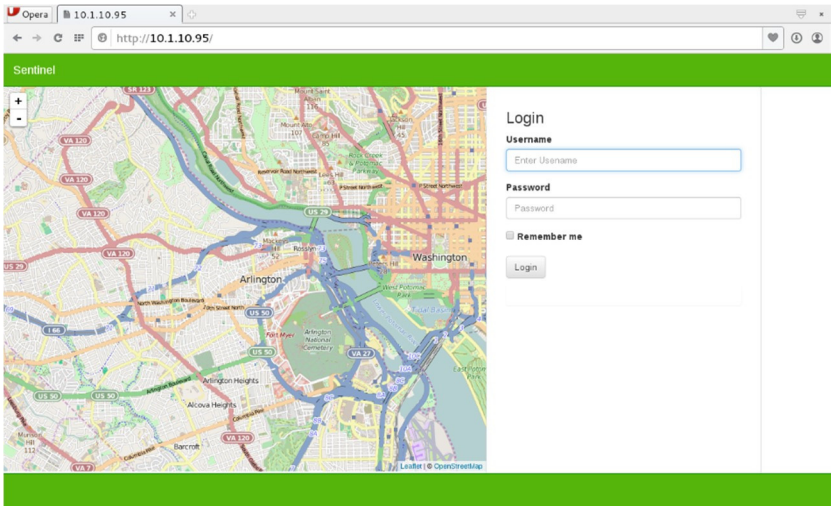
Sentinel™

User Manual

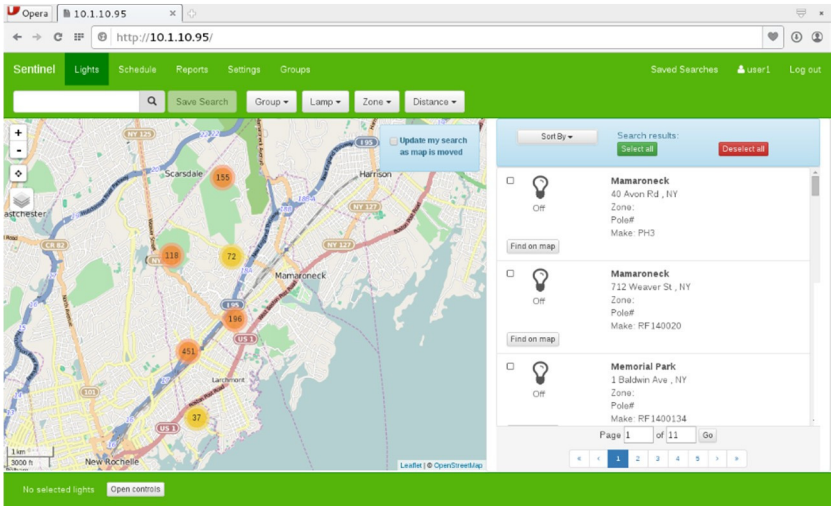
24 May 2018 Rev C

Website

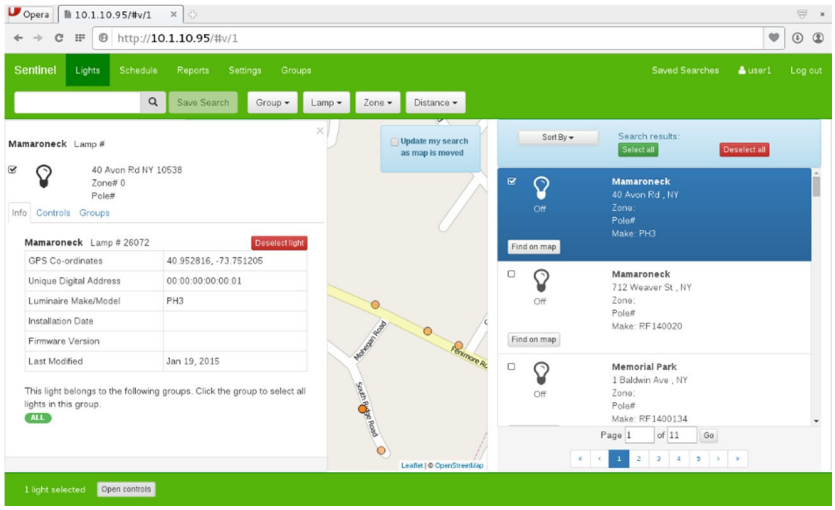
The primary way of accessing the gateway is through the integrated web server. The web server runs on the standard HTTP port 80, so you simply have to point your web browser at the given IP address for the gateway. When you first connect to the gateway, you will see a page similar to the following:



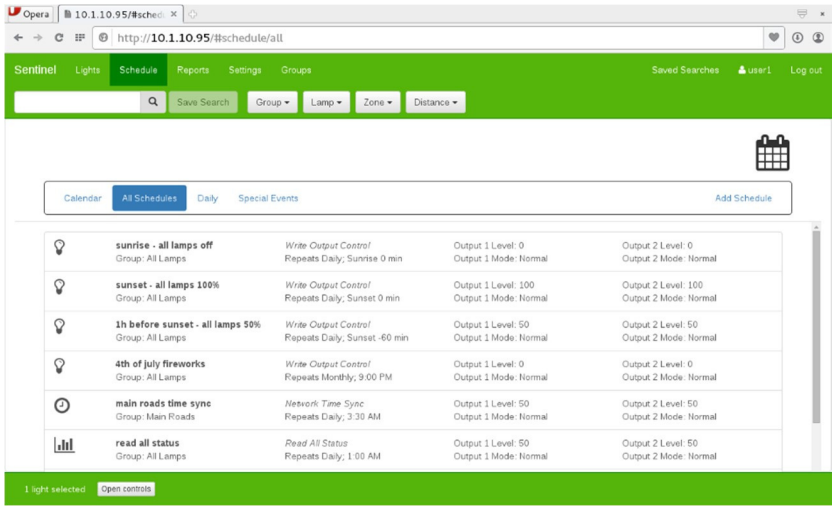
Once you log in, the login prompt on the right will be replaced by a listing of all the lamps, similar to the following:



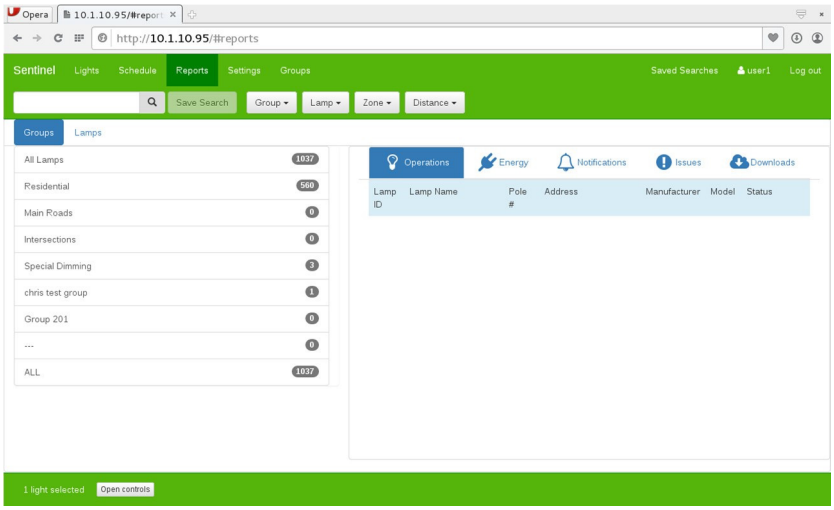
The tabs at the top are your main way of switching modes. The default tab is 'Lights', it allows you to view all the lights in the system and control them. The controls for a light can be opened by pressing the 'Open Controls' button in the bottom left corner of the page. That will open a control/info box similar to the following:



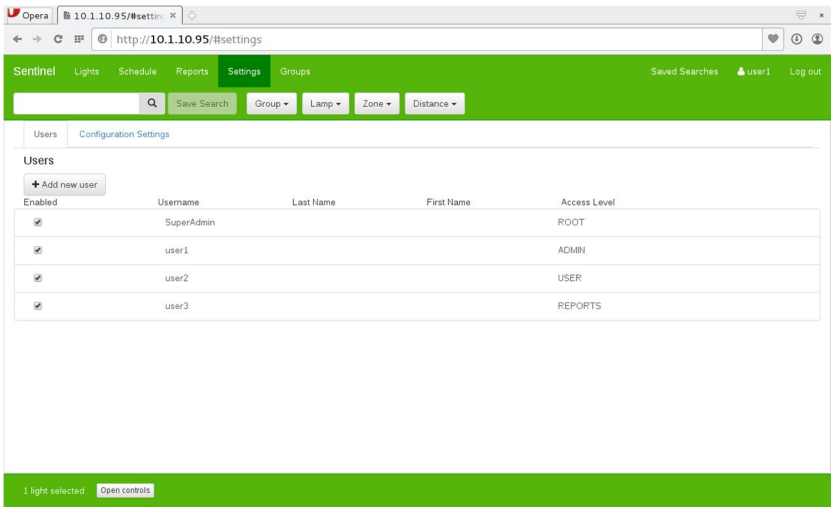
The next tab allows you to update the schedules on the system.

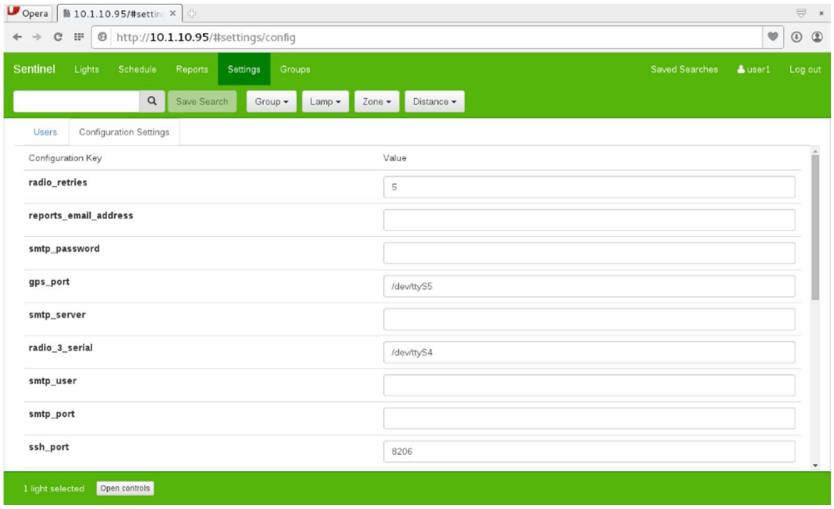


The 'Reports' tab allows you to view the reports for either individual lights or a group of lights.

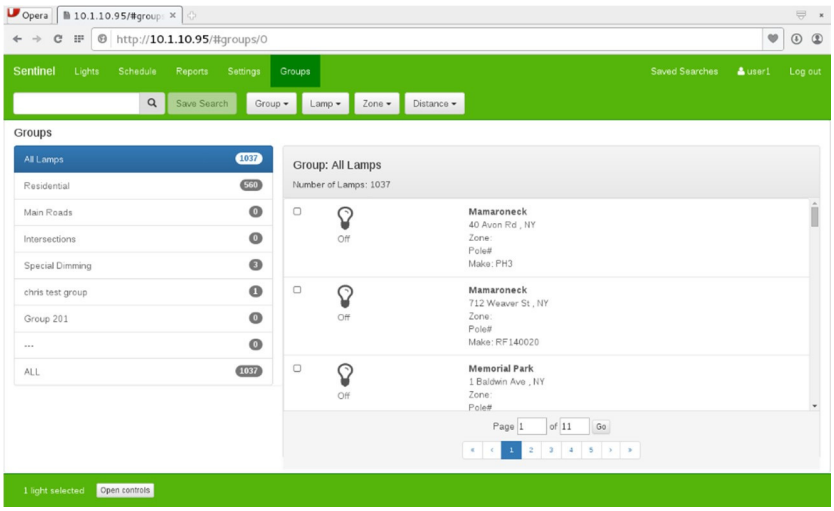


The 'Settings' tab allows you to view and set settings in the system, as well as adding/editing users.

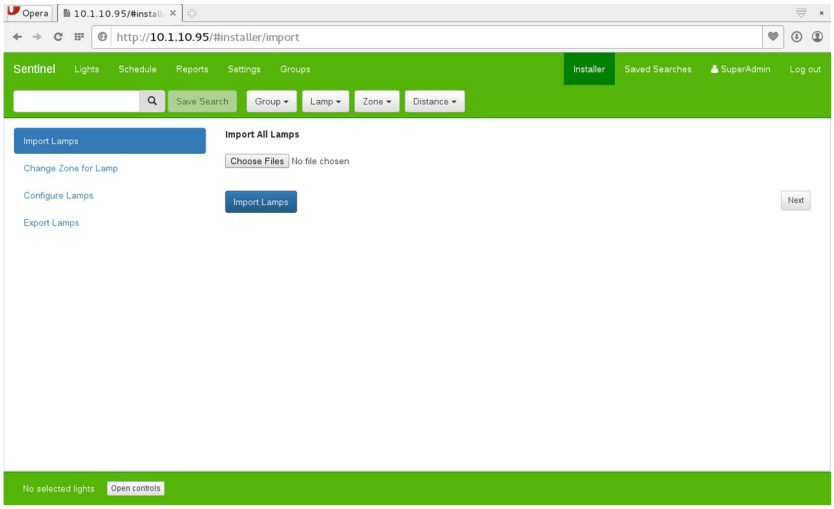




The 'Groups' tab allows you to view and edit the groups of lights in the system.



Finally, the 'Installer' tab is only available to the SuperAdmin user. Provisioning mode can only be enabled by passing --provisioning on the command line to the gateway software. It cannot be set through the web interface, even if it shows up.



Sentinel System™

Lights Tab

Viewing Light Information

Modifying Light Information

Controlling a Light

Selecting Lights

Groups Tab

Reports Tab

Settings Tab

From this tab, you can create/modify users, as well as change settings in the system. To add a new user, go to the 'Users' sub-tab and click the 'Add User' button. From here, you can set all of the information associated with the user. This is their username, first name, last name, access level, if the user is enabled or disabled, and their password. Only admin-level users can create new users.

To edit a user's information, click on the specified user. You can change their first/last name, access level, and if they are enabled or disabled. Admin-level users can also change the passwords of other users.

Configuration Settings

The 'Configuration Settings' sub-tab has a large list of all the configuration values in the system. This is a simple key/value mapping, and as such it does not provide much error checking. The values and their meaning are summarized in the following table.

Configuration Value	Meaning
radio_1_serial	The serial port Radio 1 is connected to
radio_2_serial	The serial port that Radio 2 is connected to.
radio_3_serial	The serial port that Radio 3 is connected to
radio_retries	How many times we should try sending out a command before we give up.

radio_timeout	How many milliseconds between sending a message and expecting a response.
radio_poll	
ignore_self	Should we ignore our own messages that we send out on the serial port? This is generally hardware-dependent.
gps_port	The serial port that the GPS receiver is on

ssh_port	What port to run the SSH server on.
start_web_server	Should the webserver start automatically?
timezone	The timezone that this gateway is in. This will default to the currently set timezone on the system, you should not have to change this.
web_port	What port the webserver should listen on for incoming HTTP connections. This should stay at port 80.
longitude	What the longitude of the gateway is
latitude	What the latitude of the gateway is
provisioning	If we are in provisioning mode or not. Read-only.

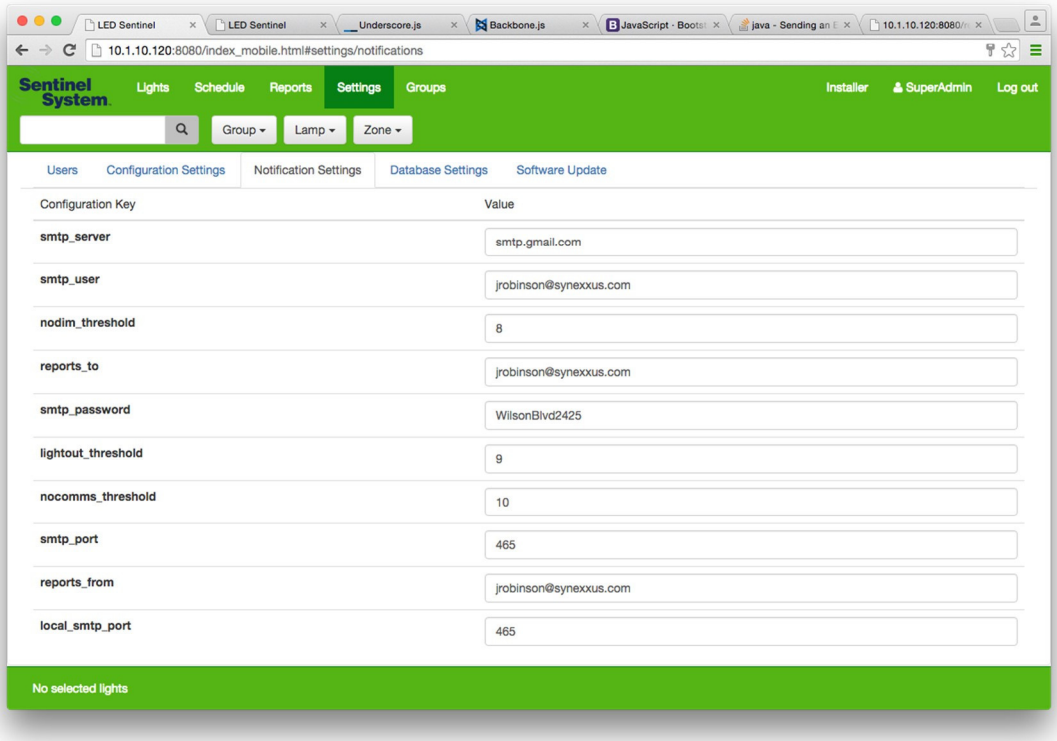
lamp_sync_hrs	Frequency in hours at which network time sync command is sent to the all lamps group. Value must be 1-24
webapps_location	Location on the gateway server where the extracted website resides
error_threshold	Number of days in a row a lamp error must persist for it to show up as a notification (repair code) on the website
nodim_threshold	Number of days in a row the no-dim repair code must persist for the lamp to be included in the no-dim email error report
lightout_threshold	Number of days in a row the light-out repair code must persist for the lamp to be included in the light-out email error report
nocomms_threshold	Number of days in a row the no-comms repair code must persist for the lamp to be included in the no-comms email error report
local_smtp_port	Local port that SMTP emails will send on
smtp_port	Port of the SMTP server
reports_to	Email addresses, comma delimited, where the no-dim, light-out, and no-
	comms notification emails will send to
reports_from	Email address that notification emails will send from (may differ from smtp_user)

smtp_user	Username for the SMTP server
smtp_server	SMTP server address
smtp_password	SMTP server password

The configuration settings tab also allows the user to set the ping all lamps and synchronize time schedules. These schedules correspond to sending the network time sync and read all status commands to the all lamps group.

Notification Settings

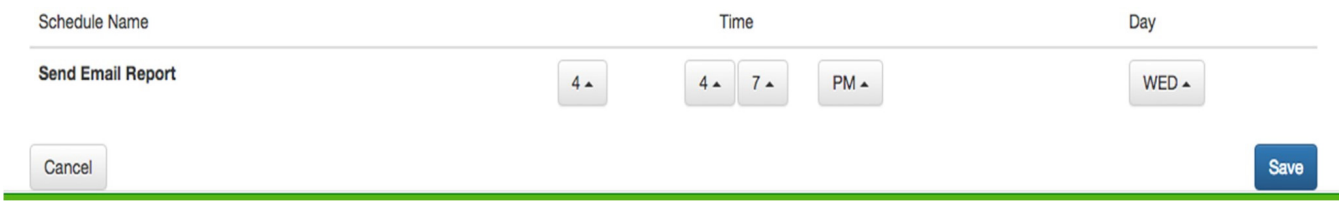
The notification settings tab contains config key, config value pairs which relate to email notifications. The user can use the config parameters to set the email address the notification will be sent from, sent to, and the smtp parameters used to send the email.



Configuration Value	Meaning
smtp_port	The SMTP port to send email to
local_smtp_port	The local port used for outbound SMTP datagrams

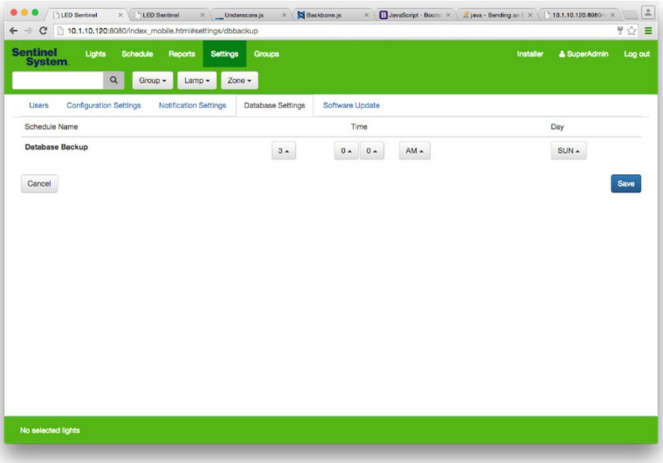
smtp_server	The SMTP server to send email from
smtp_user	The user to connect to the SMTP server as.
smtp_password	The password used to authenticate with the SMTP server
reports_to	The e-mail address to send reports to, comma delimited to send to multiple email addresses
reports_from	The e-mail address to send reports from
nocomms_threshold	number of consecutive days in a row a lamp must receive no communication to be included in the email report
lightout_threshold	number of consecutive days in a row a lamp must be out to be included in the email report
nodim_threshold	number of consecutive days in a row a lamp must not dim to be included in the email report

In addition to setting the notification thresholds and smtp settings the administrator may also set the schedule on which the notifications are sent using the dropdown menus located at the bottom of the notification settings view tab. Notifications are sent on a weekly basis.



Database Settings

The database settings tab allows the user to specify the schedule on which the database backup occurs. The database backup can be scheduled to occur once on a weekly basis.



Registers

The registers tab allows the user to read, write, save, and test the configuration register map for a specific lamp ID. The individual commands are given below.

- 0x1B - Test Register
- 0x1C - Write Register
- 0x1D - Read Register
- 0x1E - Save Register

Note that the range of values for a register is limited between 0 and 255. If the user attempts to write a value outside this range a warning will display notifying the user that the range is outside the acceptable limits.

The register are read/written in 4 byte blocks. The user may modify all 4 bytes but most likely they will not so the typical sequence for operating the register page would be:

1. Read the 4 byte block
2. Modify the bytes as needed
3. Write the 4 byte block

This sequence can be repeated for multiple blocks.

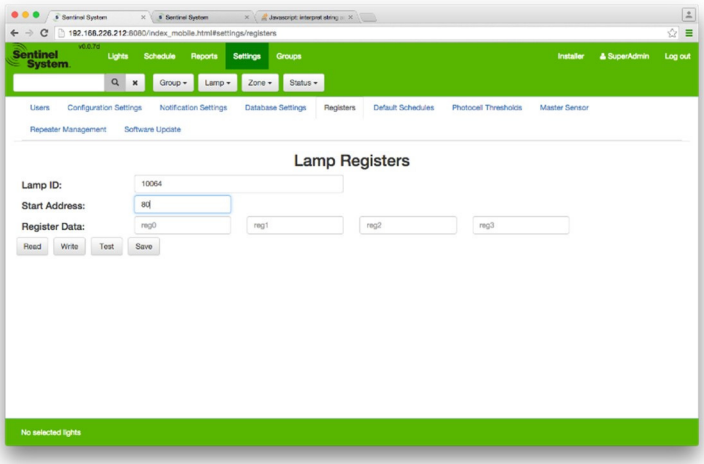
The test command is optional. If modifying something non-critical it can be skipped (that would be up to user). If critical (setting Tx or Rx frequency for instance) it should always be used. Once test is executed, it sets a 1 minute timer in the node and sets a flag to use the new values. If for instance the frequency had changed, the user (or provisioning tool) could then send a Read All Status command to the light to see if responds.

After 1 minute the test mode will automatically exit and the node will revert to using the original settings. If a mistake was made in programming you would be able to communicate with the node again. The new settings are not lost. They are mapped into a different RAM space and the test flag simply indicates to execute from that RAM temporarily.

If the new settings are OK, the save command can be issued. This essentially copies the new values from temporary RAM into EEPROM so they become permanent. The save and test commands apply to any new registers that have been written so there is no address associated with them.

The program key is simply a precaution so no one can inadvertently change register values unless they are authorized. Probably not necessary but since this can render lights completely inoperable it is implemented.

For more information see: 'Configuration Register Map Rev A6.doc' and 'Sentinel Remote Gateway Specification <date>.doc'.



Default Schedules

This feature uses commands 0x0B and 0x0C to Write/Set and Read the default schedule. The four default events that make up the schedule are defined with the same byte configuration as the Write Output Control command 0x01. Default schedules are executed daily so have a 24 hour/second time associated with each of the events. If an event is not used it should be left erased (all 0xFF). The default schedule is not saved to the remote gateway database.

The user interface allows the user to first select a lamp or group to perform the action on. Default schedule reads can only be performed on a specific lamp ID, writes can be performed for either a lamp or a group. The lamp and group control type radio buttons will toggle between an input field and a dropdown menu. When performing a read or write the input field will verify that the lamp ID exists in the lamps collection on the web front-end (which should be sync'd with the list of lamps on the database).

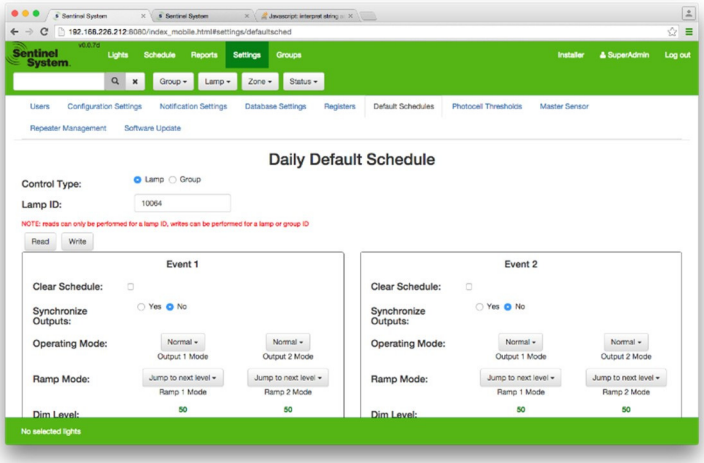
Reading:

Default schedule reads can only be performed on a specific lamp ID. After performing a read if any of the default schedules are blank, a banner at the top for he default schedule will display notifying the user that the specific event is currently blank. For schedules which are not blank, their scheduling information will automatically populate their specific events.

Writing:

Defaults should writes can be performed for either as specific lamp ID or a group. Prior to writing the data the Lamp ID or selected group is checked to verify it exists in the lamp or group collection (sync'd with lamps and groups in the database), if the lamp or group does not exist a warning banner will display notifying the user of the error. Additionally all fields in the specific events are checked for validity (i.e. you cannot leave the hours set to HH or minutes set to m). To clear a schedule check the 'clear schedule' check box, note that if this check box is enabled the fields will not be verified prior to writing (since they will be ignored).

For more information see: LED_DailyDefaultSchedule20150418.pdf.



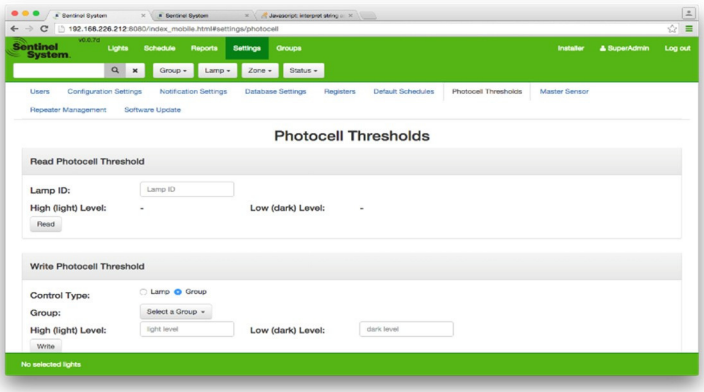
Photocell Thresholds

Photocell thresholds are contained in the configuration registers and are modified using the same scheme as the registers tab. Configuration data is read/written in blocks of four bytes based upona starting address. Four commands are available:

- Read Register (0x1D) ? Pass address 0x94 and return address 0x94 plus 10 bit light value and 10 bit dark value. A read should be executed to return the current values before any write.
- WriteRegister (0x1C) ? Pass address 0x94 then 10 bit light value and 10 bit dark value
- Save Register (0x1E) ? This commands saves all new configuration values. A program key is required to be passed.
- Test Register (0x1B) ? This command is not necessary for the photocell thresholds but is explained here for clarity. Test settings that have been written: the new settings are enabled for 60 seconds from last received command. Test mode exits automatically after 60 seconds in case modifications have made the node inoperable.

The Read Photocell Threshold button will execute a Read Register command on an individual node. The Save Photocell Threshold button will execute a Write Register followed by a Save Register command on either a node or a group. This information does not get saved in the remote gateway database.

The user interface allows the user to select a lamp or group to perform the write photocell threshold on. Photocell threshold reads can only be performed on a specific lamp ID, writes can be performed for either a lamp or a group. The lamp and group control type radio buttons will toggle between an input field and a dropdown menu. When performing a read or write the input field will verify that the lamp ID exists in the lamps collection on the web front-end (which should be sync'd with the list of lamps on the database). Prior to reading or writing the photocell threshold the Lamp ID or selected group is checked to verify it exists in the lamp or group collection (sync'd with lamps and groups in the database), if the lamp or group does not exist a warning banner will display notifying the user of the error. Additionally when writing the photocell threshold the value must be between 0 and 255.



Master Sensor

Master sensors are configured using the Add Event Group command 0x11. This command defines the group or node ID and dim/mode settings that the master node will transmit when an event input is detected. Also included is a byte that will define how long the output(s) will be active from 1 to 30 minutes. A master sensor can only have one node or group assigned to it. The Add Group or Node to Sensor and Save Sensor Changes buttons would execute this command.

Note: the master sensor will also execute the event input dim/mode settings when the event input is detected.

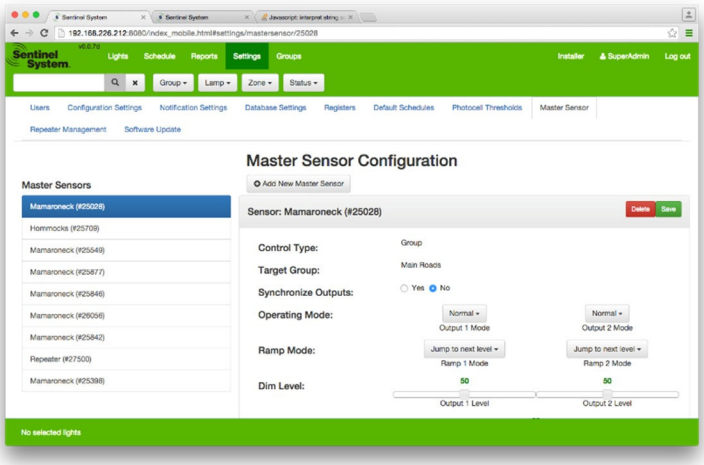
The Event Group can be read from the master sensor using Read Group ID command 0x0F. The Event Group is always group index 1. This command should not be necessary if the master sensor configurations are saved in the database.

The Event Group can be erased from the master sensor using Erase Group ID command 0x0F.

Master nodes are enabled by setting Output 1 Mode/Control bit 6 using the Write Output control command 0x01 when the Add New Sensor button is pressed. Master nodes are disabled by clearing bit 6 when the Disable/Delete Sensor button is pressed. Command 0x0F may also be used as part of Disable/Delete (for discussion)

The event dim/mode settings are stored in the configuration registers and can also be read or written using commands 0x1C-0x1E starting at address 0x70. The master sensor configurations should be saved in the remote gateway database however so these commands are not implemented on this page.

For more information see: LED_MasterSensorConfiguration20150418.pdf.



Repeater Management

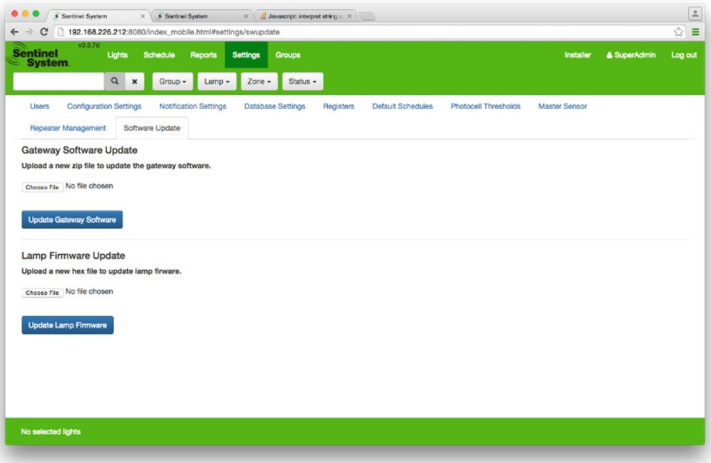
Software Update

The software update tab allows the user to easily update the java server side back-end, the website front-end, and the lamp firmware. For more information see the individual update instructions for the website front-end, java back-end, and lamp firmware.

Website: website update

Java: java update

Lamp Firmware: firmware update



Offline Mapping

Offline mapping is configured using the map base layers.son file the directions below document how to change the offline map location.

- Open /client/data/mapBaseLayers.json
- Change the arguments for “Offline” to “/osm_tiles/{z}/{x}/{y}.png”

The config file will then go to document root on the host server automatically. A static IP may also be used if the tiles are stored somewhere else (this will require an internet connection for the host and server).

FCC NOTICE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

FRENCH VERSION:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC WARNING

- This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna used for this transmitter must be installed to provide a separation distance of at least 80 cm from all persons.

FRENCH VERSION:

- Passerelle seulement: Cet appareil est conforme aux normes FCC exposition aux rayonnements RF limites fixées pour un incontrôlée environnement. L'antenne utilisée pour ce transmetteur doit être installé pour fournir une distance de séparation de au moins 80 cm de toute.

FCC WARNING

- You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the users authority to operate the equipment.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
- This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and the receiver.
  - Connect the equipment into an outlet different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.

FRENCH VERSION:

- Vous êtes averti que les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser l'équipement.
- Cet équipement a été testé et jugé conforme aux limites d' un dispositif numérique de classe B, conformément à la partie 15 des règles de la FCC . Ces limites sont conçues pour fournir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle .
- Cet équipement génère , utilise et peut émettre de l'énergie radiofréquence et, si non installé et utilisé conformément aux instructions , peut provoquer des interférences dans les communications radio . Cependant , il n'y a aucune garantie que des interférences ne se produiront pas dans une installation particulière . Si cet équipement provoque des interférences nuisibles à la réception radio ou de télévision , ce qui peut être déterminé en allumant et éteignant l'équipement , l'utilisateur est encouragé à essayer de corriger l'interférence par une ou plusieurs des mesures suivantes :
  - Réorienter ou déplacer l'antenne de réception .
  - Augmentez la distance entre l'équipement et le récepteur .
  - Branchez l'appareil sur une prise différente de celle à laquelle le récepteur est branché.
  - Consulter le revendeur ou un technicien radio / TV expérimenté.

FOR MORE INFORMATION VISIT www.sentinelcontrols.com
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