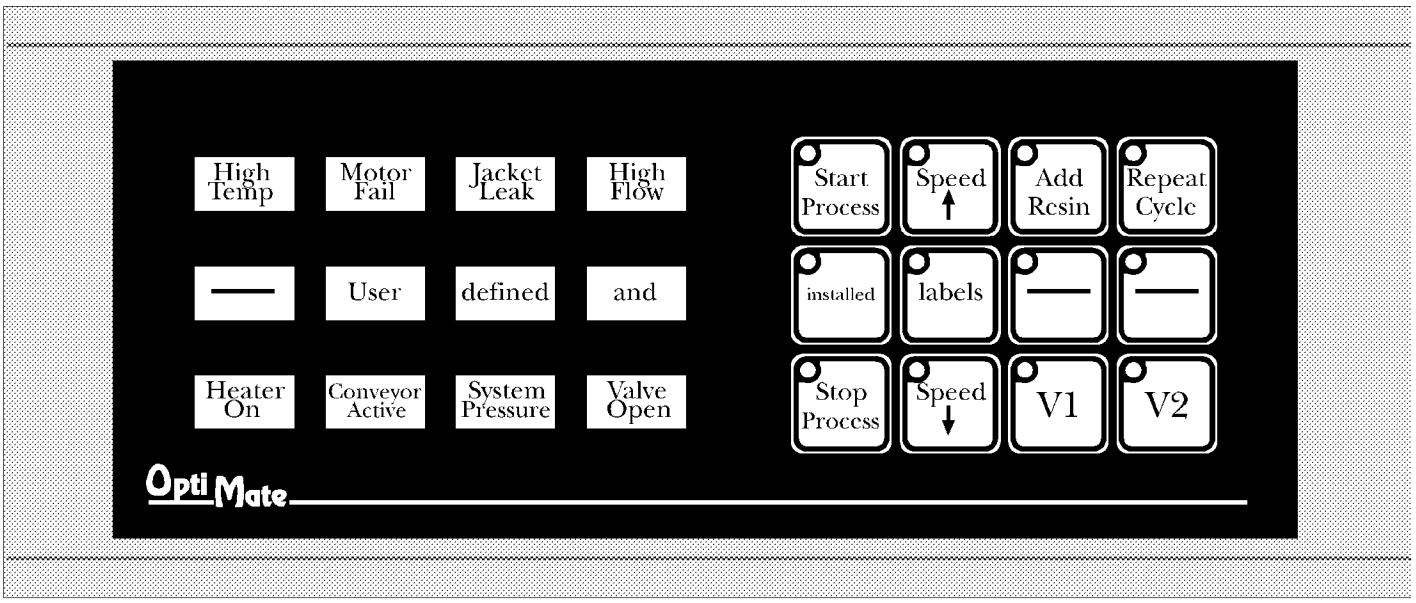


OM1212 Lamp/ Pushbutton Module

General Overview

The OM1212 Lamp/Pushbutton Panel features 12 high-intensity LED light bars and 12 pushbuttons. Each of the lamps can be individually controlled to be on, off, or flash. Each of the buttons can be individually configured to operate as either a momentary or alternate-action pushbutton.

Lamps and buttons can be custom labeled by the user with plastic inserts. The inserts can be legended with text and/or graphics, and slipped into protective pockets behind the faceplate.

The OM1212 Lamp/Pushbutton Panel is part of Optimation's OptiMate® series. Each OptiMate module is designed to connect to a microprocessor or most PLC's with a single cable connection. OptiMate modules can be used individually, or together with any combination of other OptiMate modules.

When used with a microprocessor system, simple communications over either an RS232 or RS422 communications cable allow the microprocessor to directly read the state of each button and control each lamp.

When used with a PLC, operation is transparent to the user. Lamps and buttons appear in the PLC ladder logic as coils and contacts. The OM1212 takes care of the rest.

Applications

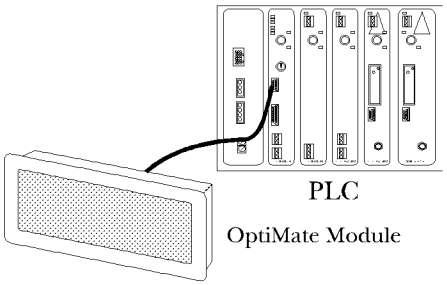
- Machine control
- Process control
- Security systems
- HVAC
- Plant monitoring/control
- PLC applications
- Microprocessor applications

Features

- 12 Plug-In LED Light Bars
- 12 tactile snap membrane pushbuttons
- Independently configurable for momentary or alternate action
- User-legendable
- PLC compatible
- RS232/RS422 communications
- Stand alone operation capable
- Multimodule operation capable

Contents

Configuration Options

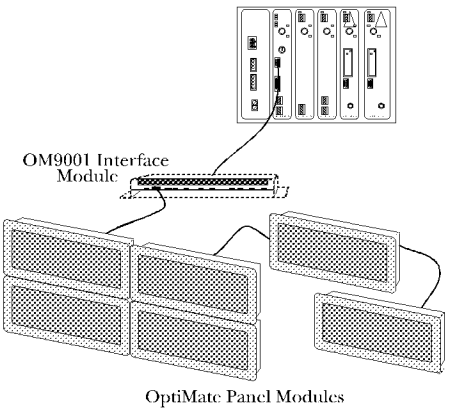


PLC Stand Alone

OptiMate modules plug directly into most PLCs. A simple cable connection allows you to interface and control the OptiMate module via PLC data registers.

The OM1212 Lamp/Pushbutton module uses a bank of six PLC registers to hold pushbutton state, control lights and force pushbutton states. The OM1212 continuously communicates with the PLC registers and updates lamp operation and button status on a real-time basis.

PLCs are slave devices on their standard communications ports. This means that a panel attached to the standard port must control the transfer of information by reading and writing the PLC registers. OptiMate modules will perform these communications for most major PLC protocols. Configuration for particular PLC protocols and interconnect cabling is covered in the following pages.



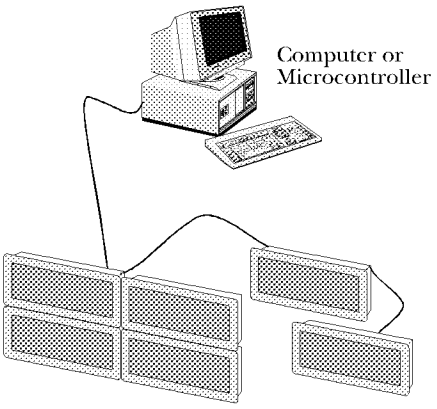
PLC Multi Modules

Larger systems involving operator panels can be successfully addressed using OptiMate modules. These applications utilize the OM9001 Communications Master to transfer data between the PLC and the individual OptiMate modules. OptiMate modules can be located together to form custom panels or they can be distributed anywhere within 4000 feet.

The OM9001 Communications Master provides a transparent interface between the PLC and a group of OptiMate modules. The communication interface between modules requires only four wires.

System configuration is simple via an interactive configuration program that runs on any IBM PC compatible computer.

This modular approach to custom applications provides a nearly limitless number of possibilities.



Microprocessor Based Systems

OptiMate modules can interface directly to most computers or microcontrollers. The modules communicate over either RS422 or RS232 serial communications. All that is required to interface OptiMate modules is a serial port. The OptiMate Hex communications protocol, detailed in this document, allow the user to directly control lamp operation and access pushbutton status.

Since each module has its own unique address, up to 31 modules can be interfaced on one communications cable.

In a microprocessor-based system, the host microprocessor is the system master. The OptiMate modules are slave devices that respond to commands from the host. In the case of the OM1212, these commands are requests for pushbutton status and messages that dictate lamps states.

Communications over RS422 allows placement of modules anywhere within a 4000 foot cable distance. Modules can be grouped together to form a panel. Modules can be grouped in several clusters all on the same communications cable.

Use with a PLC

Memory Mapping

Memory mapping is a technique that "maps" the memory of an OptiMate module into the holding registers of the programmable controller. By knowing where the data of the specific OptiMate module is mapped, this data can be moved, changed or monitored using ladder logic.

The term PLC register is used by Optimation for the area of memory within the programmable controller that can be used for data storage. PLC registers are sometimes known as data registers or internal registers.

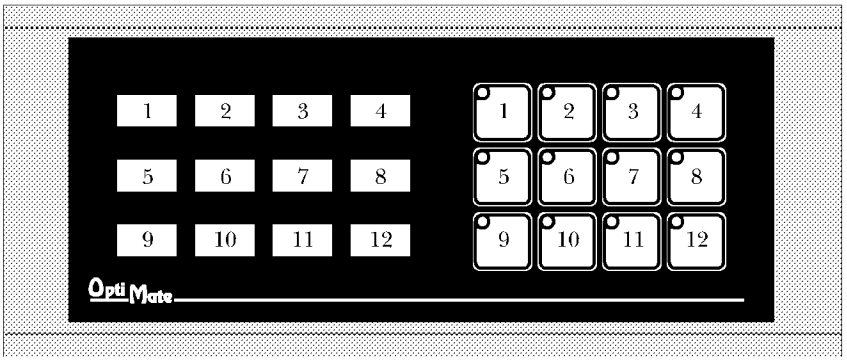
MSB															LSB
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

PLC Register

The OM1212 Lamp/Pushbutton Module uses a bank of 6 contiguous holding registers. The register set definition is shown in the table below.

OM1212 Lamp/Pushbutton Module PLC Register Map

Holding Register	Register Function
X (first register of bank)	Indicator lamps on/off control
X+1	Indicator lamps flash control
X+2	Button LEDs on/off control (LED separation mode only)
X+3	Button LEDs flash control
X+4	Button on/off status
X+5	Force pushbutton data & commands



Configuration

Configuration of the OM1212 or system of OptiMate modules is performed via an IBM PC compatible computer. Optimation supplies configuration software that will allow you to select module configuration, system configuration and PLC protocol definition.

If the module is to be operated in stand alone mode, with a PLC, the configuration selections must be made to select the proper PLC protocol information. If the module is part of a multi-module system, the configuration editor will automatically configure for the following

- Hex Protocol (serial slave, 19200 baud, 8 bits, 2 stop bits, no parity)

The OM9001 Communications Master will talk to the module over this protocol and to the PLC over the PLC protocol you select.

When configuring, always remember to set the module address to 31 (switches 1-5 on) before applying power. ***Once configured, change the address setting***. If the module operates stand-alone, change the address to anything other than 31. If the module is part of a multi-module system, change the address to whatever you have configured the module for.

> Note: DIP switch 6 is a termination switch for RS422. It should always be OFF unless the panel is at the end of the cable in an RS422 system.

Further configuration details are covered in the OptiMate Configuration Editor manual.

Register	MSB														LSB	
X					12	11	10	9	8	7	6	5	4	3	2	1	Indicator Light On/Off Status
X+1					12	11	10	9	8	7	6	5	4	3	2	1	Indicator Light Flash Control
X+2					12	11	10	9	8	7	6	5	4	3	2	1	Button LEDs On/Off Status (LED Separation Mode)
X+3					12	11	10	9	8	7	6	5	4	3	2	1	Button LEDs Flash Control
X+4					12	11	10	9	8	7	6	5	4	3	2	1	Button On/Off Status
X+5	F1	F2	F3		12	11	10	9	8	7	6	5	4	3	2	1	Force Data & Commands

OM1212 Register Bit Association

Reading Pushbutton Status

Once the module is configured and connected to the PLC, reading a button's status simply entails reading the appropriate register bit. In typical applications, a pushbutton appears in PLC ladder logic as a contact. The register bit association is shown in the table on the previous page. The OptiMate module will automatically place status into this register. A '1' indicates active or "on" condition.

Turning on a Lamp

When configured for PLC operation, turning on a lamp simply requires the writing of a '1' to the appropriate register bit. With most PLCs this is accomplished by activating a coil in the PLCs ladder logic. The OptiMate module will automatically retrieve the register data and light any lamps whose bits are set.

A lamp must be turned on in order for the flash control bits to have any effect.

Flashing an Inset LED

As shown in the table, the second register will initiate lamp flash. To flash a lamp, the lamp must be on and lamp flash bit must be set.

> Note: To flash an inset LED, the pushbutton must be a momentary-action pushbutton with LED separation enabled.

Lamp flash is approximately .5 seconds on and .25 seconds off.

Turning on the Inset Indicator Light

In most cases, the LED inset in each button simply provides a visual indication of the status of the button. However, if a module is configured for LED separation mode, the indicator light can be set directly from the PLC. In LED separation mode, turning on a lamp simply requires the writing of a '1' to the appropriate register bit. The register bit association is shown in the table on the previous page. The OptiMate module will automatically retrieve the register data and light any lamps whose bits are set.

LED separation is available only for momentary pushbuttons.

Flashing an Inset LED

As shown in the table, the fourth register will initiate inset LED flash. To flash an LED, the LED must be on and LED flash bit must be set. In LED separation mode, LED "on" status is set directly via PLC register bits.

Lamp flash is approximately .5 seconds on and .25 seconds off.

Force Commands

If the OM1212 module is configured for force capability, the PLC can directly control button status when desired. This may be desirable for initialization purposes.

The force capability also may prove useful for functions initiated from the Pushbutton panel. For example, consider a situation where an operator initiates a control process by pressing an alternate-action panel button. The button status and indicator light would stay on and lighted to indicate that the function is still in process. At the end of the process, the PLC program could force the button status off.

There are three types of force functions available. These are described below.

Force function	Description
F1 (Force buttons status)	When the F1 bit is set, all buttons will be forced to the status set in the force data registers (x+5). Once these buttons are forced to the status set, the OM1212 will automatically clear F1.
F2 (Force buttons on)	When the F2 bit is set, all buttons matching the bits set in the force data registers (x+5) will be forced on. Once these buttons are forced on, the OM1212 will automatically clear F2.
F3 (Clear buttons)	When the F3 bit is set, all buttons matching the bits set in the force data registers (x+5) will be forced off. Once these buttons are forced off, the OM1212 will automatically clear F3.

> Note:Force obviously applies only to alternate-action pushbuttons.

Examples of Use with a PLC Direct PLC

Defining the Base Register Address

The simplest method of interfacing a PLC Direct PLC program to an OM1212 module is to configure the module base address in the PLC's control relay memory. This allows your program to treat pushbuttons as contacts and LEDs as coils. The following table lists these addresses for various PLC Direct PLCs.

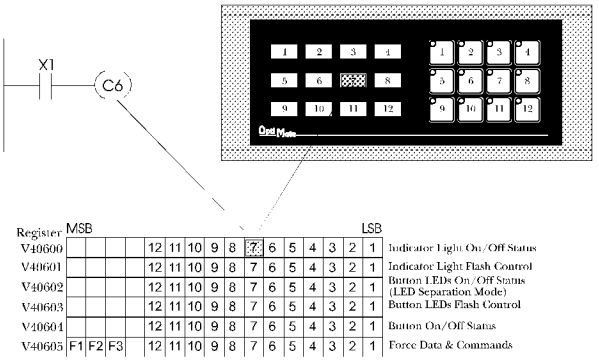
PLC Direct CPU	Control Relay Register address range
DL230	V40600-V40617
DL240	V40600-V40617
DL330	R016-R037
DL330P	R016-R017 and R020-R027
DL340	R016-R037 and R100-R106
DL430	V40600-V40635
DL440	V40600-V40677

The following examples are DL205 or DL405 programs with the OM1212 configured for address V40600. The table below shows the control relay correlation for an OM1212 configured for address V40600.

Device	Lamp On/Off	Lamp Flash	PB LED On/Off	PB LED Flash	Button Status	Force
1	C0	C20	C40	C60	C100	C120
2	C1	C21	C41	C61	C101	C121
3	C2	C22	C42	C62	C102	C122
4	C3	C23	C43	C63	C103	C123
5	C4	C24	C44	C64	C104	C124
6	C5	C25	C45	C65	C105	C125
7	C6	C26	C46	C66	C106	C126
8	C7	C27	C47	C67	C107	C127
9	C10	C30	C50	C70	C110	C130
10	C11	C31	C51	C71	C111	C131
11	C12	C32	C52	C72	C112	C132
12	C13	C33	C53	C73	C113	C133
F3						C135
F2						C136
F1						C137

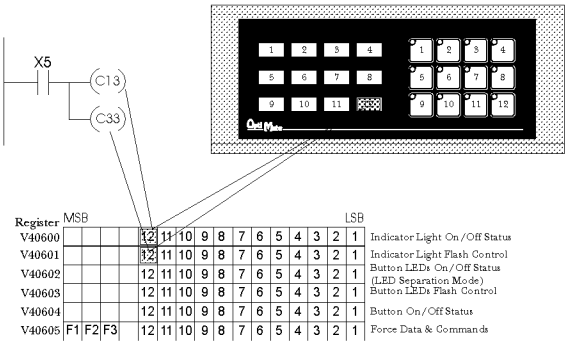
Turning on a Lamp

Turning on a lamp in the OM1212 simply requires activating its associated control relay coil. In the figure below, lamp 7 will be turned on whenever input X1 is active (energizing C6).



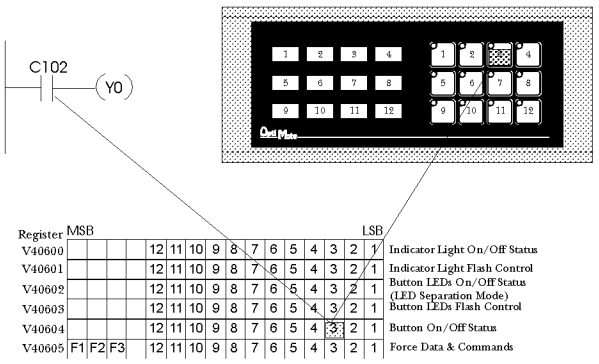
Flashing a Lamp

To flash a lamp, you simply need to turn it on and also set the associated flash bit. The example below shows a 205/405 program used to flash lamp 12 whenever X5 is energized.



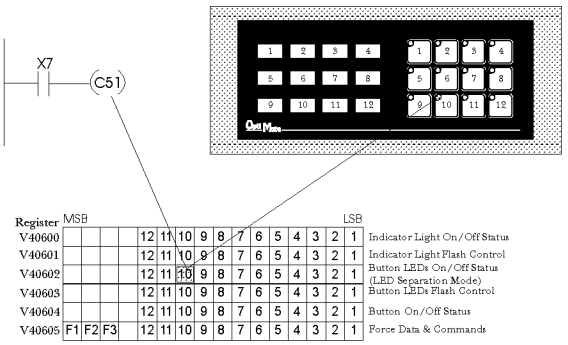
Using a Pushbutton

The following example illustrates the use of an OM1212 with a DL205 or DL405 PLC. When button 3 is activated, C102 will become active and turn on output Y0.



Lighting an Inset LED

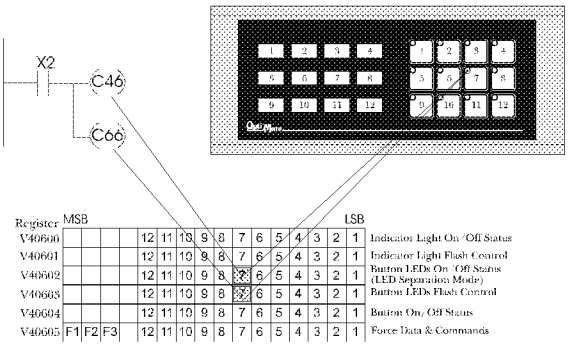
In LED separation mode, the LEDs in the corner of each momentary pushbutton may be directly controlled by the PLC program. The following example shows a segment of a 205/405 program that will light button 10's inset LED whenever input X7 is energized. *In order for this to work, the panel must be configured for LED separation and button 10 must be a momentary pushbutton.*



Flashing an Inset LED

To flash an inset LED, you simply need to turn it on and also set the associated flash bit. For momentary buttons with LED separation enabled, the on/off state is controlled by the PLC, as shown in the previous example.

The example below shows a 205/405 program used to set the LED inset in button 7 to flash whenever X2 is energized.



Forcing Button Status

One of the more advanced capabilities of the OM1212 panel is the ability to force button state from the PLC program. This may be desirable, for example, if an alternate action is used to start a function process. When it is pushed and while the function is active, the button will remain on. You may want the PLC program to clear the button at the end of the function process.

Another example is one of a system that has individual enable or on/off (alternate-action) buttons for several different devices. You may also have other buttons (probably momentary) that enable a group of these same devices. You may want your program to force on the device enable buttons when the group enable button is pressed.

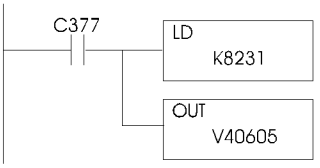
There are many other cases where button force capability can be useful in a system.

There are three types of force functions available for the OM1212 panel - force status, force on and force off. All three functions require moving appropriate data into the PLC registers defined as Force Data & Commands (see the table described in "Use with a PLC").

Note : Force only applies to Alternate-Action pushbuttons.

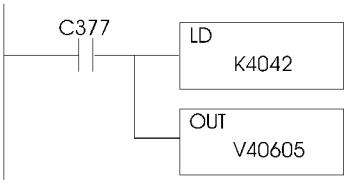
Force Button Status

This function is used to set the state (on or off) of every alternate-action pushbutton in the panel. To use the "Force Button Status" function, simply set the F1 bit to 1 and all buttons that you want to be on to 1, while leaving all other bits off. The example on the right shows buttons 1,5,6, and 10 being forced on and all other buttons forced off when C377 is active.



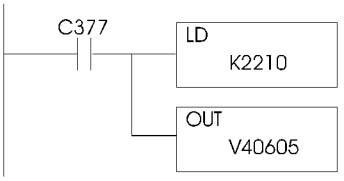
Force Button(s) On

This function is used to turn individual button(s) on without affecting the state of any other buttons. To use the "Force Buttons On" function, set the F2 bit to 1 and all buttons that you want to turn on to 1. Any buttons associated with bits that are left at '0' will not be affected. The following example shows buttons 2 and 7 being forced on when C377 is active.



Clear Button(s)

This function is used to selectively turn individual button(s) off without affecting the state of any other buttons. To use the "Clear Buttons" function, set the F3 bit to 1 and all buttons that you want to turn off to 1. Any buttons associated with bits that are left as '0' will not be affected. The example on the right shows buttons 5 and 10 being cleared when C377 is active.



Examples of Use with an Allen Bradley PLC

Interfacing to A/B Memory

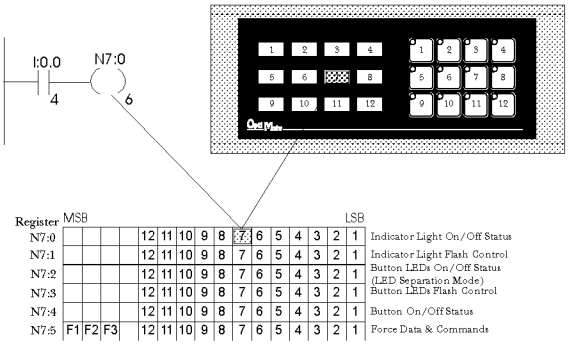
OptiMate modules interface to Allen Bradley SLC 5/03, SLC 5/04 and Micrologix PLCs via integer file type N. The 5/03 and 5/04 have file type N7 as standard. Other "N" type files can be created. The Micrologix has a fixed file type N7. Please refer to Allen Bradley programming documentation for information on setting up and using "N" type files. This allows your program to treat pushbuttons as contacts and LEDs as coils.

The following examples are SLC or Micrologix programs with the OM1212 configured for address N7:0. The table below shows the correlation for an OM1212 configured for address N7:00.

Device	Lamp On/Off	Lamp Flash	PB LED On/Off	PB LED Flash	Button Status	Force
1	N7:0/0	N7:1/0	N7:2/0	N7:3/0	N7:4/0	N7:5/0
2	N7:0/1	N7:1/1	N7:2/1	N7:3/1	N7:4/1	N7:5/1
3	N7:0/2	N7:1/2	N7:2/2	N7:3/2	N7:4/2	N7:5/2
4	N7:0/3	N7:1/3	N7:2/3	N7:3/3	N7:4/3	N7:5/3
5	N7:0/4	N7:1/4	N7:2/4	N7:3/4	N7:4/4	N7:5/4
6	N7:0/5	N7:1/5	N7:2/5	N7:3/5	N7:4/5	N7:5/5
7	N7:0/6	N7:1/6	N7:2/6	N7:3/6	N7:4/6	N7:5/6
8	N7:0/7	N7:1/7	N7:2/7	N7:3/7	N7:4/7	N7:5/7
9	N7:0/8	N7:1/8	N7:2/8	N7:3/8	N7:4/8	N7:5/8
10	N7:0/9	N7:1/9	N7:2/9	N7:3/9	N7:4/9	N7:5/9
11	N7:0/10	N7:1/10	N7:2/10	N7:3/10	N7:4/10	N7:5/10
12	N7:0/11	N7:1/11	N7:2/11	N7:3/11	N7:4/11	N7:5/11
F3						N7:5/13
F2						N7:5/14
F1						N7:5/15

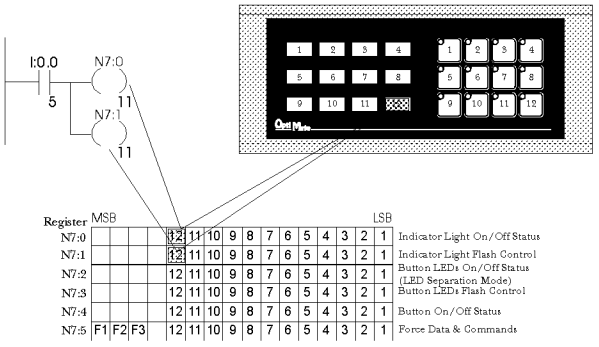
Turning on a Lamp

Turning on a lamp in the OM1212 simply requires activating its associated control relay coil. In the figure below, lamp 7 will be turned on whenever input I:0.0/4 is active (energizing N7:0/6).



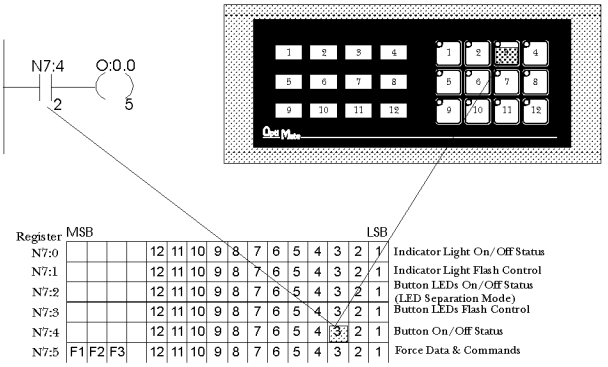
Flashing a Lamp

To flash a lamp, you simply need to turn it on and also set the associated flash bit. The example below shows a SLC or Micrologix program used to flash lamp 12 whenever I:0.0/5 is energized.



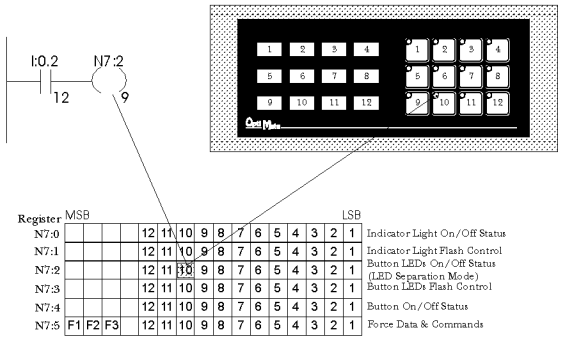
Using a Pushbutton

The following example illustrates the use of an OM1212 with a SLC or Micrologix PLC. When button 3 is activated, N7:4/2 will become active and turn on output O:0.0/5.



Lighting an Inset LED

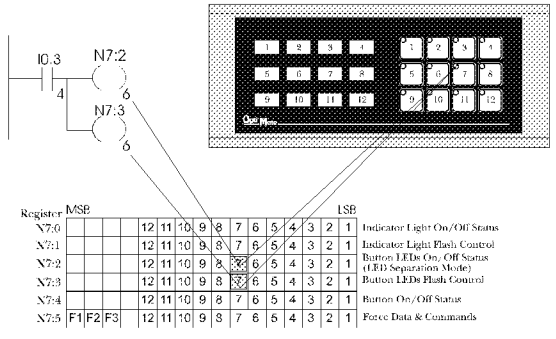
In LED separation mode, the LEDs in the corner of each momentary pushbutton may be directly controlled by the PLC program. The following example shows a segment of a SLC or Micrologix program that will light button 10's inset LED whenever input I:0.2/12 is energized. *In order for this to work, the panel must be configured for LED separation and button 10 must be a momentary pushbutton.*



Flashing an Inset LED

To flash an inset LED, you simply need to turn it on and also set the associated flash bit. For momentary buttons with LED separation enabled, the on/off state is controlled by the PLC as shown in the previous example.

The example below shows a SLC or Micrologix program used to set the LED inset in button 7 to flash whenever I:0.3/4 is energized.



Forcing Button Status

One of the more advanced capabilities of the OM1212 panel is the ability to force button state from the PLC program. This may be desirable, for example, if an alternate action is used to start a function process. When it is pushed and while the function is active, the button will remain on. You may want the PLC program to clear the button at the end of the function process.

Another example is one of a system that has individual enable or on/off (alternate-action) buttons for several different devices. You may also have other buttons (probably momentary) that enable a group of these same devices. You may want your program to force on the device enable buttons when the group enable button is pressed.

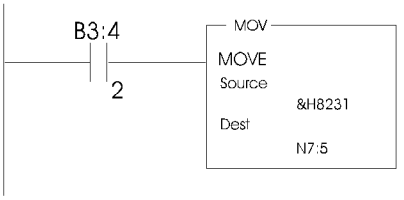
There are many other cases where button force capability can be useful in a system.

There are three types of force functions available for the OM1212 panel - force status, force on and force off. All three functions require moving appropriate data into the PLC registers defined as Force Data & Commands (see the table described in "Use with a PLC").

Note : Force only applies to Alternate-Action pushbuttons.

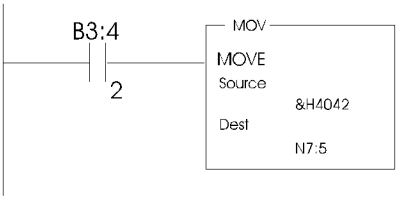
Force Button Status

This function is used to set the state (on or off) of every alternate-action pushbutton in the panel. To use the "Force Button Status" function, simply set the F1 bit to 1 and all buttons that you want to be on to 1, while leaving all other bits off. The example on the right shows buttons 1,5,6, and 10 being forced on and all other buttons forced off when B3:4/2 is active.



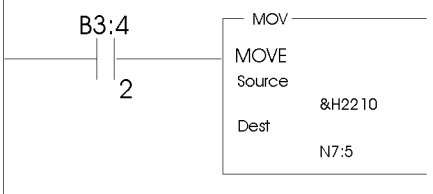
Force Button(s) On

This function is used to turn individual button(s) on without affecting the state of any other buttons. To use the "Force Buttons On" function, set the F2 bit to 1 and all buttons that you want to turn on to 1. Any buttons associated with bits that are left at '0' will not be affected. The following example shows buttons 2 and 7 being forced on when B3:4/2 is active.



Clear Button(s)

This function is used to selectively turn individual button(s) off without affecting the state of any other buttons. To use the "Clear Buttons" function, set the F3 bit to 1 and all buttons that you want to turn off to 1. Any buttons associated with bits that are left as '0' will not be affected. The example on the right shows buttons 5 and 10 being cleared when C377 is active.



Use in a Microprocessor-Based System

OptiMate modules can interface a microprocessor-based controller over a serial link. This link can be either RS232 (for point to point) or RS422 (for multi-drop or point to point). In either case the microprocessor acts as the master. It can write data to the module or read data from the module.

Communication with a computer-based system (anything with a serial port that can be used as a master), is by use of the OptiMate Hex protocol. This protocol, shown below is very straightforward and easy to use.

Module Address

Switches 1-5 of a six-position DIP switch on the back of each OptiMate module provides a method for setting the address. By use of this DIP switch you can set the module address to any number between 0 and 31. See the addressing description in the "Configuration" section of this manual.

Configuration

Each of the 12 pushbuttons can be independently configured for either momentary or alternate-action operation. A momentary button is on or active only while it is being pressed. An alternate-action button changes state each time it is pressed.

A second configuration option in a microprocessor-based system is whether the inset LEDs are directly linked to pushbutton state or are separated. In LED separation mode, the on/off state of LEDs inset into momentary pushbuttons can be controlled via messages from the host computer. Normally LED separation is not used.

Flash capability is always available in computer-based systems. Remember that in order to flash, the LED must be on. This means for normal (non-LED separation) operation, that the button must be active to flash. For LED separation mode, flashing an LED entails turning it on and setting the flash bit.

Communications Protocols

To use an OptiMate module as a slave device in a microprocessor based system, the module must be configured for Hex protocol. The other options that must be set are baud rate, parity and number of stop bits (note; if parity is set to even or odd, only one stop bit is allowed). Once selected, it must be downloaded to the module.

OptiMate Hex Protocol

General Format

STX Module address function text checksum

where	Module address	=	0 to 30
	Function	=	0xA0 ; General Status/Control
		=	0xA2 ; Force buttons
	checksum	=	8 bit sum of all characters after address until checksum

For function type A0 : General Status/Control

STX Module address ftn lite1_8 lite9_12 lite1_8 lite9_12 led1_8 led9_12 led1_8 ed9_12 checksum
on on flash flash

where	Module address	=	0 to 30
	ftn	=	0xA0 ; Write LED states
	on	=	Light or LED on/off state. For insert PB LEDs, applies only if configured for LED separation. If flash not set, on will cause on solid. If not on (0), LED will be off regardless of flash bit.
	flash	=	Flash .5 sec on, .25 sec off (must be on for flash)

Response

STX pb1_8 pb9_12 checksum if message received and processed OK
or
NAK if any errors in message

where	pbx_x	=	Corresponds to buttons. LSB of data character corresponds to lowest numbered button. Bits are in sequence left to right, top to bottom.
	1	=	Button active
	0	=	Button not active

For function type A2 : Force Buttons

STX Module address ftn flags pb1_8 pb9_12 checksum

where	Module address	=	0 to 30
	ftn	=	0xA2 ; Force buttons
	flags	=	bit 7 - Force all buttons to the following status bit 6 - Or all buttons with the following status bit 5 - Clear all buttons selected in the following
	pbx_x	=	Corresponds to buttons. LSB of data character corresponds to lowest numbered button. Bits are in sequence left to right, top to bottom.

Response

ACK if message received and processed OK
or
NAK if any errors in message

Broadcast message (sent to all modules)

Synchronize lamp flashing (between all system modules that have flashing lamps or LEDs)

STX Broadcast address function checksum

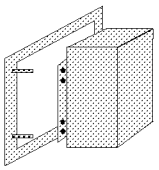
where	broadcast address	=	99
	function	=	0

Set Up and Interconnect

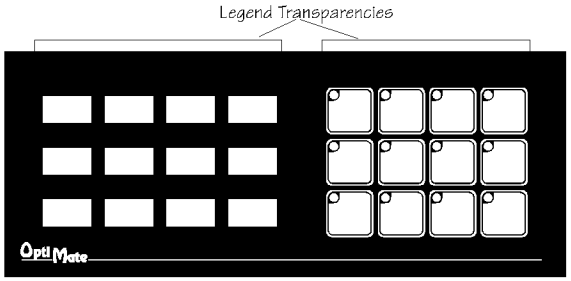
Legending the Lamps and Buttons

Legending the OM1212 module is a relatively simple process that basically involves sliding legend transparencies into pockets in the panel overlay. Use the following procedure.

- Remove the bezel from the module. The bezel snaps to the module box along the top and bottom edges. Pull the bezel out and over the snaps to remove.



- Create a legend transparency. There are a number of available options for doing so. A pattern is provided on the specification sheet of this document.
  - > Use a computer graphics program and a laser printer to create the transparency directly. Alternately print on paper and photocopy to a transparency.
  - > Use press-on letters onto a transparency sheet.
  - > Use a typewriter or lettering machine to letter onto paper, then photocopy.



- Cut along outline. Place into overlay pocket. The OM1212 overlay is not glued to the faceplate. This facilitates changing of LED light bars. The legend transparency should be placed between the overlay and the faceplate. The faceplate and overlay are keyed on both ends to ensure proper alignment when reassembled. (If LED colors do not need to be changed, the overlay may be glued to the faceplate by pulling off the backing and pressing the overlay onto the faceplate).
- Re-attach bezel. Push bezel onto box until it snaps together.

Lamp Colors

OM1212 comes with either all red LED light bars or with one row each of red, yellow and green light bars (the -1 option). All light bars are socketed. Light bars are available from Optimation in packets of four.

Replacing a light bar involves removing the bezel and overlay (as in the labeling procedure on the left). Once the bezel and overlay are removed, individual LED light bars may be extracted by use of needle nose pliers. Replacement light bars can be pushed into place. (The light bars are symmetrical, so orientation is not important.)

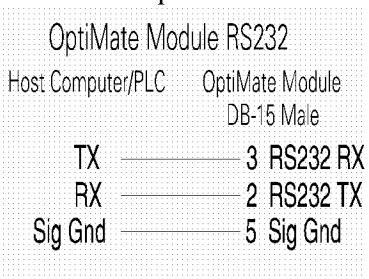
Connection to the System

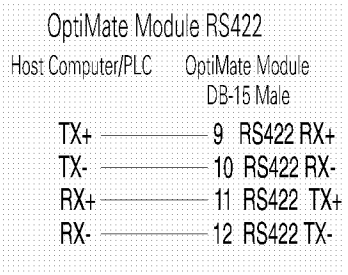
OptiMate modules are designed for communications connection to system devices. The module can be connected to a computer, PLC or communication master over the serial port (RS232 or RS422).

Connection to a Computer or PLC

Connection of an OptiMate module to a computer or PLC can be accomplished over either an RS232 or RS422 link. RS232 is limited to one OptiMate module to one computer serial port. RS422 allows up to 31 modules to be connected to one computer port. Since PLCs are slave devices, the RS422 link for a PLC is limited to one OptiMate module.

Refer to manufacturer's documentation for PLC or computer serial link connector pinouts.





Optimation sells interface cables for connection to several different PLCs as well as to IBM PCAT compatible ports.

Serial Connection to Communications Master

Connection to an Optimation Communications Master over a serial link is via RS422. The Communication master port connections are reversed from the module ports to enable direct pin to pin connection. For distances under 50 feet (in a low electrical noise environment), a ribbon cable connection works quite well. For longer distances or in noisy environments, a two pair shielded RS422 cable is recommended.

Configuration

Configuration Selections

OptiMate modules can be configured for the specific application by using the OptiMate Configuration Editor. The Configuration Editor runs on any IBM PC compatible computer. It allows the user to select the exact functionality to meet application requirements.

For the OM1212 module, the following are important configuration parameters. Further configuration details are covered n Optimation's OptiMate Configuration Editor manual.

Computer-Based Systems

Decision	Selection
Single/Multi Module	Choose Single module even if the system will contain several modules. The Multi module selection applies only to systems using a communications master. In computer-based systems, each module is configured independently. After configuration, multiple modules can be connected together to form a system.
Configuration starting point	First-time configuration, start with defaults for module. Subsequent configurations can utilize disk files you create.
PLC Type	Select OptiMate Hex
Protocol	Select appropriate baud rate, # data bits, #stop bits & parity. Note that if 8 data bits and even or odd parity selected, only 1 stop bit is available. Hex protocol requires 8 data bits.
Alternate/ Momentary	Set as required for application
LED Separation	Enable LED separation only if all momentary buttons inset LEDs are to be controlled from the host computer
Force option	Force capability is always available for computer based systems.

Single Module PLC-Based Systems

Decision	Selection
Single/Multi Module	Choose single module configuration
Configuration starting point	First-time configuration start with defaults for module. Subsequent configurations can utilize disk files you create
PLC Type	Select appropriate PLC type
Protocol	Select appropriate baud rate, # data bits, # stop bits & parity. Note that if 8 data bits and even or odd parity selected, only 1 stop bit is available
Momentary/ Alternate	Set as required for application
LED Separation	Enable LED separation only if all momentary button inset LEDs are to be controlled from the host PLC
Force Option	Set as required for application

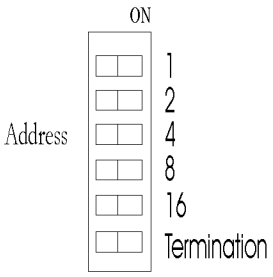
Multi-Module PLC Applications (Uses Communications Master)

Decision	Selection
Single/Multi Module	Choose Multi module
PLC Type	This applies to the Communications Master. Choose appropriate type
Protocol	This applies to the Communications Master. Choose appropriate baud rate, # bits, # stop bits & parity. Note that if 8 data bits and even or odd parity are selected, only 1 stop bit is available.
Module Protocol	Will be Hex
Momentary/ Alternate	Set as required for application
LED Separation	Enable LED separation only if all momentary buttons are to be controlled from host PLC
Force option	Set as required for application

Configuration must be downloaded from the IBM PC compatible to each module. This is done over the serial link. Module address must be set to 31 prior to application of power for module to accept configuration data. Communication cable is available from Optimation.

Addressing

Setting the module address is a matter of turning the module over and pressing the appropriate dip switches. There are 6 dip switches; 5 of which have a numeric value listed next to the switch. To select an address, push (with a pencil or small screwdriver) the appropriate combination of switches down to the right.



For example to select address 14, the 2, 4 and 8 switches should be pressed down to the right and the 1 and 16 switches down to the left.

Remember that for configuration, address 31 (numeric switches 1-16 on) must be selected first, then apply power to the module.

The termination switch must always remain in the OFF position unless the module is the last, and only the last, module on the cable in an RS422 system.

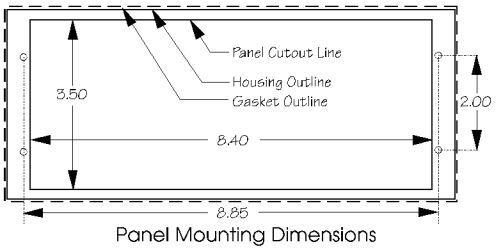
Power

OptiMate modules can operate on any voltage between 8 and 30 VDC. Power must be connected to the terminal plug located on the back of the module.

Specifications

Physical

- Recessed Mount Housing 9.5"L x 4.0"H x 1.75"D
- Cutout size for above 3.5"Hx8.4"L
- Panel Fasteners : Four, 6x32 threaded studs, shown above (on ends, symmetrical about center line)



Panel Mounting Dimensions

- Weight : 18 ounces
- Color : Dark gray housing with black panel
- Pushbutton dimensions : .65 inches square on .75 inch centers
- Pushbutton life : 1,000,000 switch cycles
- Lamp Colors Available : Red, Green, Yellow
- Lamp window size .7" x .4"

Electrical

- Power (all lamps on) : 8 - 30VDC @ 7VA
  570 mA @ 12VDC 285 mA @ 24VDC
- Power connector : Pluggable terminal block, 2 position

Communications

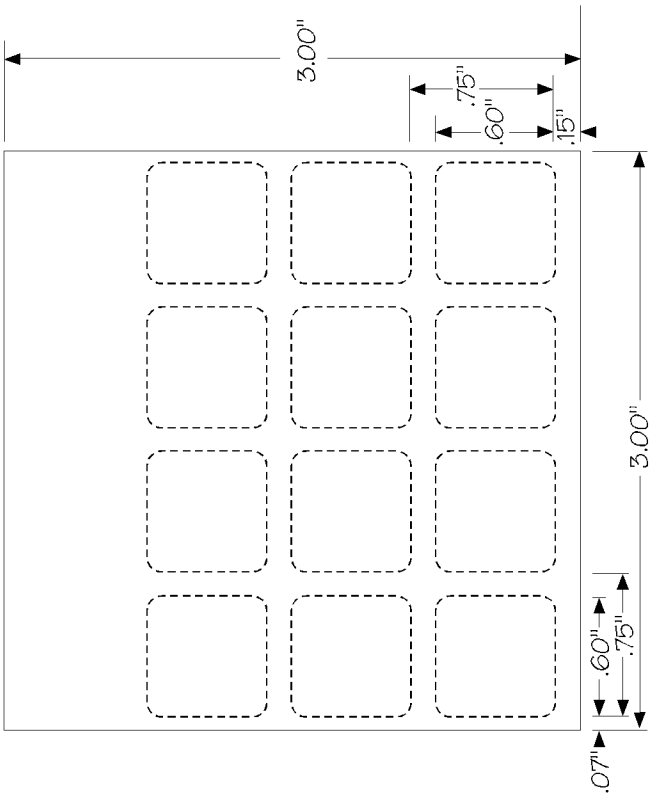
- RS232 and RS422
- 4800 to 19200 baud
- Compatible with most major PLC protocols
- Microprocessor compatible OptiMate Hex protocol
- 15 pin female 'D' shell connector (screw terminal adapter available)

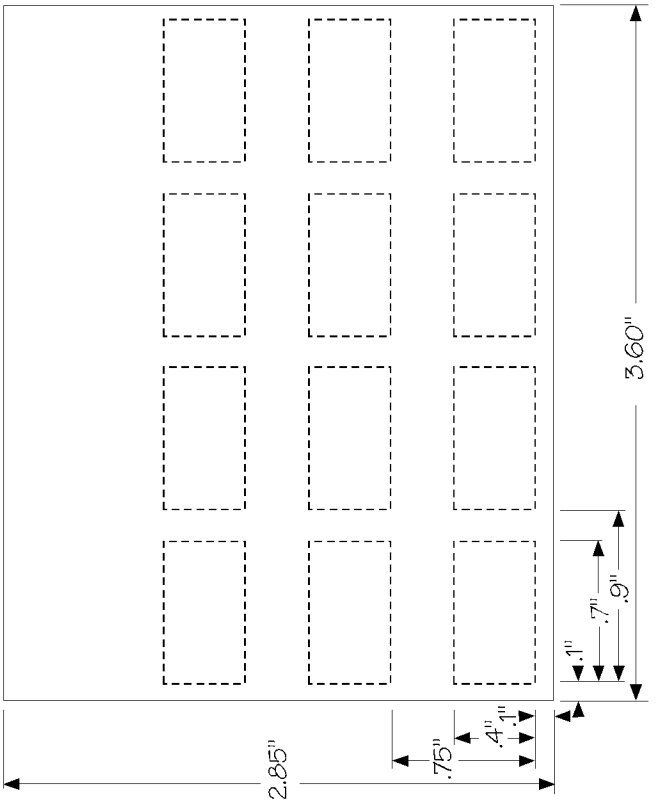
Communications Failure Operation

Should the module (when set to any address other than 31) ever fail to communicate successfully for a period of 12 seconds, all inset lamps and LEDs will flash rapidly.

Environmental

- Enclosure - NEMA 4 recessed mount
- Temperature - 0 to 50 C
- Humidity - 95% Non-condensing





Label Strip Pattern