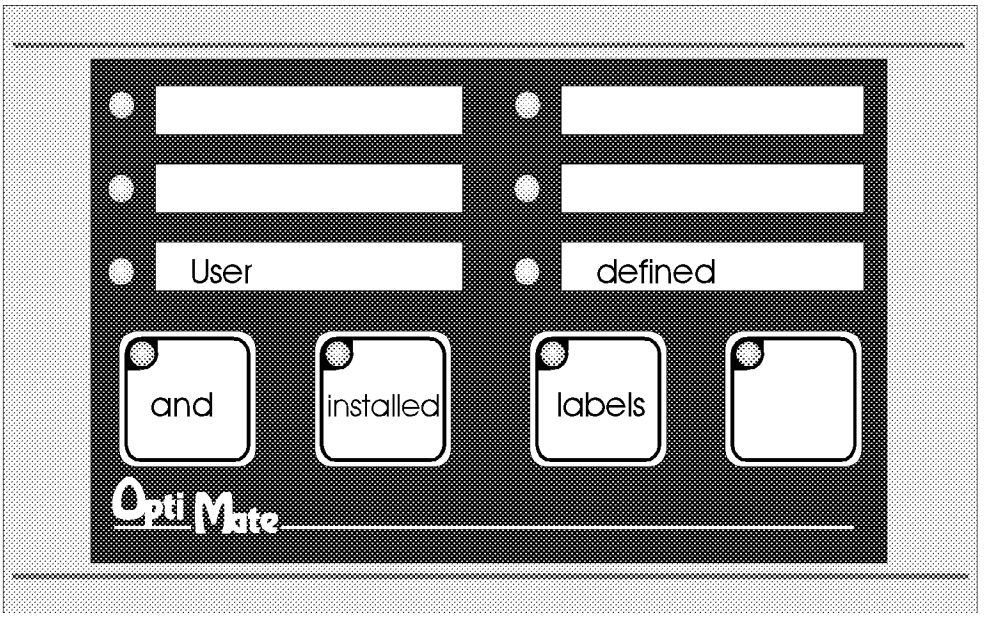


OM406 Indicator/Pushbutton Panel

General Overview

The OM406 Indicator/Pushbutton Panel features 6 LED indicator lamps and 4 pushbuttons. Each of the lamps can be individually controlled to be on, off, or flash. Each of the pushbuttons can be individually configured to operate as either a momentary or alternate action pushbutton. When configured for momentary action, the LEDs inset in each pushbutton can be configured to indicate the button status or to act independently of the button status.

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

The OM406 Indicator/Pushbutton Panel is part of Optimation's **OptiMate**® series. Each OptiMate module is designed to connect to a PLC with a single cable connection.

When used with a microprocessor system, simple 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 OM406 takes care of the rest.

Applications

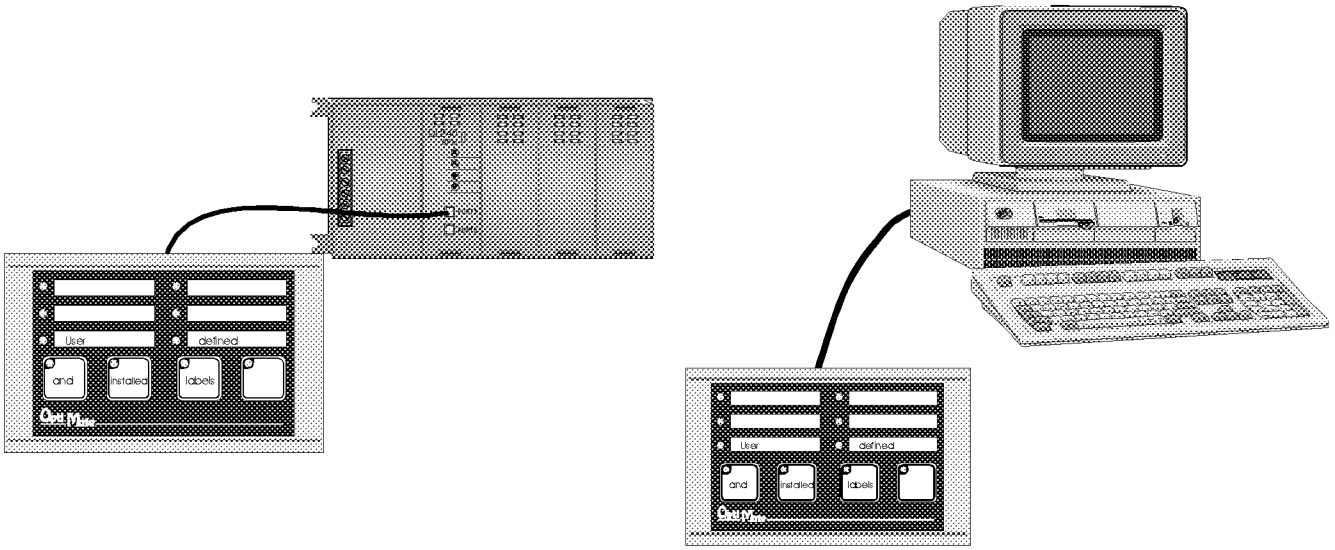
- Machine control
- Process control
- Security systems
- HVAC
- Plant monitoring/control
- PLC applications
- Microprocessor applications

Features

- 6 LED Indicator Lamps
- 4 tactile snap membrane pushbuttons
- Pushbuttons are independently configurable for momentary or alternate action
- User legendable
- PLC compatible
- RS232 communications
- Stand alone operation capable

Contents

Configuration Options



PLC Stand Alone

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

The OM406 Indicator/Pushbutton module uses a bank of four PLC registers to hold pushbutton state, control lights and force pushbutton states. The OM406 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 panels will perform this communications for most major PLC protocols. Configuration for particular PLC protocols and interconnect cabling is covered in the following pages.

Microprocessor Based Systems

OptiMate 400 Series modules can interface directly to most computers or microcontrollers. The modules communicate over RS232 serial communications. All that is required to interface OptiMate modules is a serial port. The OptiMate Hex communications protocol, detailed in this document, allows the user to directly control lamp operation and access pushbutton status.

Since the OptiMate 400 Series panels can only communicate on RS232, only 1 panel can be interfaced on each serial communications port.

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 OM406, these commands are requests for pushbutton status and messages that dictate lamps states.

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 panel is mapped, this data can be moved, changed or monitored using ladder logic.

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

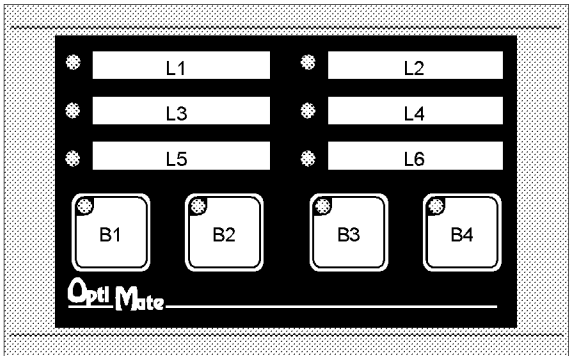
MSB															LSB
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

PLC Register

The OM406 Indicator/Pushbutton Module uses a bank of 4 contiguous holding registers. The register set definition is shown in the table below.

OM406 Indicator/Pushbutton Panel PLC Register Map

Holding Register	Register Function
X (first register of bank)	Indicator lamps and button LEDs on/off control
X+1	Indicator lamps and button LEDs flash control
X+2	Button on/off status
X+3	Force pushbutton data & commands



Configuration

Configuration of the OM406 or system of OptiMate panels is performed via an IBM PC compatible computer. The OM-WINEDIT configuration software will allow you to select module configuration and PLC protocol definition.

If the panel is to be operated in stand alone mode, with a PLC, the configuration selections must be made to select the proper PLC protocol information.

Note : When configuring, always remember to insert the programming cable into the panel to place it into configuration mode. When you are finished downloading the configuration, wait a few seconds then remove the programming cable. This will return the panel to the PLC run mode.

Further configuration details are covered in the OM-WINEDIT help screens.

Register	MSB															LSB	
X			L6	L5	L4	L3	L2	L1					B4	B3	B2	B1	Indicator Light/LED On/Off
X+1			L6	L5	L4	L3	L2	L1					B4	B3	B2	B1	Indicator Light/LED Flash Control
X+2													B4	B3	B2	B1	Button On/Off Status
X+3	F1	F2	F3										B4	B3	B2	B1	Force Data & Commands

Register Bit Association

Reading Pushbutton Status

Once the panel 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 figure below. The panel 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 panel 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 a Lamp

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

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 pushbutton simply provides a visual indication of the status of the pushbutton. 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 figure below. The OptiMate panel will automatically retrieve the register data and illuminate any lamps whose bits are set.

LED separation is available only for momentary pushbuttons.

Flashing an Inset LED

As shown in the figure below, the second register will initiate inset LED flash. To flash an LED, the LED must be on and LED flash bit must be set. In normal mode, LED "on" status simply reflects pushbutton status. 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 OM406 panel 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 pushbutton. The button status and inset LED 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+3). Once these buttons are forced to the status set, the OM406 will automatically clear the force data registers (X+3).
F2 (Force buttons on)	When the F2 bit is set, all buttons matching the bits set in the force data registers (X+3) will be forced on. Once these buttons are forced on, the OM406 will automatically clear the force data registers (X+3).
F3 (Clear buttons)	When the F3 bit is set, all buttons matching the bits set in the force data registers (X+3) will be forced off. Once these buttons are forced off, the OM406 will automatically clear the force data registers (X+3).

Force applies only to alternate action pushbuttons.

Register	MSB												LSB				
X			L6	L5	L4	L3	L2	L1					B4	B3	B2	B1	Indicator Light/LED On/Off
X+1			L6	L5	L4	L3	L2	L1					B4	B3	B2	B1	Indicator Light/LED Flash Control
X+2													B4	B3	B2	B1	Button On/Off Status
X+3	F1	F2	F3										B4	B3	B2	B1	Force Data & Commands

Register Bit Association

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 OM406 panel 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.

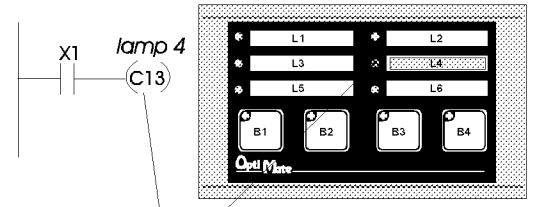
PLC Direct CPU	Control Relay Register address range
DL130	V40600-V40617
DL230	V40600-V40617
DL240	V40600-V40617
DL250	V40600-V40617
DL330	R016-R037
DL330P	R016-R017 and R020-R027
DL340	R016-R037 and R100-R106
DL350	V40600-V40617
DL430	V40600-V40635
DL440	V40600-V40677
DL450	V40600-V40777

The following examples are DL105, DL205, DL350 or DL405 programs with the OM406 configured for address V40600. The table below shows the control relay correlation for an OM406 configured for address V40600.

Device	Lamp/LED On/Off	Lamp/LED Flash	Button Status	Force
B1	C0	C20	C40	C60
B2	C1	C21	C41	C61
B3	C2	C22	C42	C62
B4	C3	C23	C43	C63
L1	C10	C30		
L2	C11	C31		
L3	C12	C32		
L4	C13	C33		
L5	C14	C34		
L6	C15	C35		C75(F3)
				C76(F2)
				C77(F1)

Turning on a Lamp

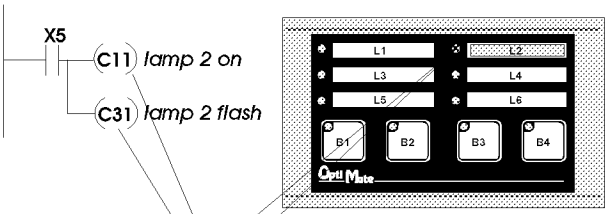
Turning on a lamp in the OM406 simply requires activating its associated control relay coil. In the figure below, lamp 4 will be turned on whenever input X1 is active (energizing C13).



Register	MSB												LSB	
V40600			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED On/Off Status
V40601			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED Flash Control
V40602											B4	B3	B2	B1	Button On/Off Status
V40603	F1	F2	F3								B4	B3	B2	B1	Force Data & Commands

Flashing a Lamp

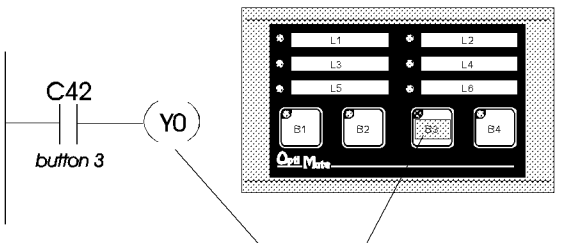
To flash a lamp, you simply need to both turn it on and set the associated flash bit. The example below shows a PLC program used to flash lamp 2 whenever X5 is energized.



Register	MSB												LSB	
V40600			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED On/Off Status
V40601			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED Flash Control
V40602											B4	B3	B2	B1	Button On/Off Status
V40603	F1	F2	F3								B4	B3	B2	B1	Force Data & Commands

Using a Pushbutton

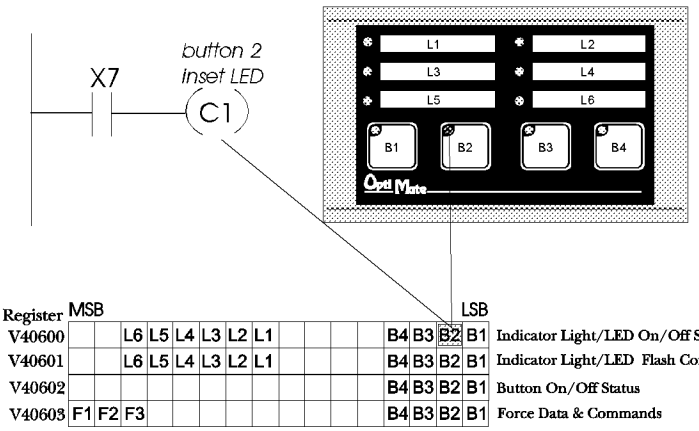
The following example illustrates the use of an OM406 pushbutton in a program. When pushbuton 3 is activated, C42 will become active and turn on output Y0.



Register	MSB												LSB	
V40600			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED On/Off Status
V40601			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED Flash Control
V40602											B4	B3	B2	B1	Button On/Off Status
V40603	F1	F2	F3								B4	B3	B2	B1	Force Data & Commands

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 example on the right shows a segment of a program that will light button 2's inset LED whenever input X7 is energized. *In order for this to work, the panel must be configured for LED separation and button 2 must be a momentary pushbutton.*



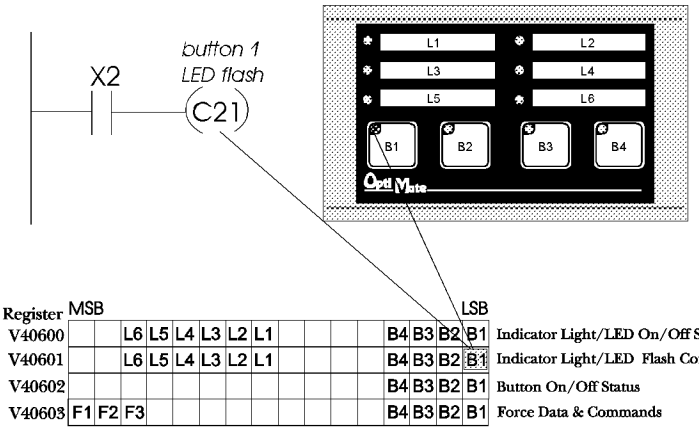
Register	MSB												LSB	
V40600			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED On/Off Status
V40601			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED Flash Control
V40602											B4	B3	B2	B1	Button On/Off Status
V40603	F1	F2	F3								B4	B3	B2	B1	Force Data & Commands

Flashing an Inset LED

To flash an inset LED, you simply need to both turn it on and set the associated flash bit. If the panel is not set up for LED separation, status is simply the button state. For momentary buttons with LED separation enabled, the on/off state is controlled by the PLC as shown in the previous example. For alternate action buttons, on/off state is always the button state.

The example on the right shows a program used to set the LED inset in button 1 to flash whenever X2 is energized. If the panel has been configured with button 1 being an alternate action button, the LED will operate as shown in the table below.

Button State	X2 State	LED operation
Inactive	de-energized	Off
Inactive	energized	Off
Active	de-energized	On solid
Active	energized	Flashing



Register	MSB												LSB	
V40600			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED On/Off Status
V40601			L6	L5	L4	L3	L2	L1			B4	B3	B2	B1	Indicator Light/LED Flash Control
V40602											B4	B3	B2	B1	Button On/Off Status
V40603	F1	F2	F3								B4	B3	B2	B1	Force Data & Commands

Forcing Button Status

One of the more advanced capabilities of the OM406 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 a system that has individual enable or on/off (alternate action) buttons for several different devices. You may also have other buttons (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.

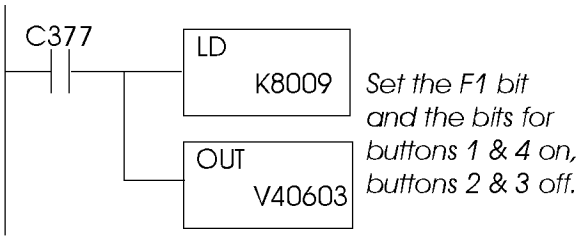
There are many other cases where button force capability can be useful in a system.

There are three types of force functions available for the OM406 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 below).

Note: Force only applies to Alternate Action pushbuttons

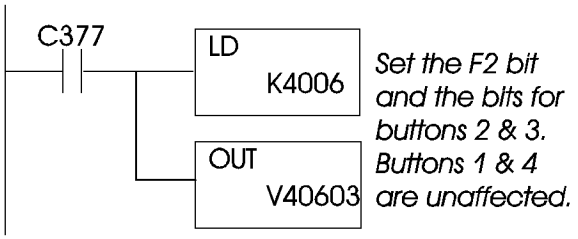
Force Button Status

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 below shows buttons 1 and 4 being forced on and all other buttons forced off when C377 is active.



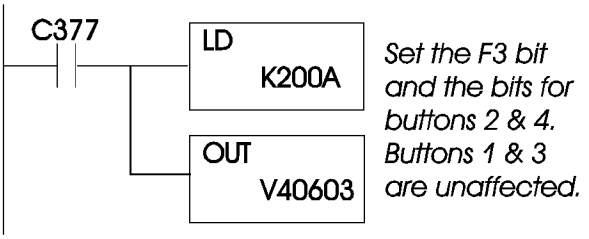
Force Button(s) On

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 3 being forced on when C377 is active.



Force Button(s) Off

This function is used to selectively turn individual button(s) off without affecting the state of any other buttons. To use the "Force Buttons Off" 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 below shows buttons 2 and 4 being cleared when C377 is active.



Register	MSB												LSB				
X			L6	L5	L4	L3	L2	L1					B4	B3	B2	B1	Indicator Light/LED On/Off
X+1			L6	L5	L4	L3	L2	L1					B4	B3	B2	B1	Indicator Light/LED Flash Control
X+2													B4	B3	B2	B1	Button On/Off Status
X+3	F1	F2	F3										B4	B3	B2	B1	Force Data & Commands

Register Bit Association

Examples of Use with an Allen-Bradley PLC

Interfacing to A-B Memory

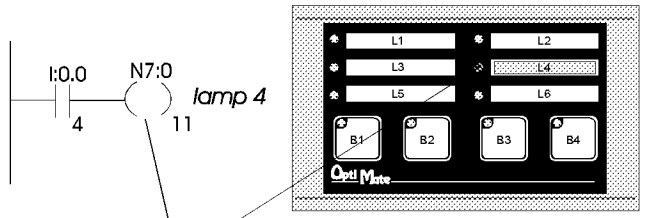
OptiMate modules interface to Allen-Bradley SLC 5/03, SLC 5/04 and Micrologix PLCs via integer file type N. The 5/03 and 5/04 have file type N7 as standard. Other "N" type files can be created. The Micrologix has a fixed file type N7. Please refer to Allen-Bradley programming documentation for information 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 OM406 configured for address N7:0. The table below shows the correlation for an OM406 configured for address N7:0.

Device	Lamp/LED On/Off	Lamp/LED Flash	Button Status	Force
B1	N7:0/0	N7:1/0	N7:2/0	N7:3/0
B2	N7:0/1	N7:1/1	N7:2/1	N7:3/1
B3	N7:0/2	N7:1/2	N7:2/2	N7:3/2
B4	N7:0/3	N7:1/3	N7:2/3	N7:3/3
L1	N7:0/8	N7:1/8		
L2	N7:0/9	N7:1/9		
L3	N7:0/10	N7:1/10		
L4	N7:0/11	N7:1/11		
L5	N7:0/12	N7:1/12		
L6	N7:0/13	N7:1/13		N7:3/13(F3)
				N7:3/14(F2)
				N7:3/15(F1)

Turning on a Lamp

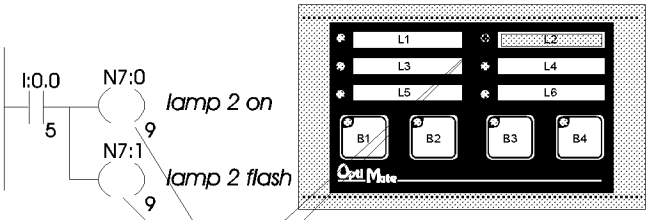
Turning on a lamp in the OM406 simply requires activating its associated control relay coil. In the figure below, lamp 4 will be turned on whenever input I:0.0/4 is active (energizing N7:0/11).



Register	MSB											LSB	
N7:0			L6	L5	L4	L3	L2	L1				B4 B3 B2 B1	Indicator Light/LED On/Off Status
N7:1			L6	L5	L4	L3	L2	L1				B4 B3 B2 B1	Indicator Light/LED Flash Control
N7:2												B4 B3 B2 B1	Button On/Off Status
N7:3	F1	F2	F3									B4 B3 B2 B1	Force Data & Commands

Flashing a Lamp

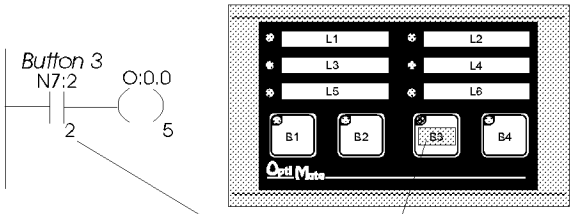
To flash a lamp, you need to both turn it on and set the associated flash bit. The example below shows a SLC or Micrologix program used to flash lamp 2 whenever I:0.0/5 is energized.



Register	MSB											LSB	
N7:0			L6	L5	L4	L3	L2	L1				B4 B3 B2 B1	Indicator Light/LED On/Off Status
N7:1			L6	L5	L4	L3	L2	L1				B4 B3 B2 B1	Indicator Light/LED Flash Control
N7:2												B4 B3 B2 B1	Button On/Off Status
N7:3	F1	F2	F3									B4 B3 B2 B1	Force Data & Commands

Using a Pushbutton

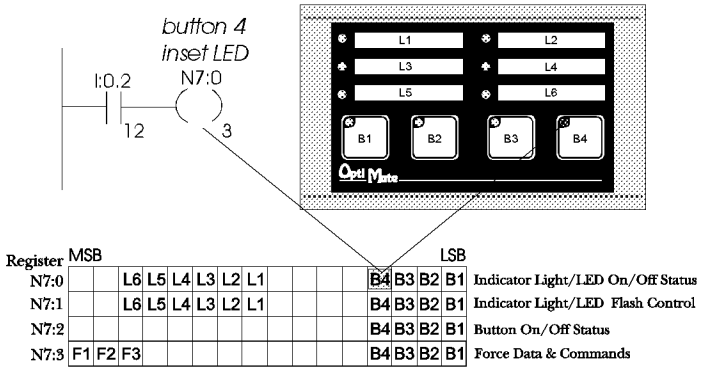
The following example illustrates the use of an OM406 with a SLC or Micrologix PLC. When button 3 is activated, N7:2/2 will become active and turn on output O:0.0/5.



Register	MSB											LSB	
N7:0			L6	L5	L4	L3	L2	L1				B4 B3 B2 B1	Indicator Light/LED On/Off Status
N7:1			L6	L5	L4	L3	L2	L1				B4 B3 B2 B1	Indicator Light/LED Flash Control
N7:2												B4 B3 B2 B1	Button On/Off Status
N7:3	F1	F2	F3									B4 B3 B2 B1	Force Data & Commands

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 example on the right shows a segment of a SLC or Micrologix program that will light button 4'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 4 must be a momentary pushbutton.*

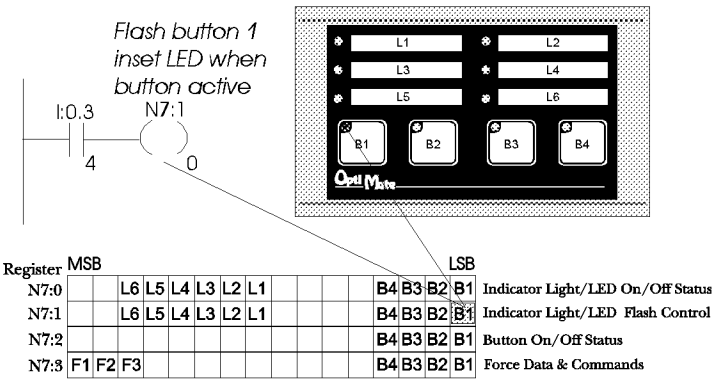


Flashing an Inset LED

To flash an inset LED, you need to both turn it on and set the associated flash bit. If the panel is not set up for LED separation, status is simply the button state. For momentary buttons with LED separation enabled, the on/off state is controlled by the PLC as shown in the previous example. For alternate action buttons, on/off state is always the button state.

The example on the right shows a SLC or Micrologix program used to set the LED inset in button 1 to flash whenever I:0.3/4 is energized. If the panel has been configured with button 1 being an alternate action button, the LED will operate as shown in the table below.

Button State	I:0.3/4 State	LED operation
Inactive	de-energized	Off
Inactive	energized	Off
Active	de-energized	On solid
Active	energized	Flashing



Note: When using an OM406 panel with an A-B PLC, always ensure that at least 4 words of memory are allocated in the "N" type file that you are using to ensure proper communications between the PLC and the panel.

Forcing Button Status

One of the more advanced capabilities of the OM406 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.

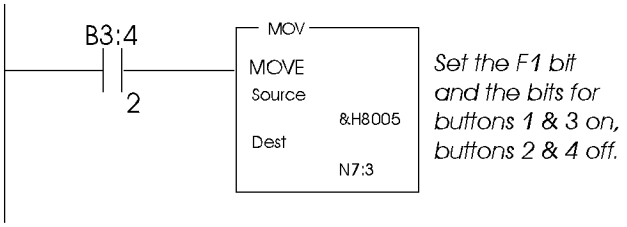
There are many other cases where button force capability can be useful in a system.

There are three types of force functions available for the OM406 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 below).

Note: Force only applies to Alternate Action pushbuttons

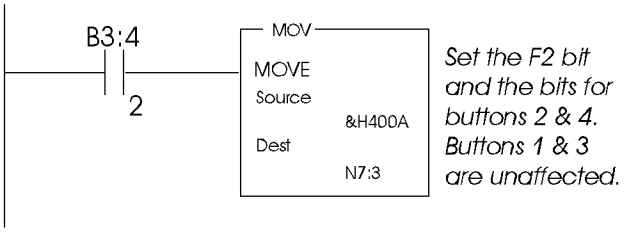
Force Button Status

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 below shows buttons 1 and 3 being forced on and buttons 2 and 4 being forced off when B3:4/2 is active.



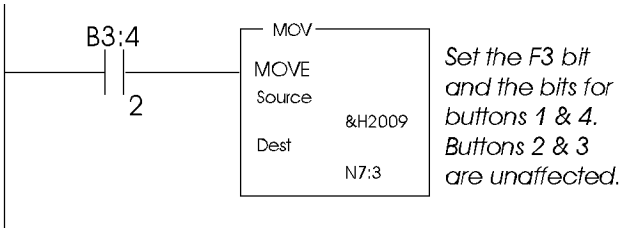
Force Button(s) On

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 4 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 below shows buttons 1 and 4 being cleared when B3:4/2 is active.



Register	MSB												LSB				
X			L6	L5	L4	L3	L2	L1					B4	B3	B2	B1	Indicator Light/LED On/Off
X+1			L6	L5	L4	L3	L2	L1					B4	B3	B2	B1	Indicator Light/LED Flash Control
X+2													B4	B3	B2	B1	Button On/Off Status
X+3	F1	F2	F3										B4	B3	B2	B1	Force Data & Commands

Register Bit Association

Use in a Microprocessor Based System

OptiMate modules can interface a microprocessor based controller over a serial link. For the OptiMate 400 Series line of panels, this link can only be RS232 (for point to point) with the microprocessor acting 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 straight forward and easy to use.

Panel Address

Panel address is configured in the OM-WINEDIT configuration software. The panel will normally be configured for a panel address of 0. The panel will respond only to the host if it is properly addressed. See the addressing description in the "Configuration" section of this manual.

Configuration

Each of the 4 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 in 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 the OptiMate Hex protocol. The other options that must be set are baud rate, parity and number of stop bits. If parity is set to even or odd, only one stop bit is allowed. Once selected, it must be downloaded to the module.

OM406 OptiMate Hex Protocol

General Format

STX Module address function text checksum

Where
- STX = 0x02
- 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 led1_4 lites (|—— on —|) led1_4 lites (|— flash —|) checksum

where
- Module address = 0 to 30
- ftn = 0xA0 ; Write LED states
- led1_4 = LEDs inset in buttons, in numeric order
- lites = LED indicator lamps in order
- 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_4 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.
- 1 = Button active
- 0 = Button not active

NAK = 0x15

For function type A2 : Force Buttons

STX Module address ftn flags pb1_4 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 status
- pbx_x = Corresponds to buttons. LSB of data character corresponds to lowest numbered button. Bits are in sequence left to right.

Response

ACK if message received and processed OK

where ACK = 0x06

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

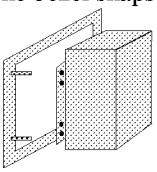
Note: Spaces are shown for readability only. There are no spaces between message fields.
0xXX denotes a Hex number.

Set Up and Interconnect

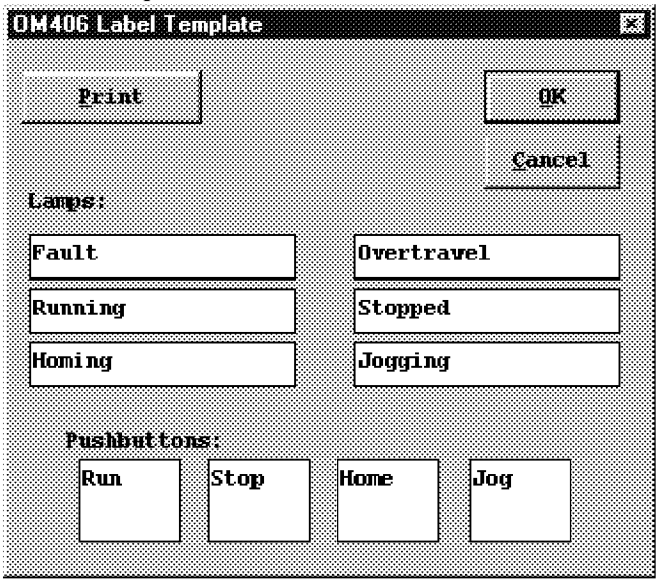
Legending the Lamps and Buttons

Legending the OM406 module is a relatively simple process that basically involves sliding legend transparencies into a pocket 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.

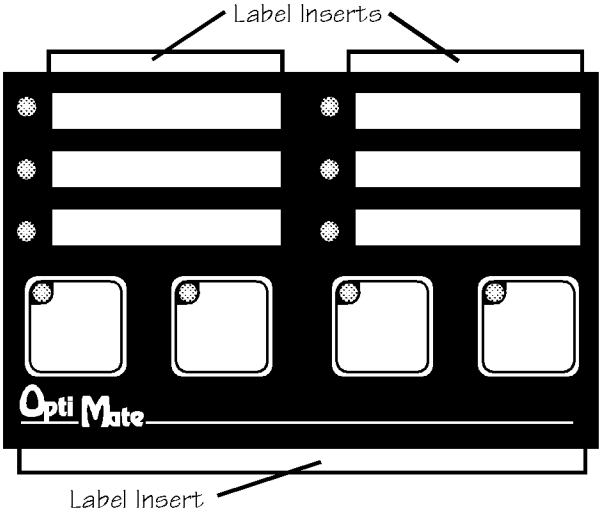


- Create a legend transparency. There are a number of available options for doing so. A pattern is provided on the specification sheet of this document.
  - > Use the built in label making capability of the OM-WINEDIT software to create labels. Either print on the transparency directly or print on paper and photocopy onto the transparency. The figure below is a screen from OM-WINEDIT which illustrates the process.



  - > 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 indicator lamp's legends slide in from the top in two places while the pushbutton's legend slides in from the bottom.
- Re-attach bezel. Push bezel onto box until it snaps together. Ensure that the bezel covers all housing snaps before installing the panel.



Configuration

Configuration Selections

OptiMate panels can be configured for the specific application by using the OM-WINEDIT Configuration Editor. The Configuration Editor runs on any IBM PC compatible computer with the Windows operating system. It allows the user to select the exact functionality to meet application requirements.

For the OM406 panel, the following are important configuration parameters. Further configuration details are covered in the OM-WINEDIT help screens

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.
Configuration starting point	First time configuration, start with defaults for module. Subsequent configurations can utilize disk files you create.
PLC Type	Select OptiMate Hex
Panel Address	Normally set to 0 with 400 Series Panels
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 Panel PLC Based Systems

Decision	Selection
Single/Multi Panel	Choose single panel 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 Panel PLC Applications (Uses OP-9001Communications Master)

Not applicable with the 400 Series Panels

Note : When configuring, always remember to insert the programming cable into the panel to place it into configuration mode. When you are finished downloading the configuration, wait a few seconds then remove the programming cable. This will return the panel to the PLC run mode. Communication cables are available from Optimation.

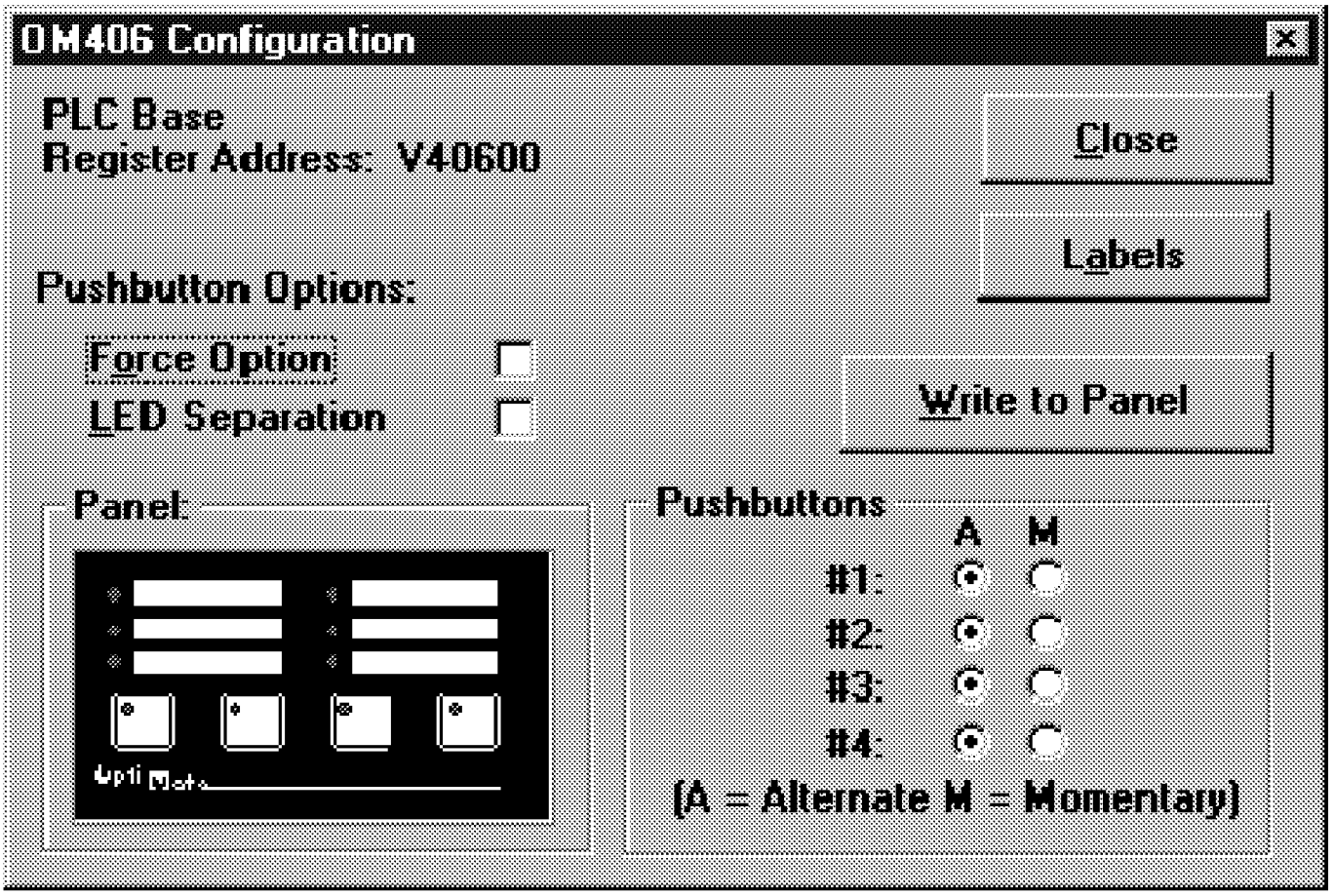
Configuration of the OM406 Indicator/Pushbutton Panel is performed via an IBM PC compatible computer. The OM-WINEDIT configuration software allows you to select panel type, panel application and PLC protocol definition.

If the OM406 is to be operated with a PLC, the configuration selection must be made to select the proper PLC protocol information such as baud rate, parity, stop bits, etc.

Specific configuration of the OM406 begins with defining the block of PLC registers to be used. Next, each of the pushbuttons must be configured for either alternate or momentary. If momentary action is selected for some or all of the pushbuttons, LED separation should be selected if you want the LEDs inset in all of the momentary pushbuttons to act independently of the button status. If alternate action is selected for some or all of the pushbuttons, the force option should be enabled if you want the capability of forcing the state of an alternate action pushbutton on or off without touching the panel.

The OM406 pushbutton configuration screen in the OM-WINEDIT software is shown below.

Note : When configuring, always remember to insert the programming cable into the panel to place it into configuration mode. When you are finished down-loading the configuration, wait a few seconds then re-move the programming cable. This will return the panel to the PLC run mode.



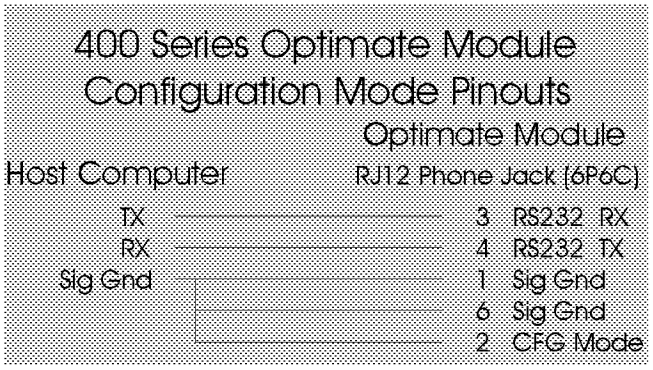
Connection to the System

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

Connection to a Computer for Configuration

Connection of a 400 Series OptiMate module to a computer for configuration can be accomplished over an RS232 link. RS232 is limited to one OptiMate module to a computer serial port. See the figure below for 400 Series OptiMate Module configuration mode pinouts.

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

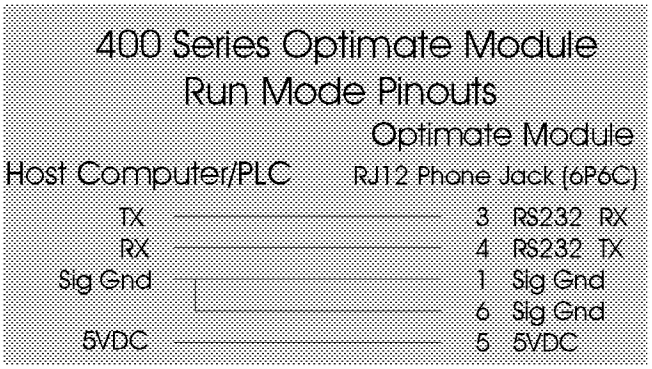


Configuration cables are available for connection to IBM PC-AT compatible ports.

Run Mode Connection to a Computer or PLC

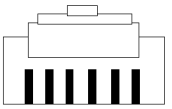
Connection of a 400 Series OptiMate module to a computer or PLC can be accomplished over an RS232 link. RS232 is limited to one OptiMate module to one computer serial port. Since PLCs are slave devices, the RS232 link for a PLC is limited to one OptiMate module. See the figure below for 400 Series OptiMate Module run mode pinouts.

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



Standard cables are available for connection to several different PLCs as well as to IBM PC-AT compatible ports.

The figure below shows the RJ12 connector pinout for connection to an OptiMate 400 Series module.



RJ12 Connector
Optimate End

Power

The OM406 Setpoint/Display Panel will operate only on a DC voltage of *5VDC*. Steady state current is listed on the specification page.

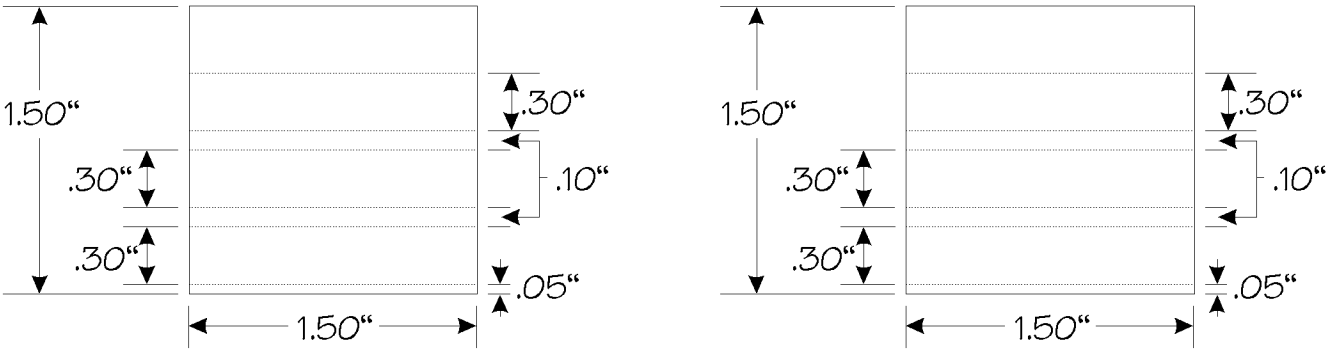
The OM406 panel can draw power from its communications cable making a single 6 wire phone type cable the only cable necessary for installation. PLC Direct DL105, DL205, DL350, or DL405 CPUs are the only PLC CPUs that can connect to the OM406 in this manner. Microprocessor based devices can also be used in this way if they have a 5VDC connection in their comm ports.

The OM406 panel can be powered from a 5VDC adapter for panel configuration or connection to PLCs or microprocessor based devices that do not have a 5VDC connection in their communication ports. Examples are the PLC Direct DL340 and the Allen-Bradley 5/03, 5/04 and Micrologix CPUs. A description of the DC power connector is listed on the specification page.

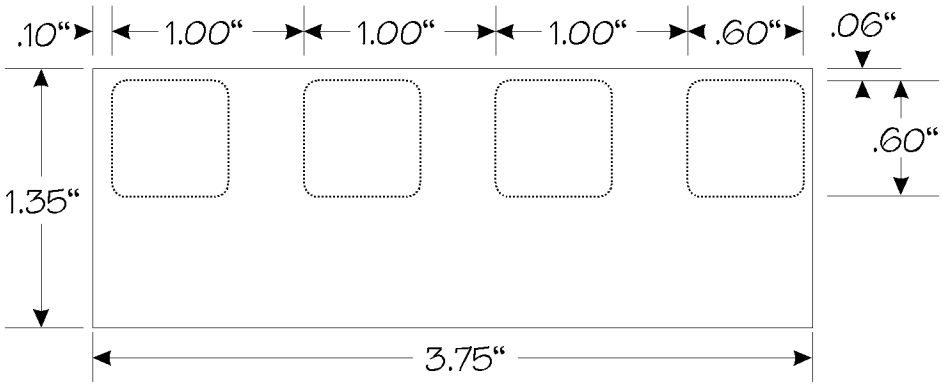
Note: Only use an Optimation approved 5VDC power supply or equivalent that contains a center negative DC power jack.

There is a very brief (0.1 -1 millisecond) power on surge up to 0.35 amps. This is typical of nearly any type of electronic equipment and is due to the initial charging of power capacitors. This surge is not normally a problem for a commercial power supply.

Label Templates



Indicator Lamp Label Insert Templates

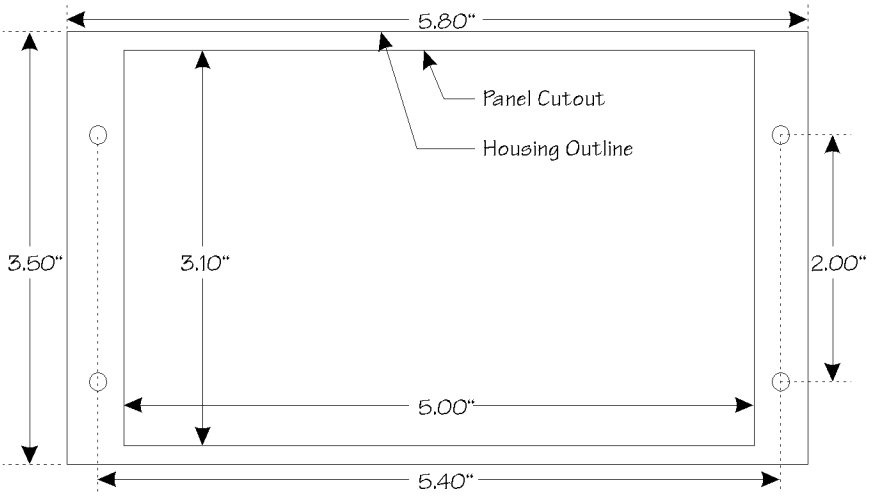


Pushbutton Label Insert Template

Specifications

Physical

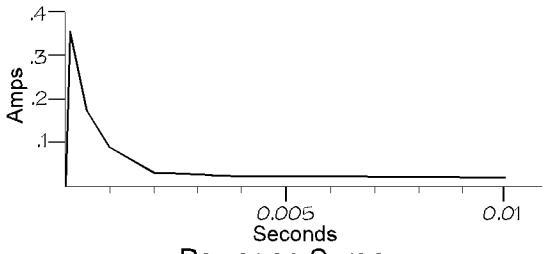
- Recessed Mount Housing: 6.00"L x 3.50"H x 1.25"D
- Cutout size: 3.20"H x 5.10"L
- Panel Fasteners: Four, 6x32 threaded studs, shown at right (on ends, symmetrical about center line)
- Weight : 8 ounces
- Colors : Dark gray housing with dark gray panel.
- Pushbutton dimensions: .65 inches square on 1.00 inch centers
- Pushbutton life: 1,000,000 switch cycles
- Indicator Lamp Colors: Red



Panel Mounting Dimensions

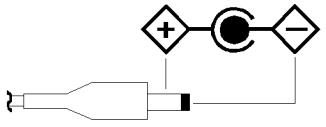
Electrical

- Power: 5VDC @ 0.25Watts
  50 mA @ 5VDC
- Power On Surge (see figure below)
  0.35A for 1 millisecond max



Power on Surge

- Power connector:
  DC power plug, center negative (see figure below)
  DC power plug is necessary for panel configuration and for connection to PLCs that do not have a 5VDC connection in their communication ports.



Always use an Optimation approved 5VDC power supply with a center negative plug.

Communications

- RS232
- 4800 to 19200 baud
- Compatible with major PLC protocols
- Microprocessor compatible OptiMate Hex protocol
- 6 pin RJ12 phone jack type connector

Communications Failure Operation

Should the panel (when not selected for configuration) ever fail to communicate successfully for a period of 12 seconds, the LEDs on the panel front will flash rapidly.

Environmental

- Enclosure - NEMA 4 (when properly installed)
- Temperature - 0 to 50 C
- Humidity - 95% Non-condensing