

# Wi-OLC System

Wireless Outdoor Lighting Control System

## User Manual

**FP**  *Outdoor Lighting Controls*



**Sun - Tech**

Sunrise Technologies, Inc.

# Wi-OLC System

Wireless Outdoor Lighting Control System

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## Disclaimer

### Information to user:

The Wi-OLC System is authorized to operate on the 2.4GHz, unlicensed short range wireless frequency band (IEEE 802.15.4 <sup>TM</sup> specifications) authorized by the Federal Communications Commission (FCC).

The 2.4GHz Radio Service is under the jurisdiction of the Federal Communications Commission (FCC). Any adjustments or alterations which would alter the performance of the transceiver's original FCC type acceptance, or which would change the frequency or performance are strictly prohibited.

Replacement or substitution of crystals, transistors, ICs, regulator diodes or any other part(s) of a unique nature, with parts other than those recommended by Sunrise Technologies, Inc may cause violations of the technical regulations in Part 15 of the FCC Rules or in violation of type acceptance requirements of the rules.

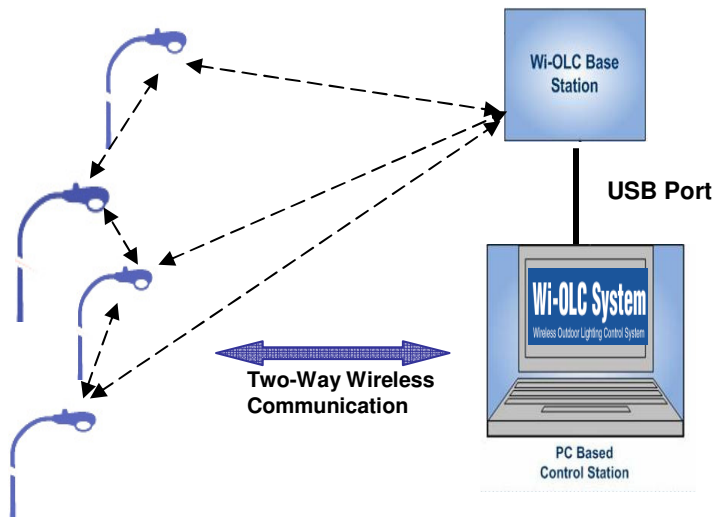
The FCC with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. The Sunrise Technologies Wi-OLC base Station or Photocontrol Node meet the human exposure limits found in OET Bulletin 65, and ANSI/IEEE C95.1. Proper operation of these radios in accordance to the instructions found in this manual will result in exposure substantially below FCC's recommended limits.

The following safety precaution should be observed:

- In order to comply with FCC RF exposure limits, the Base Station or the Photocontrol Node should be located at a minimum distance of 20 cm (8 inches) or more from the body of all persons.

# Wi-OLC System

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## Wi-OLC Wireless Network

### System Overview

The Wi-OLC System is a Personnel Computed (PC) based system designed to control outdoor light using wireless radio technology. The Base station and Wi-OLC nodes form a mesh communication network using ZigBee Pro wireless radios.

The Control Panel Software specifically developed for the application performs two main functions, the first is to manage the wireless network and the second to manage the pre-defined lighting schedules.

The Control Panel Software allows for control of individual lights or as groups of lights. The software uses Time of Day and Day of week from schedules for the entire year.

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**Wi-OLC System Components**

## System Requirements

The Wi-OLC system uses the following platform for the system:

- Control Panel software – Microsoft Visual Basic 6.0 with MS Access Database, on Windows 2000/XP/Vista using Intel x86 based PC (**User Supplied**).
- Base Station – Telegesis ZigBee Pro USB Dongle or Ethernet Base Station to the Control Panel PC Software.
- OLC Photocontrol Nodes – OLC Photocontrol nodes equipped with ZigBee Pro Mesh Wireless Technology.

## Getting Started

Control Panel Software Installation

Install Control Panel Software on PC dedicated to the Wi-OLC system by running **Setup.EXE** from CD provided. The Setup program will prompt you through the setup process.

## Connect Base Station

Connect Base station Dongle to USB port or Ethernet Port (depending of type of Base station) on PC dedicated to the Control Panel software.

PC must be on at all times with Control Panel software running in order for real-time monitoring and control of lights. It is recommended to battery carry-over PC during power outages.

# Wi-OLC System

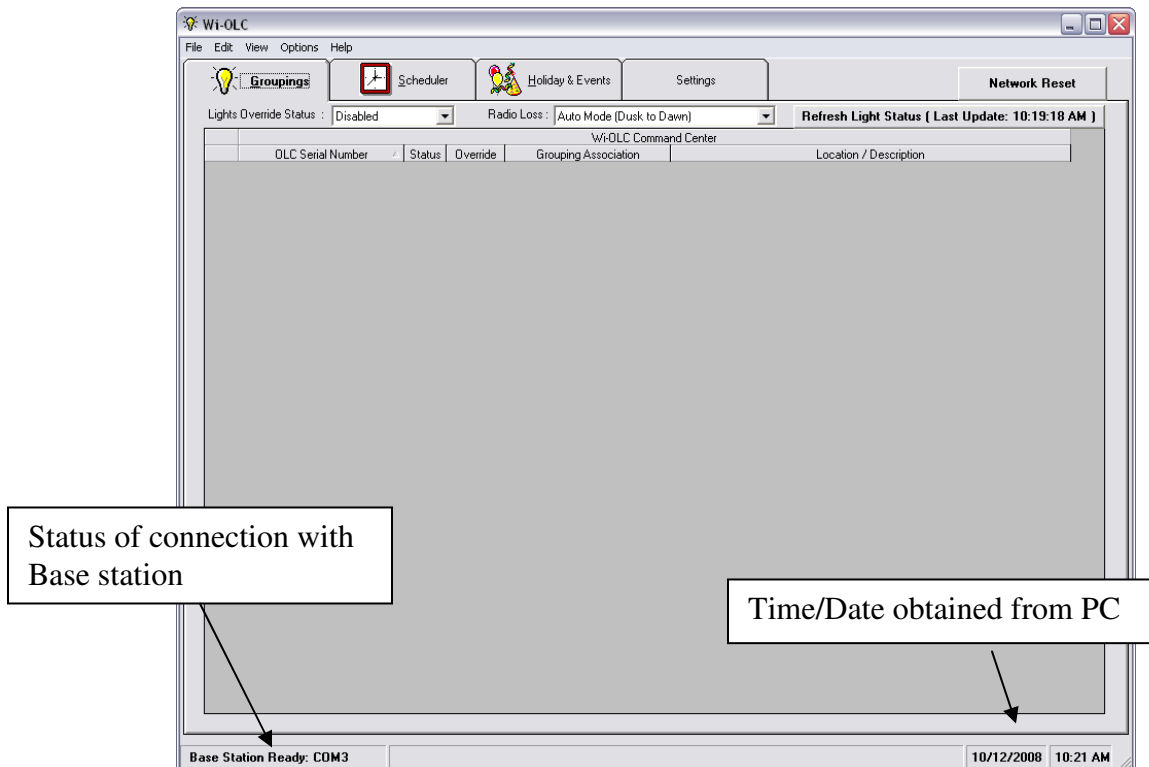
Wireless Outdoor Lighting Control System

## PC Placement

Wireless communication from the Base station to the Wi-OLC nodes can be affected by walls and other solid obstructions. To achieve maximum reliable communication with the Wi-OLC nodes locate the PC/Base station as close to an outside wall as possible.

## Start Control Panel Software

Start the Control Panel software by going to “**Start**” on bottom tool bar on the PC desktop, then go to “**Programs**” and Select “**Wi-OLC Control Panel**”

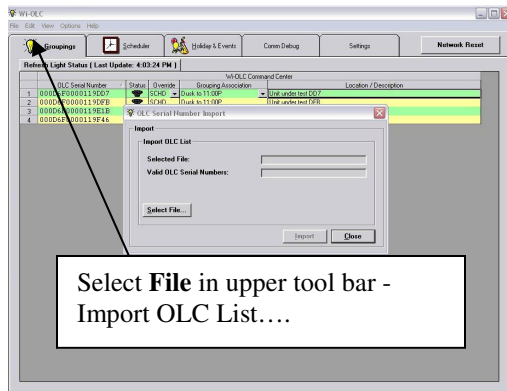


To make it easier to start the Control Panel software drag icon to PC Desktop. The following icon will display on the PC Desktop.

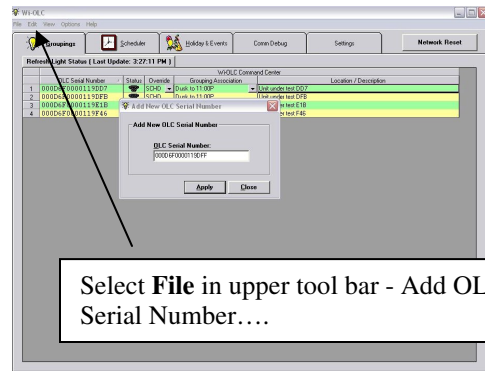


## Entering Wi-OLC Serial Numbers

In order for the system to recognize the Wi-OLC nodes as part of this network the Wi-OLC serial numbers (MAC Addresses) need to be entered into the Control Panel Database.



Up Load Serial Number File



Manual Serial Number Entry

### Import List

A database file is provided with each set of Wi-OLC nodes supplied. The list can be imported to the Control Panel software by selecting **File - Import List.....** then select location of database file.

### Manual Entry

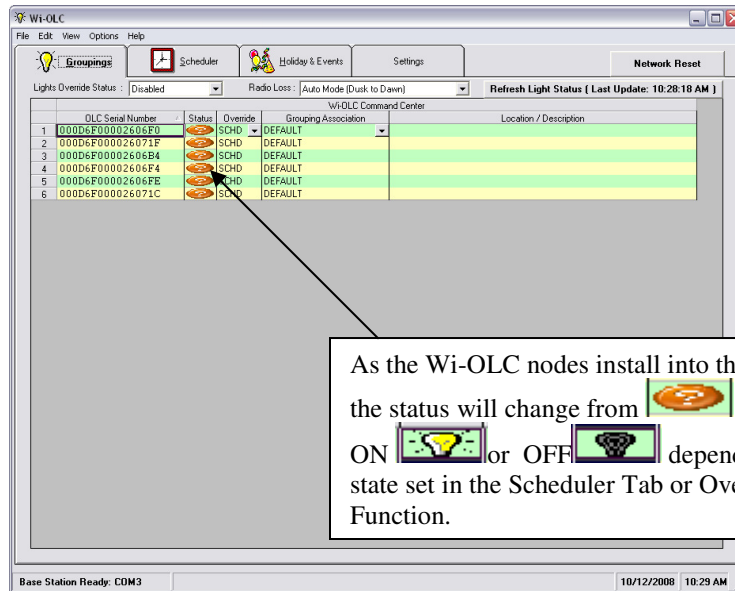
Enter 16 digit alpha-numeric numbers into database by selecting **File – Add OLC Serial Number.....**, making sure to use all capitals letters. Example: 000D6F00002606F6

# Wi-OLC System

Wireless Outdoor Lighting Control System

## Wi-OLC Node Installation into Control Panel Software

The first time the Wi-OLC nodes are commissioned into the network they go through a process of finding the best RF path to the Basestation and can take several minutes depending on the size of the network.





## Installing Wi-OLC Nodes on Outdoor Light Fixtures

Remove existing photocontrol and replace with the Wi-OLC node. An internal **RED** LED will flash and continue to flash until the Control Panel Software has confirmed the serial number is in the OLC Serial Number list in the Groping Tab. The Wi-OLC node will respond to the internal light sensor and can be “Glove Tested” to check lamp and fixture is working properly.



**Typical Installation**

When installing Wi-OLC nodes make sure Control Panel Software is running.

It is recommended to start the installation as close to the Base Station to ensure communication with each light as they are installed. The “Line of Site” communication range from one Wi-OLC to another is approximately 2,000 feet.

## Grouping Tab

The Group Tap is used to identify the individual Wi-OLC and assign it to a specific group of lights. This Tab is also used to document the physical location of each Wi-OLC Node.

**Status Column –** Indicates state of each light under control.

- Lamp On – Last reported state of light under control.
- Lamp Off – Last reported state of light under control.
- Known State – Wi-OLC nodes that have not been commissioned into network or the Control Panel Software has been shutdown and restarted.
- Stopped reporting- After three consecutive polls with no response from the Wi-OLC node, the red “X” will be displayed.

	OLC Serial Number	Status	Override	Grouping Association	Location / Description
1	000D6F000026071F		SCHD	Dusk to 11:30 PM	Front Parking Lot Pole Number 22
2	000D6F000026071C		SCHD	Dusk to 11:30 PM	Front Parking Lot Pole Number 23
3	000D6F00002606FE		SCHD	Dusk to 11:30 PM	Back parking Lot Pole Number 40
4	000D6F00002606F4		SCHD	Dusk 11:30 Off Wknd	Back Parking Lot Pole Number 43
5	000D6F00002606F0		SCHD	Dusk 11:30 Off Wknd	Back Parking Lot Pole Number 44
6	000D6F00002606B4		SCHD	Dusk 11:30 Off Wknd	Back Parking Lot Pole Number 45

Base Station Ready: COM3

## OLC Serial Number Column

Each Wi-OLC node is assigned a serial number to identify it for network management as well as monitoring and control purposes. To delete for any reason the Wi-OLC node from the system by highlighting the record and then select Edit in the upper tool bar and the option to delete can be selected.

## Location/Description Column

In order to keep track of each Wi-OLC node a open field is provided to enter data associated with the specific installation.

# Wi-OLC System

Wireless Outdoor Lighting Control System

## Groupings Tab – Continued

**Override Column –** Selecting **ON** or **OFF** will Override all scheduler operation for individual light. The light will need to be put back in **SCHD** for the light to be back under Scheduler control.

**Grouping Association Column –** This field assigns each OLC Node to specific group.

	OLC Serial Number	Status	Override	Grouping Association	Location / Description
1	000D6F000026071F		SCHD	Dusk to 11:30 PM	Front Parking Lot Pole Number 22
2	000D6F000026071C		SCHD	Dusk to 11:30 PM	Front Parking Lot Pole Number 23
3	000D6F00002606FE		SCHD	Dusk to 11:30 PM	Back Parking Lot Pole Number 40
4	000D6F00002606F4		SCHD	Dusk 11:30 Off Wkend	Back Parking Lot Pole Number 43
5	000D6F00002606F0		SCHD	Dusk 11:30 Off Wkend	Back Parking Lot Pole Number 44
6	000D6F00002606B4		SCHD	Dusk 11:30 Off Wkend	Back Parking Lot Pole Number 45

Base Station Ready: COM3

10/11/2008 1:35 PM

## Scheduler Tab

This Tab setups each of the Lighting Control Groups. Each group can be setup for 7 Day repeating schedule, Monday-Friday, Weekend and many other schedule combinations.

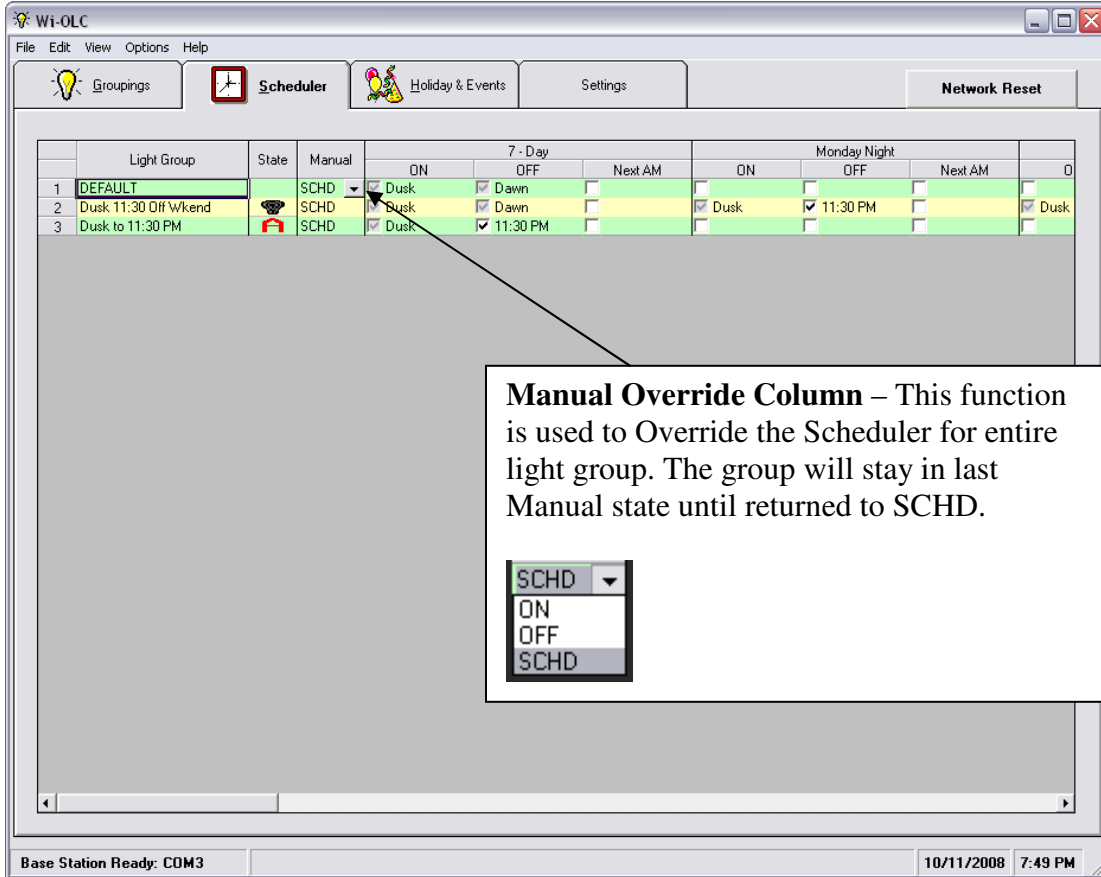
**State Column**

- Blank indicates group is not used to control any of Wi-OLC nodes.
- Light group Off and under control of the Scheduler.
- Light group is On and under control the Scheduler.
- Light group is in Auto State, meaning the light is under local control of the internal light sensor in Wi-OLC node.

## Light Group Column

Light control groups are added in the Groups tab by Selecting **Add Group** in the Group Association Column or by selecting File in the upper Tool Bar and selecting Add Group. Once the Group is added it can setup with a Schedule.

## Scheduler Tab - Continued



**Manual Override Column** – This function is used to Override the Scheduler for entire light group. The group will stay in last Manual state until returned to SCHD.

SCHD  
ON  
OFF  
SCHD

Light Group	State	Manual	7 - Day			Monday Night			0
			ON	OFF	Next AM	ON	OFF	Next AM	
1 DEFAULT	SCHD		<input type="checkbox"/> Dusk	<input checked="" type="checkbox"/> Dawn		<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> 11:30 PM	<input checked="" type="checkbox"/> Dusk	
2 Dusk 11:30 Off Wkend	SCHD		<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> Dawn		<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> 11:30 PM	<input checked="" type="checkbox"/> Dusk	
3 Dusk to 11:30 PM	SCHD		<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> 11:30 PM		<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> 11:30 PM	<input checked="" type="checkbox"/> Dusk	

Base Station Ready: COM3      10/11/2008 7:49 PM

## Scheduler Tab –Continued

### Wi-OLC Node Scheduling

The scheduler's logic works from left to right. The default setting is for Dusk to Dawn operation on a 7-Day schedule. Any changes made to the columns to the right will override the 7-Day schedule.

Light Group	State	Manual	7 - Day			Monday Night			Blank Field
			ON	OFF	Next AM	ON	OFF	Next AM	
1 DEFAULT	SCHD	<input type="checkbox"/>	<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> Dawn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Dusk 11:30 Off Wknd	SCHD	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> Dawn	<input type="checkbox"/>	<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> 11:30 PM	<input type="checkbox"/>	<input checked="" type="checkbox"/> Dusk
3 Dusk to 11:30 PM	SCHD	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Dusk	<input checked="" type="checkbox"/> 11:30 PM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Dusk** – Light turns ON approximately 20 minutes after Sunset.

**Dawn**- Light turns OFF approximately 20 minutes before Sunrise

**Time** – Time of day used to control group.

**Next AM** – Light Turns ON in early morning before Dawn and light will turn OFF at Dawn

**Blank Field** – No operation is scheduled and reverts to 7-Day Columns for operation.

### On/Off/Next AM Columns

The Scheduler can be setup on a 7-Day repeating schedule or different time for each day of the week. There are columns provided for Holidays and Special Events.

## Scheduler Tab –Continued

### Disable Light Group for Entire Night

Selecting OFF in both ON and OFF columns keeps lights off for an entire night.

The screenshot shows the 'Scheduler' tab in the Wi-OLC software. The interface includes a menu bar (File, Edit, View, Options, Help) and a toolbar with icons for Groupings, Scheduler, Holiday & Events, Comm Debug, Settings, and Network Reset. Below the toolbar is a table with the following columns: Light Group, State, Manual, and scheduling columns for Saturday Night, Sunday Night, and Holiday. The scheduling columns are further divided into ON, OFF, and Next AM. A callout box points to the 'OFF' selection in the 'ON' and 'OFF' columns for Saturday Night, indicating that selecting 'OFF' in both columns keeps the lights off for the entire night.

Light Group	State	Manual	Saturday Night			Sunday Night			Holiday		
			ON	OFF	Next AM	ON	OFF	Next AM	ON	OFF	Next AM
1 DEFAULT		SCHD									
2 Dusk 11:30 Off W/weekend		SCHD	OFF	OFF		OFF	OFF		OFF	OFF	
3 Dusk to 11:30 PM		SCHD									

A selection is provided in both ON and OFF Columns to keep light Off for all night.

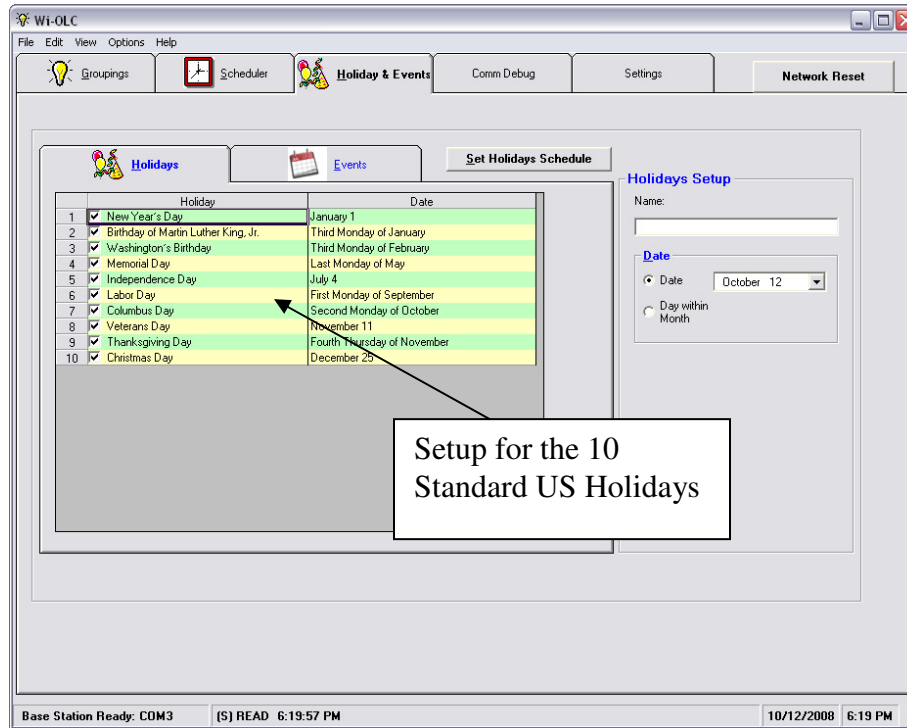
OFF  
Dusk  
OFF

Base Station Ready: COM3 10/12/2008 11:35 AM

## Holiday & Events Tab

### Holiday Tap

This section sets up the holidays for use by the Scheduler.

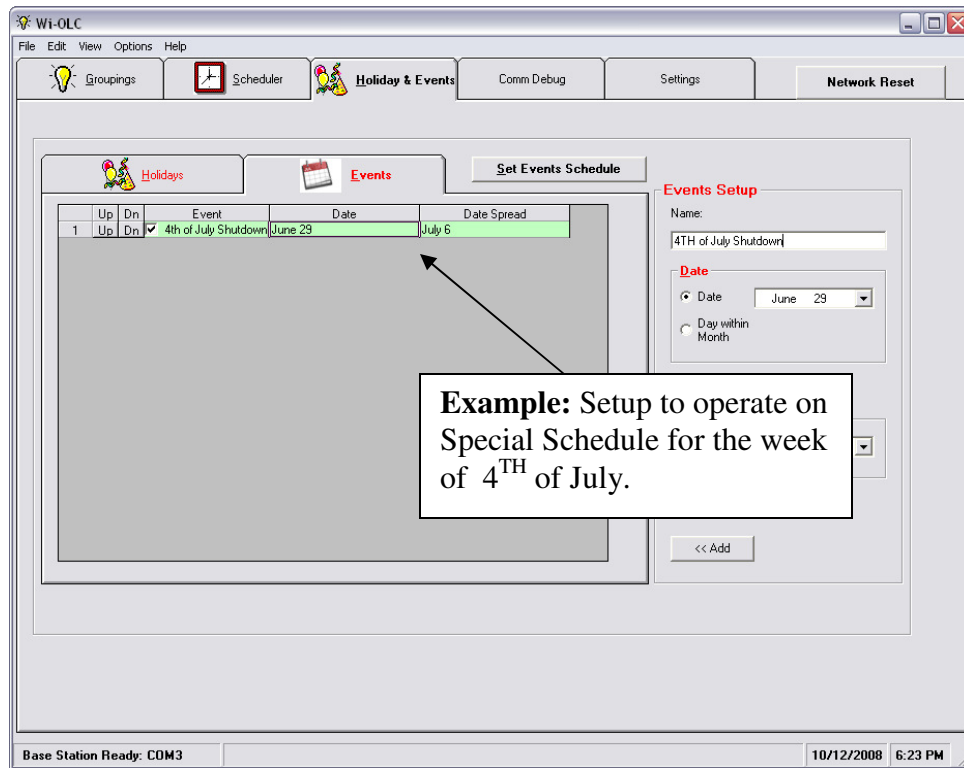


Setup for the 10  
Standard US Holidays



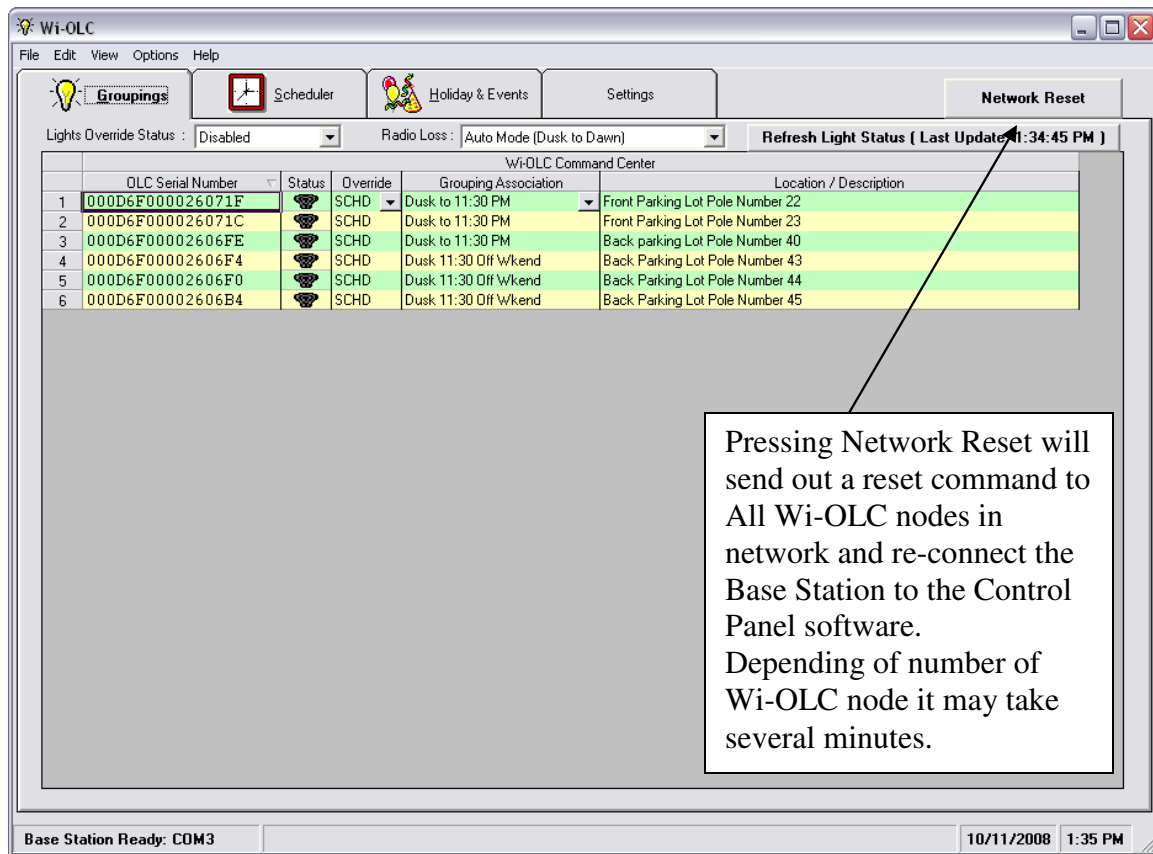
## Special Events Tap

The option is able to setup a string continuous days to act as a special Event period.



## Network Reset Command

On receiving a Network Reset message from the Control Panel, the OLC nodes perform a network initialization. It performs a join to the network and starts its internal timers to receive Read/Write commands from the Control Panel. The Control Panel is not restarted and the lamp continues to be in the last given command state.



## Override Feature

An override function is provided in the case all schedules need to be overridden and all lights are to be turned ON or OFF immediately.

The screenshot shows the Wi-OLC software interface. The 'Scheduler' tab is active. The 'Lights Override Status' is set to 'Disabled'. The 'Radio Loss' is set to 'Auto Mode (Dusk to Dawn)'. The 'Refresh Light Status' button shows the last update as 1:34:45 PM. Below this is a table of light schedules.

	OLC Serial Number	Status	Override	Grouping Association	Location / Description
1	000D6F000026071F		SCHD	Dusk to 11:30 PM	Front Parking Lot Pole Number 22
2	000D6F000026071C		SCHD	Dusk to 11:30 PM	Front Parking Lot Pole Number 23
3	000D6F00002606FE		SCHD	Dusk to 11:30 PM	Back Parking Lot Pole Number 40
4	000D6F00002606F4		SCHD	Dusk 11:30 Off Wknd	Back Parking Lot Pole Number 43
5	000D6F00002606F0		SCHD	Dusk 11:30 Off Wknd	Back Parking Lot Pole Number 44
6	000D6F00002606B4		SCHD	Dusk 11:30 Off Wknd	Back Parking Lot Pole Number 45

**Lights Override Status Dropdown Box**  
 Selecting **All Lights ON** or **All Lights OFF** will turn lights ON or OFF until commanded to return from Override state.

Disabled  
 Disabled  
 All Lights ON  
 All Lights OFF  
 All Lights Auto

Selecting **All Lights Auto** puts all the lights into Dusk to Dawn control (Wi-OLC node internal light sensor) until commanded to return from Override state.

Base Station Ready: COM3 10/11/2008 1:35 PM

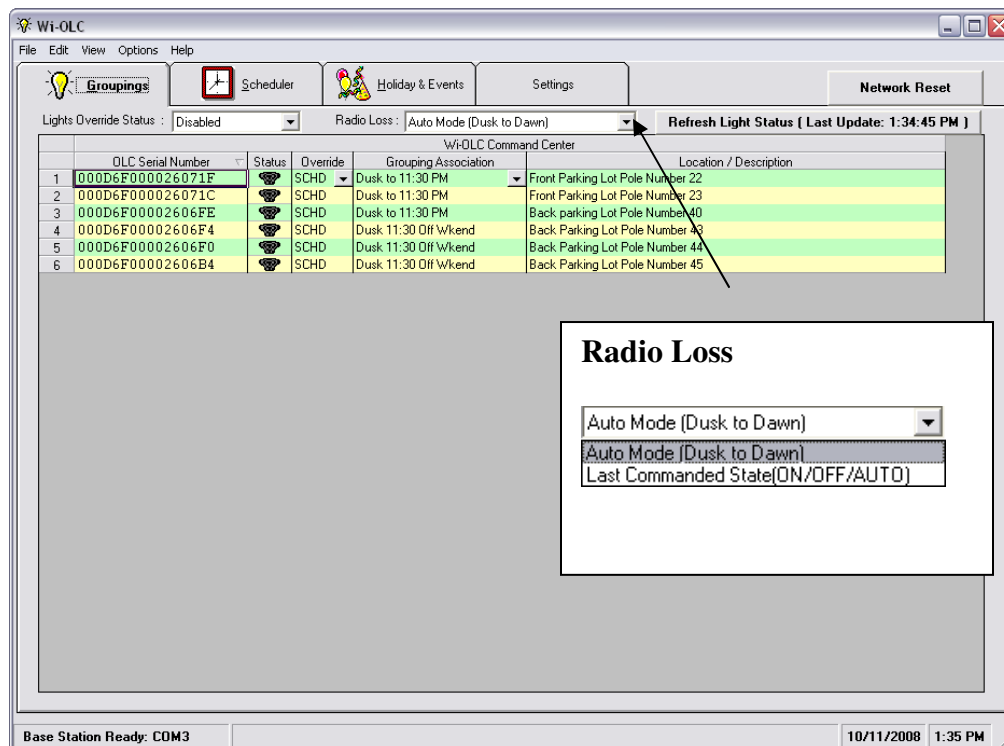
## Disable (Override)

In order to return lights to their normal Schedules, the **Disable** function must be selected. This will send a command to the all Wi-OLC nodes to return to normal schedules.

The Fail-safe feature is to enable Safe operation of lights in the rare event the **Radio Loss Function**

The Radio loss function is used to

If the Wi-OLC node does not receive the periodic Poll Request from the Control Panel for 3 Polling Period, this indicates that there is a failure in the Control Panels/Base station or the Control Panel Software is shutdown. This will cause the Wi-OLC nodes to revert to Fail-Safe mode which is Dusk to Dawn operation using internal light sensor after the 3 polling periods.



The OLC node then needs to move to fail-safe operation based on the “fail-safe enable” parameter in the non-volatile memory configured by the Control Panel. This parameter is used to indicate if the Control Panel is shut down by the operator or has failed unexpectedly. The OLC first checks the value of fail-safe mode parameter.

- If fail-safe enable parameter in OLC node configuration is set to TRUE, the OLC Photocontrol node switches to Auto mode and performs photo sensor-based dawn-to-dusk operation. This is the normal fail-safe operation at the OLC node
- If the fail-safe enable parameter is set to FALSE, the OLC Photocontrol node continues in the same state as per the last command given from the Control Panel (Lamp On/Off/Auto).

# Wi-OLC System

Wireless Outdoor Lighting Control System

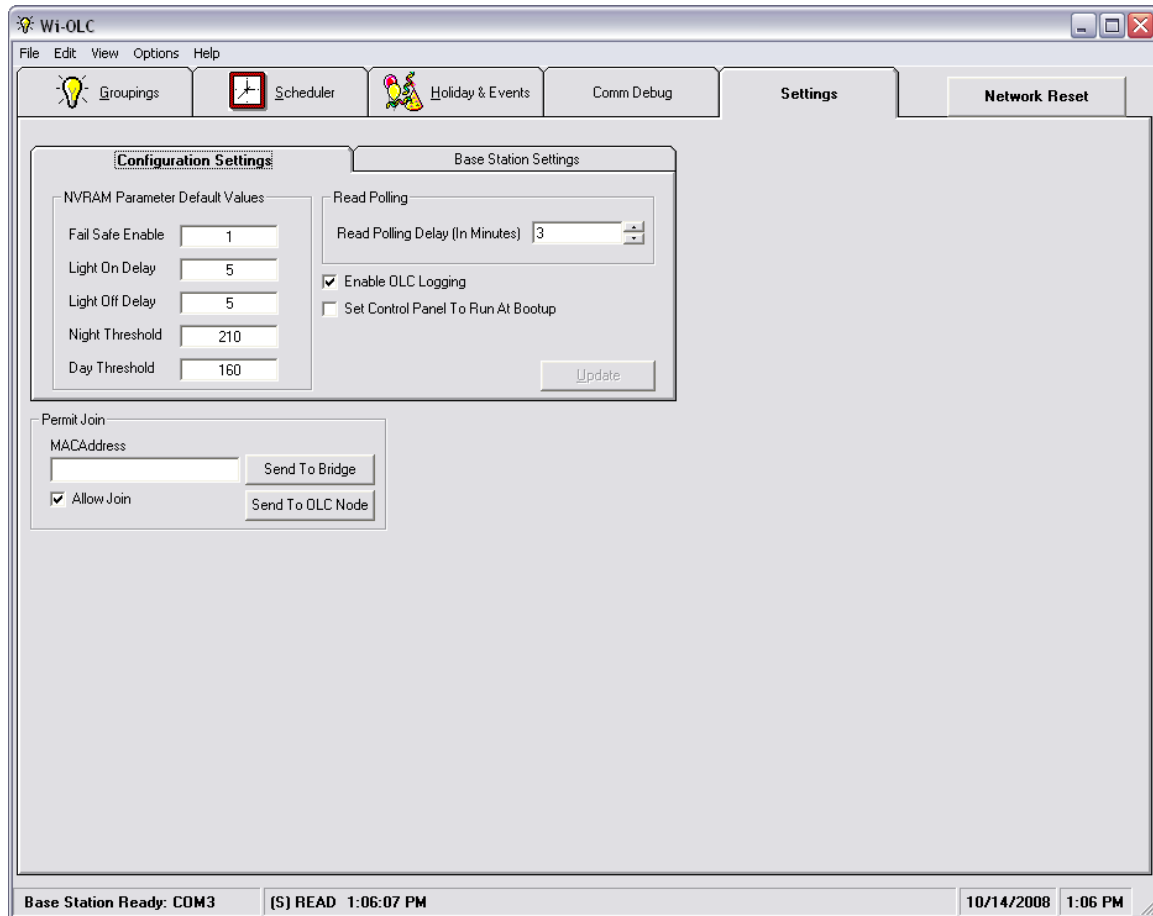
The OLC node remains in fail-safe mode until a subsequent Read Data Request is received from the Control Panel.

# Wi-OLC System

Wireless Outdoor Lighting Control System

Engineering and Troubleshooting Tabs

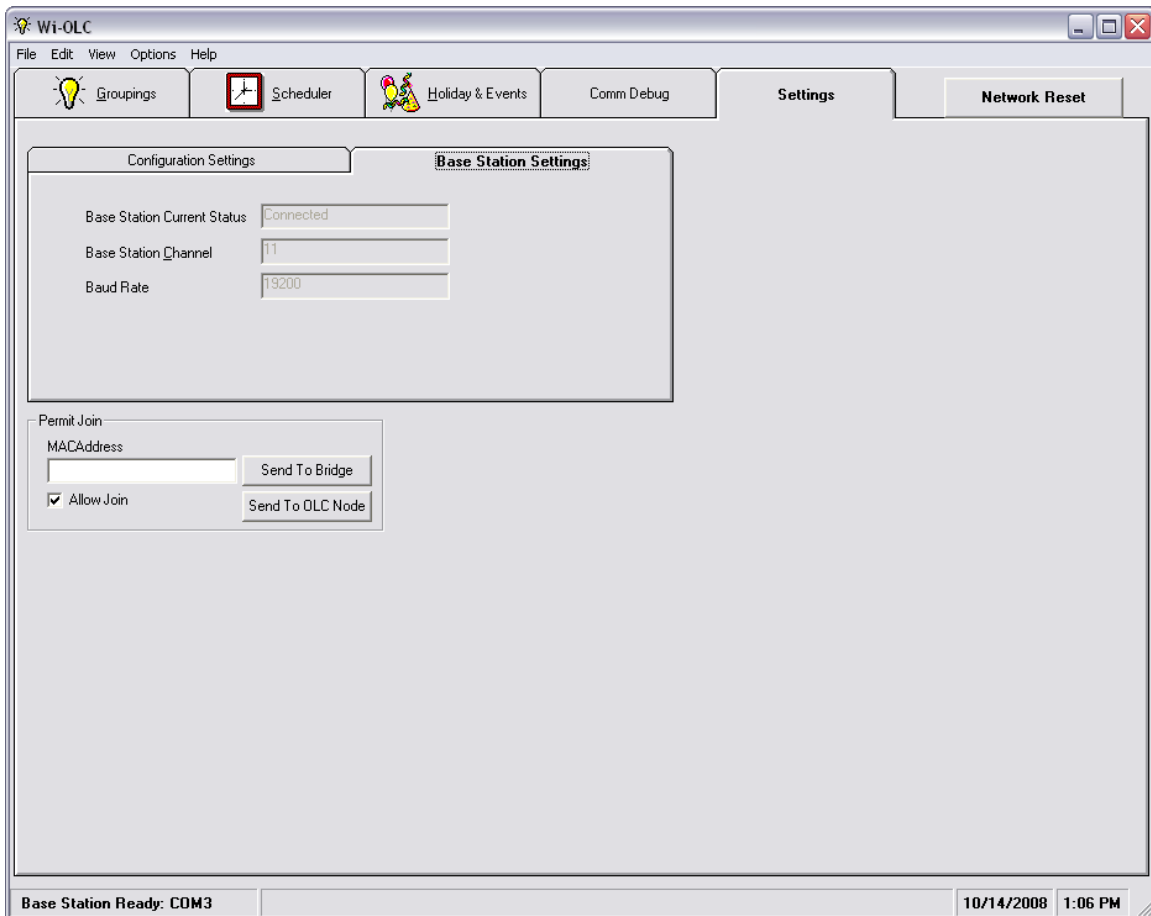
Configuration Setting Tab



The image shows a screenshot of the Wi-OLC Configuration Settings window. The window has a title bar with the text "Wi-OLC" and standard window controls. Below the title bar is a menu bar with "File", "Edit", "View", "Options", and "Help". A toolbar contains icons for "Groupings", "Scheduler", "Holiday & Events", "Comm Debug", "Settings", and "Network Reset". The "Settings" tab is active, showing two sub-tabs: "Configuration Settings" and "Base Station Settings". The "Configuration Settings" sub-tab is selected, displaying a "NVRAM Parameter Default Values" section with five input fields: "Fail Safe Enable" (1), "Light On Delay" (5), "Light Off Delay" (5), "Night Threshold" (210), and "Day Threshold" (160). To the right of these fields is a "Read Polling" section with a "Read Polling Delay (In Minutes)" input field set to 3, and two checkboxes: "Enable OLC Logging" (checked) and "Set Control Panel To Run At Bootup" (unchecked). An "Update" button is located below the "Read Polling" section. Below the "NVRAM" section is a "Permit Join" section with a "MACAddress" input field, a "Send To Bridge" button, a checked "Allow Join" checkbox, and a "Send To OLC Node" button. The status bar at the bottom of the window displays "Base Station Ready: COM3", "(S) READ 1:06:07 PM", and the date/time "10/14/2008 1:06 PM".

# Wi-OLC System

Wireless Outdoor Lighting Control System



The image shows the Wi-OLC System software interface. It features a menu bar with File, Edit, View, Options, and Help. Below the menu bar are five tabs: Groupings (with a lightbulb icon), Scheduler (with a calendar icon), Holiday & Events (with a party hat icon), Comm Debug, and Settings (which is currently selected). To the right of the Settings tab is a button labeled Network Reset. The main content area is divided into two sections: Configuration Settings and Base Station Settings. The Base Station Settings section contains three input fields: Base Station Current Status (set to Connected), Base Station Channel (set to 11), and Baud Rate (set to 19200). Below these fields is a Permit Join section with a MACAddress input field, a Send To Bridge button, a checked Allow Join checkbox, and a Send To OLC Node button. At the bottom of the window, there is a status bar showing Base Station Ready: COM3 on the left and the date 10/14/2008 and time 1:06 PM on the right.

Wi-OLC

File Edit View Options Help

Groupings Scheduler Holiday & Events Comm Debug Settings Network Reset

Configuration Settings Base Station Settings

Base Station Current Status: Connected

Base Station Channel: 11

Baud Rate: 19200

Permit Join

MACAddress: [ ] Send To Bridge

☒ Allow Join Send To OLC Node

Base Station Ready: COM3 10/14/2008 1:06 PM

# Wi-OLC System

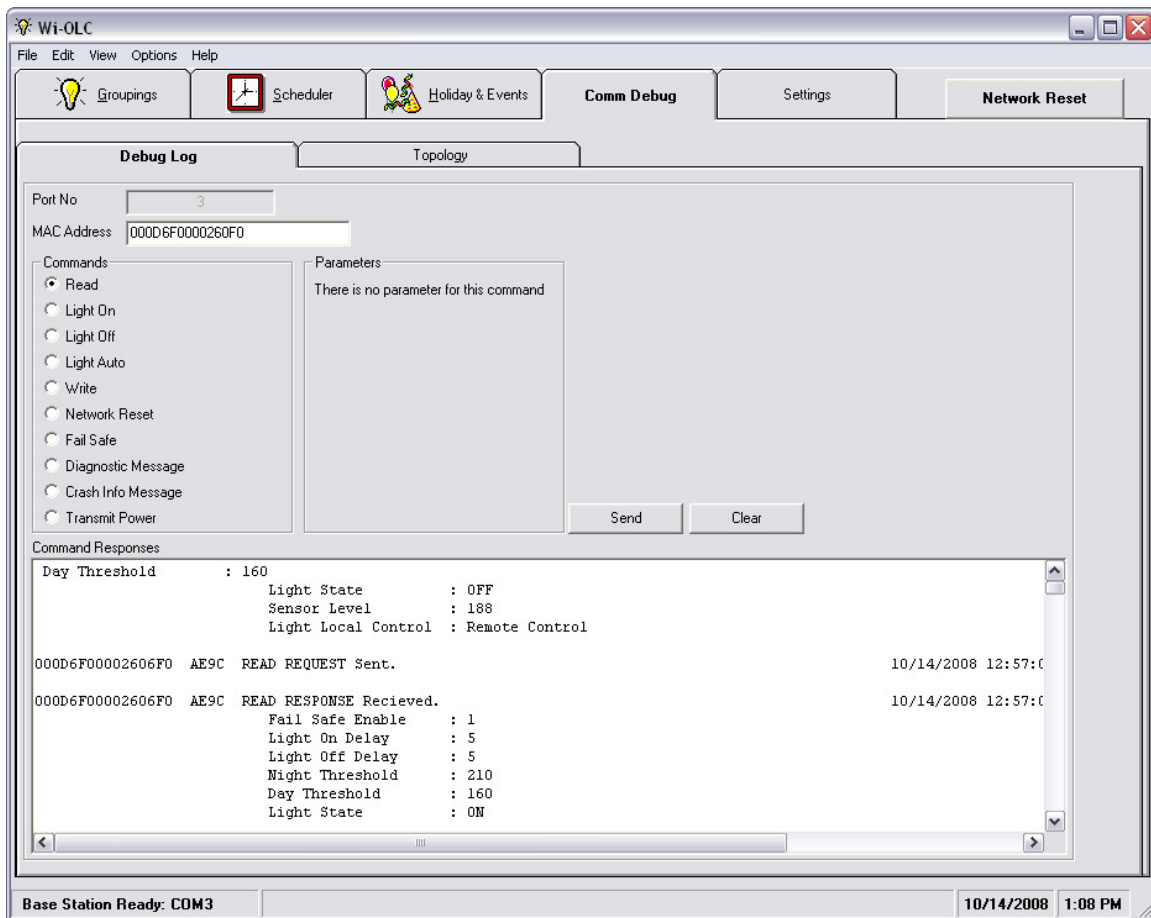
Wireless Outdoor Lighting Control System

The screenshot shows the Wi-OLC software interface. The main window has a menu bar (File, Edit, View, Options, Help) and a toolbar with icons for Groupings, Scheduler, Holiday & Events, Comm Debug, Settings, and Network Reset. The 'Comm Debug' tab is active, showing a 'Debug Log' window. In this window, the 'Port No' is set to 3 and the 'MAC Address' is 000D6F0000260F0. The 'Commands' list on the left includes Read (selected), Light On, Light Off, Light Auto, Write, Network Reset, Fail Safe, Diagnostic Message, Crash Info Message, and Transmit Power. The 'Parameters' section on the right states 'There is no parameter for this command'. Below the commands, the 'Command Responses' section displays a log of messages: 'Day Threshold : 160', 'Light State : OFF', 'Sensor Level : 188', 'Light Local Control : Remote Control', '000D6F0000260F0 AE9C READ REQUEST Sent.' (timestamped 10/14/2008 12:57:0), and '000D6F0000260F0 AE9C READ RESPONSE Recieved.' (timestamped 10/14/2008 12:57:0). The response details include 'Fail Safe Enable : 1', 'Light On Delay : 5', 'Light Off Delay : 5', 'Night Threshold : 210', 'Day Threshold : 160', and 'Light State : ON'. The status bar at the bottom indicates 'Base Station Ready: COM3' and the date/time '10/14/2008 1:08 PM'.



# Wi-OLC System

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**System Check:** To check that each of the installed Wi-OLCs can communicate with the Base Station, and the Base Station can communicate with The Control Panel Software, click the Groupings tab. Wi-OLCs listed as On or Off are active in the network. OLCs with a question mark are not in communication with the Base Station and need to be checked.

**System Check:** To verify communication with an individual Wi-OLC and confirm system operation, select “On” in override column.

## Troubleshooting Guide

# Wi-OLC System

Wireless Outdoor Lighting Control System

Problem	Perform These Checks
The power indicator light at the Wi-OLC base station is not flashing green.	<ul style="list-style-type: none"> <li>Verify that the USB cable is properly connected to the Base Station and to the control panel computer. Verify that the base stations power adapter is plugged into an AC outlet</li> </ul> <p><i>If the USB connecting cable is longer than fifteen feet, use the base station's optional RS485 extended range cable.</i></p>
The LEDs in the Wi-OLC do not flash on installation.	<ul style="list-style-type: none"> <li>Check the outdoor light has power to the NEMA photocontrol receptacle.</li> <li>Insert a known good Wi-OLC in the socket and observe both green and red LEDs flash for 2-3 seconds, then the Red only on 5 second intervals.</li> </ul>
An installed OLC does not appear in Wi-OLC list of registered Wi-OLCs.	<ul style="list-style-type: none"> <li>Verify that the red LED is flashing on 5 second interval.</li> <li>Verify the Wi-OLC is within 2,000 feet of the Base Station or other Wi-OLC controlled light.</li> </ul> <p><i>Wait about thirty seconds for a new OLC to register on the network after you install it. A new OLC does not appear in the Control Panel serial number list until it is registered.</i></p>
A light or group of lights does not turn on from Wi-OLC Control Panel Software.	<ul style="list-style-type: none"> <li>Verify the Base Station and all Wi-OLC are within range</li> <li>Check whether the filament in a dark light needs replacement.</li> </ul>
A light or group of lights does not turn off from <del>Light Watcher</del> .	<ul style="list-style-type: none"> <li>Verify at <del>Light Watcher</del> that light control is in manual mode.</li> <li>Verify at <del>Light Watcher</del> that the OLCs in question are registered in the network.</li> </ul>
<del>Light Watcher</del> indicates that it cannot communicate with the base station.	<p>Shutdown the <del>Light Watcher</del> control panel off. Disconnect the base station's power source and plug it back in. Reboot the computer and relaunch <del>Light Watcher</del> application. Open the Groupings tab in <del>Light Watcher</del> and check the State column for communication with the OLCs in the network. OLCs not in communication with the network have a question mark in the State column.</p> <p><i>OLCs may require twenty to thirty minutes to re-register after you repower or reset the base station. Only registered OLCs appear in Light Watcher's Groupings tab without a question mark in the State column.</i></p>

If you cannot resolve a technical problem, please contact the Wi-OLC system administrator or Sunrise Technologies 508-821-1597

**NODE BAR CODE LABEL**

**LOCATION**
