

Installation Manual V2.1

SMA 1000 Series Network Repeater



SMA 1000 Series Network Repeater

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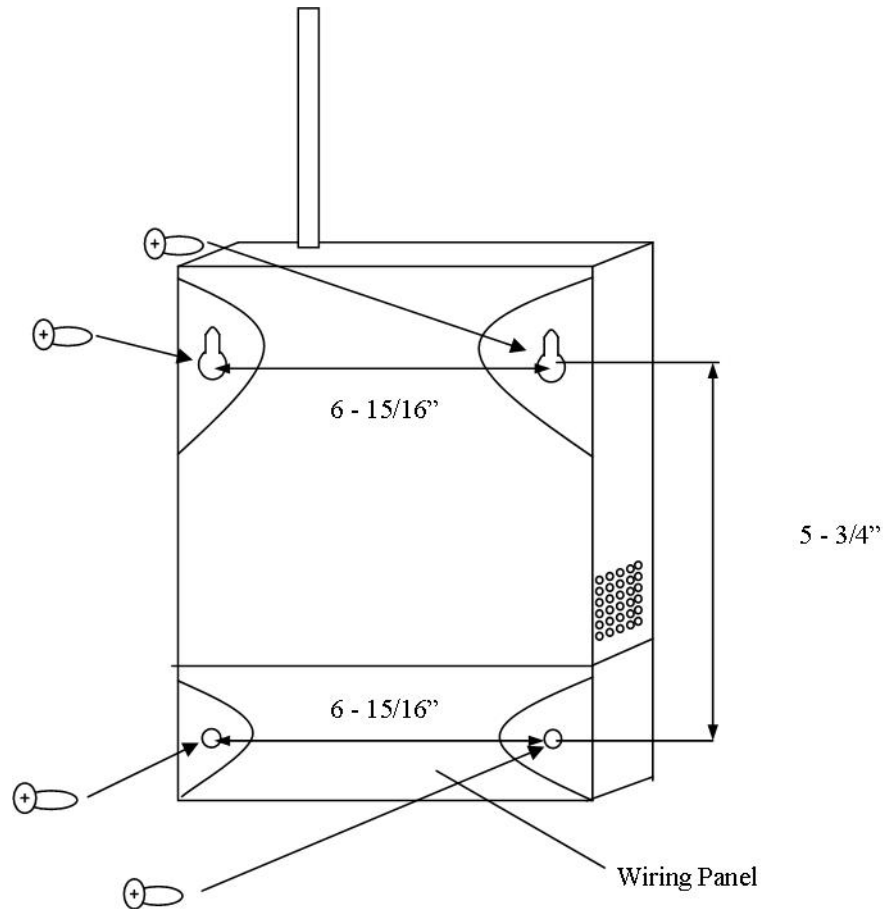
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Installation Instructions

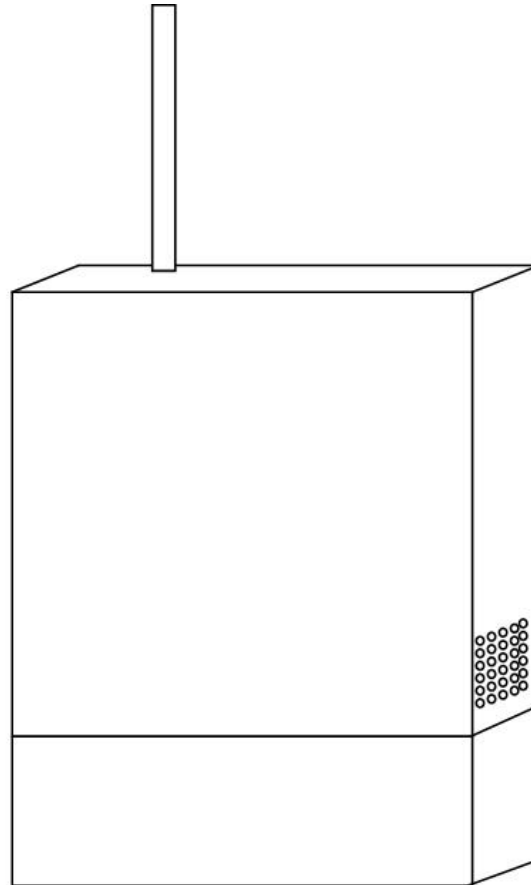
Mounting Instructions



1. Remove the cover of the wiring panel.
2. Mark the four drilling points on the wall based on the drawing above.
3. Drill the holes for the anchors supplied in the mounting kit at the designated markings from step 1.
4. Install the four anchors in the holes that were just drilled.
5. Install the first two screws in the top holes leaving $1/8''$ of the thread exposed.
6. Line up the top key slots over the screws and lock the network repeater into place.
7. Install the bottom screws through the wiring access panel and tighten into place.
8. After all wiring is complete, re-install the wiring panel cover.

Installation Instructions

Wiring Instructions



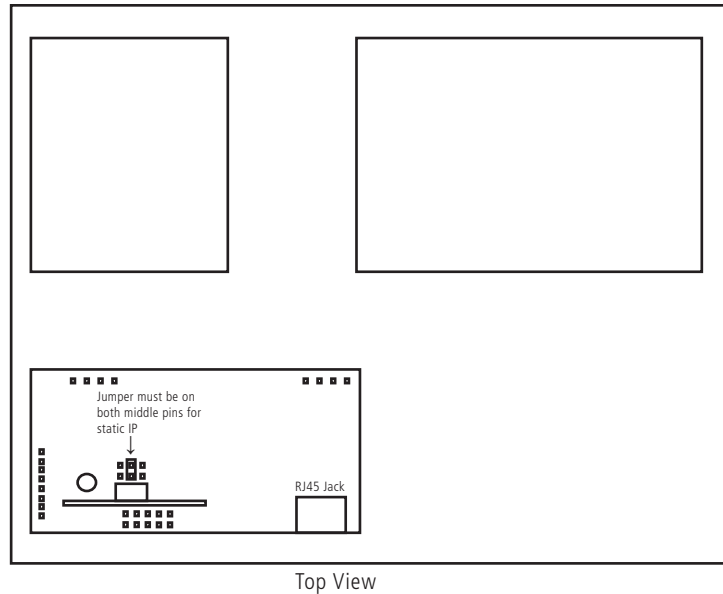
Blue	Yellow/ Green	Brown	Europe
White	Green	Black	USA
L2 Neutral	Ground	L1 Hot	
120VAC @ .2 amp			

Note: 14 AWG is the smallest conductor acceptable for power input.

Setting up the Network Repeater

Initial Setup

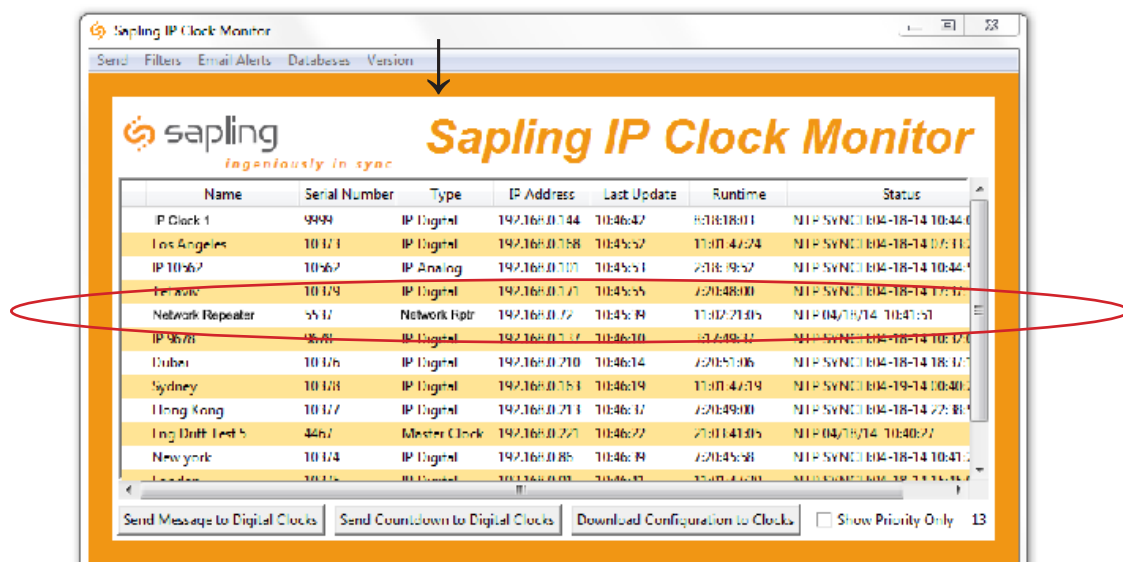
1. The Network Repeater is set up to use DHCP by default. Once the Network Repeater is plugged into the switch/router, it will try to get an IP address automatically.
2. If DHCP is not being used, and a static IP or crossover connection is preferred, then a jumper must be installed on the main board in the following orientation:



3. **Static IP** - If using a static IP, the IP address will be defaulted to 192.168.0.123. Go to a web browser and type in 192.168.0.123 to load the web interface. Once this is done, follow the instructions on page 9 to find the Network Settings page. Turn off DHCP and enter the new IP address and click submit. Then power down the Network Repeater, remove the jumper, and reboot the Network Repeater. To access the web interface, type in the new IP address in the web browser.

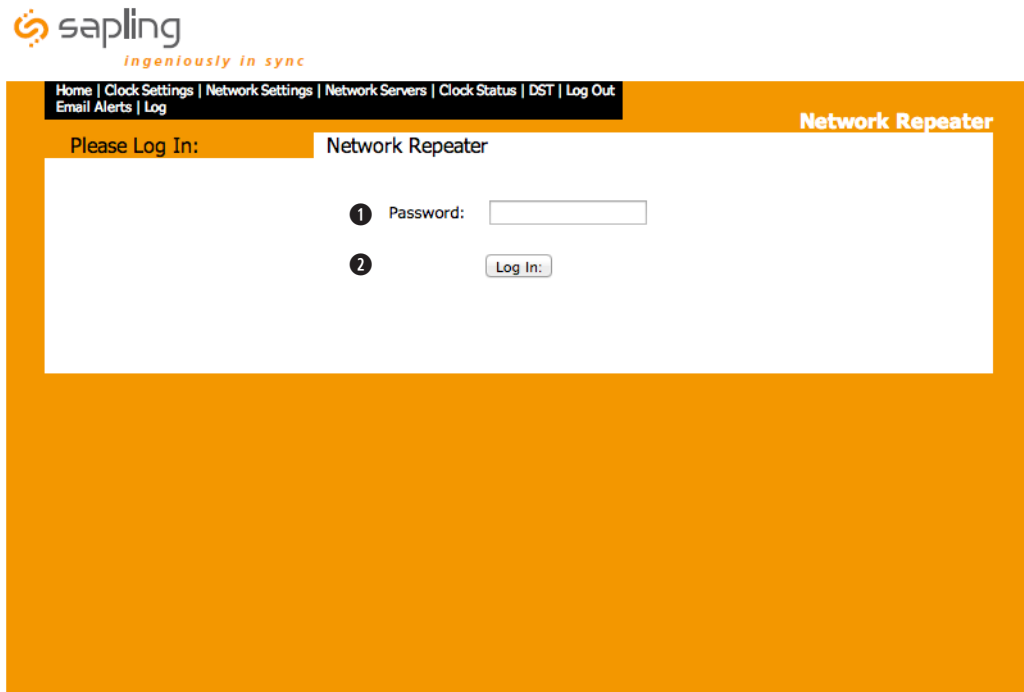
DHCP - If DHCP is being utilized, load the Sapling Monitor software on a PC that is connected to the network. Launch the Monitor.exe file and follow step 4.

4. Locate the Network Repeater by searching under the "Type" heading. Once it's located, double click on it to open its web interface.



Web Interface

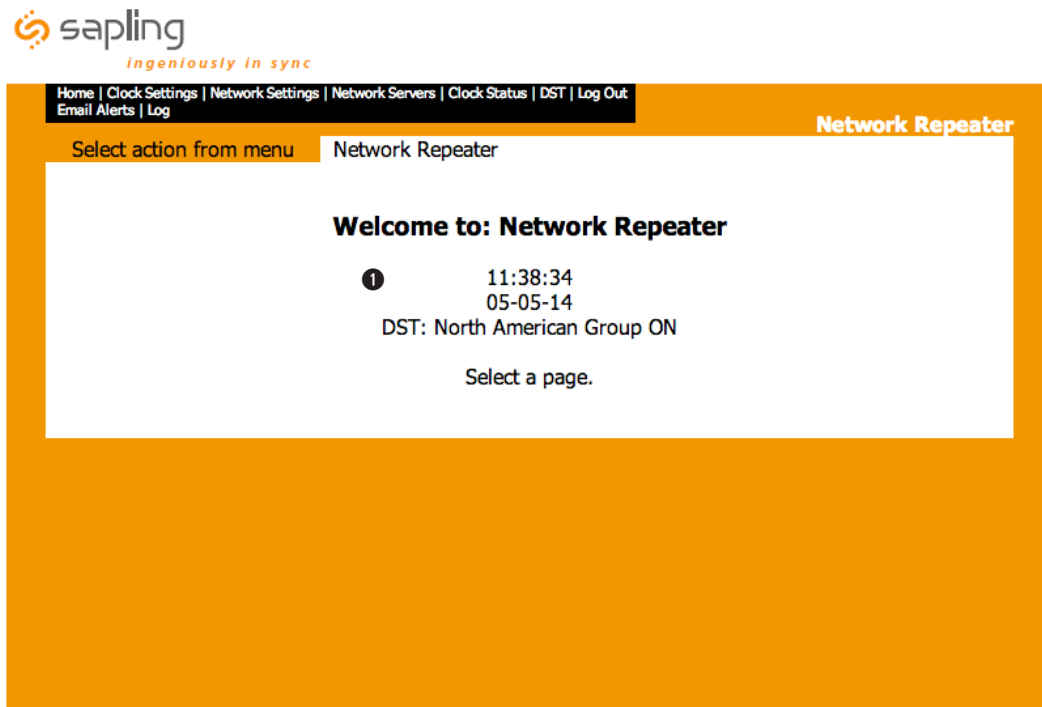
Login

The screenshot shows the login page for the Sapling Network Repeater. At the top left is the Sapling logo with the tagline 'ingeniously in sync'. A navigation bar contains links: Home, Clock Settings, Network Settings, Network Servers, Clock Status, DST, Log Out, Email Alerts, and Log. The page title is 'Network Repeater'. The main content area has a white background with the text 'Please Log In: Network Repeater'. Below this, there is a '1 Password:' label next to a text input field. Below the input field is a '2 Log In:' button. The entire page is framed by an orange border.

- 1 Password** - Type the password in this field to access the Network Repeater's Web Interface. The default user password is 1111 and the default technician password is 6063.
- 2 Log In** - Click this button after the password is entered in order to log in.

Web Interface

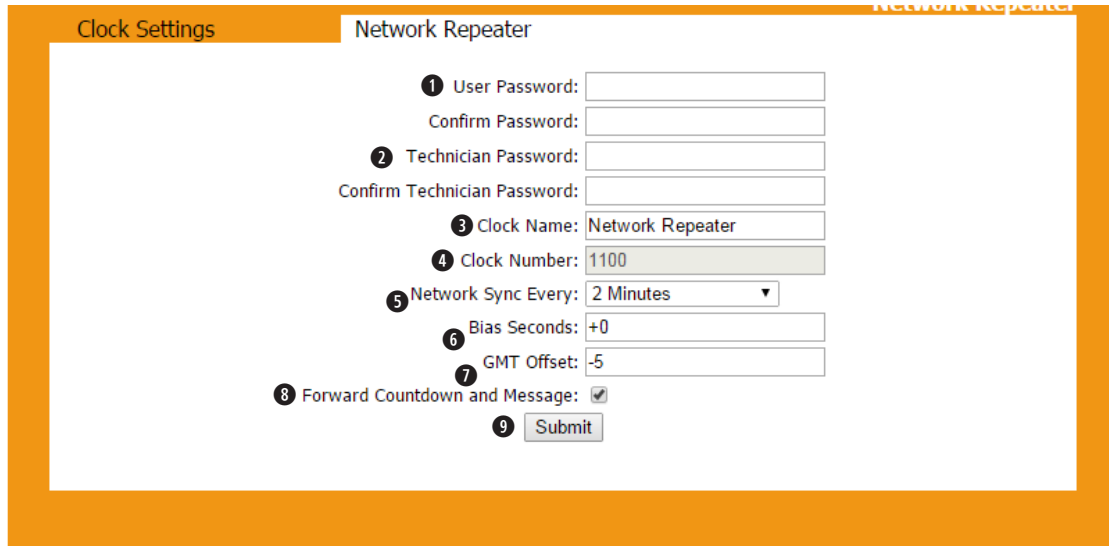
Home



- ① **Home** - This screen displays the time, date and the Daylight Saving Time status.

Web Interface

Clock Settings



Clock Settings **Network Repeater**

1 User Password:

Confirm Password:

2 Technician Password:

Confirm Technician Password:

3 Clock Name:

4 Clock Number:

5 Network Sync Every:

6 Bias Seconds:

7 GMT Offset:

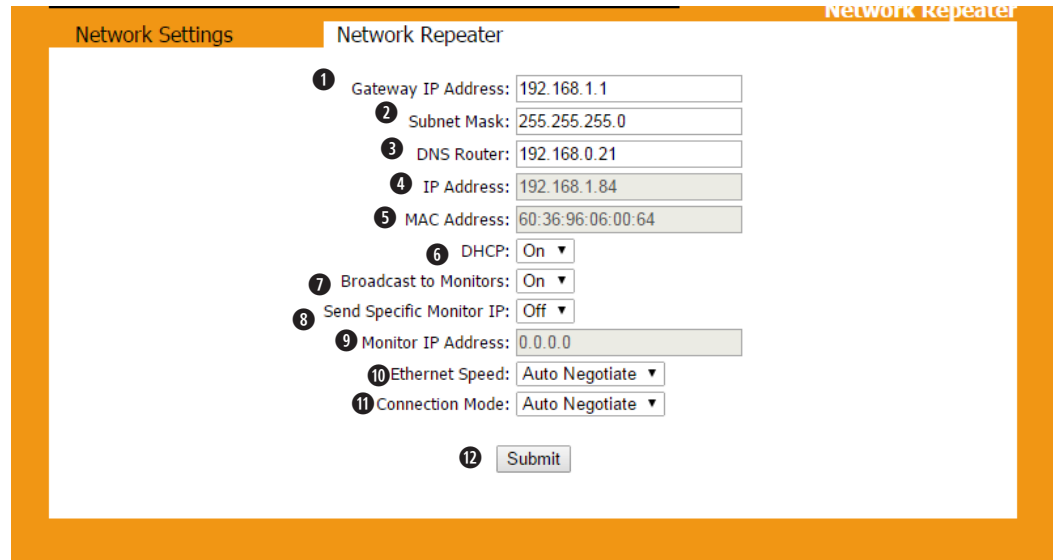
8 Forward Countdown and Message:

9

- 1 **User Password** - This field allows the user to enter a password for the user level programming. The password must be entered once in the User Password field and once in the Confirm Password field in order to be changed. The default User Password is 1111.
- 2 **Technician Password** - This field allows the user to enter a password for the technician level programming. The password must be entered once in the Technician Password field and once in the Confirm Technician Password field in order to be changed. The default Technician Password is 6063.
- 3 **Clock Name** - This field allows the user to name the Network Repeater
- 4 **Clock Number** - This is a read only option. The serial number of the network repeater is displayed.
- 5 **Network Sync Every** - This option allows the user to set how often the Network Repeater synchronizes to the master clock.
- 6 **Bias Seconds** - This option offsets the time on the repeater while still receiving an input. This value should match the value used on the SMA Series Master Clock to ensure synchronized time.
- 7 **GMT Offset** - This option sets the offset from Greenwich Mean Time. This value should match the value used on the SMA Series Master Clock to ensure synchronized time.
- 8 **Forward Countdown and Message** - This box, when checked, will allow the network repeater to forward countdowns and messages from the master clock.
- 9 **Submit** - This button, when clicked, will save and activate all settings on the Clock Settings page.

Web Interface

Network Settings

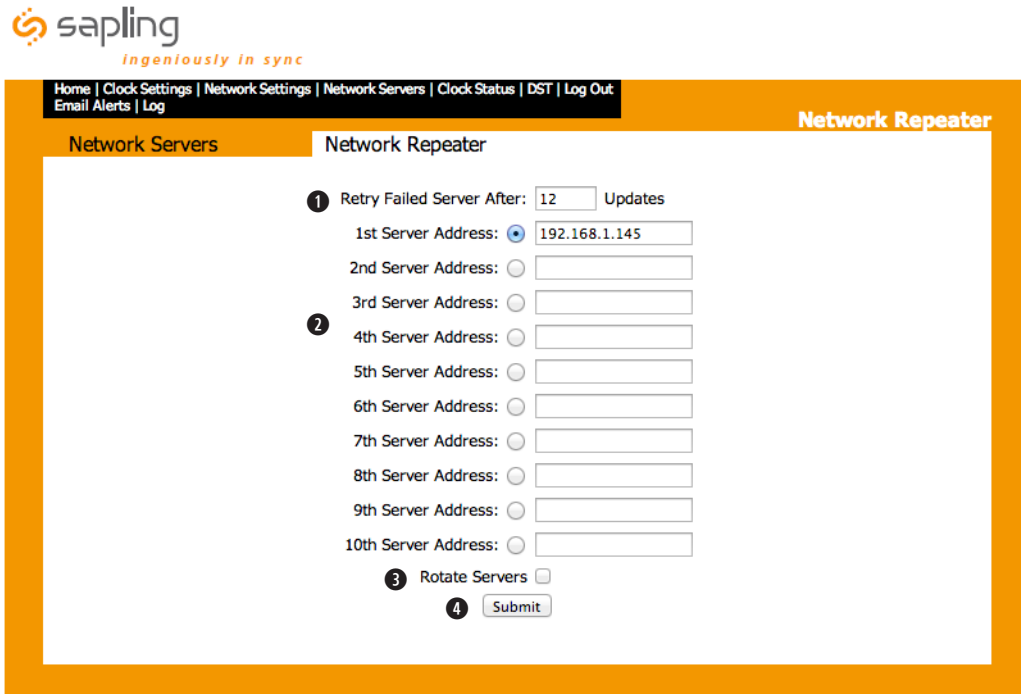


- 1 **Gateway IP Address** - This field allows for the Gateway IP address to be set.
- 2 **Subnet Mask** - This field allows the Subnet Mask to be set.
- 3 **DNS Router** - This field allows for the DNS router address to be set.
- 4 **IP Address** - This field will display the IP address that was given by the DHCP server. If DHCP is disabled, then the user will be able to set the repeater's IP address.
- 5 **MAC Address** - This read only option is the repeater's physical address.
- 6 **DHCP**- This setting allows the user to choose whether the repeater uses DHCP server or not.
- 7 **Broadcast to Monitors** -This setting allows the repeater to send out its data in broadcast mode.
- 8 **Send Specific Monitor IP** - This setting allows the user to send the repeater's status to a computer on a sub-net outside of the normal network.
- 9 **Monitor IP Address** - This is where the user will type in the IP address of the specific sub-network in which the repeater's status will be sent outside of the normal network if option 8 in enabled.
- 10 **Ethernet Speed*** - Allows the user to either manually set the Ethernet speed at 10MBit, 100MBit, or allows the repeater to Auto Negotiate the speed with the Network Router/Switch
- 11 **Connection Mode*** - Allows the user to either manually set the connection mode to Full Duplex, Half Duplex, or allows the repeater to Auto Negotiate the speed with the Network Router/Switch.
- 12 **Submit** - This button, when pressed, saves all of the settings that were changed.

*"Auto Negotiate" is the recommended setting for this feature.

Web Interface

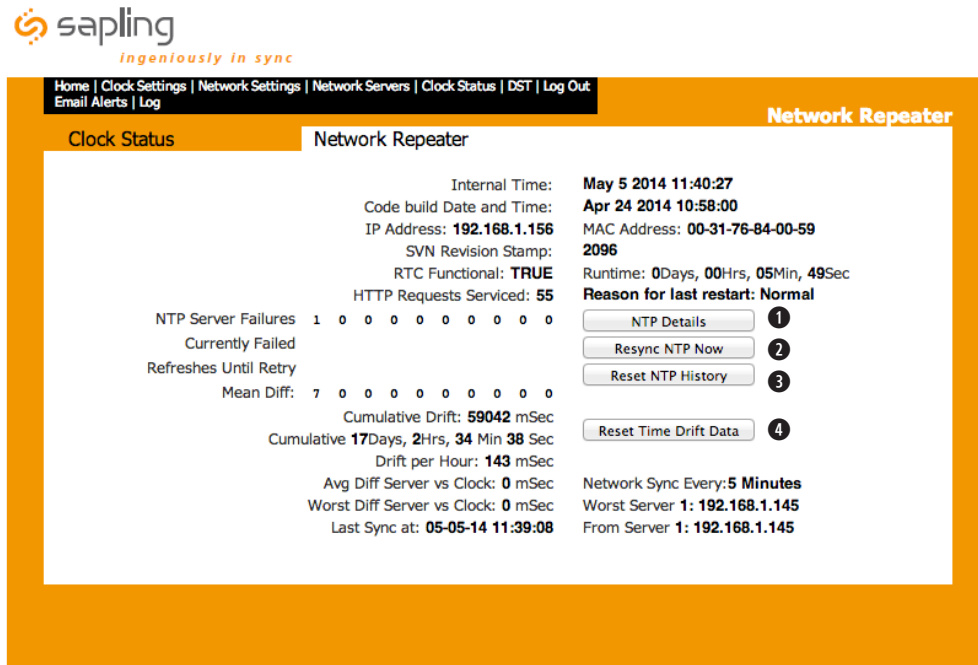
Network Servers



- ① **Retry Failed Server After X Updates** - This field allows the user to specify how many refresh cycles before the network repeater will retry to access the time from an SMA Master Clock. The Network Repeater will only synchronize with a SMA Series Master Clock.
- ② **Server Addresses** - This field is where the user will enter the IP address of the SMA Series Master Clock that will be used for synchronization. The Network Repeater will **NOT** synchronize to any other time servers but the SMA Series Master Clock.
- ③ **Rotate Servers** - Not applicable with the Network Repeater.
- ④ **Submit** - This button, when clicked, will save all changes on the Network Settings page.

Web Interface

Clock Status



The screenshot shows the Sapling web interface for a Network Repeater. The top navigation bar includes links for Home, Clock Settings, Network Settings, Network Servers, Clock Status, DST, Log Out, Email Alerts, and Log. The main content area is divided into two sections: 'Clock Status' and 'Network Repeater'.

Clock Status

NTP Server Failures	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Currently Failed																			
Refreshes Until Retry																			
Mean Diff:	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Network Repeater

Internal Time: **May 5 2014 11:40:27**
 Code build Date and Time: **Apr 24 2014 10:58:00**
 IP Address: **192.168.1.156** MAC Address: **00-31-76-84-00-59**
 SVN Revision Stamp: **2096**
 RTC Functional: **TRUE** Runtime: **0Days, 00Hrs, 05Min, 49Sec**
 HTTP Requests Serviced: **55** Reason for last restart: **Normal**

Buttons:

- 1 NTP Details
- 2 Resync NTP Now
- 3 Reset NTP History
- 4 Reset Time Drift Data

Additional Network Repeater Information:

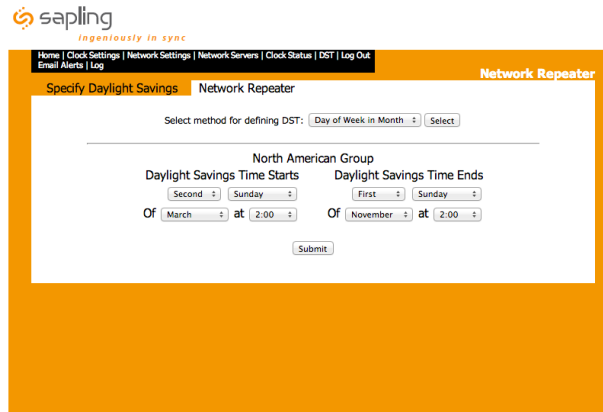
Cumulative Drift: **59042** mSec
 Cumulative **17**Days, **2**Hrs, **34** Min **38** Sec
 Drift per Hour: **143** mSec
 Avg Diff Server vs Clock: **0** mSec
 Worst Diff Server vs Clock: **0** mSec
 Last Sync at: **05-05-14 11:39:08**
 Network Sync Every: **5 Minutes**
 Worst Server **1: 192.168.1.145**
 From Server **1: 192.168.1.145**

- 1 **NTP Details** - This button, when clicked, provides additional details about the NTP synchronization.
- 2 **Resync NTP Now** - This button, when clicked, forces a synchronization with the master clock.
- 3 **Reset NTP History** - This button, when clicked, resets all the data in the NTP Details window.
- 4 **Reset Time Drift Data** - This button, when clicked, resets the statistics of the time drifts.

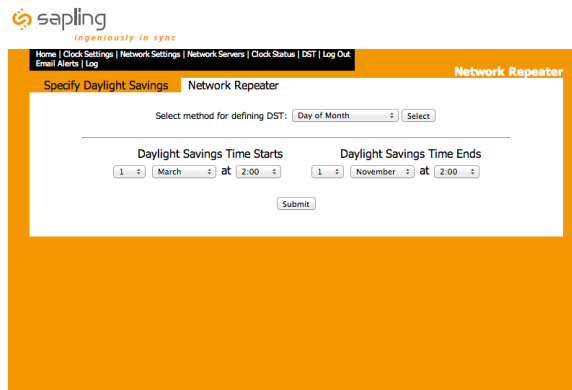
Web Interface

Daylight Saving Time

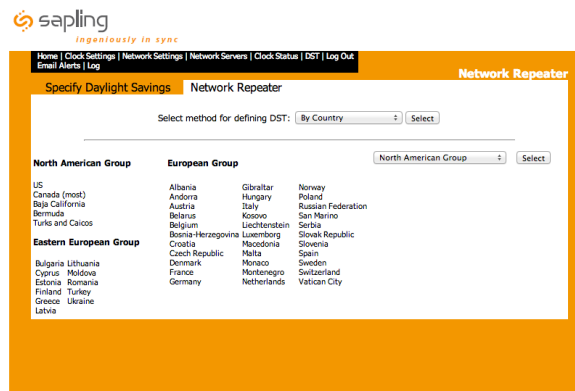
IMPORTANT: In order to correctly synchronize with the SMA Series Master Clock, use the same DST setting as the SMA Series Master Clock that is being used as the primary time source.



- 1 **Day of Week in Month DST Option** - This Daylight Saving Time setting is used when the time is to be changed on the specific day, month and time. This method is typically used in some international countries. Once the option is selected, click Submit to confirm.



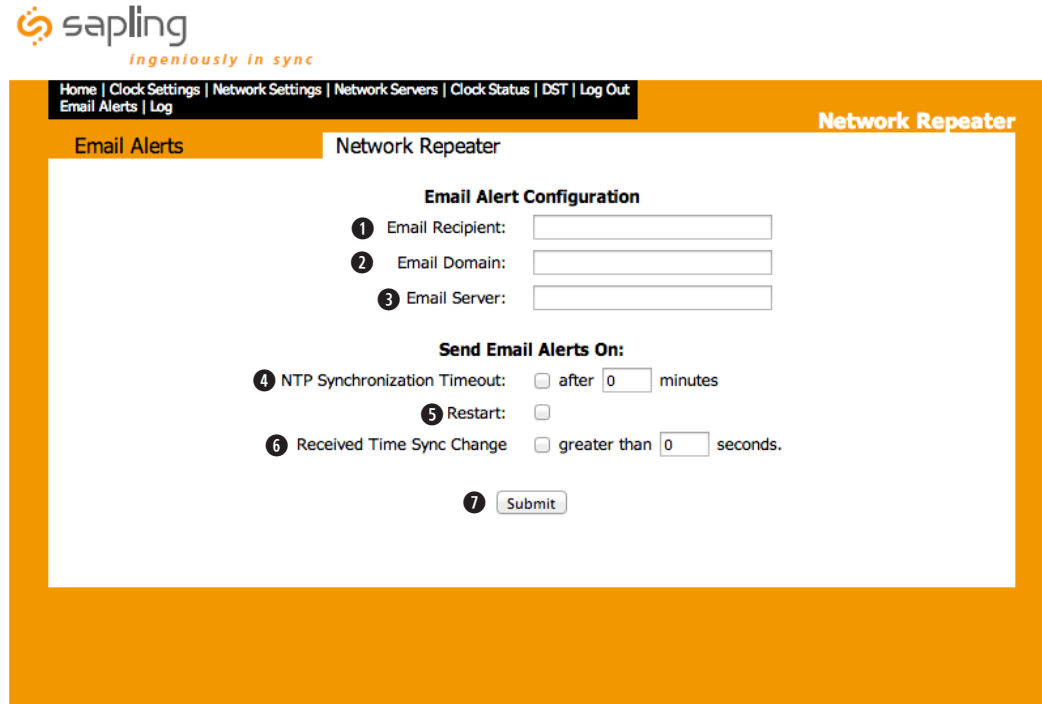
- 2 **Day of Month DST Option** - This Daylight Saving Time option is used when the time is to be changed on a specific day of the month. Once the option is selected, click Submit to confirm.



- 3 **Selecting DST by Country Option** - This Daylight Saving Time option is used when the time is to be changed time based on what country it is located in. Select the pre-defined group that best fits which DST setting is desired.

Web Interface

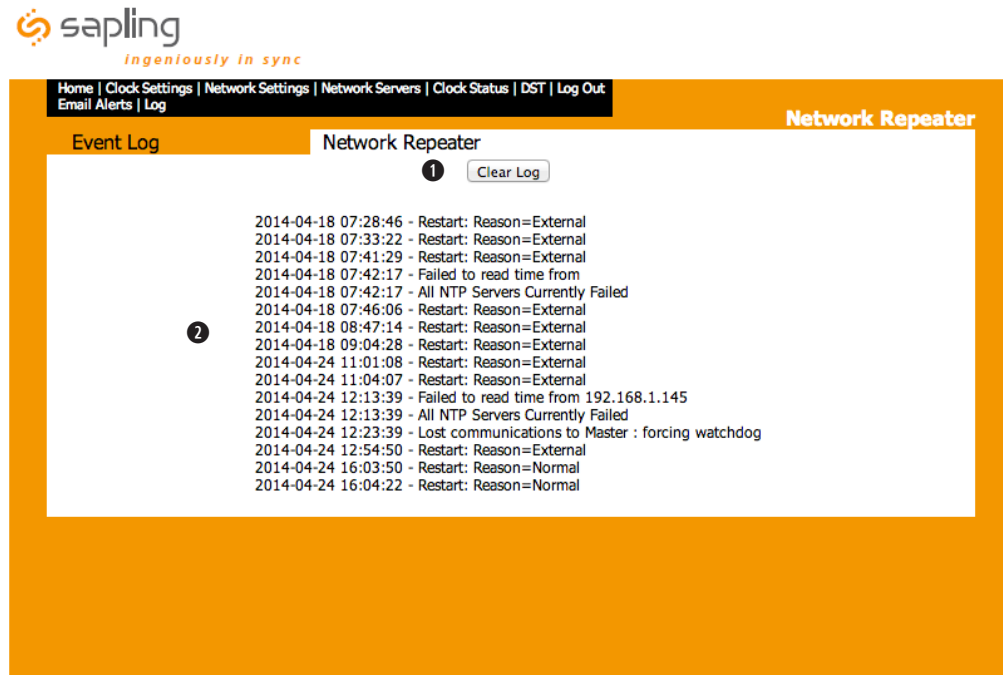
Email Alerts



- ❶ **Email Recipient** This field is where the user name of the email recipient will be inserted. Do not enter the domain and suffix. (correct: johnsmith) (incorrect: johnsmith@domain.com)
- ❷ **Email Domain** This field is where the user will enter the domain name of the email server. (i.e. domain.com)
- ❸ **Email Server** This field is where the email server address will be placed. (i.e. server.domain.com)
- ❹ **Email Alert: NTP Synchronization Timeout** When checked, this will send an alert when the repeater hasn't received a time synchronization after X minutes.
- ❺ **Email Alert: Restart** When checked, this will send an alert if the repeater has been reset.
- ❻ **Email Alert: Received Time Sync Change** When checked, this will send an alert when time that is synchronized is greater than X seconds.
- ❼ **Submit** This button, when clicked, will save all changes on the Email Alerts page.

Web Interface

Event Log



The screenshot shows the Sapling web interface for a Network Repeater. At the top, there is a navigation bar with links: Home | Clock Settings | Network Settings | Network Servers | Clock Status | DST | Log Out | Email Alerts | Log. The main content area is titled 'Network Repeater' and contains an 'Event Log' section. A 'Clear Log' button is located at the top right of the log area. The log entries are as follows:

Timestamp	Event Description
2014-04-18 07:28:46	Restart: Reason=External
2014-04-18 07:33:22	Restart: Reason=External
2014-04-18 07:41:29	Restart: Reason=External
2014-04-18 07:42:17	Failed to read time from
2014-04-18 07:42:17	All NTP Servers Currently Failed
2014-04-18 07:46:06	Restart: Reason=External
2014-04-18 08:47:14	Restart: Reason=External
2014-04-18 09:04:28	Restart: Reason=External
2014-04-24 11:01:08	Restart: Reason=External
2014-04-24 11:04:07	Restart: Reason=External
2014-04-24 12:13:39	Failed to read time from 192.168.1.145
2014-04-24 12:13:39	All NTP Servers Currently Failed
2014-04-24 12:23:39	Lost communications to Master : forcing watchdog
2014-04-24 12:54:50	Restart: Reason=External
2014-04-24 16:03:50	Restart: Reason=Normal
2014-04-24 16:04:22	Restart: Reason=Normal

- ❶ **Clear Log** - This button, when clicked, allows the user to clear the log of all results.
- ❷ **Event List** - This feature allows the user to see all the events and settings the Network Repeater has previously carried out.

Support

Frequently Asked Questions

Where is the best location for the Network Repeater to be mounted?

Usually, the hallway is the best location because it is mostly open space in typical applications.

How far can the Network Repeater transmit the wireless signal?

The Transceiver can transmit up to 1000 meters in open space.

Will the Repeater have interference from cordless or cellular phones?

No, because with Sapling's innovative frequency-hopping technology, interference will not occur. The repeater switches frequencies automatically when the receiver and transmitter is open, thus interference is avoided.

My power source is 230 volts. Can the Network Repeater be powered on that voltage?

Yes, the Repeater can work on 110 volts/50-60 Hz or 230 volts/50-60 Hz.

How often does the Network Repeater send the wireless signal?

The Network Repeater sends out the signal once a minute.

Can the Network Repeater receive time from other devices besides the Sapling SMA Series Master Clock?

No, the Network Repeater only receives time from the SMA Series Master Clock.

Troubleshooting

The clocks aren't receiving the signal. What should I do?

Make sure that the Repeater is in a place where the signal can be transmitted in open space.

What should I do if the Repeater is not powering up?

Measure the voltage between pins L1 & L2. The voltmeter should read 85 - 135 VAC between the hot and the neutral.

What do I do if I cannot get an IP address from the DHCP server and want to use a static IP instead?

See page 5 for instructions on setting the Network Repeater to use a static IP address.

FCC Wants You to Know

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 commercial 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:

- a) Reorient or relocate the receiving antenna.
- b) Increase the separation between the equipment and receiver.
- c) Connect the equipment to an outlet on a circuit different from which the receiver is connected.
- d) Consult the dealer or an experienced radio/TV technician.

FCC WARNING

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

Note: For precautionary measures, FCC recommends a distance of 10cm from the clock to constant human physical exposure.