

For:

- LP-3500 Series

Includes:

- Users Guide
- LP-CT 4.0 Setup Software



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LP Controller User Guide Overview

This user guide describes Johnson Controls LP Controller hardware and software features and how to configure these features with Johnson Controls LP-CT Windows based Setup Software.

Johnson Controls Lighting Control Panels each contain a LP Controller. The LP Controller is a microprocessor-based controller that provides the latest lighting control features to automate lighting control in a facility. Each LP Controller provides for RS-485 communication, input connections for external devices and outputs to drive its high voltage relays.

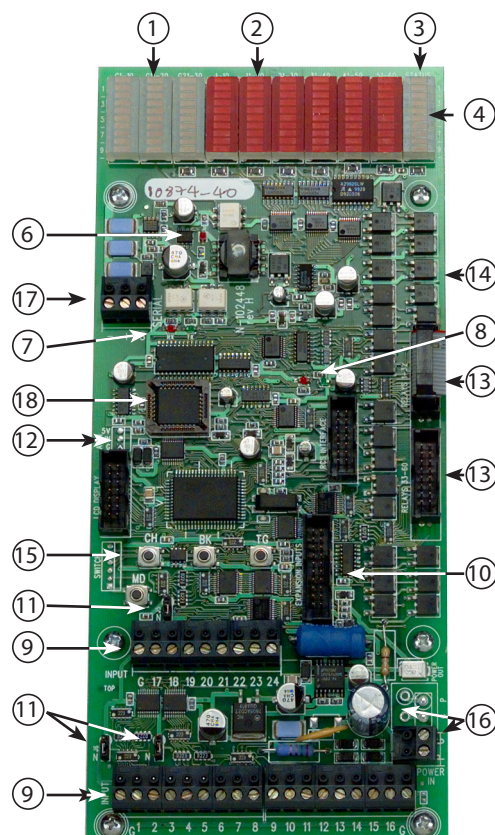
Johnson Controls LP-CT Windows Setup Software is required in order to setup and commission Johnson Controls lighting control panels. It provides an easy way to set up each Johnson Controls lighting control panel and a means for saving the setup to a hard drive or diskette.

Johnson Controls will factory program each LP Controller from completed LP-CT Set Up Worksheets provided by the customer. Each LP Controller can be factory addressed, tagged with the name of the electrical room where it will be installed, and a copy of each .lpx file can be emailed to the customer. We highly recommend this service to minimize field technician time. See the LP-CT Set Up Worksheets at the end of this manual.

The LP-CT software is a one-time purchase for a single site license. Each site must purchase its own software. Until further notice all future LP-CT upgrades will be free to existing customers who can prove proof of purchase.

Figure 1 is a picture of the LP Controller used for the LP-3500.

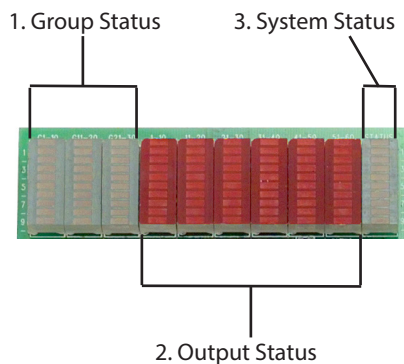
LP Controller Hardware Features



A description of each numbered item is listed below.

Figure 1

Group, Output and System Status LEDs



1. Group Status LED's show the status of each of the LP Controllers 60 lighting groups. The green LEDs labeled G1-G30 indicate output group status. If the associated LED is on then the group is on. If the LED is flashing, then the group is on but in the Flash Warning mode and will automatically turn off after the On-Time After Flash has expired. In normal operation, the AUTO (or BK) pushbutton is used to toggle the display between groups 1-30 and groups 31-60. System Status LED 2 indicates which set of group status is being displayed. If Status LED 2 is off then groups 1-30 status are being displayed and if Status LED 2 is on then groups 31-60 status are being displayed.
2. Output Status LED's show the status of each of the LP Controllers outputs. If the LED is on the output is on and if the LED is off its associated output is off.
3. System Status LED #1 (top, right) is the heartbeat of the LP Controller. During normal operation this LED should be flashing on and off. During programming mode it will be steady on. If this LED is not flashing during normal operation then there is a potential problem with the LP Controller. Please see the Troubleshooting section of this guide or contact Johnson Controls.

LP Controller Hardware Features

See Figure 1



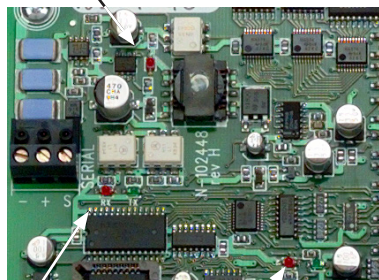
4. The LP Controllers will use STATUS LEDs 2-7 to display network communication information. This is a great feature for technicians to quickly determine network status. The information displayed on all LP Controllers is as follows.
 - STATUS LED 2 - Illuminates when any serial command is received.
 - STATUS LED 3 - Illuminates when end of command character is received.
 - STATUS LED 4 - Illuminates when this LP Controller is addressed.
 - STATUS LED 5 - Illuminates when a correct checksum is detected.
 - STATUS LED 6 - Illuminates when this LP Controller receives a legal command.
 - STATUS LED 7 - Illuminates when the LP Controller has executed a command.

Power, Communication and Watchdog LEDs

6. Power LED is steady on when the proper power is applied to the LP Controller. If this LED is not on please see the Troubleshooting section of this user guide or contact Johnson Controls.
7. Communication TX LED illuminates if the LP Controller is sending outbound communication and the RX LED illuminates each time inbound communication is received. If these LED's are not operating please see the Troubleshooting section of this user guide or contact Johnson Controls.
8. Watchdog LED should be steady on. If this LED is flashing or off please see the Troubleshooting section of this guide or contact Johnson Controls.

See Figure 1

Power LED



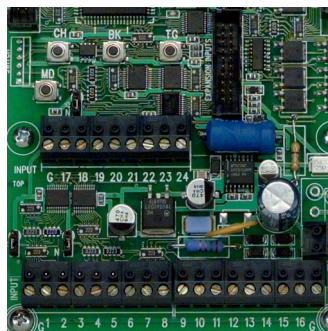
RX & TX
LEDs

Watchdog
LED

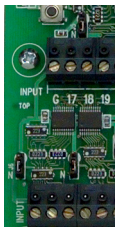
Inputs

9. Input terminal blocks for connecting input wiring. The terminal blocks can be removed from the LP Controller for easy installation or for quick replacement of a LP Controller. 24 inputs standard, expandable to 120 inputs;
10. Input expansion connector (Socket) provides connection of up to three optional thirty-two Input expansion modules for a total of 120 inputs.

See Figure 1



LP Controller Hardware Features (cont.)



Inputs (cont.)

11. Input Power jumper provides the capability to select the LP Controller to power its inputs or allow an external power source to power its inputs. Occupancy sensors that use 24VDC to power the sensor are typical applications that are externally powering an input. Jumper in the "N" position configures the inputs to be dry contact and powered by the LP Controller. Jumper in the opposite position configures the inputs to be externally powered by up to 24VDC. Each jumper affects only its respective eight inputs only. There is one jumper for each of the LP Controller's eight inputs.

12. Analog Input terminal accepts a VDC signal up to a maximum of 6VDC for Johnson Controls PHOTO Light Sensors Model PHOTO /I-5V-0-5 for indoor level, PHOTO /O-5V-0-5 for outdoor light level and PHOTO /S-5V-0-5 for skylight levels.

Outputs



13. Output terminals to output devices. The LP Controller provides cable headers for connection to its outputs. A ribbon cable is used to connect the LP Controller output header to a Relay Interface Board. Each output driver on the LP Controller is protected to survive a direct short which minimize failures.

14. On board current limiting is provided on all output drivers.

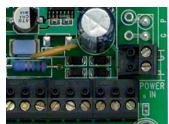
Pushbuttons



15. Three pushbuttons labeled "OVER" (or CH), "AUTO" (or BK) and "STAT" (or TG) are provided on the LP Controller to provide, 1) manually override of all the relays, 2) set the network address of the LP Controller, and 3) view network status and group and relay status for more information on their use please refer to the software features section of the user guide.

Power Supply Protection

16. Supply Power terminals for connection of 24VAC power. The terminal block can be removed from the LP Controller for easy installation or quick replacement of an LP Controller. The LP Controller supply power protection circuitry provides 30VA self reset over-current protection.



Network Terminals

17. Network communication terminal blocks for connecting network. The terminal blocks can be removed from the LP Controller for easy installation or for quick replacement of an LP Controller. On-board isolation circuitry provides 500-volt isolation for the RS-485 communication network.



EPROM and EEPROM Diagnostics

18. The LP Controller continuously verifies integrity of its EPROM (Electrically Programmable-Read Only Memory) and EEPROM (Electrically Erasable Programmable Read Only Memory). Unit will notify that an error exists through the LP-CT Set Up software.

The LP Controller software features listed in this user guide apply to the Johnson Controls models running software version 4.0.

LP Controller Software Features

Number of Inputs

- 24 inputs standard on all LP-3500 models. 32 and 48 relays have a standard input module increasing inputs to 56.
- Inputs expandable on LP3532 and LP3548 models only. LP3532 -56 inputs maximum and LP3548 - 120 inputs maximum.
- 1 analog input per LP Controller.

Timers Durations

- Up to 3 timer values per LP Controller.
- Timers can be from 1 minute to 18 hours in length in 1-minute increments.
- Timers can be assigned to any input. Timers must expire before an output can be commanded off.
- Timers will automatically turn the output off after the timer has expired (or flash then turn output off if the flash warning feature is selected).
- Input turns group on when activated but does not start timer until input is deactivated.

Relay Refresh

- This provides the capability for the LP Controller to refresh the status of each output to the correct state. The purpose of this feature is to overcome power dips that may occur while output coils are being energized.
- Refresh rate can be set to "0" for no refresh or refresh between 3 to 30 minutes in 1 minute increments. If you select 10 minutes then the LP Controller will automatically pulse the output coil to the correct state every ten minutes.
- This feature should only be used if you are experiencing problems with all outputs in a particular zone turning on or off or if you know the power source to the LP Controller drops below acceptable levels.

Naming Inputs

- Each input with the exception of the analog input can be named for identification purposes.
- Requires LP-CT 4.0, Input names are saved in the LP-CT .lpx, file not in the LP Controller.

Input Type

- The LP Controller provides six input types: Maintained, Momentary On, Momentary Off, Momentary On/Off, Linked On and State Change.
- Maintained inputs require the input be maintained to activate the output.

LP Controller Software Features (cont.)

Input Type (Cont.)

- Momentary On inputs require a momentary closure to activate an output. It requires a separate input be assigned as a Momentary Off input to deactivate the output.
*Note: if a timer is assigned to this input, the timer starts once the input is deactivated.
- Momentary Off inputs require a momentary closure to deactivate an output. It requires a separate input be assigned as a Momentary On input to activate the output.
- Momentary On/Off inputs require a momentary closure to toggle the state of the output. This input type requires only one input to perform both on and off control of an output. This input type requires the input device be in a location where the lights are within visual contact.
*Note: if a timer is assigned to this input, the timer starts once the input is deactivated.
- Linked On inputs are designed for multi-level lighting control applications that require timers for automatic shutoff of lighting. A typical application is 1/3, 2/3 and 3/3 lighting levels in conference room. One input is assigned to the 1/3 level output and a second input to the 2/3 level output. Typically two additional inputs are assigned as Momentary Off inputs for the 1/3 and 2/3 outputs. Activating the 1/3 light level switch will turn on the respective output and begin its timer. Once the timer has expired the 1/3 light level output will flash to warn the occupants that the lights are about to turn off. Once the lights flash the two switches, 1/3 and 2/3, are linked as one so either the 1/3 or 2/3 switch can be activated to re-initialize the timer for the 1/3 lighting level. Immediately after either switch is activated the switches are automatically un-linked and return to their independent state until another flash warning occurs. Without this features a user may accidentally activate the wrong level switch causing frustration for the user.
- Change State inputs are designed for use with maintained 3-way switches in retrofit applications. A change of state will toggle the state of the associated output.

Analog Input

- Each LP Controller provides an input for accepting a 0-5 VDC signal up to a maximum of 6 VDC for Johnson Controls PHOTO Light Sensors Model PHOTO /I-5V-0-5 for indoor level, PHOTO /O-5V-0-5 for outdoor light level and PHOTO /S-5V-0-5 for skylight levels.

Input Polarity

- Each input can be assigned either normally open or normally closed polarity.

Assigning an Input to control an Output Group

- Any input can control any output.
- Multiple inputs can control the same output.
- Some inputs have higher priority than others see "Input Types" for details.

LP Controller Software Features (cont.)

Output Flash

- Any output can be assigned to flash before turning off to warn the occupants that the lights will be turning off in the next 1-60 minutes. This feature is typically called Flash Warning.
- Outputs can be assigned to turn off with no Flash Warning. Do not select Output Flash for HID lighting that require time to restrike after turning off.

Maintained Input Priority

- This feature provides the capability to set a hierarchy of exclusive control for maintained inputs that control an output.
- The four priorities are None, Maintained ON, Maintained OFF and Maintained ON/OFF.
- None Priority will provide no priority to the maintained input thus allowing inputs or network commands to gain control of its associated output.
- Maintained ON Priority will gain control of its assigned output and not allow any other input or network command to turn its assigned output off.
- Maintained OFF Priority will gain control of its assigned output and not allow any other input or network command to turn its assigned output on.
- Maintained ON/OFF Priority will gain control of its assigned output and not allow any other input or network command to turn its assigned output on or off. This is the highest priority.

View Current Input States

- With the use of LP-CT software and laptop or PC, the status of all the LP Controller inputs can be reviewed at any time.
- Momentary inputs will display their on status only for the duration of the momentary closure.

Number of Relays/Outputs

- This feature provides the capability to limit the number of outputs the LP Controller will control.
- This value can be between 1-48 outputs.
- The maximum number of outputs are determined by the LP Controllers enclosure capacity and the number of outputs installed in the enclosure

Group On-time after flash

- Each output that is assigned to flash (see "Output Flash") before automatically turning off will have an on-time after flash value of 1-60 minutes in 1 second increments.
- All outputs use the same on-time after flash value per LP Controller.

LP Controller Software Features (cont.)

Output/Relay Energize Time

- The length of time the outputs coil is energized to change its state is programmable from .024 seconds to 1.56 seconds in .012 second increments.
- This time is factory set for .072 seconds and typically should not be changed.

Assigning Outputs/Circuits to a Group

- Johnson Controls uses a control strategy that requires all outputs to be assigned to one or more groups. Control is accomplished at the group level so each controlled output needs to be assigned to a group.
- Each LP Controller provides up to 60 groups
- A group can include one output or many outputs up to the LP Controller maximum. See table 1 for a listing of LP Controllers and their maximum output capacities.
- If an application requires individual control of each output then assign each output to an individual group such as output 1 to group 1, output 2 to group 2, etc. Many applications require multiple outputs to be turned on or off as a group. Grouping eliminates the need to have a separate command for each output rather all of the groups outputs can be controlled with one input or network command.
- If groups share the same output then the shared output will not turn off until all its groups are commanded off. For instance, a common area lighting circuit may be connected to output 1. If output 1 is assigned to both group 1 and 2 then both groups must be commanded off before the common area lighting will turn off. If group 1 and 2 are on and a command is issued to turn off group 1, output 1 will remain on because group 2 is on.
- Grouping is performed in the LP Controller software so no hardwiring of outputs into groups is necessary.

Naming Groups and Super Groups

- Each group and Super Group can be named for identification purposes.
- Requires LP-CT 4.0, Group and Super Group names are saved in the LP-CT .lpx file not in the LP Controller.

Assigning Groups to Super Groups

- A Super Group is a logical grouping of 2 to 59 groups. The word super is used to differentiate between the two group types.
- Super Groups provide the capability to control multiple groups with one input or network command yet still allow individual control of each group.
- For example, Super Group 1 can contain groups 2-5. A network command can be issued to turn off Super Group 1, which will turn off groups 2-5. However, an input assigned to group 4 can turn on group 4 without affecting groups 2,3 or 5. Super Groups provides a high degree of flexibility.

LP Controller Software Features (cont.)

Assigning Groups to Super Groups (cont.)

- A Super Group can contain any group but the Super Group number itself. Super Group 1 can contain any group but group 1.
- Super Groups contain two or more Groups.
- Groups containing one or more outputs.

Serial On Priority

- Serial On Priority provides the capability to assign a network command priority over a Momentary Off, Momentary On/Off, Input Timer Duration, On-Time After Flash or Maintained Input with None selected for Maintained Input Priority.
- Each Normal or Super Group has the option for Serial On Priority.
- The only configuration that has higher priority than a Serial On Priority is a Maintained Input with Maintained Input Priority set to Momentary Off or Momentary On/Off. These input configurations will turn the group off even if a network command with Serial On Priority has been issued.
- Any Input Timers or Groups in the flash warning mode will be overridden by a network command with Serial On Priority.

Automatic Output Sequencing

- Each output in a group is sequenced rather than energizing all relays simultaneously.
- This minimizes large current draw typically required when energizing multiple outputs at once.

Manual Override of Outputs

- Each LP Controller provides a pushbutton which toggles the state of all its outputs. It does not execute any input or network command while in Manual Override.
- Press the pushbutton labeled OVER (or CH) to override all outputs. Each time this pushbutton is pressed all outputs will change state from on to off or off to on. You should hear the outputs change state.

Manual Override of Outputs (cont.)

- Any commands issued to the outputs during Manual Override will be stored in the LP Controller so each output will return to the last commanded state once the AUTO (or BK) pushbutton is pressed.
- Manual Override mode will time-out in 10 minutes with no pushbutton button activity. Manual Override mode expiration does not restore outputs to the last commanded state until AUTO (or BK) is pressed. Outputs will respond to new group commands from network commands and inputs after the Manual Override mode has timed-out.

LP Controller Software Features (cont.)

Return to Automatic control from Manual Override

- Pressing AUTO (or BK) Pushbutton refreshes/restores the LP Controller from OVERRIDE to NORMAL operation. All outputs will return to their state prior to the OVER (or CH) pushbutton being pressed or to the stored state caused by a command being received during manual override, so you may hear outputs changing state.
- If the LP Controller is not in Manual Override, pressing AUTO (or BK) toggles the view of the Group Status LEDs from groups 1-30 to groups 31-60.

Setting or Viewing LP Controller Network Address

- The LP Controller network address can be set between 1 and 255.
- To set the LP Controller network address press the AUTO (or BK) and STAT (OR TG) pushbuttons simultaneously.
- Be sure to disconnect the network while setting the LP Controller network address.
- The LP Controller address will be displayed on blinking STATUS LEDs 2-9 in the upper right hand corner of the LP Controller. Each LED is assigned the following binary value:

LED#	LED Value
2	1
3	2
4	4
5	8
6	16
7	32
8	64
9	128

To determine the address of the LP Controller add the value of LEDs 2-9 that are blinking. All LEDs blinking will represent address 255.

- To increment the address by one press the OVER (or CH) pushbutton. Continue to increment until the desired network address is displayed.
- To decrement the address by one press the STAT (or TG) pushbutton. Continue to decrement until the desired network address is displayed.
- To save the network address to non-volatile memory, press the AUTO (or BK) pushbutton. This will also return the LP Controller to auto mode.
- Failure to Press the AUTO (or BK) pushbutton will result in loss of network address after power failure because it will not be saved to non-volatile memory.

Wake-Up LEDs

- After 10 minutes of no pushbutton activity the LEDs will enter an LED saver mode much like a screen saver mode on a PC.
- To wake up the LEDs press the STAT (or TG) pushbutton. The LED's will illuminate to display group and output status.

LP Controller Software Features (cont.)

Resetting the LP Controller

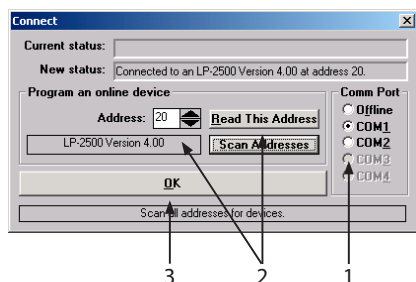
- The LP Controller can be reset if you are experiencing abnormal behavior. Resetting is the same as powering down and powering back up the LP Controller.
- This will load the data saved in its non-volatile EEPROM into its RAM.
- To reset the LP Controller press the three pushbuttons OVER (or CH), AUTO (or BK) and STAT (or TG) simultaneously.

LP Controller Network Features

Pushbutton Mode Expiration

- Override, Stat and address-set modes (as well as LED illumination) will time-out in 10 minutes with no pushbutton button activity.
- Mode expiration does not restore relays or save a new address until AUTO (or BK) is pressed. In the meantime however, relays will respond to new serial commands and inputs.
- Each LP Controller is network ready for RS-485 with 500 volt isolation circuitry.
- Up to 255 LP Controllers can be networked over a twisted pair of wires.
- Johnson Controls LP Controllers provide seamless integration with most BAS that utilize BACnet MS/TP or Metasys N2, including those from Andover Controls, Automated Logic, Delta Controls, Honeywell, Johnson Controls, Siemens, Trane, and others. Other protocols may be supported through the use of additional optional equipment to manage the protocol translation.

LP Controller Set Up Software (LP-CT)



Software Installation

- 1) From Windows Start select Run and browse for location of LP-CT file.
- 2) Select setup.exe and click on OK. LP-CT will be installed on your computer.

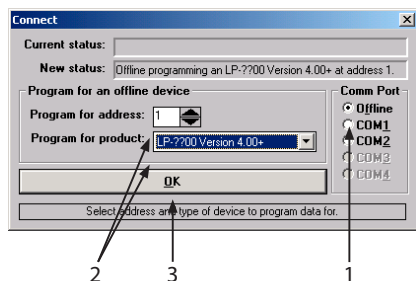
Connecting To A LP Controller

Connecting LP-CT to a single LP Controller

- 1) Select the communication port connected to LP Controller.
- 2) Enter address of LP Controller and select "Read This Address". LP-CT will try to establish communication with this LP Controller. If communication is established the LP Controller address and it's software version will be displayed. Or select "Scan Address" if you don't know the LP Controller address.
- 3) Click on OK to connect to LP Controller and select OK when prompted to read LP Controller database.
- 4) If communication is not established, verify you have correct address and communication port.

Connecting LP-CT to multiple LP Controllers over a network

Note: You will need a USB to RS-45 converter for your PC to communicate to multiple LP Controllers.



- 1) Select the communication port connected to LP Controller.
- 2) Enter address of LP Controller and select "Read This Address" or select "Scan Addresses". LP-CT will try to establish communication with this lighting control panel or scan addresses 1-255 and list all LP Controller on this network.
- 3) Make sure the address of the LP Controller is in the address box then click on OK to connect to LP Controller and select OK when prompted to read LP Controller database.
- 4) If communication is not established, verify you have correct communication port.

Configuring a database Online or Offline

A database can be configured while connected to a LP Controller or offline. To configure a database while connected to a LP Controller follow the instructions to connect to a LP Controller listed above then skip to step 4 below.

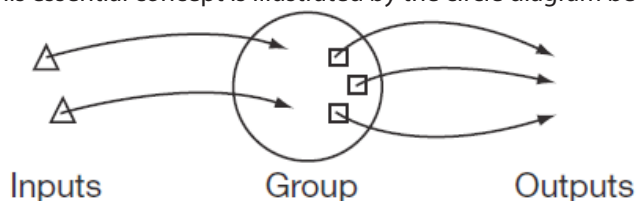
- 1) To configure a database offline select "Offline" as the Communication Port during start-up.
- 2) Select the desired LP Controller address in the box labeled "Program for Address" and the type and software version to be programmed offline in the box labeled "Program for Type".
- 3) Select OK.
- 4) The database configuration screen will be displayed.

LP Controller Set Up Software (LP-CT)

Creating LP Controller Configuration Database

Overall Concept

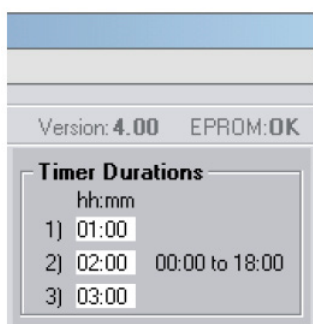
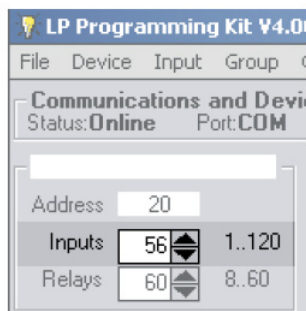
The essential function of the set-up software is to assign inputs to outputs. Hardwired inputs and outputs are “soft wired” via the “Output Group” in the set-up software. This essential concept is illustrated by the circle diagram below.



Inputs are assigned to a Group on the main screen, “LP Programming Kit V4.0” shown below.

Outputs are assigned to that group on the “Group Set-Up” screen shown below.

LP Controller Setup Software



Creating Configuration Database (Cont.) Configuring Inputs

Number of Inputs

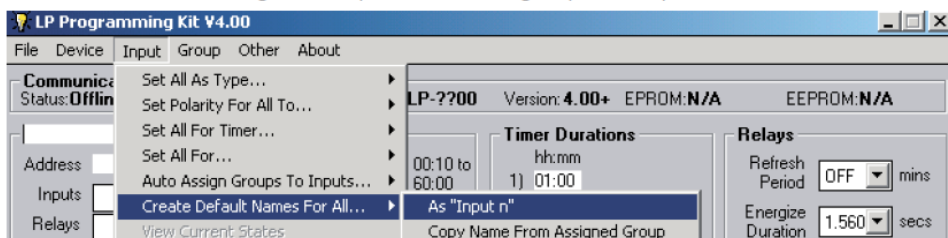
- 1) Select the number of inputs that will be utilized by typing in a number between 1 and 120 in the box labeled "Inputs". This number should match the input hardware provided with the LP Controller.
- 2) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

Timers Durations

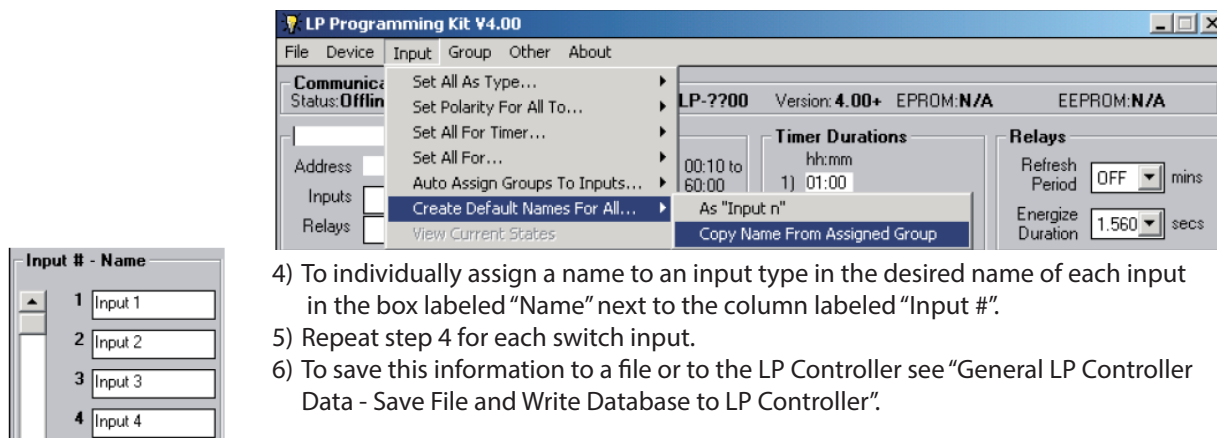
- 1) Type in the duration of the timer (1 minute to 18 hours) in the boxes labeled "Timer Durations 1, 2 and 3". The first two places are for hours (hh) and the second two places for minutes (mm). These timers will be activated by an input and will affect an output.
- 2) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

Naming Inputs

- 1) Each input can have a name in addition to a number.
- 2) To automatically name the inputs as Input 1, Input 2, etc. go to the tool bar and select "Input/Create Default Name for All" then select "As Input n". Each input will be named according to its input number e.g. Input 1, Input 2, etc.



- 3) To automatically name the inputs with the name of the group it controls go to the tool bar and select "Input/Create Default Name" for All then select "Copy Name From Assigned Group". Each input will be named with the same name of the group it controls.



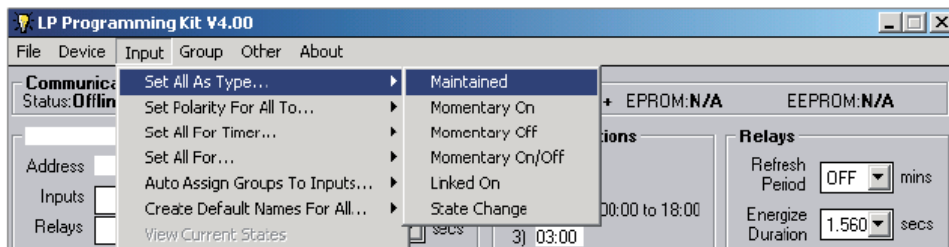
- 4) To individually assign a name to an input type in the desired name of each input in the box labeled "Name" next to the column labeled "Input #".
- 5) Repeat step 4 for each switch input.
- 6) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

LP Controller Set Up Software (LP-CT)

Configuring Inputs

Input Type

- 1) There are six input types: Maintained, Momentary On, Momentary Off, Momentary On/Off, Linked On and State Change. See the LP Controller Software section of this manual for a description of each input type.
- 2) To automatically assign all inputs to the same type go to the tool bar and select "Input/Set All As Type" then select the desired type. All inputs will be assigned this type.



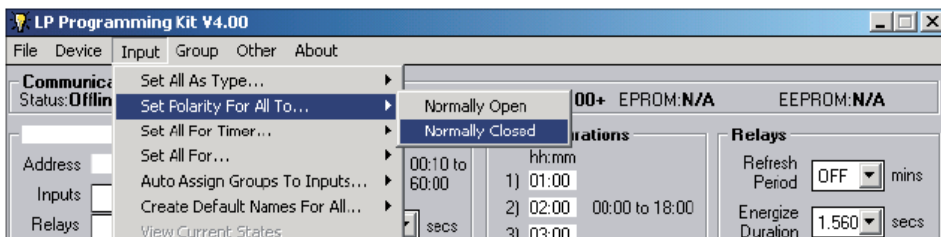
- 3) To individually assign input types select the input type in the box directly next to the input number labeled "Type".
- 4) Repeat step 3 for each input.



- 5) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

Input Polarity

- 1) Each input can be assigned a normally open or normally closed polarity.
- 2) To automatically assign all inputs to the same type go to the tool bar and select Input/Set All As Type then select the desired type. All inputs will be assigned this type.



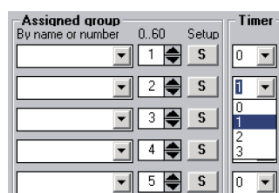
- 3) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

LP Controller Set Up Software (LP-CT)

Configuring Inputs

Assigning an Input to control an Output Group

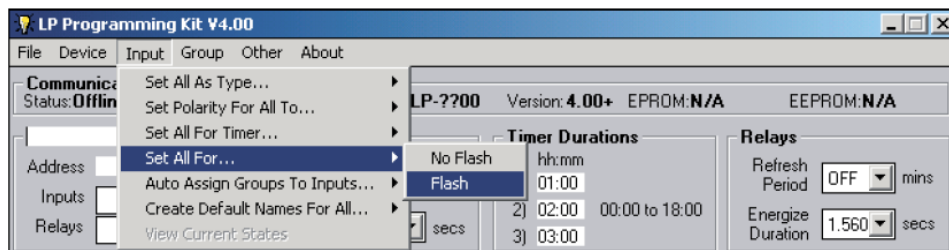
- 1) Under the Column heading labeled "Assigned Group" select the name of the group the input will be controlling. If you do not know the Group Name then type in or select the group number between 1 and 60 under the column labeled "0..60".



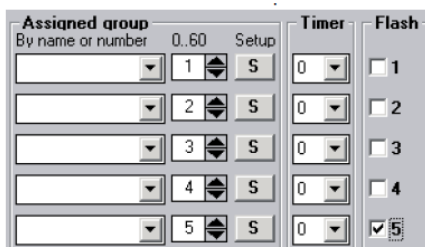
- 2) Repeat step 1 for all inputs.
- 3) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

Assign a Timer to an Output Group

- 1) To automatically assign all inputs to the same timer go to the tool bar and select "Input/Set All For Timer" then select the desired timer. All inputs will be assigned to this timer.
- 2) To individually set timers, enter timer duration between 1 and 3 in the box labeled "Timer" or scroll down to the desired timer. Entering 0 will deactivate the timer feature.



- 3) Repeat step 2 for all inputs.



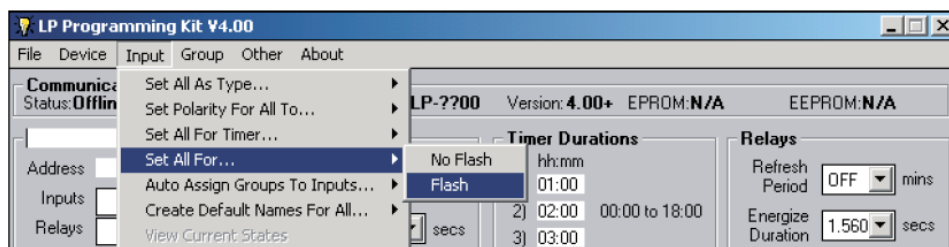
- 4) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

LP Controller Set Up Software (LP-CT)

Configuring Inputs

Output Flash Warning

- 1) To automatically assign all inputs to Flash or No Flash, go to the tool bar and select "Input/Set All For" then select Flash or No Flash. All inputs will be assigned this selection.



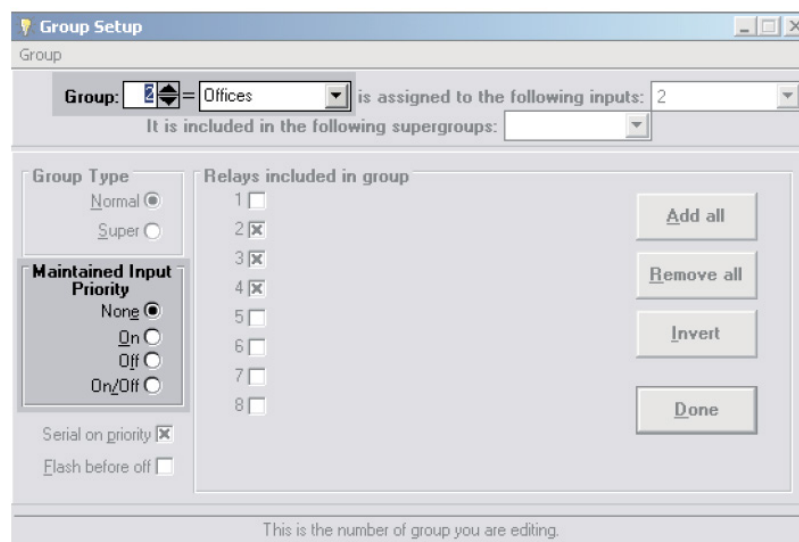
- 2) To individually set Flash, click on the box labeled "Flash" to enable the flash before off feature. The input number is located to the right of the box.



- 3) To deactivate the flash before off feature click on the check mark in the box.
- 4) Repeat step 2 or 3 for all inputs.
- 5) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

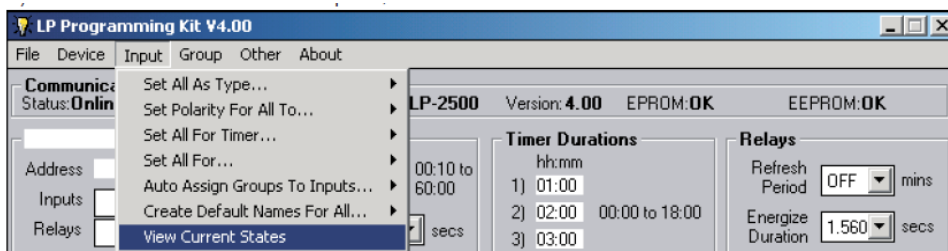
Maintained Input Priority

- 1) Select the group that will be controlled by this maintained input. See the instructions titled "Assigning an Input to control an Output Group".
- 2) In the box titled "Maintained Input Priority" select either None, On, Off or On/Off.
- 3) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".



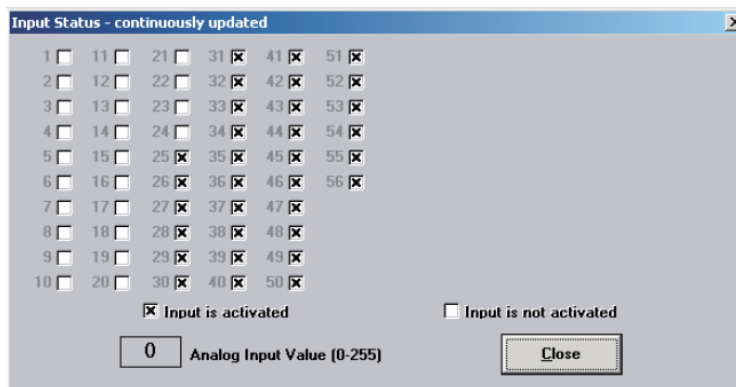
LP Controller Set Up Software (LP-CT)

Configuring Inputs



View Current Input States

- 1) From the toolbar select "Input", then "View Current States".
- 2) An Input Status screen will appear to continuously display input status for each input configured in the database. To set the number of inputs in the LP Controller database, see the instructions titled "Number of Inputs".

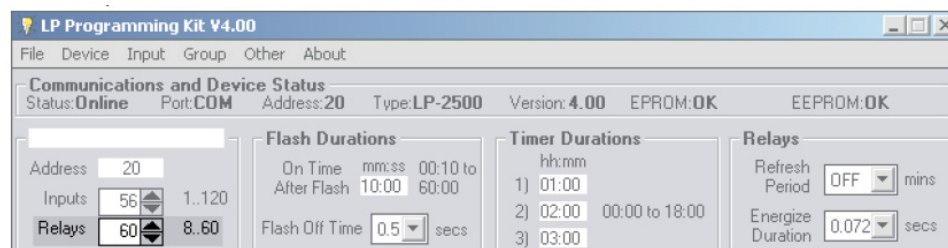


- 3) The boxes and numbers represent the input numbers. An "X" in the box indicates the input is activated. Momentary inputs will only display the "X" for the duration of the momentary closure.
- 4) The box labeled "Analog Input Value" will display a value of 0-240 in proportion to the 0-5 VDC signal connected to the LP Controller analog input terminals. If there is no analog input connected the analog input value will display "0" if the in is more than 5VDC, it will display proportional up to 255 (240-255 = 5-5.3 VDC). Input should be limited to 6 VDC maximum.

Configuring Outputs

Number of Relays/Outputs

- 1) Select the number of outputs that will be utilized by typing in a number between 1 and 60 in the box labeled "Outputs". This number should match the number of outputs to be controlled.



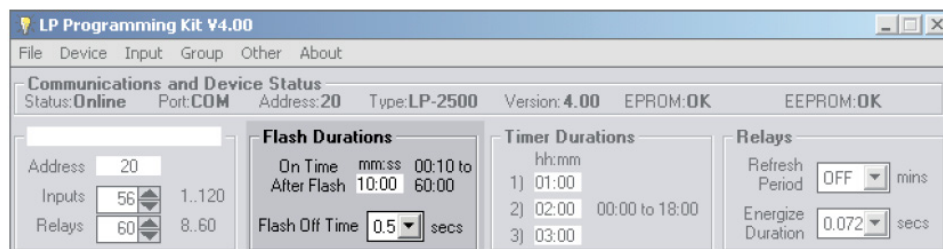
- 2) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

LP Controller Set Up Software (LP-CT)

Configuring Outputs

Group On-time after flash

- 1) In the area labeled "Flash Durations" there is a box labeled " On-Time After Flash".



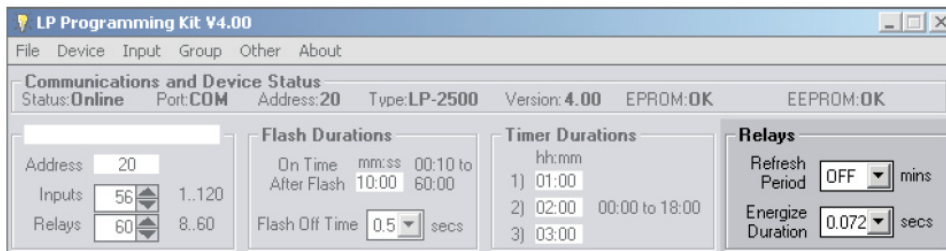
- 2) Set the length of time (in mm:ss). This will be the length of time the output will be on after the flash warning has occurred.
- 3) This value can be from 10 seconds to 60 minutes in one-second increments.
- 4) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

Group Flash Off-time

- 1) In the area labeled "Flash Durations" there is a drop down box labeled "Flash Off Time".
- 2) This value is factory set for .5 seconds.
- 3) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

Output Refresh Time

- 1) In the area labeled "Relays" there is a drop down box labeled "Refresh Period".
- 2) To set an output refresh rate select a time between 3-30 seconds from the drop down box.



- 3) To deactivate this feature select OFF from the drop down box.
- 4) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

Output/Relay Energize Time

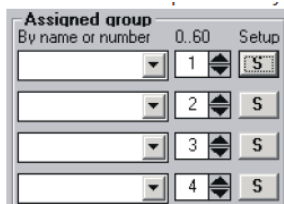
- 1) In the area labeled "Relays" there is a drop down box labeled "Energize Duration".
- 2) The output energize duration is factory set for 0.072 seconds. There should be no need to change this value.
- 3) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

LP Controller Set Up Software (LP-CT)

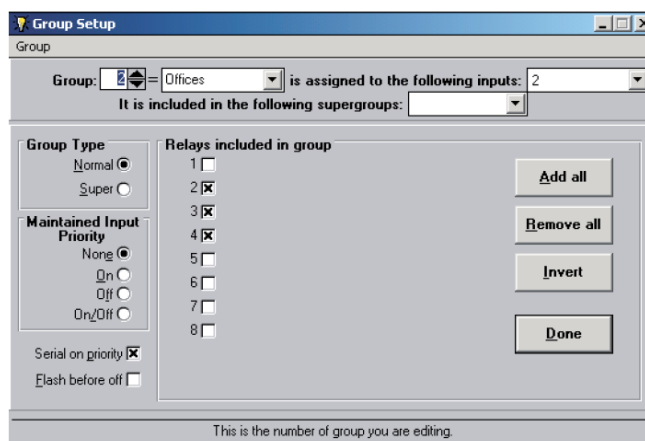
Configuring Outputs

Assigning Outputs/Circuits to a Group

- 1) Under the column heading labeled "Assigned Group" select "Setup". This can also be accomplished by selecting Group from the toolbar then selecting "Setup".



- 2) The Group Setup screen should appear.



- 3) Select the desired Group between 1-60, to be created or modified.
- 4) Once the Group number is selected, click on the box associated to the output/relay number to be added to the group. Select each respective box until all the desired outputs/relays are assigned to this group. There are buttons to the left labeled "Add All" to add all relays to the group; "Remove All" to delete all from the group and "Invert" to select the outputs that are not checked.
- 5) Repeat steps 3-4.
- 6) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

Naming Groups

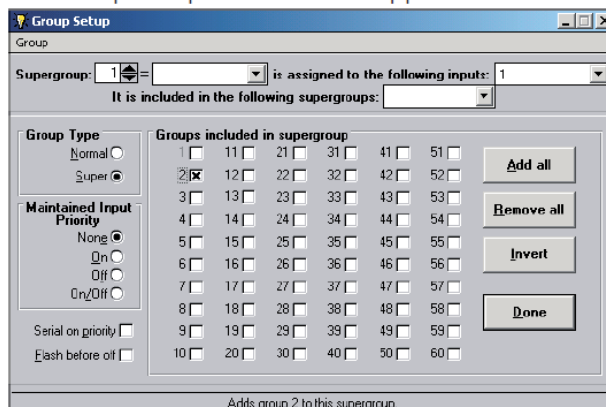
- 1) Under the column heading labeled "Assigned Group" select "Setup". This can also be accomplished by selecting Group from the toolbar then selecting "Setup".
- 2) The Group Setup screen should appear.
- 3) Select the desired Group between 1-60, to be named.
- 4) In the box next to the Group number type up to 15 characters to name the output.
- 5) Repeat steps 3-4.
- 6) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller". These names are saved in the .lpx file so be sure to "Open Names" after opening the LP Controller database.

LP Controller Set Up Software (LP-CT)

Configuring Outputs

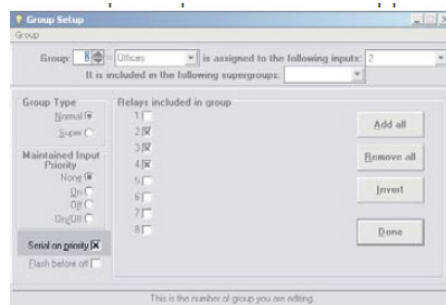
Assigning Groups to Super Groups

- 1) Under the column heading labeled "Assigned Group" select "Setup". This can also be accomplished by selecting Group from the toolbar then selecting "Setup".



- 2) The Group Setup screen should appear.
- 3) Select the desired Super Group number between 1-60, to be created or modified.
- 4) Once the Group number is selected, click on the circle in the "Group Type" area labeled "Super". The numbers next to the boxes represent the groups included in the Super group. The group that matches the Super group number will be grayed out because it cannot be assigned to the Super group.
- 5) Select the desired groups to be included in the Super group by clicking the respective box.
- 6) Repeat steps 3-5 until all Super groups are defined.
- 7) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

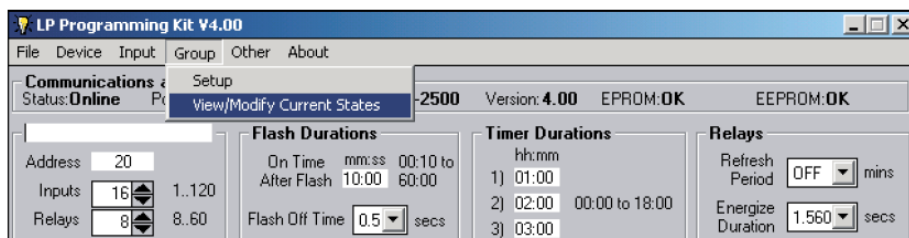
Serial On Priority



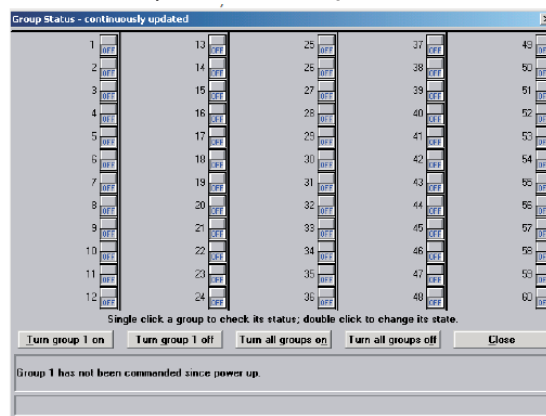
- 1) Under the column heading labeled "Assigned Group" select "Setup". This can also be accomplished by selecting Group from the toolbar then selecting "Setup".
- 2) The Group Setup screen should appear.
- 3) To activate this feature click on the box in the lower left hand corner of the screen labeled "Serial On Priority". An "X" will appear in this box to indicate the feature is selected.
- 4) To deactivate this feature click on this box to remove the "X".
- 5) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".

LP Controller Set Up Software (LP-CT)

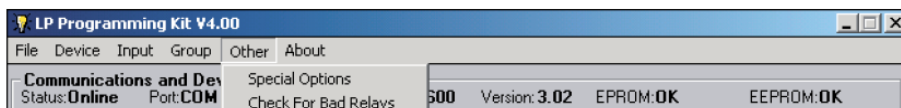
Configuring Outputs



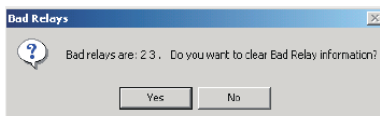
View/Modify Current Output States



- 1) From the toolbar select "Group", then "View/Modify Current States".
- 2) A Group Status screen will appear and continuously display output status for each output configured in the database. To set the number of outputs in the LP Controller database, see the instructions titled "Number of Relays/Outputs".
- 3) To check the status of a Group, mouse-click once with the mouse cursor on the desired Group status display. Text boxes at the bottom of the screen will display status information and the current status of the group including what caused the group to be in its current state.



- 4) To manually change the state of a Group, mouse-click twice on the Group status display. The State of the group will change.

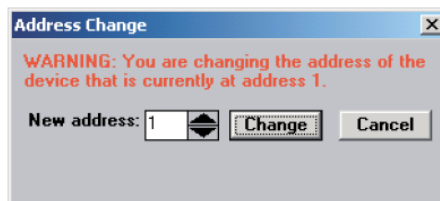


Check Bad Relays/Circuits (Not available on LP-3500 models)

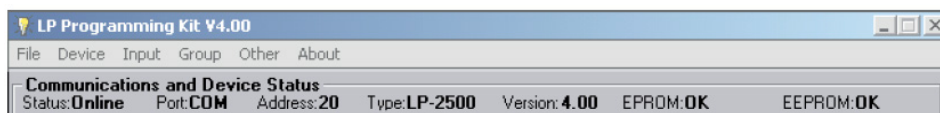
This feature provides the capability to display the relays which are not in the correct state. The Bad relays/circuits are displayed on the above screen. These relays may be malfunctioning and need replacing. Resetting the relays will be required to clear this screen. If you do not reset the bad relays then the same relay numbers will be displayed the next time you check bad relays. Be sure to reset the bad relays by selecting YES. If you want to keep the Bad relay listing the next time you select this screen then select NO.

LP Controller Set Up Software (LP-CT)

Setting a LP Controller's Address



- 1) Connect to LP Controller.
- 2) Double click on the address box the "Address Change" screen will appear.
- 3) Enter the new address and click 'Change'.
- 4) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".



General LP Controller Data

Communication and Device Status

Status

The Status box displays either on-line or off-line programming. If on-line is displayed then your computer is currently connected to a LP Controller, which is not the case with off-line.

Port

Is not applicable with off-line programming. The computer serial port will be displayed in this box if you have selected on-line programming.

Address

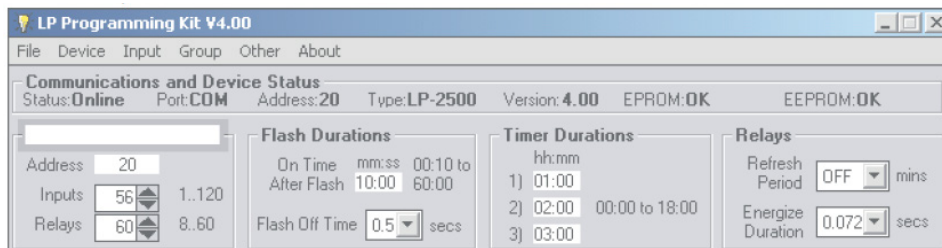
The address of the LP Controller you selected in on-line or off-line setup.

EPROM

Displays the status of the LP Controllers EPROM which contains the LP Controllers software. This is not applicable for off-line programming.

EEPROM

Displays the status of the LP Controllers non-volatile EEPROM which contains the LP Controller database. This is not applicable for off-line programming.



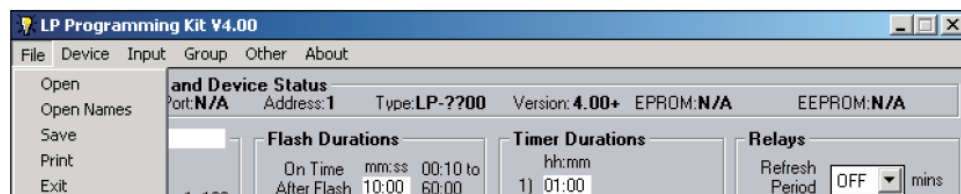
Naming a LP Controller

- 1) Select the blank text block above LP Controller Address type in LP Controller name up to 15 characters.
- 2) To save this information to a file or to the LP Controller see "General LP Controller Data - Save File and Write Database to LP Controller".
- 3) All name information is saved in the .lpx file not in the LP-Controller.

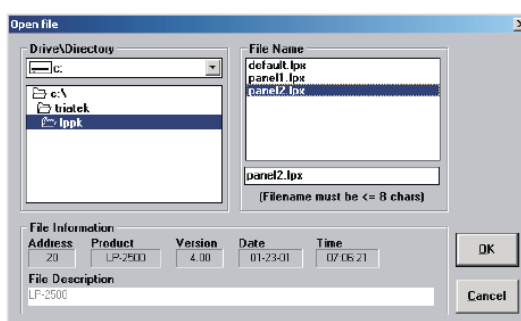
LP Controller Set Up Software (LP-CT)

Open File

- 1) Select the "File" drop down menu "Open" or "Open Names".
- 2) "Open File" provides the capability to open a saved *.lpx file. The suffix ".lpx" is used for all Johnson Controls LP Controller files.
- 3) "Open Names" which reads all name data and displays it on screen.

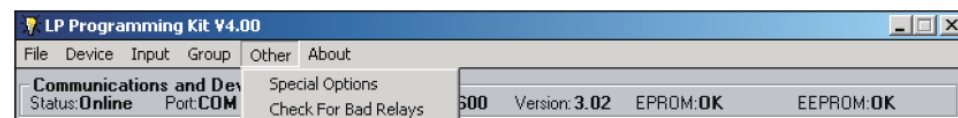
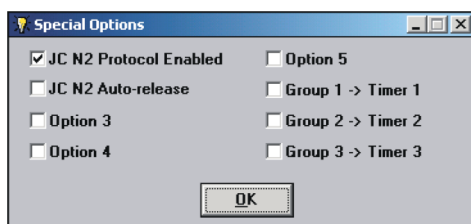
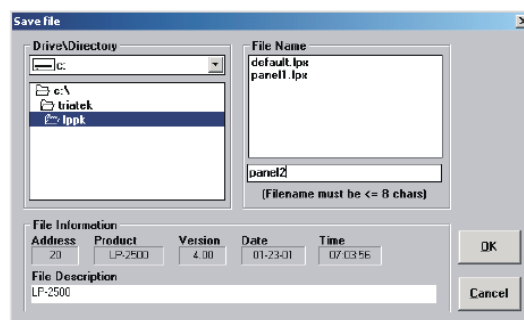
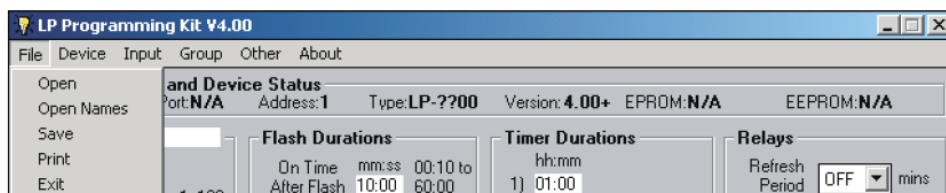


- 4) Select the File you want to open.
- 5) Press "OK" to open the file..



Save File

- 1) Select the "File" drop down menu "Save".
- 2) "Save File" provides the capability to save the current information as an ".lpx" file. The name can be up to eight characters in length.
- 3) "File Description" provides the capability to describe the file such as "North Wing Electrical Closet" or "Fifth Floor Lighting", etc. to further explain or describe the file.
- 4) Press "OK" to save the file.



LP Controller Set Up Software (LP-CT)

Warning: Be sure that Groups 1, 2 and 3 do not have relays assigned if these options are selected.

Special Options

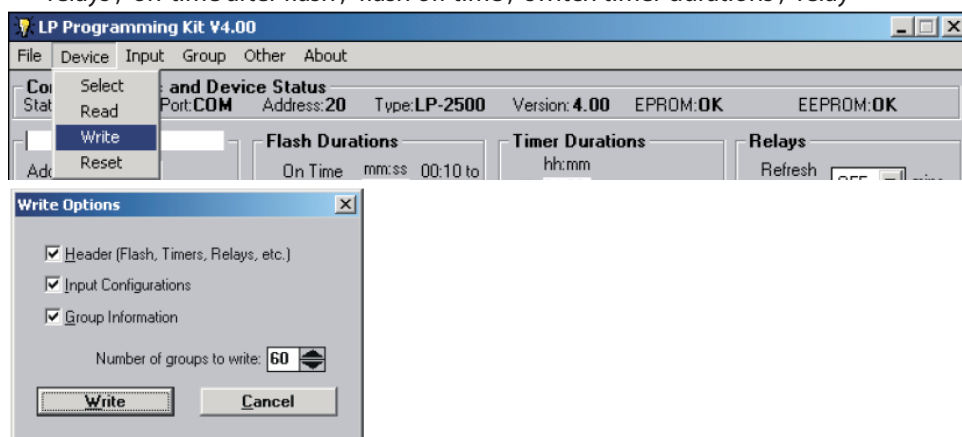
- 1) Select "Other" drop down menu select "Special Options" Special Options appears.
- 2) "JC N2 Protocol Enabled" provides the capability to enable Johnson Controls N2 protocol. This option will need to be enabled when networking the LP Controller with Johnson Controls Metasys, Companion or Facilitator product lines. Click on this box to enable the Johnson Controls N2 protocol.
- 3) "JC Override Auto Release" is for Johnson Controls N2 integration applications only. The Johnson Control N2 protocol will release the lighting zone if communication is not detected within 10 minutes. Releasing the lighting zone could turn the lights on or off depending on the Johnson Controls N2 command received by the LP Controller prior to the release. Disable this feature if you want the lights to stay in the current state when communication is lost.
- 4) Group 1 -> Timer 1; Group 2 -> Timer 2; Group 3 -> Timer 3:

This option provides the capability to alternate all switches in a panel with a timer from timer control to no timer control. Examples are classrooms or offices that need a switch without a timer during the day and utilize the timer after hours. To select this

BAS Command	Switch Timer State	On Switch is pressed
Panel X, Group 1 On	All switches in Panel X with Timer 1 will respond as if there is no timer	Lights will stay on until command off
Panel X, Group 1 Off	All switches in Panel X with a Timer of 1 will now use Timer 1 when pressed	Lights will stay on for duration of Timer 1 then turn off or flash if set for flash warning
Panel X, Group 2 On	All switches in Panel X with Timer 2 will respond as if there is no timer	Lights will stay on until command off
Panel X, Group 2 Off	All switches in Panel X with a Timer of 2 will now use Timer 2 when pressed	Lights will stay on for duration of Timer 2 then turn off or flash if set for flash warning
Panel X, Group 3 On	All switches in Panel X with Timer 3 will respond as if there is no timer	Lights will stay on until command off
Panel X, Group 3 Off	All switches in Panel X with a Timer of 3 will now use Timer 3 when pressed	Lights will stay on for duration of Timer 3 then turn off or flash if set for flash warning

Write Database to LP Controller

- 1) Select "Device" drop down menu "Write" to write LP Controller database to the LP Controller.
- 2) Select this box if header information is to be written to selected LP Controller. Header information includes all the global LP Controller data such as "inputs", "relays", "on-time after flash", "flash off time", "switch timer durations", "relay

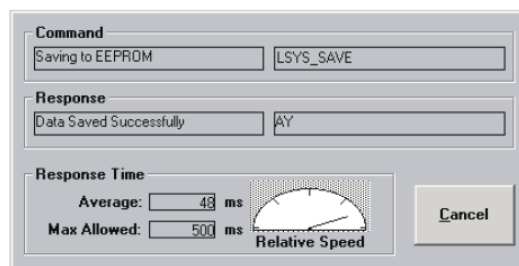


refresh rate" and relay energize duration.

- 3) Select this box if input configurations are to be written to selected LP Controller. Input Configurations includes "input names/numbers", "types", "timers", "flash" and "input polarity".

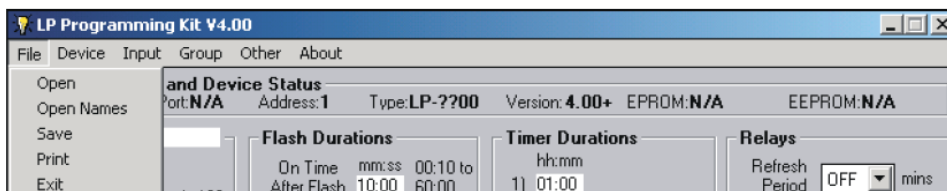
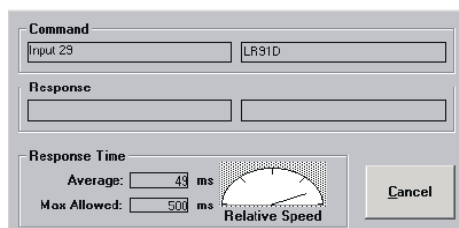
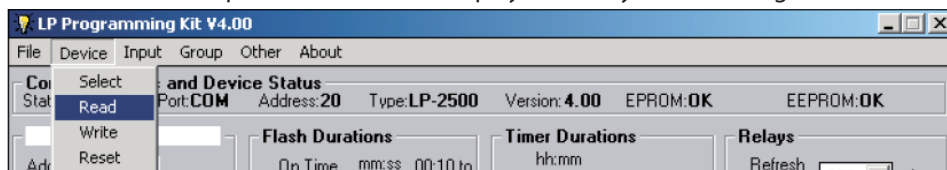
LP Controller Set Up Software (LP-CT)

- 4) Select this box if group information is to be written to selected LP Controller. Group information includes all group information listed in the "group setup" display.
- 5) Select the number of groups to be written to selected LP Controller. If the LP Controller is configured for 10 groups, type in the number or use the scroll bars until the desired number is displayed. This information takes the longest time to write.
- 6) Select "Write" to begin writing to LP Controller. Commands and responses will be



displayed as information is written to the LP Controller.

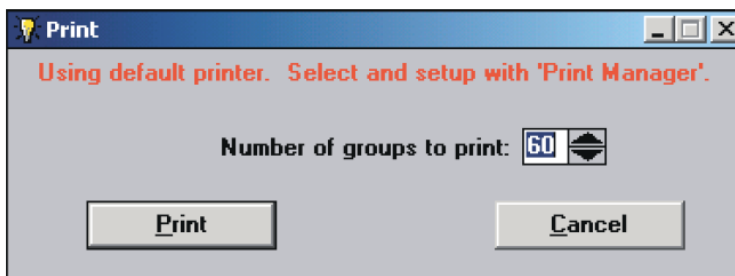
- 7) As information is being read or written the box to the left of, and under the word "Command" and to the left of, and under the word "Response", displays in English the information being communicated. The box to the right displays the actual protocol commands.
- 8) The "Response Time" with "Relative Speed" indicator will reflect system communication speed. This screen is displayed while you are writing information to



a LP Controller.

Read LP Controller Database

- 1) Select "Device" drop down menu "Read" to read LP Controller database.



LP Controller Set Up Software (LP-CT)

This screen is displayed while you are reading information from a LP Controller.

Print LP Controller Database

- 1) Select "File" drop down menu "Print" to print LP Controller database.
- 2) Select the desired number of lighting zones between 1 and 60 (older systems only allow 30 zones), in increments of 1.
You may type in the number or use the scrollbars for the desired number of lighting zones. A lighting zone is defined as one or more relays and is set in "Zone Info".
- 3) Select "Print" to print desired lighting zones.
- 3) Select "Cancel" to cancel print selection and return to the "Main Screen".

*NOTE: We recommend you keep a print out of LP Controller data for your files.

Trouble-Shooting the LP Controller

Outputs won't turn on

- Verify power is connected to the LP Controller. There should be LEDs illuminated.
- Verify there is at least 24 VAC present to the secondary of the transformer supplying power to the LP Controller. Use a voltmeter to check the power.
- Check to see if Maintained input priority for the group to that is not responding to control commands is not set to Maintained Off Priority or Maintained On/Off Priority.
- Verify that the output ribbon cable connector is properly seated.
- Press the OVER (or CH) pushbutton to see if all the relays will turn on. If so, then the output portion of the LP Controller is operating properly.
- Verify that the connector to output (relay or Circuit breaker) is properly seated. Inputs don't turn groups on.
- Use LP-CT to verify that the LP Controller sees the input change state. Use an alligator clip or shorting wire to test the input terminal by shorting the input to "G". An X should appear on the LP-CT View Input State screen.
- Verify the input jumpers are in the correct location.
- Verify the input device is operating properly.

The LP Controller doesn't communicate or Communication LED TX and RX are not blinking.

- Verify the LP-CT cable or network cable is connected correctly.
- If you are using LP-CT verify that the correct communication port is selected.
- Verify the LP Controller is addressed properly.

System Status LED 2 is not on.

- Verify power is connected to the LP Controller. There should be LEDs illuminated.
- Verify there is at least 24 VAC present to the secondary of the transformer supplying power to the LP Controller. Use a voltmeter to check the power.

Johnson Controls LP-CT Set Up Worksheets

Panel	Johnson Controls Part Number	Relay Capacity	Relays Used	Relay Spares	Relay Spaces	Switch Inputs Provided	Switch Inputs Used	Spare Switch Inputs	Panel Address
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Group Programming Schedule

Panel Name: Location:

Group Information									
Group Number	Group Name	Type	Main Switch Priority None, On, Off or On/Off	Relays in Group	Flash Warning	Serial Override			
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

Johnson Controls LP-CT Set Up Worksheets

Group Programming Schedule

Panel Name: Location:

Group Number	Group Name	Type	Group Information				Flash Warning	Serial Override
			Main Switch On, Off or On/Off	Priority None, On, Off or On/Off	Relays in Group			
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53								
54								
55								
56								
57								
58								
59								
60								

Switch Input Programming Schedule

Panel Name: Location:

Address (1-255)	Flash Durations	Timers Durations (hh:mm / 00:00-18:00)			Relays	
					Refresh Rate (Off or 3-30 mins)	
Inputs (1-120)			On Time After Flash (mm:ss)		1. 2.	
Relays (1-60)			Flash Off Time (0.5-2.0)		3.	Energize Duration (0.024-1.560)

Switch Information								
Input Number	Input Name	Switch Type	Normally Open	Normally Closed	Assigned Group Name or Number (1-60)		Timer Number 0, 1, 2, or 3	Flash
1								
2								
3								
4								
5								
6								
7								
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22								
23								
24								

NOTES

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