ILC

INTELLIGENT LIGHTING CONTROLS, INC.
Energy Saving Lighting Controls

LightLEEDer
Pro Network
Software Manual

Includes software, installation and programming information for LightLEEDer lighting control systems to configure and program the system, diagnose the network, and backup your programming.

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Section 1 Program Description

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1.0 Overview

LightLEEDer Network Configuration Software is an ILC priority software package designed for the ILC networked LightLEEDer series lighting control panels. This program requires a Basic or Advance Network Controller in the system to allow communications with this software, without that hardware, you will need to use the LightLEEDer Pro Single Panel Configuration Software.

Using this software you can configure and program the system, diagnose the network, and backup your programming using a personal computer locally or over a network.

1.1 Suggested Minimum System Requirements

The following are the minimum requirements system required to run the LightLEEDer Pro software. Running this software with less than the minimum hardware requirements or operating systems other than listed may provide unexpected results.

- Personal Computer or Laptop
- 1.66 Ghz single core processor
- Windows XP, Vista, or 7
- 32 0r 64 bit OS
- USB 1.0, USB 2.0 preferred
- 1Gb Ram
- SVGA monitor 1024 x 768
- 10/100 Ethernet adapter

1.2 Installing the Program

Download the latest software from our website located in the Resource Library/Software Downloads. Once the program has been downloaded, unzip the file into known location like your desktop. This file will appear like: ILC LightLEEDerNet Setup Vxx.exe with xx equal to the version level. To start the installation double click this executable file. If you receive a security message about this program making changes to your system, click "YES" to approve this action.
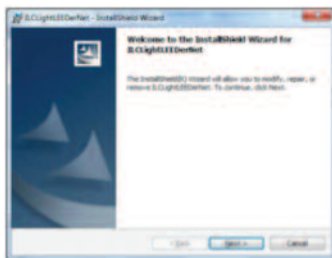

Figure 1.1 Opening installation screen

Click on "NEXT" to begin the process, then "INSTALL", then "FINISH".

The following screen will then appear for the driver required for USB communications. Press "INSTALL" to load and finish the installation.
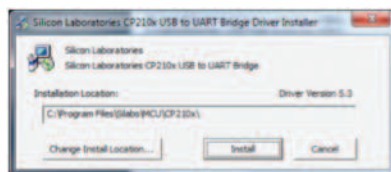

Figure 1.2 USB Driver Screen

1.3 Starting the LightLEEDer Pro Network Software

Locate the icon created during the installation on your desktop and double click on it to open the program as shown in Figure 1.3

Figure 1.3 Opening Screen

1.4 Navigating the Program

1.4.0 Overview: This section describes how to navigate through the software screens.

1.4.1 Opening Screen: From this screen you can identify the software version you're running as shown in Figure 1.3. The lower left corner of the screen shows the current program file that is open (no file is open in the figure). The lower right hand of the screen shows the connection status (currently disconnected). The main navigation menu bar gives you the following options:

1.4.2 File: This pull-down menu allows you to create a new file, open an existing file, save a file, save-as for renaming a current file, and Exit. Files saved or opened will default to the C:\ILC LightLEEDer Net folder location.

1.4.3 Connect: Allows configuration of the communications for a connection between the software and the hardware.

> • **USB** connections have selections for communications ports 1-8. See section 2.1 for more information.

> • **Modem** uses the same communications selections along with the telephone number of the panel. See section 2.3 for more information.

> • **TCP/IP** selection includes an entry box for the panels IP address. See section 2.2 for more information.

1.4.4 Network Configuration: This navigates you to a screen with check-off boxes for the panels connected in the network. Note: The Network Controller (NC) and Node 1 are required. Right click on a box to enable editing or programming in the software.

1.4.5 Edit Node XX: This is the main programming menu for the panel or Network Controller. Note: certain programming must be programmed at the Network Controller (NC) level like Clock settings as an example.

> • **Relays:** From this menu configure the relays installed, relay lock, timer-off options, relay conditionals, setup relay Groups, map inputs to relays/Groups, and view/force relay status from the software.

> • **Switch Inputs:** This menu is for configuring LightSync devices, input types, input active times, input conditionals, pilot settings, and photocell settings.

> • **Timers:** Configure timer types, schedule times, timer mapping, off-hour sweeps, open/closed times, Blink Alerts and Alarms, timed-on, and test timer programming. Note: Many of these options are done from the Network Controller level.

> • **Clock:** Setup time, date, Daylight Saving time, time zone, and view Sunrise/Sunset times. Note: These are done from the Network Controller level.

> • **Presets:** Program Presets, capture Presets, and view and activate presets from this area. Note: Capture Presets is done from the Network Controller level.

> • **Other Devices:** Add-on devices can be programmed or configured, dimmer output modules enabled and programmed, and motor controllers programmed.

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> • **Special Functions:** Allows editing of names and password. Note: Some of these are done from the Network Controller level.

> • **Panel Settings:** Sets the relay numbering from left/right to right only for LL-4 controllers.

1.4.6 Tools: This menu contains tools for programming auto-mapping, clearing, and configuring along with tools to check programming.

> • **Auto Map Tools:** This screen contains buttons to auto-map and configures settings in the program alone with option buttons to clear sections of the programming.

> • **Check Settings:** This tool will check the logic of the programming.

1.4.7 Document: This gives you the ability to create documents of all program settings.

1.4.8 Print: Provides a means to print the programming settings.

1.4.9 About: Provides the opening screen with the software version and a 1-800 number to contact ILC.

Section 2
Software Communications

ILC LIGHTLEEDER NC
          SAT 04/24/12
          04:19:44 PM
EDIT

HOME

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2.0 Overview

This section will go into detail on how to connect and communicate with a LightLEEDer system. It will also explain how to download/upload and save the settings. Note: Only 1 physical programming connection type can be connected to the system at one time.

2.1 Direct USB Connection

To connect the software to the system through a USB port of your computer you will be required to have a standard USB A-B cable and the USB driver loaded in during the software installation in Section 1.2.

      1. Connect the USB cable from the PC with the installed software to either the Basic or Advance Network Controller port as shown in Figure 2.1 and Figure 2.2.

USB port

77013495A
97013495
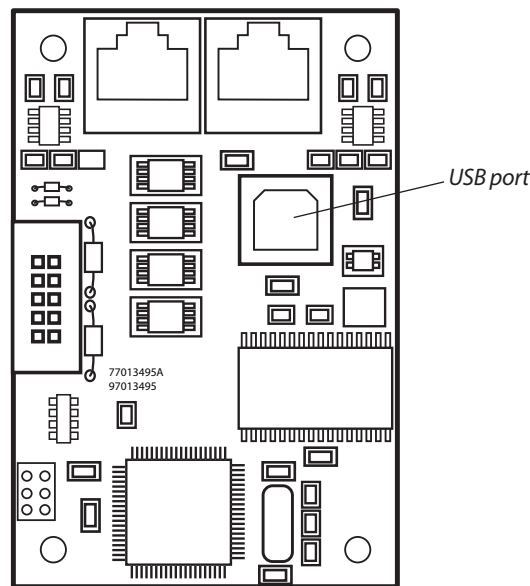
Figure 2.1 Basic Network Controller USB Port

USB port
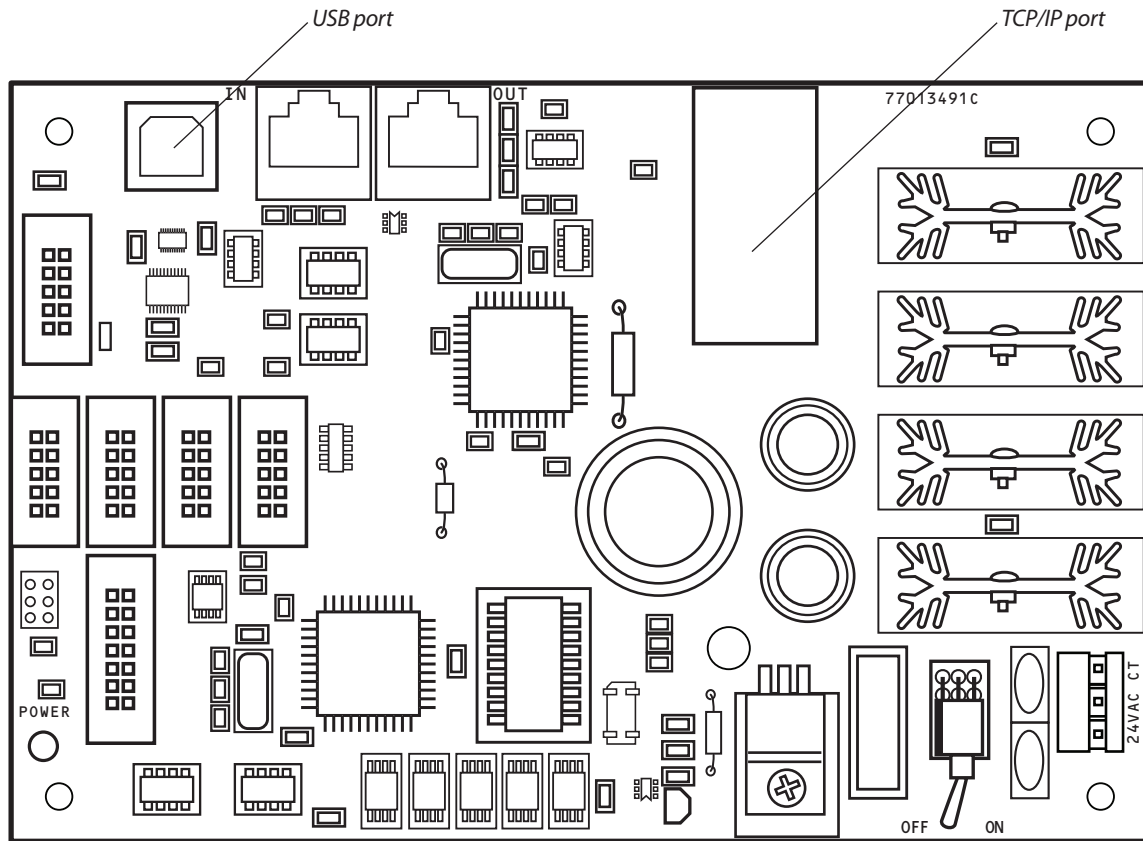
TCP/IP port

Figure 2.2 Advance Network Controller USB and TCP/IP Ports

2. From the opening screen select "Connect" from the menu bar at the top of the software. The communications screen will open as shown in Figure 2.3.

3. Select USB communications and the COM number of your computer's port being used. If this is unknown, enter the Windows Device Manager, expand the "Ports", and look for the connection like this example: Silicon Labs CP210x USB to UART Bridge (COM3).

4. Press the "Connect to LightLEEDer Network" button.

5. The connection screen will appear and the connection will show in the lower right hand of the screen "Connected: NC". If you receive an error, check all connections and cables, verify the panel is powered, and that only 1 connection type is physically connected. Press "Disconnect From LightLEEDer" to end communications to the system.

6. See section 2.4 for downloading/uploading.
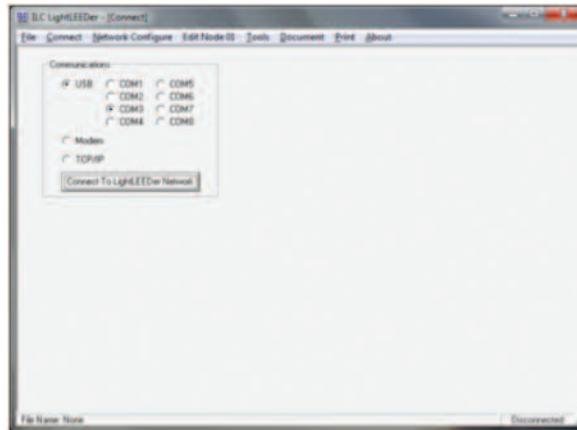
Figure 2.3 Communications Screen

2.2 Network TCP/IP Connection

To connect the software to the LightLEEDer system through a TCP/IP connection you will be required to have a standard network interface controller in your PC, plus either a cross-over cable for a direct connection or an Ethernet Switch or Hub between the PC and the system.

1. Connect the lighting system from the TCP/IP port on the Advance Network Controller to your PC. See Figure 2.2 for location.

2. From the opening screen select "Connect" from the menu bar at the top of the software. The communications screen will open as shown in Figure 2.3.

3. Select the TCP/IP communications then enter the IP address of the controller.

   Note: The factory IP address of the Advance Network Controller is 192.168.1.24. To communicate, the PC must be set to the same sub-net as the system for example: 192.168.1.28. To change the internal IP address of the controller refer to LightLEEDer TCP/IP configuration sheet available from ILC's website.

4. Press the "Connect to LightLEEDer Network" button.

5. The connection screen will appear and the connection will show in the lower right hand of the screen "Connected: NC". If you receive an error, check all connections and cables, verify the panel is powered, and that only 1 connection type is physically connected. Press "Disconnect From LightLEEDer" to end communications to the system.

6. See section 2.4 for downloading/uploading.

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2.3 Dial-up Modem Connection

To connect the software to the system with a remote modem you will be required have a LightLEEDer Modem module connected to the Advance Network Controller, a modem installed in the PC, and an analog phone line that is not connected through a digital system.

1. Connect the LightLEEDer modem and computer to an analog phone line.

2. From the opening screen select "Connect" from the menu bar at the top of the software. The communications screen will open as shown in Figure 2.3.

3. Select the Modem communications then enter the phone number that the controller is connected to.

4. Press the "Connect to LightLEEDer Network" button.

5. The connection screen will appear and the connection will show in the lower right hand of the screen "Connected: NC". If you receive an error, check all connections and cables, verify the panel is powered, and that only 1 connection type is physically connected. Press "Disconnect from LightLEEDer" to end communications to the system.

6. See section 2.4 for downloading/uploading.

2.4 On-Line Connect Functions

After a connection is established as shown in figure 2.4, the connection screen will contain the firmware revision information of the connected panel, time, date, run time, along with buttons for; clock-set, virtual keypad, restart Network Controller, system diagnostics, upload and download. Selections are available for download/upload name options.

- **LightLEEDer Firmware Revision:** The current firmware will display in the upper right hand of the screen.

- **Time, Date, and Run-time:** This is displayed on this screen and is read directly from the system.

- **Set LightLEEDer Clock:** This button when pressed will synchronize the system clock with the computers clock.

- **Virtual Keypad:** When activated, a virtual screen will appear that emulates a panel's keypad/LCD.

- **Restart Network Controller:** Pressing this button will restart the Network Controller only. It will also disconnect the software's connection.

- **System Diagnostics:** When this is activated with the current programming open, a communications status screen will open as shown in figure 2.5 and the program will automatically poll the system's panels and LightSync devices on the network (Network Controller Level). A command is sent and returned to verify communications between these panels and devices, if communications fails or is incorrect, the status will turn red and display a fault counter number. This should be run for a few hundred cycles to get a clear picture of the network condition. Note: A few errors are common on this type of communications.

- **Panel Level Diagnostics:** This works very similar to the Network Controller Level diagnostics except it includes LightSync dimmer and motor devices. From the opening diagnostics screen, select the node number of the desired panel. It will automatically start polling devices configured in the software programming. You may select "Scan for Installed Devices" if the system has not been programmed or programming has not been loaded.

- **Download to LightLEEDer:** Press this button to download the programming from the computer software to the lighting system. Enter the password on the next screen if one has been activated, then "Continue" to start the process. You will see an indicator showing the download to the Network Controller, then each controller in the system. Note: Canceling the download will possibly write a password to the system. Contact ILC for information on how to recover from this operation.

- **Change Password:** At the download screen you have an option to change the password for the system by checking the "Change Panel Password" box and entering the new password.

- **Changes Only:** After the first time downloaded, minor changes can be downloaded with the changes only by selecting "Download Changes Only" from the Connect screen to speed up the download time. When changes only are selected you may also check "Bypass Checksums for Unchanged Data" which speeds up downloads but does not verify download which is not recommended for the final download.

- **Upload from LightLEEDer:** Press this button to upload the programming from the lighting system into the computer software. Once activated, a prompt will appear "Discard All Host Changes"; this will clear all settings from the software to prepare for the settings from the controllers. Press "Yes" to start the upload. You will see an indicator showing upload for the Network Controller then each controller in the system.
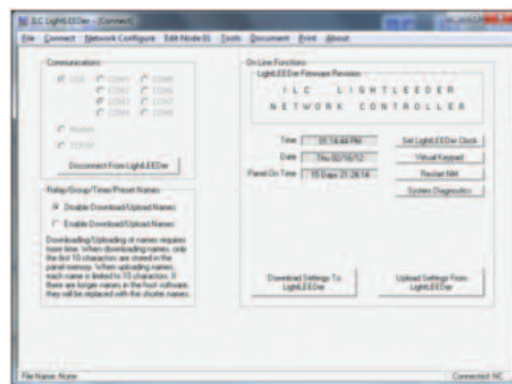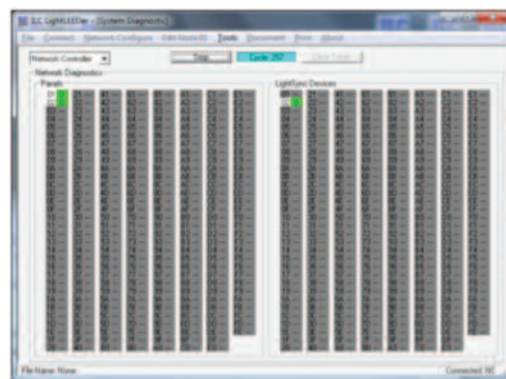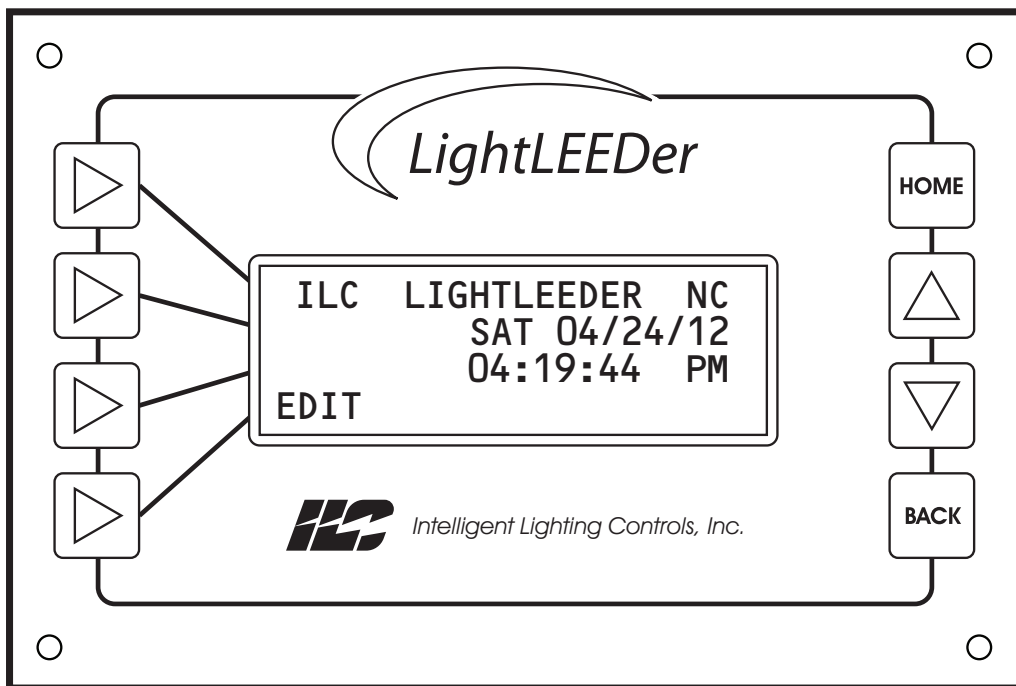

Figure 2.4 Opening Screen

Figure 2.5 Diagnostics Screen

Section 3
Programming the System


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ILC  LIGHTLEEDER  NC
        SAT 04/24/12
        04:19:44  PM
EDIT
```

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3.0 Overview of Local and Network Programming Conventions

The LightLEEDer system consists of from 2 to 254 panels with a maximum of 64 relays per panel plus a Network Controller that syncs and controls network functions. Each panel has a sub-network from a Local port primarily for LightSync devices and Expansion panels. **Programming devices connected to the local port are done at the panel level. Devices on the panel network are programmed at the Network level along with other network wide settings like timer settings.**

3.1 Configuring the Network

From the opening screen, click on "Network Configure" on the main navigation bar, and then left click on each installed node in the system to place a check for each one. Note: Every system must have a Network Controller and a Node 1 panel.

To start editing, right click on the node desired or the Network Controller (NC). You will notice once you do this the "Edit Node XX" (XX equals the node selected) changes giving you an indication of what panel is being edited.

3.2 Panel Settings

3.2.0 Overview: This section describes how to setup some basic panel settings.

3.2.1 Panel Numbering Configuration: This setting is used when a LightLEEDer-4 panel is used in the network as this panel only has relays on the right side of the controller. From the "Edit Node XX" (XX = the LL-4 node presently being programmed) pull-down menu select "Panel Settings", then select "Right Only Relay Numbering" from the panel configuration. Note: The default is Left/Right relay numbering which are standard panels.

3.2.2 Names: Names can be programmed into the system to identify panel location, relay control areas, group functions, and preset functions. This section also describes how to switch from custom and default programming. **Note**: It is suggested to incorporate the default number into the following custom names

- • **Edit Panel Names:** From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Special Functions", then "Edit Names", and then "Edit Panel Name". Type the name required up to 18 characters.

- • **Edit Relay Names:** From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Special Functions", then "Edit Names", and then "Edit Relay Names". Type the desired name next to the relay number. Up to 10 characters can be viewed from the controller as shown on the screen in the lower right corner. Note: It is suggested to code the relay number and node number in your naming. To set the relays to the default names press the button provided on the screen.

- • **Edit Group Names:** From the "Edit Node NC" pull-down menu select "Special Functions", then "Edit Names", and then "Edit Group Names". Type the desired name next to the Group number on one of the 4 screens. Up to 10 characters can be viewed from the controller as shown on the screen in the lower right corner. Note: It is suggested to code the Group number in your naming. To set the Groups to the default names press the button provided on the screen.

- • **Edit Timer Names:** From the "Edit Node NC" pull-down menu select "Special Functions", then "Edit Names", and then "Edit Timer Names". Type the desired name next to the Timer number on one of the 2 screens. Up to 10 characters can be viewed from the controller as shown on the screen in the lower right corner. Note: It is suggested to code the Timer number in your naming. To set the Timer to the default names press the button provided on the screen.

- • **Edit Preset Names:** From the "Edit Node NC" pull-down menu select "Special Functions", then "Edit Names", and then "Edit Preset Names". Type the desired name next to the Preset number on one of the 4 screens. Up to 10 characters can be viewed from the controller as shown on the screen in the lower right corner. Note: It is suggested to code the Preset number in your naming. To set the Presets to the default names press the button provided on the screen.

3.2.3 Setting up Add-on Modules: Panel level or Gateway add-on modules connected to the system are required to be enabled in the system along with settings required by some modules. See the appendix for specific modules settings and programming.

- • **Panel Level Modules:** From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Other Devices", then "Add-On Modules", and then select "Add-on Module 1, 2, 3, or 4" depending on what port it is physically connected to). Select the module type from the pull-down menu. See the appendix if settings or programming are required.

- • **Gateway Level Modules:** From the "Edit Node NC" pull-down menu select "Other Devices", then "Add-On Modules", and then select "Add-on Module 1, 2, 3, or 4" depending on what port it is physically connected to. Select the module type from the pull-down menu. See the appendix if settings or programming are required.

3.2.4 Setting up Dimmer Outputs: See appendix for setup and programming.

3.2.5 Setting up Motor Outputs: See appendix for setup and programming.

3.2.6 Passwords: There are two levels of passwords, full control and control only. The full control password must be changed from the download screen as shown in section 2.4. To adjust the Control Only Password, from the "Edit Node NC" pull-down menu select "Special Functions", then "Change Password" and then type the desired password in the location provided.

3.3 Clock Settings

3.3.0 Overview: Clock settings are done at the Network Level and broadcasted to the entire system. These settings are extremely important if time based operations are used in this system.

3.3.1 Real Time Clock Source: The LightLEEDer controllers are equipped with hardware to sync the clock from a 50/60Hz power line or to be synced by a crystal. From the "Edit Node NC" pull-down menu select "Panel Settings", depending on your source, select 50 or 60Hz line frequency for the most accurate syncing.

3.3.2 Daylight Saving Time: From the "Edit Node NC" pull-down menu select "Clock", then "Daylight Saving Time" to open the settings screen. Select the check box for "Enable Automatic Daylight Saving Time Adjustment" if this is desired for the system. The program will set the dates to the default but may be changed if the standards change.

3.3.3 Astro Clock Settings: From the "Edit Node NC" pull-down menu select "Clock", then "Astro Clock Settings". Set the time zone for your area and if desired adjust the Latitude and Longitude to fine tune it. A find button will activate a pull-down menu if you would like to select it by state/city.

3.4 Relay Configuration and Programming

3.4.0 Overview: This section will describe how to configure the relay options, conditionals, relay groups, and status and control. Relay input mapping will be discussed in section 3.5

3.4.1 Configure Output Options: From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Relays", then "Relay Options" to enter the relay output configuration.

- • **Select Relay:** From the relay selection select the relay to configure. The default naming will be: RLY:01.01 which equates to node/relay number.

- • **Select Pole Number:** Set this to single, double, or triple depending on the hardware installed in the panel.

  Note: Double and triple pole relays must be assembled at the factory with physical connections between each pole. Using single pole relays to control multiple poles may be hazardous and is not acceptable by the NEC and may void the warranty.

- • **Timer OFF Settings:** Relays controlled OFF with a timer or switch/blink, have options that control the output in a certain way other than the default OFF. These actions can be as simple as blinking the relay before turning the relay OFF to warn occupants of a pending OFF sweep. Refer to table 1 for a list of options and section 3.7.4 to adjust time lengths for blink alerts, overrides, and alarms.

- • **Power-On Setting:** Relays can be set to turn ON or OFF after power has been restored from a power outage using the pull-down menu. The default action is no action. See Table 2 for options and descriptions.

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- **Enable Lock Switch:** Checking this box enables the physical lock switch on each relay. This allows the relay to be locked out from any panel controls.

- **Release Revert:** Checking this box to have the relay revert back to the original state after a conditional is not true.

- **Relay Conditionals:** Conditionals can be setup with the pull down menus to provide logic control allowing for "AND control" and "OR control" for setting relays to a specific On or Off state or hold the current state if the condition is true. Two conditionals (A & B) can be programmed to each relay. Priorities can be set by selecting "Change" for each conditional allowing one to have precedence over another. Refer to table 3 for conditional options.

Relay Timer OFF Options
Single Blink: Each relay output controlled can be programmed to blink the load twice and then postponed 5 minutes prior to being turned OFF. If an ON command is received during the blink alert time, the relay output will be overridden ON for 120 minutes where the process starts again. See section 3.7.4 to adjust the time length from 2 to 99 minutes.
Double Blink: Each relay output controlled can be programmed to blink the load twice and then postponed 5 minutes prior to being turned OFF, and then blinked twice 1 minute before turning OFF. If an ON command is received during the blink alert time, the relay output will be overridden ON for 120 minutes where the process starts again. See section 3.7.4 to adjust the time length from 2 to 99 minutes.
Override Blink Alerts: Once a Blink Alert is activated it can be overridden to postpone the relays from being turned OFF. This is accomplished by turning the load OFF then ON with a LightSync switch device. The amount of time postponed before the sweep comes through again is adjustable from 9 to 999 minutes.
HID Delay: Each relay output controlled can be programmed to observe the blink alert without blinking the High-Intensity Discharge load, but the override waiting period is observed allowing a switch command to reset the time event in the same manner as a blink alert.
Alarm OFF: Relay performs a momentary OFF function. Relays programmed to this function will turn OFF and then return to the ON state. See section 3.7.4 to adjust the time length from 1 to 99 seconds.
Alarm ON: Relay performs a momentary ON function. Relays programmed to this function will turn ON then return to the OFF state. See section 3.7.4 to adjust the time length from 1 to 99 seconds.
Alarm OFF Pulse: During the OFF pulse period the relay is cycled OFF and ON at 1 second intervals. See section 3.7.4 to adjust the time length from 1 to 99 seconds.
Alarm ON Pulse: During the ON pulse period the relay is cycled ON and OFF at 1 second intervals. See section 3.7.4 to adjust the time length from 1 to 99 seconds.
ACS OFF: Each relay programmed will turn OFF for 5 seconds, setting the Automatic Control Switch to the OFF position
ACS Blink: Each relay programmed will turn OFF for 1 second, setting the Automatic Control Switch to initiate a 5 minute delay before shutting OFF.

Table 1 Timer OFF Options

Power-up Options
No Action: Relays will remain in the state they were in prior to the power outage.
Turn ON: The relay is turned ON when power is applied to the panel
Turn OFF: The relay is turned OFF when power is applied to the panel
ON if Input is Closed: The relay is turned ON when power is applied to the panel if the selected input is closed.
OFF if Input is Closed: The relay is turned OFF when power is applied to the panel if the selected input is closed.
ON During Open Hours, OFF During Closed Hours: The relay is turned ON when power is applied to the panel if it is in an OPEN time or OFF if CLOSED time. See section 3.7 for OPEN/CLOSE time setup
ON During Closed Hours, OFF During Open Hours: The relay is turned ON when power is applied to the panel if it is in a CLOSED time or OFF if OPEN time. See section 3.7 for OPEN/CLOSE time setup
ON if Day Time, OFF if Night Time: The relay is turned ON when power is applied to the panel if the load is normally ON controlled by a normal timer or OFF if the load is normally OFF controlled by a normal timer. Night and day time based on Sunrise/Sunset.
ON if Night Time, OFF if Day Time: The relay is turned ON when power is applied to the panel if the load is normally OFF controlled by a normal timer or OFF if the load is normally ON controlled by a normal timer. Night and day time based on Sunrise/Sunset.
Based on Time and Day: The relay is turned ON or OFF when power is applied to the panel according to the schedule programmed. This can be set to 30 minute increments.

Table 2 Power-up Options

Relay Conditionals
CONDITIONAL CONTROL IF TRUE:
Force OFF: Forces the relay OFF if the conditional is true
Force ON: Forces the relay ON if the conditional is true
Hold Status: Holds the relay in the present position if the conditional is true

Conditional Types
Relay ON: Any chosen relay that is presently ON
Relay OFF: Any chosen relay that is presently OFF
ON input closed: Any chosen ON input that is closed
ON input open: Any chosen ON input that is open
Off input closed: Any chosen OFF input that is closed
Off input open: Any chosen OFF input that is open

Conditional Priority (listed 1st, 2nd, 3rd)
Force ON/Force ON/Force ON - Force ON/Hold Status/Force OFF - Force ON/ForceOFF/Hold Status
Hold Status/Force ON/OFF - Hold Status/Hold Status/Hold Status - Hold Status/Force OFF/Force ON
Force OFF/Force ON/Hold Status - Force OFF/Hold Status/Force ON - Force OFF/Force OFF/Force OFF

Table 3 Conditional Options

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3.4.2 Configure Relay Groups: Relays can be grouped together to make it easy to program when they are always controlled together. The LightLEEDer has the capability of 256 groups that are network-wide. From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Relays", then "Relay Grouping" to enter the relay Grouping screen. Select a Group number from the pull-down menu, and then select the relays to include.

3.4.3 Relay Status: From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Relays", then "Status", then "Relay Status" to enter the relay status screen. Each relay is provided with a status indicator and an ON and OFF force button. The screen also provides buttons to force all relays ON/OFF. Note: Panels with less than 64 relays will show the non-installed relays as OFF.

3.4.4 Relay Lock Status: From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Relays", then "Status", then "Relay Lock Status" to enter and view the status of the relay locks.

3.4.5 Relay Group Status: From the "Edit Node NC" pull-down menu select "Relays", then "Status", then "Group Status" to enter the relay status screen. Each group is provided with a status indicator and an ON and OFF force button in 4 screens.

3.4.6 Relay Presets: Relays can be programmed into preset ON or OFF patterns that can be activated by a timer, switch, or other external command.

- **Setup Presets:** From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Presets", then "Edit Presets". Select one of the 256 available presets, and then click on the relays to select ON or OFF pattern, or leave to be ignored.

- **Capture and Set Presets:** Using this programming method will capture the relays present On/OFF state in every panel. Use the above method if you want relays to be excluded from the On/OFF pattern. From the "Edit Node NC" pull-down menu select "Preset", and then "Capture Presets". Each Preset has a capture button, state indicator showing ON/OFF, and a set button in 4 screens for all of the available presets.

3.5 LightSync Switch Inputs

3.5.0 Overview: All of the LightSync devices are either located in a panel mounted directly on relay driver module or inside the enclosure or connected to the local sub-network port. Devices can also be placed on the panel network but should be avoided if possible. Devices on the panels local port are programmed at the panel level and devices on the panel network are programmed at the Network Controller (NC) level.

3.5.1 Configure Inputs: From the "Edit Node XX" (XX = the present node being programmed) or the "Edit Node NC" pull-down menu select "Switch Inputs", then "Configure Inputs".

- **Select LightSync Device:** From the LightSync Device pull-down menu select the device to be programmed.

- **Select Device Type:** From the LightSync Device Type pull-down menu select the device to be programmed. See table 4 for Input Device Types description.

- **Select Local or Global:** From the "Inputs" pull-down menu select "Global" if this switch will be used in other panels to control relays. Note: Adding the Global Input adds data to the system data so if this is not used do not enable the global function.

- **Select Input Type:** Each input point can be configured with 2 input types that can be set to be disabled or change from one type to another based on a time schedule (excluding photocell type). From the Input pull-down menu select the input number to be programmed, then from the "Type A" menu pull-down menu select the Input Type and then if desired select the "Type B" pull-down menu and select an Input Type. See table 4 for a description of the Input Types.

Input Device Types:
1-6 Pushbutton/8 Input: LightSync data line switch stations and other input devices.
4 Input: LightSync data line hardwire input board that will accept 2 or 3 wire momentary or maintained switch closures. Can be mounted in a panel or remote mounted.
Key Switch: LightSync data line key switch
Photocell 30 Seconds: LightSync photocell with a 30 second delay
Photocell 2 Seconds: LightSync photocell with a 2 second delay
Echo Pushbutton: Echo's any LightSync data line push button device
Echo 4 Input: Echo's any LightSync data line 4 input device
Echo Key Switch: Echo's any LightSync data line key switch device
Retro Hardwire Input: Input from a hardwired LightMaster system that has been retro fitted with a LightLEEDer controller.
Note: The Echo input types emulates another device on the system.

Table 4 Input Device Types

• **Photocell Input Type:** When photocell types are selected additional options become available. The photo levels by default are transmitted locally, if this photo level is required throughout the network a selection from a pull-down menu is available to select Global/Dead-band. Dead-band 4 transmits the values half as often as dead-band 8 and twice as often then 2. Setting this on Global will increase data on the panel network, possibly slowing it down. Each of the 8 photocell inputs have an adjustable OFF and ON levels that range from 0 (0fc) to 255 (1800fc). Input Enable/Disable Times are set for Enabled Based ON Time of Day, Enabled During Open Hours, or Enabled During Closed Hours and the times are set like normal switches. See table 5 for the foot candle conversion.

Foot Candle (FC) Conversion							
FC	**Setting**	10	113	**FC**	**Setting**	500	230
1	38	11	117	60	184	600	232
2	53	12	121	70	188	700	234
3	64	13	125	80	191	800	235
4	76	14	128	90	194	900	236
5	85	15	130	100	197	1000	237
6	91	20	141	150	208	1200	238
7	97	30	157	200	216	1400	239
8	102	40	171	300	223	1600	240
9	108	50	179	400	228	1800	241

Table 5 Foot Candle Conversion

• **Echo Input Type:** These device types will echo control from another device on the local port. From the drop-down menu next to the switch type, select the Echo Device in the panel.

• **Retro Hardware Input Type:** Input from a hardwired LightMaster system that has been retro fitted with a LightLEEDer controller.

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Input Types:

1- 6 Pushbutton/8 Input: LightSync data line switch stations and other input devices.	**Timed ON:** The timed ON input shall operate either from the input closure or open. If programmed to operate from the closure, the relays turn ON when the input closes and turn OFF after the timed duration. The relays do nothing when the input opens. If programmed to operate from the open, the relays turn ON when the input closes and remain ON. When the input opens, the relays turn OFF after the timed ON duration. The time ON is adjustable from 5 to 999 minutes.
Momentary ON/OFF: When momentary contact is made between the ON and COM, relay outputs controlled by this input shall be turned ON. When momentary contact is made between OFF and COM, relay outputs controlled by this input shall be turned OFF.	
Momentary ON/OFF w/Blink: When momentary contact is made between the ON and COM, relay outputs controlled by this input shall be turned ON. When momentary contact is made between OFF and COM, relay outputs controlled by this input shall blink and postpone being turned OFF. Alert time shall be programmed from 2 to 99 minutes. **Note:** Output must be programmed for a blink alert. See section 3.4.1	**HID Bi-Level:** This feature requires the configuration of ON/OFF relay outputs and HI/LOW relay outputs. The first momentary contact between ON and COM sets the ON relay outputs to ON and the HI/LOW outputs to HIGH (for at least 15 Minutes). The second ON contact switches the HI/LOW outputs to LOW. Additional contact closures will toggle the HI/LOW relay outputs. The cycle then repeats until momentary contact is made between switch input OFF and COM. Then the ON/OFF outputs and HI/LOW outputs are turned OFF.
Momentary Push-Button ON/OFF: When momentary contact is made between the ON and COM, relay outputs controlled by this input are turned ON and OFF alternately, based on current state of the switch.	
	Two-Step Alternating Sequence: The first time the switch is activated, relay outputs programmed as "Group A" are turned ON and relay outputs programmed as "Group B" are turned OFF. The second time the switch is activated, "Group A" relay outputs are turned OFF and "Group B" relay outputs are turned ON. The third time the switch is activated, the pattern begins again at step one.
Momentary Push-Button ON: When momentary contact is made between the ON and COM, relay outputs controlled by this input shall be turned ON.	
Momentary Push-Button OFF: When momentary contact is made between ON and COM, relay outputs controlled by this input shall be turned OFF.	
Momentary Push-Button Toggle: When momentary contact is made between ON and COM, relay outputs controlled by this input shall toggle from the present state. Note: Toggle Source must be set as shown in section 3.5.1.	**Four-Step Alternating Sequence:** The first time the switch is activated, relay outputs programmed as "Group A" are turned ON and relay outputs programmed as "Group B" are turned OFF. The second time the switch is activated, "Group A" relay outputs are turned OFF and "Group B" relay outputs are turned ON. The third time the switch is activated; both "Group A" and "Group B" relay outputs are turned ON. The fourth time the switch is activated; both "Group A" and "Group B" relays are turned OFF. The fifth time the switch is activated, the process begins again at step one.
Maintained ON/OFF: When contact is made between the ON and COM, relay outputs controlled by this input are turned ON. When contact is broken between ON and COM, relay outputs controlled by this input are turned OFF. See section 3.5.1	
Maintained Multi-way: When contact is either made or broken between the ON and COM, relay outputs controlled by this input will be toggled between ON and OFF conditions. This function shall be similar to that of standard 3 and 4 way switches.	**Set Preset:** When momentary contact is made between the ON and COM, the selected preset scene will be activated.
	Force Timer: When momentary contact is made between the ON and COM, the selected timer will be activated.
Maintained ON/OFF w/Blink: When contact is made between the ON and COM, relay outputs controlled by this input are turned ON. When contact is broken between ON and COM, relay outputs controlled by this input shall blink and postpone being turned OFF. The alert time shall be programmable from 2 to 99 minutes. **Note:** Output must be programmed for a blink alert. See section 3.4.1	**Disabled:** When this is selected the inputs will not be active. If the Disabled switch input type A or B is set to an Input Active Time the switch input will be ignored.

Table 6 Input Types

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- **Input Toggle Source Relay:** This must be set if using a Push Button Toggle input type. From the Input Toggle Source Relay pull-down menus select the toggle relay's node number and relay number.

- **Input Active Times:** There are 2 types available, one type is based on the time-of-day and the other by the Open/Close times (see section 3.7.1 for Open/Close setup). For the time-of-day type, by default all times are active for type "A" switch input type, by clicking the time/day box you change to the "B" input type. Clicking on the time section or the day section will select the entire row or column. Press the "Next" button to go to the next time section or press "Prev" to go back.

- **Copy Device or Input Configurations:** To copy a device or input configuration programming from one to another, select the node from the pull-down menu next to the "Copy Device Configuration" or select the device and input from the "Copy Input Conf" and press the button.

- **Input Disable Conditionals:** An AND conditional can be set to allow switch activation only when both conditions are true. An OR conditional can be set to allow switch activation when either conditional is true. From the "Conditionals – Input Disable" area select condition "A", and then select the conditional type and the relay/input. Select the "B" conditional then select the logic desired. See table 7 for conditional types.

Conditional Types
Relay ON: Any chosen relay that is presently ON
Relay OFF: Any chosen relay that is presently OFF
ON input closed: Any chosen ON input that is closed
ON input open: Any chosen ON input that is open
OFF input closed: Any chosen OFF input that is closed
OFF input open: Any chosen OFF input that is open

Note: Switch inputs must be programmed with a switch type to function

Table 7 Conditional Types

- **Status Pilot Configuration:** LightSync devices equipped with status LEDs or status outputs can be programmed to illuminate or be active with the options shown in table 8 for each input. From the "Pilot Configuration" pull-down menu select the desired action for the pilot.

Pilot Status Options
Always ON: The status pilot light will always be illuminated (default setting)
Always OFF: The status pilot light will never be illuminated
Relay ON: The status pilot light will be illuminated when the chosen relay is ON
Relay OFF: The status pilot light will be illuminated when the chosen relay is OFF
Group True: The status pilot light will be illuminated when the chosen Group is true
Group False: The status pilot light will be illuminated when the chosen Group is false
Preset True: The status pilot light will be illuminated when the chosen Preset is true
Preset False: The status pilot light will be illuminated when the chosen Preset is false

Table 8 Pilot Status Options

3.5.2 Input Status: From the "Edit Node XX" (XX = the present node being programmed) or the "Edit Node NC" pull-down menu select "Switch Inputs", then "Input Status". From this screen you can select the desired device from a pull-down menu, it will indicate the device type it is programmed to, communications status to the device, input type settings, and switch input closure status indicators.

3.6 Mapping Inputs to Relays or Groups

3.6.0 Overview: Inputs must be programmed to control the relays to the desired action. This is accomplished at the panel level for each node. Note: Inputs must be configured using the procedure in section 3.5 prior to mapping.

3.6.1 Local Inputs to Relay Control: From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Relays", then "Input Mapping", then "Local Inputs to Relays" to enter the input to relay control screen. Select the LightSync device and the input number from the pull-down menu and then click on the relay to control for the desired action as shown in table 9. Note: The relay control actions may vary depending on the input type selected as shown.

3.6.2 Local Inputs to Group Control: From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Relays", then "Input Mapping", then "Local Inputs to Groups" to enter the input to Group control screen. Select the LightSync device and the input number from the pull-down menu and then click on the Group to control for the desired action as shown in table 9. There are 4 selectable screens with 64 Groups per screen. Note: The Group control actions may vary depending on the input type selected as shown.

Note: For local inputs to Relay or Group control an option is available on each screen to copy the mapping from a device/input to another device/input. Once the device and input are selected, set the device and input pull-down menu next to the "Copy Group Mapping", then press the button.

3.6.3 Network Inputs to Relay Control: From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Relays", then "Input Mapping", then "Network Inputs to Relays" to enter the network input to relay control screen. Select 1 of the available 64 Network Inputs, and then select the node/device/input of the LightSync device. Select the relay(s) by clicking on the relay until the desired action displays.

Relay Action
• **ON (SA H-P)** = ON only, HID power, Step A for 2/4 step switching
• **OFF (SB H/L)** = OFF only, HID high-low N.O., step B for 2/4 step switching
• **ON-OFF (H/C)** = ON/OFF, HID high-low N.C., step A for 2/4 step switching

Table 9 Relay Action

3.7 Time Based Operations

3.7.0 Overview: LightLEEDer panels are capable of 128 time based actions which include Time-of-Day, Astronomical scheduling, and Open-Close-Time control. Timers can turn ON or OFF any relay, group of relays, set a dimming output, or trigger any Preset. See table 10 for more information.

> • **Procedure:** Configure the timer as a Normal Time, Astro Time, or Open/Close Time, set the schedule to days- of week or daily calendar, set conditionals if required, and then map the timers to relay/group/preset control.

Timer Types and Functions
Time-of-Day(Normal): Schedule events based on a time of day or day of week which can be enabled or disabled for any day of the calendar year.
Astronomical Time Scheduling: Sunrise and Sunset times used for activation times. Activation times can be set from 1 to 999 minutes before or after these times.
Open-Close-Time Control: Timer control based on the Open and Closed times of the facility. Times can be programmed for each day of the week or individual days of the year. Activation times can be set from 1 to 999 minutes before or after these times.
Timer Functions: Can be programmed to turn relays, groups, or presets ON or OFF. Two timers will be needed to be programmed for ON and OFF control, 1 for ON and 1 for OFF.
Blink Alerts and Timer OFF Output Options: Are options that can be programmed into the system that react to an OFF timer to control relays off including; Blink Alert, Double Blink, HID Delay, Alarm OFF, Alarm ON, Alarm OFF Pulse, Alarm ON Pulse, Sentry, ACS OFF, and ACS Blink. See Section 3.7.4 for more information on these options.

Table 10 Timer Types and Functions

3.7.1 Configure Timers: For the following programing select the "Edit Node NC" pull-down menu select "Timers", then "Configure Timers" to enter the Configure Timers screen as shown in figure 3.1.

> • Time-of-Day (Normal Timers): Select "Normal Time" from the "Time of Day" area, and then select the time from the three pull-down menus you want the timer to control the relays.
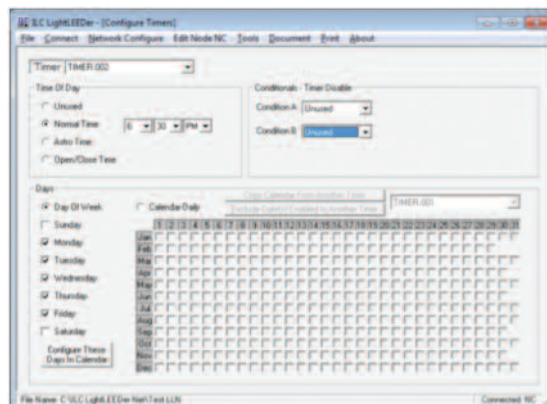

Figure 3.1

- **Astronomical Time Scheduling (Sunrise/Sunset):** Select "Astro Time" from the "Time of Day" area, then the Sunrise/Sunset selection and any offsets from the pull-down menu required.

- **Open-Close Time Control:** This will set the times when your facility opens and closes. Times set for a specific date (or holiday) supersedes the normal times of the week. Select the Open/Close from the "Time of Day" area, then the Open/Close selection and any offsets from the pull-down menu required.

- **Configure Active Days-of-Week:** Select "Day-of-Week" from the "Days" area, and then select the days required with the check boxes provided. Note: A button is provided to configure the days into the calendar from the "Day of Week" selection.

- **Configure Active Calendar Daily:** Select "Calendar-Daily" from the "Days" area, and then select the days/dates required with the check boxes provided. Selecting month or a date will select the whole row of column. To copy/exclude a calendar from another timer, select the timer to copy or exclude and press the appropriate button to activate.

- **Configure Timer Conditionals Timer Disable:** An AND conditional can be set to disable a timer when both conditions are true. An OR conditional can be set to disable a timer when either conditional is true. From the "Conditionals – Timer Disable" area, select condition "A", and then select the conditional type and the relay/input. Select the "B" conditional then select the logic desired. See table 7 for conditional types.

3.7.2 Timer Mapping Control: Timer mapping assigns the relays being controlled to the timers programmed for the action you require.

- **Timer to Relay Control:** From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Timers", then "Timer to Relay Control", Select the timer, then select the relay until the required action appears.

- **Timer to Group Control:** From the "Edit Node NC" pull-down menu select "Timers", then "Timer to Relay Control", select the timer, then select the Group until the required action appears.

- **Timer to Preset Control:** From the "Edit Node NC" pull-down menu select "Timers", then "Timer to Preset Control", select the timer, then select the Preset until the required action appears.

3.7.3 Off Hour Sweeps: You can program the controller to execute OFF sweeps at intervals of 1, 2, or 3 hours after a normal Close Time to turn lights OFF that have been turned ON by switches and other means. To use this function a Close Time must be setup in the Open/Close timers. Off hour sweeps can control relays or groups.

- **Intervals:** From the "Edit Node NC" pull-down menu select "Timers", then "Off Hour Sweeps", and then "Interval". Select 1, 2, or 3 hour interval of the Off-Hour sweeps.

- **Groups:** From the "Edit Node NC" pull-down menu select "Timers", then "Off Hour Sweeps", and then "Groups". Select the groups required on the 4 available screens to be controlled by the Off-Hour sweeps.

- **Relays:** From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Timers", then "Off Hour Sweeps", and then "Relays". Select the relays to be controlled by the Off-Hour sweeps.

3.7.4 Blink Alert and Alarm Settings: These internal timing settings will determine how a relay will operate when commanded OFF: Blink Alert, Double Blink, HID Delay, Alarm OFF, Alarm ON, Alarm OFF Pulse, and Alarm ON Pulse.

- Blink Alert: The length of time between a blink alert and the execution of an OFF timer, which has not been overridden by a switch closure. The default is 5 minutes and can be adjusted from 2 to 99 minutes.

- Override: The length of time a switch closure can be programmed to postpone the execution of an OFF timer (blink alert). The default is 120 minutes and can be adjusted from 2 to 999 minutes.

- Alarms: The length of time an alarm or alarm pulse will be activated. The default is 5 seconds and can be adjusted from 1 to 99 seconds.

From the "Edit Node NC" pull-down menu select "Timers", then "Blink Alert and Alarm Settings". From the three pull-down menus select the required times.

3.7.5 Configure Timed-ON: Timed-on settings are for inputs that are controlling relays ON for a predetermined time (set in the input types) and then turned OFF after that time. This setting determines whether the timer starts when the switch is opened or closed. From the "Edit Node NC" pull-down menu select "Timers", then "Configure Timed-On". Select timed-on timers begin when input opens/closes.

3.7.6 Test Timers: From the "Edit Node NC" pull-down menu select "Timers", then "Test Timers". Select the "Test" button next to the timer number on the 2 screens available.

3.8 Programming Examples

3.8.0 Overview: This section has some basic programming examples to help guide you to program the system properly.

3.8.1 Program a LightSync Switch to Control Relays: Program a 2 button LightSync pushbutton switch located in node 01. The address of the device is 01.04. The inputs on the switch from top to bottom are 01.04.1 and 01.04.2. Input 01.04.1 controls relay 5 and input 01.04.2 controls relays 7, 9. Control is On/OFF. We will assume the panels and relays have been configured prior to the following.

Configure the Input:

> 1. Select Node 1 from the "Network Configure" screen.
>
> 2. From the "Edit Node 01" pull-down menu select "Switch Inputs", then "Configure Inputs".
>
> 3. Select LightSync device 04 from the pull-down menu.
>
> 4. Select a 2 button device type.
>
> 5. From Input 1 Type A select Push Button ON/OFF
>
> 6. Select Input 2 and set to the same input type.

Map the Inputs to a Group:

> 7. From the "Edit Node 01" pull-down menu select "Relays", then "Input Mapping" then "Local Inputs to Relays"
>
> 8. Select Device 04 Input 1.
>
> 9. Click on relay 05 until it displays ON/OFF for the action.
>
> 10. Select Input 2, then click on relays 07 and 09 until they display ON/OFF for the action.
>
> 11. Save the programming
>
> 12. Download the programming to the controllers

3.8.2 Program a Network Input to Control a Group: Program a 1 pushbutton switch (addressed as 00.0A.1) that is a device node on the panel network to control relay group 003 ON/OFF. Relay group 003 is composed of relays 10 and 12 located in Controller node 01 and relays 25 and 27 located in Controller node 04.

Configure the Input:

> 1. Select NC from the "Network Configure" screen.
>
> 2. From the "Edit Node NC" pull-down menu select "Switch Inputs", then "Configure Inputs".
>
> 3. Select LightSync device 0A from the pull-down menu.
>
> 4. Select a 1 button device type.
>
> 5. From Input 1 Type A select Push Button ON/OFF

Configure Group:

> 6. Select Node 01 from the "Network Configure" screen.
>
> 7. From the "Edit Node 01" select "Relays", then "Relay Grouping".
>
> 8. Select Relay Group 003 from the pull-down menu.
>
> 9. Click on relays 10 and 12 to include them in this group.
>
> 10. Select Node 04 from the "Network Configure" screen.
>
> 11. Enter the "Relay Grouping" screen of Node 04 and include relays 25 and 27.

Map the Inputs to Control the Group:

> 12. From the "Edit Node NC" select "Relays", then "Input Mapping", then "Local Inputs to Groups".
>
> 13. Select Device 0A, Input 1
>
> 14. Select Group 003 until the ON/OFF action appears.
>
> 15. Save the programming
>
> 16. Download the programming to the controllers

3.8.3 Configure a Normal Timer to Turn Relays ON and OFF: Configure Timer 001 to turn relays 6, 7, 8 in node 01 ON at 07:30 AM and Timer 002 to turn them OFF at 06:30PM Monday through Friday.

Configure the Timer:

1. From the "Edit Node NC" select "Timers", then "Configure Timer".

2. With the 001 Timer selected, press "Normal Timer"

3. Set the time to 7:30 AM.

4. Select the check boxes for the days of Monday through Friday.

5. Select Timer 002 and set as a Normal Timer also.

6. Set the time to 6:30 PM

7. Select the check boxes for the days of Monday through Friday.

Map the Timers to Control the Relays:

1. Select Node 01 from the "Network Configure" screen.

2. From the "Edit Node 01" select "Timers", then "Timer to Relay Control"

3. Select Timer 001 from the pull-down menu.

4. Select Relays 06, 07, and 08 until their action is ON.

5. Select Timer 002

6. Select Relays 06, 07, and 08 until their action is OFF.

7. Save the programming

8. Download the programming to the controllers

Section 4
Appendix
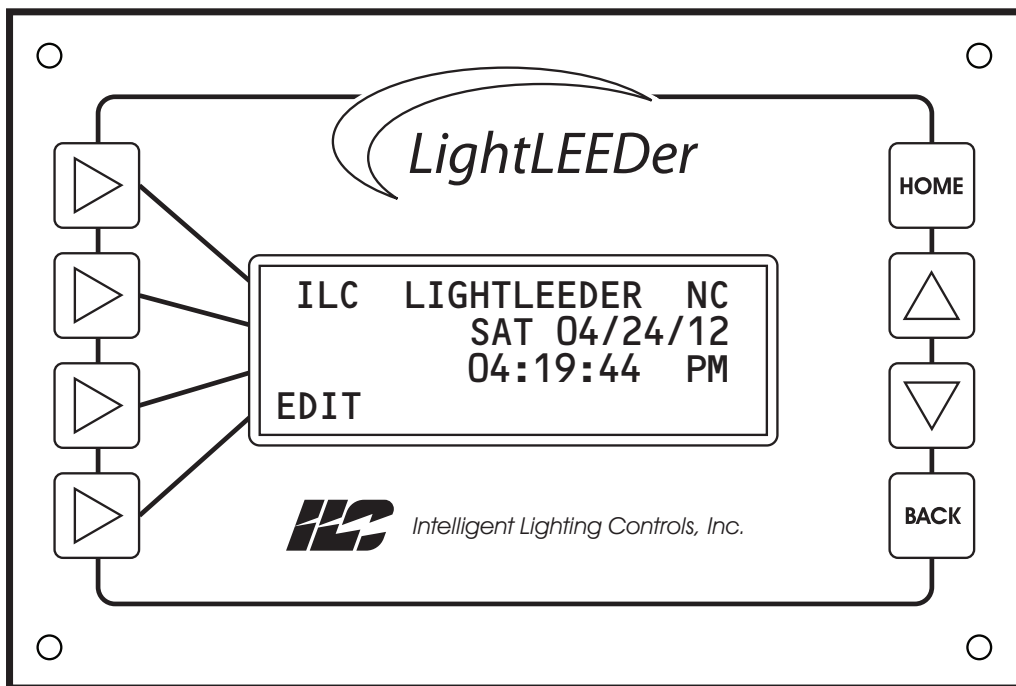
Section 4 Appendix

4.0 Dimmer Module Configuration and Programming

4.1 DMX Module Configuration and Programming

4.2 Modbus Module Configuration

4.3 Motor Control Module Configuration and Programming

4.0 Dimmer Module Configuration and Programming

The LightSync Dimming Module is designed for 0 – 10V device control. It is used in conjunction with a photocell controller for programmable daylight harvesting. This module can be installed in the lighting control panel or remotely mounted on the LightSync network. Each of the 4 independent channels can control up to 200 ballasts with 256 steps between 0 and 10V. Each output may be programmed to respond to 16 control options per channel.

Dimmer Output Enable: From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Other Devices", then "Dimmer Outputs", and then select "Configure Dimmer Outputs". Select the Dimmer output device from the pull-down menu, then select the check box to enable device.

Dimmer Output Configuration: From the Dimmer Output Configuration select the output, and then from the pull-down menus select the desired functions.

> • Power-ON Levels: Sets the dimming output level at start-up from 0 -100%.
>
> • Fade Rate: Setting allows the output to ramp up or ramp down at an adjustable rate from 0 – 300 seconds.
>
> • Min Output: The output level can be set to a minimum setting from 0- 100%. This option is used if a fixture flickers at very low settings.
>
> • Max Output: The output level can be set to a maximum setting from 0 – 100%. This option is used if the level is required to only reach a maximum level.
>
> • DMX Enable: Enabling this feature allows DMX control directly to the dimmer output. Note: a DMX module is required.
>
> • Photocell (PC) Tracking: Allows tracking of a photocell in an open-loop 2/3 point tracking or a closed-loop set-point tracking.

Photocell 2 or 3 Point Tracking (open loop): From the Dimmer Output screen select PC Tracking 2 Point or PC Tracking 3 Point from the pull-down menu. Select the tracking device panel node and the photocell address, and then from the graphical screen move the points for the desired voltage output and foot candle to get the desired operation.

Photocell Set-point Tracking (closed loop): From the Dimmer Output screen select PC Tracking Set-point from the pull-down menu. Select the tracking device panel node and the photocell address, and then select the target foot candles from the pull down menus.

Control Options: Each output has 16 dimming control options available for control which include; Inputs, Timers, and Presets.

> • **Program Input Control:** Select a Control Point from the pull-down menu, set the Control to Input, then select the Node/Device/Input from the pull-down menus.
>
> • **Program Timer Control:** Select a Control Point from the pull-down menu, set the Control to Timer, and then select the Timer from the pull-down menus.
>
> • **Program Preset Control:** Select a Control Point from the pull-down menu, set the Control to Preset, then select the Preset from the pull-down menus.
>
> • **Control Action:** Select a Control Action from the pull-down menu to revert to photocell, raise level 10%, lower 10%, or a Go-To level from 0 – 100%.
>
> • **Fade/Instant:** Select from the pull-down menu to select whether the action will be instant or fade to the desired level.
>
> • **Revert Options:** This is a setting as to when an output will revert back to photocell control. These options include; when an Input opens, never reverts, or from 5 to 600 minutes in 5 minute increments.

Copy Basic Configuration to All Dimmer Outputs: A button on each screen is available to copy to all dimmer outputs the following; power-on level, fade rate, min/max levels, and photocell tracking.

Dimmer Output / Relay Control: Relays can be controlled by each dimmer output ON and OFF. From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Other Devices", then "Dimmer Outputs", then select "Dimmer Output / Relay Control". Select the Dimmer Output Device from the pull-down menu that matches the address of the hardware, and then from the pull-down menus select the output, ON level, and OFF level.

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4.1 DMX Module Configuration and Programming

The LightLEEDer DMX512 Control Module provides control of relays and 0 – 10V dimming devices. Any channel from the DMX controller can be mapped to control any relay or set of relays ON or OFF in the panel. The ON and OFF set points are adjustable from 1 to 100% and relays may be locked-on or locked-off.

- **Configure Module:** From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Other Devices", then "Add-On Modules", then select the Add-on port the device is physically connected to. Select the "DMX Receiver" device from the pull-down module type menu.
- **ON/OFF Levels and Priority:** From the pull-down menus select the percentage levels from 1% to 99% to turn the relays ON and OFF. From the Priority pull-down menu select either DMX or Inputs. Setting the priority to DMX will lock-on the relay if above the ON level or lock-off the relay if below the OFF level.
- **Map Relays to DMX Channels:** From the pull-down menu next to each relay select the DMX channel required. After mapping the first relay, an Auto Map button will appear which will map them sequential if pressed.

4.2 Modbus Module Configurations

Modbus protocol is an open protocol developed by Gould-Modicon to integrate industrial PLC's, sensing devices, and other control devices. LightLEEDer Modbus modules can interface either ASCII or RTU type of communications with Baud rates from 4800 to 38,400 and parity of none, even, or odd. With the panel module, commands can be sent to the panel to force relays On and OFF, force relays On and OFF with a timer option (blink, double blink, HID delay, Alarm ON, Alarm OFF, Pulse ON, and Pulse OFF), monitor relay status, monitor input status, and enable/disable inputs.

- **Configure Module:** From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Other Devices", then "Add-On Modules", then select the Add-on port the device is physically connected to. Select the "ModBus" device from the pull-down module type menu.
- **Modbus Configuration:** From the pull-down menus select the communication settings for mode, baud rate, and parity. See the LightLEEDer Operation Manual for more information.

4.3 Motor Control Module Configuration and Programming

Configure Module: From the "Edit Node XX" (XX = the present node being programmed) pull-down menu select "Other Devices", then "Motor Outputs", then select the Add-On device address of the device and select "Device Enabled".

Control Options: Each output has 16 motor control options available for control which include; Inputs, Timers, and Presets.

- **Program Input Control:** Select a Control Point from the pull-down menu, set the Control to Input, then select the Node/Device/Input from the pull-down menus.
- **Program Timer Control:** Select a Control Point from the pull-down menu, set the Control to Timer, and then select the Timer from the pull-down menus.
- **Program Preset Control:** Select a Control Point from the pull-down menu, set the Control to Preset, then select the Preset from the pull-down menus.
- **Control Action:** Select a Control Action from the pull-down menu to Stop, Run Positive, or Run Negative.
- **Output Runtime:** From the pull-down menu select Latched or runtime from .1 to 300 seconds.