	R
25 – 100	N/A	24-99	Reserved	
101- 200		100-199	STATUS DATA	
101	1-16	100	Input Status 10 Inputs as individual bits – bit 0 (lsb) = input 1 etc. Note that any Change of State to “1” will remain latched	R/W

Holding / Input Reg	Coil/ Input Status.	DIT No.	DESCRIPTION	Read/ Write
			until read by a Modbus Poll. This will ensure that any fleeting abnormal input is never missed by the Modbus Master. These status bits can also be written to the Omni10c in the Model C1661A to trigger an alarm. When using Modbus Coil writes (Modbus Function 5) the coil mapping is as follows: Coil Number : Input Number 1 : 1 2 : 2 3 : 3 4 : 4 5 : 5 6 : 6 7 : 7 8 : 8 9 : 9 10 : 10 bits 11 -15 are reserved, and will always return 0	

Holding / Input Reg	Coil/ Input Status.	DIT No.	DESCRIPTION	Read/ Write
102	17-32	101	Common Service Input Status If any bit below is 1 then the input is ON. Bit 0: INH (Inhibit input) Bit 1: TST (Lamp Test input) Bit 2: ACK (Acknowledge input) Bit 3: SIL (Silence input) Bit 4: RES (Reset input) Bit 5: FS (Flash Sync input - this bit is READ ONLY) Bit 6: FO (First Out input - this bit is READ ONLY) Bits 7-15: Reserved **NOTE:** The SIL, ACK and RES bits are automatically reset to 0 after 3 seconds when set by the Modbus Master. All other bits must be reset by the Modbus Master. When using Modbus Coil writes (Modbus Function 5) the coil mapping is as follows: Coil Number : Control Input 17 : INH (Inhibit input) 18 : TST (Lamp Test input) 19 : ACK (Acknowledge input) 20 : SIL (Silence input) 21 : RES (Reset input) 22-32 : Reserved	R/W
103	N/A	102	Alarm Status 1 bit for every input where “1” means the input is in alarm and “0” means the input is in the normal condition. Bit 0 (lsb) = alarm status of input 1. Bits 10-15 are reserved and always return 0.	R
104	N/A	103	Common Service Output Status If any bit below is 1 then the output Relay is energised Bit 0: RL1 – Relay 1 output Bit 1: RL2 – Relay 2 output Bits 2-15: Reserved	R
105	N/A	104	Lamp Status: Lamp 2 (high byte) : Lamp 1 (low byte) The current lamp status for a given lamp can be read or written to here. Status for two lamps is provided per Modbus register, one lamp per byte. Status is as follows:	R/W

Holding / Input Reg	Coil/ Input Status.	DIT No.	DESCRIPTION	Read/ Write
			0 = OFF 8 = FAST FLASH 16 = SLOW FLASH 24 = INTERMITTENT FAST FLASH 56 = STEADY ON	
106	N/A	105	Lamp Status: Lamp 4 (high byte) : Lamp 3 (low byte)	R/W
107	N/A	106	Lamp Status: Lamp 6 (high byte) : Lamp 5 (low byte)	R/W
108	N/A	107	Lamp Status: Lamp 8 (high byte) : Lamp 7 (low byte)	R/W
109	N/A	108	Lamp Status: Lamp 10 (high byte) : Lamp 9 (low byte)	R/W
110-115	N/A	109 – 114	Reserved	
116	N/A	115	Fault Status If the unit discovers a fault it is reflected in this register. The error codes are as follows: NO fault found: 0 INPUT fault: 47 SPI fault: 63 EEPROM fault: 79	R
117-200	N/A	116 – 199	Reserved	
201-250		200 – 249	SETUP DATA	
201	N/A	200	Setup Sequence Number: Input 2 (high byte) : Input 1 (low byte) Select Sequence number from Table 4-1. DIP switches must be set to Sequence 31 on SW1 for this register to be recognised, otherwise the DIP switch setting is used. If an invalid setting is written into these registers, the relevant sequence is set to Sequence 1.	R/W
202	N/A	201	Setup Sequence Number: Input 4 (high byte) : Input 3 (low byte)	R/W
203	N/A	202	Setup Sequence Number: Input 6 (high byte) : Input 5 (low byte)	R/W
204	N/A	203	Setup Sequence Number: Input 8 (high byte) : Input 7 (low byte)	R/W
205	N/A	204	Setup Sequence Number: Input 10 (high byte) : Input 9 (low byte)	R/W
206-208	N/A	205 – 207	Reserved	

Holding / Input Reg	Coil/ Input Status.	DIT No.	DESCRIPTION	Read/ Write
209	N/A	208	Setup Timer Setting: Input 2 (high byte) : Input 1 (low byte) Input delay timer set per input. One input per byte. The data format for an input is as follows: Most significant bit: 1 = Use the slow timer, 0 = Use the fast timer (1/10 s) Least significant 7 bits: time delay in multiples The fast timer counts time in units of tenths of a second (i.e. 1/10 s). The slow timer counts in multiples of the fast timer and is programmable. Refer to DIT 135 to configure it. The default setting is 10 which makes is a seconds counter. Fast timer example: To delay Input 1 by 20 seconds, enter 200 (or C8 hex) Slow timer example: If DIT 135 is set to 10 then to delay Input 1 by 20 seconds, enter 148 (94hex) Set to **255** to use timer setting set by SW2.	R/W
210	N/A	209	Setup Timer Setting: Input 4 (high byte) : Input 3 (low byte)	R/W
211	N/A	210	Setup Timer Setting: Input 6 (high byte) : Input 5 (low byte)	R/W
212	N/A	211	Setup Timer Setting: Input 8 (high byte) : Input 7 (low byte)	R/W
213	N/A	212	Setup Timer Setting: Input 10 (high byte) : Input 9 (low byte)	R/W
214-228	N/A	213-227	Reserved	
229	N/A	228	Setup Lamp Sense 1 bit per lamp Bit 0 sets Lamp 1, and bit 9 sets Lamp 10. Bits 10-15 are reserved. 1023 = All Lamps Normal Sense 0 = All Lamps Reversed Sense.	R/W
230	N/A	229	First Out Group Split Enter a number between 1 and 10 to decide the split between First Out Group 1 and 2. For example: A value of **4** will arrange input 1 to 4 into First Out Group 1 and inputs 5 to 10 into First Out Group 2.	R/W
231	N/A	230	Setup System Operation Bit 0: Pushbutton Edge/#Level: 1 – Edge, 0 – Level Bit 1: Auto ACK on Startup: 1 – NO Auto ACK on Startup, 0 - Auto ACK on Startup Bit 2-15: Reserved	R/W

Holding / Input Reg	Coil/ Input Status.	DIT No.	DESCRIPTION	Read/ Write
232	N/A	231	Setup Slow Timer The slow timer counts in multiples of the fast timer. This is configurable to allow the most flexible use of timers. Some examples are given below: To count in seconds: set to 10 To count in 10s of seconds: set to 100 To count in 20s of seconds: set to 200	R/W
233	N/A	232	Setup Common Relay Operation: Relay RL1 (Low Byte) (High Byte Reserved) Configure the operation of the common relay RL1 fitted to the Common Services Card, labelled RL1. This relay can be configured for Horn operation or a selection of Group Alarm (GA) (Group operations as follows: ▪ Relay Follows Input: ▪ Relay Follows Alarm ▪ Relay acts as ring-back horn ▪ Relay acts as Multiple Reflash ▪ Relay Follows ACK pushbutton	R/W
234	N/A	233	Setup Common Relay Operation: Relay RL2 (High Byte) (Low Byte Reserved) Configure the operation of the common relay RL1 fitted to the Common Services Card, labelled RL1. This relay can be configured for Horn operation or a selection of Group Alarm (GA) (Group operations as follows: ▪ Relay Follows Input: ▪ Relay Follows Alarm ▪ Relay acts as ring-back horn ▪ Relay acts as Multiple Reflash ▪ Relay Follows ACK pushbutton NOTE: Relay 2 also acts as watchdog output relay. If an internal fault occurs in the Omni10c, then relay RL2 will de-energise. It is therefore not recommended to operate RL2 as a horn relay, unless you are not concerned about the operation of the watchdog.	R/W
234-245	N/A	233-244	Reserved	R/W
246	N/A	245	Setup Common Relay Input Members: Relay 1 Configures the group of inputs that the relay will respond to. Inputs are individually mapped to any relay. Mapping is setup in binary format where Input 1 is the least significant bit. For example: to map inputs 1 to 6 to Common Relay 1, set the corresponding binary value: "0000000000111111" for DIT register 244.	R/W

Holding / Input Reg	Coil/ Input Status.	DIT No.	DESCRIPTION	Read/ Write
247	N/A	246	Setup Common Relay Input Members: Relay 2	R/W
248-264	N/A	247-263	Reserved	
265	n/a	264	Modbus Slave Settings Least Significant Byte: Modbus Slave ID 1 – 32 Most Significant Byte: Communications Settings: Bits 15:14:13 – comms settings as follows: 1 : 0 : 0 - ASCII 9600, 7,n,2 1 : 0 : 1 - ASCII 4800, 7,n,2 1 : 1 : 0 - ASCII 2400, 7,n,2 1 : 1 : 1 - ASCII 1200, 7,n,2 0 : 0 : 0 - RTU 9600, 8,n,1 0 : 0 : 1 - RTU 4800, 8,n,1 0 : 1 : 0 - RTU 2400, 8,n,1 0 : 1 : 1 - RTU 1200, 8,n,1 Bits 12 to 5 – reserved – must be set to 0	R/W