

System Controller Setup Guide for Nyquist C4000

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1

Nyquist C4000 System Controller Setup Introduction

Two options are available for installing and deploying Nyquist C4000:

1. Using a Nyquist System Controller (NQ-SYSCTRL), which already has the operating system and C4000 application software installed on it
2. Using your own server and installing the Debian OS and C4000 application software. While Option 1 is the quickest and easiest approach, Option 2 may be better suited for situations where high-availability server features like Redundant Array of Independent Disks (RAID) or hot-swappable power supplies are desired.

This manual describes the installation steps for Option 1.

Note: This manual provides the Nyquist C4000 configuration and setup process when using the Nyquist System Controller (NQ-SYSCTRL). If you are using your own server platform, refer to the *Nyquist C4000 Server Installation and Setup Guide*.

Before attempting to set up the System Controller for use with Nyquist C4000, ensure that:

- Required services are enabled on your network. Examples of required services include TFTP.
- Required multi-cast IP addresses and ports are known and available.
- Required static IP addresses are known and available.
- Required port numbers are open.

To set up your System Controller, you must have a valid product License Activation Key on hand before beginning the process.

The Setup Assistant appears when you power up the device to configure your system. (See "System Controller Setup Assistant" on page 7.)

1.1 Understanding System Requirements

The C4000 web-based UI requires a secure type network connection (for example, https) to the C4000 System Server. Users can log on to the C4000 system using a Google Chrome web browser from a computer or tablet running either a Windows 8.1 (or later) or a Mac OS X 10.12.x (or later) OS. The UI can also be accessed via a Chrome browser enabled Android-based tablet or mobile device. To access the system, type your C4000 System Controller's IP address (for example, 10.10.20.12).

1.1.1 Whitelisted Web Addresses

C4000 requires access to specific Uniform Resource Locators (URLs), commonly referred to as web addresses. Access to many of these web addresses is required during installation; access to other web addresses, such as the address for the Network Time Server (NTS) is required during runtime. The Information Technology (IT) department for the site must whitelist the web addresses so that they can be easily accessed as needed.

The following table lists the URLs that must be whitelisted.

Table 1: Whiteisted Web Sites

URL	Description
http://hostedactivation.com (specifically, http://hostedactivation.com/bogen)	Required for C4000 license activation and verification
http://downloads.digium.com	Required for updates from Digium
http://downloads.asterisk.org/ (specifically, http://downloads.asterisk.org/pub/telephony/sounds/releases)	Required for Asterisk updates
http://www.pjsip.org/	Required for PJSIP updates

Table 1: Whiteisted Web Sites (Continued)

URL	Description
http://ftp.us.debian.org (specifically: http://ftp.us.debian.org/debian/)	Required during Linux package updates
http://security.debian.org (specifically: http://security.debian.org/)	Required during Linux package updates
stun01.sipphone.com	Required for STUN based IP address resolution (This is used by the C4000 Web UI and should be enabled on the computer that runs the web UI.)
https://raw.githubusercontent.com/	Serves unprocessed versions of files stored in the GitHub repositories.
http://2431612419.airable.io https://2431612419.airable.io	airable URL
http://api.sound-machine.com https://api.sound-machine.com	SoundMachine URL
http://api.bogenedu.com/api/customers	Required for C4000 Warranty Support

URLs that are entered on the C4000 System Parameters page are used during runtime and include the URLs for the NTS, the Session Traversal Utilities for Network Address Translation (NAT) (STUN) server, and the Traversal Using Relays around NAT (TURN) server.

The default URLs for the STUN and TURN servers are not set. The default URL for NTS is pool.ntp.org.

1.1.2 Network Application Services

Required application services are already installed on the C4000 System Controller. All other listed network services must be already present or installed manually on the associated network. The following table lists the services and their locations:

Table 2: Network Application Services

Service	Description	Required	Location
Apache	Used as the web server to drive the C4000 web interface.	Mandatory	C4000 System Controller
DHCP	Supplies dynamic IP addresses to the C4000 System Controller and associated devices. (DHCP is the acronym for Dynamic Host Configuration Protocol.) It also supplies the Trivial File Transfer Protocol (TFTP) server IP address or host name to devices on the network via option_66.	Optional	Network
DNS	Resolves host names to IP addresses. DNS is an acronym for Domain Name System, a hierarchical naming system for computers, servers, or other resources connected to either the Internet or to a private network.	Optional	Network
ICE STUN TURN	Resolves IP addresses behind Network Address Translation (NAT)/ firewall. - Interactive Connectivity Establishment - Session Traversal Utilities for NAT - Traversal Using Relays around NAT	Optional	C4000 System Controller/ Network
NTP	Provides date/time synchronization for the C4000 System Controller and the associated devices (IP Phones, appliances). (NTP is an acronym for Network Time Protocol.)	Mandatory	Network

Table 2: Network Application Services (Continued)

Service	Description	Required	Location
SNMP	Provides the C4000 Linux server statistics via Simple Network Management Protocol (SNMP) v1 through Port 161.	Optional	C4000 System Controller
TFTP	<p>TFTP is used by IP phone and C4000 device provisioning. A TFTP server runs on the C4000 System Controller on port 69 (the standard TFTP port #).</p> <p>Device provisioning files are stored on the C4000 System Controller in directory: /srv/tftp.</p> <p>This is the only directory exposed by the TFTP server.</p>	Mandatory	C4000 System Controller

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2

System Controller Setup Assistant

After you have attached network cables to the System Controller, you can launch the Setup Assistant, which is a series of wizards that take you step by step through the configuration of the most important Nyquist C4000 settings via a Chrome browser.

Note: Use Chrome as your web browser.

You can access the System Controller for initial setup by either using DHCP (see "*Finding DHCP Assigned IP Address*" on page 7) to assign an IP address or using a statically assigned IP address (see "*Launching the Setup Assistant*" on page 8).

2.1 Finding DHCP Assigned IP Address

If you are going to use a DHCP assigned IP address to access your System Controller, you can use the DHCP router's UI to access the list of leases. The following graphic is an example of one router's UI; not all routers use the same interface. In this example, the System Controller's IP address is listed on the row for Hostname nq-sysctrl-0030180618fd.

Leases				Static MAC/IP Mapping		Details	
Pool Size:	Leased:	Available:	Static:	Subnet: 192.168.1.0/24	Router: 192.168.1.1		
205	10	195	1	Range Start: 192.168.1.38	DNS 1: 8.8.8.8		
				Range End: 192.168.1.243	DNS 2: 192.168.1.1		
				Unifi Controller:	Status: Enabled		
Search <input type="text"/>							
IP Address ▲	MAC Address ⇅	Expiration ⇅	Pool ⇅	Hostname ⇅			
192.168.1.171	b0:39:56:7e:65:aa	2019/04/12 16:42:59	LAN				
192.168.1.178	6c:ec:eba2:28:c8	2019/04/12 13:33:43	LAN	NQ-IO-6CECEBA228C8 <input type="button" value="Map Static IP"/>			
192.168.1.179	00:15:65:f1:c0:65	2019/04/12 14:12:46	LAN	SIP-T485 <input type="button" value="Map Static IP"/>			
192.168.1.197	18:dbf2:56:0c:c3	2019/04/12 12:40:25	LAN	FL-TECHMGR1 <input type="button" value="Map Static IP"/>			
192.168.1.220	00:30:18:06:18:fe	2019/04/11 18:26:38	LAN	nq-sysctrl-0030180618fd <input type="button" value="Map Static IP"/>			

2.2 Launching the Setup Assistant

When the System Controller is powered up for the first time, Ethernet Port A is pre-configured with a static IP address of 192.168.1.10 and Ethernet Port B is pre-configured to accept a DHCP IP address. The first step to setting up the System Controller is to accept or change the network addresses used for Ports A and B.

If you are using a static IP addresses, connect the System Controller to your network or PC's Ethernet port using Port A and type **192.168.1.10** into the web browser's address bar to access the System Controller.

If you prefer to use DHCP to assign the System Controller's IP address, then connect the System Controller to your network using Port B and type `<ip-address>` into the web browser's address bar, where `<ip-address>` is replaced by the DHCP server provided IP address.

After you enter an IP address into your web browser's address bar, the following Welcome screen will be displayed. If the Welcome screen does not display, check your network cables and IP addresses and try again.

Welcome to the Setup Assistant

The following wizards will walk you step by step through the configuration of the most important parts of the system.

After completing required settings, you will have the option to click an Expert Setup button and configure the system manually.

Click Continue to get started.

Continue

When you select the **Continue** button on the initial Welcome screen, the Network Wizard launches. The Network Wizard allows you to configure the IP address settings on Ethernet ports A and B.

Network Wizard

The System Controller has two different network ports, Port A and Port B. Port A is always used by the Nyquist server to communicate with Nyquist devices and the Nyquist web interface. Port B is an optional port that when configured is always used by the Nyquist server to communicate with Internet based services. Port B is not used to communicate with Nyquist devices. If Port B is not configured, then Port A is also used by the Nyquist Server to communicate with Internet based services.

1. Is Port A a Static IP Address or provided via a DHCP Server?

Static IP Address ▾

What is the IP Address for Port A?

192 168 1 10

What is the Subnet Mask for Port A?

255 255 255 0

What is the Gateway for Port A?

2. Is Port B a Static IP Address, provided via a DHCP Server, or Not Used?

DHCP Server ▾

3. DNS Servers: ⓘ

Save and Reset Network Interfaces

Note: DHCP assigned IP addresses must be Reserved in the DHCP server to prevent them from changing, which could cause the system to stop working.

When using a DHCP server to assign IP addresses, you do not need to enter a DNS Server, and doing so could result in an invalid network configuration that causes the Setup Assistant, the Network Wizard, or both to become unresponsive during the Reset Network Interfaces action.

The System Controller has two network ports. Port A is always used by the System Controller to communicate with Nyquist devices and can also be used to communicate with Internet based services. (See *Figure 2-1, "Port A Only Configuration,"* on page 10.) You can use Port A or Port B to access the System Controller via the Web UI. Port B is an optional port that, when configured, will always be used by the System Controller to communicate with Internet based services (for example, SoundMachine streaming music service). (See *Figure 2-2, "Port A and B Configuration,"* on page 11.)

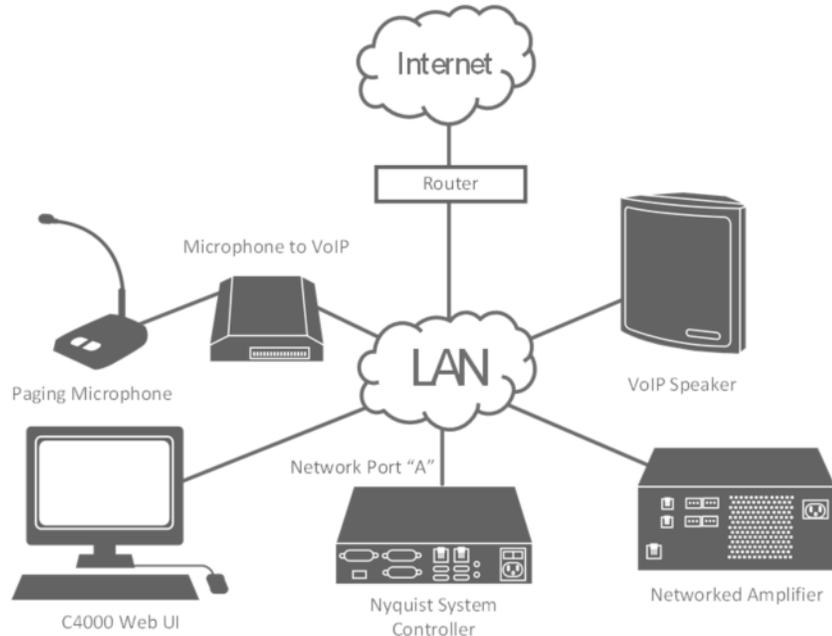


Figure 2-1, Port A Only Configuration

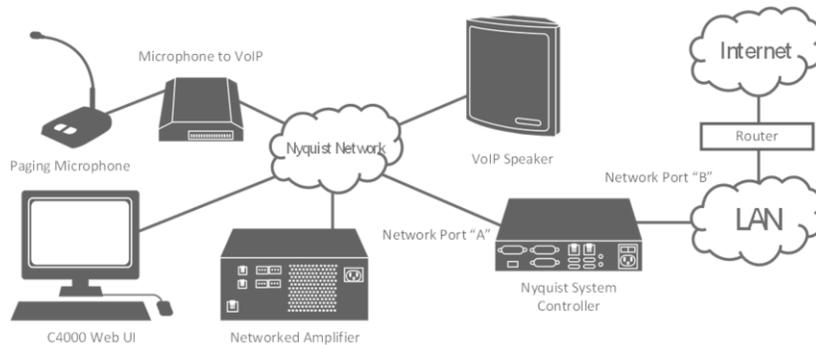


Figure 2-2, Port A and B Configuration

When setting up the network ports, you must indicate if the IP address will be provided by a DHCP Server or if a static IP address will be used. If you are using a static IP address, you must provide the IP Address, Subnet Mask, and Gateway for the Ethernet port or ports. Through the Network Wizard, you also indicate if Port B will be used and optionally provide the name of the Domain Name System (DNS), which is used to resolve host names to IP addresses. If you are using Port B for Internet access and Port B is configured as DHCP do not enter a Gateway in the Gateway field.

When you have completed entering the information for the Network Wizard, select **Save and Reset Network Interfaces**. Resetting the Network Interfaces will take several minutes, and a progress bar will appear on the screen.

The Network Wizard displays two count down timers. The first timer represents the amount of time provided for making any required network cable changes. The second timer represents the total time needed by the Network Wizard's reset operation.

When the network interface reset finishes, click the web browser's address bar and enter the IP address just assigned to the System Controller.

The C4000 system now automatically launches the License Wizard. The first thing the License Wizard displays is the network configuration for Port A and (if used) Port B.

Note: Verify that the network setup is correct before continuing. If the displayed IP addresses are not correct, use the button at the bottom of the page to go back to the Network Wizard and make any required changes before proceeding with the License Wizard.

License Wizard

A valid License Activation Key is required to activate the product.

Before proceeding with License Activation Key entry, it is very important that you verify the current network setup.

The current network setup is:

Port A: 10.10.10.32
Port B: No IP Address available

Internet connection must be available via Port A and remain that way. Once the License Activation Key is activated, you can not move the Internet connection to Port B, doing so will invalidate your license.

If these IP addresses are correct, please continue with License Activation Key entry.

If these IP addresses are not correct, please press the "Network Wizard" button to make any required changes before proceeding with the License Wizard.

Installed License Activation Keys:

Keys that start with an "N" are installed by default in the Nyquist System Controller.

Enter a Valid License Activation Key to Install: 

Activate Key

Network Wizard

Import Keys

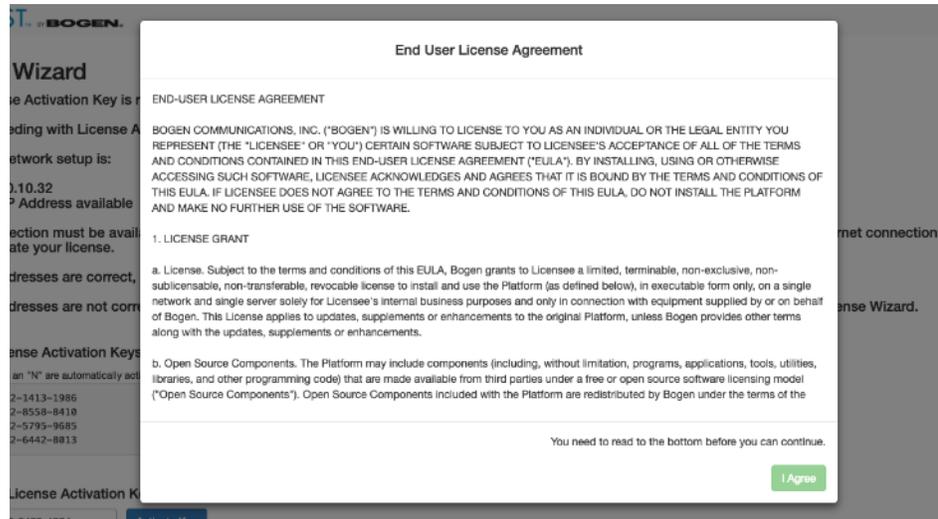
If you are swapping an existing System Controller for a replacement one, you can use the **Import Keys** button to import any keys that were exported from the previously configured System Controller. For information about importing and exporting keys, refer to the *System Administration Manual*.

If you are not using the Import Keys functionality, enter the product **License Activation Key** for your system. This key is in the format **PCxx-xxxx-xxxx-xxxx-xxxx**. Letters must be entered in uppercase.

Note: All 0 characters in the license string are the number zero.

Once the product key is entered, select **Activate Key**.

The End User License Agreement (EULA) then appears in a pop-up window.



After reading the EULA, select **I Agree** to accept it and continue with the License Wizard.

Note that the product key is now listed in the Installed License Activation Keys window and that a Node-Locked License Activation Key is also displayed, as this key has been pre-installed at the factory on all System Controllers.

While not mandatory, we recommend that you now enter any additional feature or option License Activation Keys (format **FCxx-xxxx-xxxx-xxxx-xxxx**) that you may have purchased, following the same activation procedure used for the product key. You can add as many feature or option License Activation Keys as needed. Each one will appear in the Installed License Activation Keys window following its activation.

License Wizard

A valid License Activation Key is required to activate the product.

Before proceeding with License Activation Key entry, it is very important that you verify the current network setup.

The current network setup is:

Port A: 10.10.10.246

Port B: No IP Address available

Internet connection must be available via Port A and remain that way. Once the License Activation Key is activated, you can not move the Internet connection to Port B, doing so will invalidate your license.

If these IP addresses are correct, please continue with License Activation Key entry.

If these IP addresses are not correct, please press the "Network Wizard" button to make any required changes before proceeding with the License Wizard.

Installed License Activation Keys:

Keys that start with an "N" are installed by default in the Nyquist System Controller

PC00-5909-1482-9809-5168
N000-5921-1482-3973-5175

Enter a Valid License Activation Key to Install: ?

XXXX-XXXX-XXXX-XXXX-XXXX

Activate Key

Network Wizard

Import Keys

Done

Note: Wait until the activation process completes. Do not close the browser or the License Activation Key page or the browser.

You can also enter License Activation Keys for features or options through the Admin Web UI. For more information about entering keys through the Admin Web UI at any time after the initial system setup process is complete and for feature License Activation Keys descriptions, refer to the *Nyquist C4000 System Administrator Manual*.

After entering all License Activation Keys, select **Done**.

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Product Activation

Activating C4000 version 1.0.0.1144

Calls: 10

Intercom Calls: 0

Stations: Unlimited

Zones: 24

Paging Queues: Disabled

Text-To-Speech: Disabled

Maps: Disabled

Software Maintenance Expiration Date: 04112022

Software License Expiration Date: permanent

⚠ WARNING
WAIT until this process is complete.
DO NOT interrupt this page.
DO NOT close this page.
DO NOT close the browser.

The Product Activation screen will appear. This screen provides information about the software and features that are being activated.

Note: Do not interrupt or close the the License Activation Key page.

The Customer Information Wizard will now launch to collect product registration information for warranty purposes and to activate the system's Software Update Subscription.

Customer Information Wizard

Enter the following info that will be used to register the system to the specific customer.

Company Name: *	Address 1: *
<input type="text"/>	<input type="text"/>
Contact First Name: *	Address 2:
<input type="text"/>	<input type="text"/>
Contact Last Name: *	City: *
<input type="text"/>	<input type="text"/>
Title: *	State/Province: *
<input type="text"/>	<input type="text"/>
Customer Type: *	Postal Code: *
Select ▾	<input type="text"/>
Contact Email: *	Country: *
<input type="text"/>	<input type="text"/>
Contact Phone: *	Serial Number:
<input type="text"/>	112233445566

* Required

Fill in the form and select **Continue**.

The Dialing Length Wizard is next. If you already know how to configure a C4000 system and you want to skip the wizards, you can select **Expert Setup**, which takes you directly to the C4000 system's Login page. The Station, User, Time Zone, and Network Time Server Wizard views also have an **Expert Setup** button. The **Expert Setup** button marks all the wizard-based setup database entries as "visited" so that you are not redirected back to any of the wizards.

Note: If you select **Expert Setup** and have not set a new password, you will need to enter the default username **admin** and the default password **bogen** to log into the system. Login credentials are case sensitive.

If you log in after having selected to use the Expert Setup, you must manually complete system configuration using the Admin Web UI (see the *Nyquist C4000 System Administrator Manual*).

If you don't opt to use the Expert Setup, you can continue using the setup wizards.

Dialing Length Wizard

The Dialing Length specifies the number of digits required to dial stations within a system. If setting up more than 800 stations, start with at least a 4 digit Dialing Length.

Choose the Dialing Length:

Set the dialing length (number of digits) used by stations in your system and then select **Continue**.

Station Wizard

Create an Admin Web UI Station:

Extension: 

Name: 

Create the Admin Web UI station by entering the Extension and Name for this station. Then, select **Continue**.

User Wizard

The administrative user (admin) has the ability to change all aspects of the System.

Update the administrative password:

Note: Minimum password length is 5 characters. Valid characters include Uppercase letter (A-Z), Lowercase letter (a-z), Digit (0-9), and Special Characters (!@#\$%).

Update the password for the Admin Web user.

Select **Continue**.

Time Zone Wizard

The system time zone sets the correct System local time.

Search for a city that represents the system time zone; for example, **New York (Eastern)**, **Chicago (Central)**.

Set the time zone to be used by your system and then select **Continue**.

Network Time Server Wizard

The Network Time Server provides the System with reliable synchronized time.

Enter a Network Time Server:

Specify the Network Time Server and then select **Continue**.

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Zone Wizard

Remove	Zone Number	Name	Type	Volume	Audio Distribution Volume	Pre-Announce Tone	Multicast IP Address	Multicast Port
X	1	Zone1	Paging+Time+Audio	20	20	1-Second	239.1.1.10	6100
X	2	Zone2	Paging+Time+Audio	20	20	1-Second	239.1.1.11	6104
X	3	Zone3	Paging+Time+Audio	20	20	1-Second	239.1.1.12	6108
X	4	Zone4	Paging+Time+Audio	20	20	1-Second	239.1.1.13	6112
X	5	Zone5	Paging+Time+Audio	20	20	1-Second	239.1.1.14	6116
X	6	Zone6	Paging+Time+Audio	20	20	1-Second	239.1.1.15	6120
X	7	Zone7	Paging+Time+Audio	20	20	1-Second	239.1.1.16	6124
X	8	Zone8	Paging+Time+Audio	20	20	1-Second	239.1.1.17	6128
X	9	Zone9	Paging+Time+Audio	20	20	1-Second	239.1.1.18	6132
X	10	Zone10	Paging+Time+Audio	20	20	1-Second	239.1.1.19	6136
X	11	Zone11	Paging+Time+Audio	20	20	1-Second	239.1.1.20	6140
X	12	Zone12	Paging+Time+Audio	20	20	1-Second	239.1.1.21	6144
X	13	Zone13	Paging+Time+Audio	20	20	1-Second	239.1.1.22	6148
X	14	Zone14	Paging+Time+Audio	20	20	1-Second	239.1.1.23	6152
X	15	Zone15	Paging+Time+Audio	20	20	1-Second	239.1.1.24	6156
X	16	Zone16	Paging+Time+Audio	20	20	1-Second	239.1.1.25	6160
X	17	Zone17	Paging+Time+Audio	20	20	1-Second	239.1.1.26	6164
X	18	Zone18	Paging+Time+Audio	20	20	1-Second	239.1.1.27	6168
X	19	Zone19	Paging+Time+Audio	20	20	1-Second	239.1.1.28	6172
X	20	Zone20	Paging+Time+Audio	20	20	1-Second	239.1.1.29	6176

The current license allows the creation of more than 20 zones. This wizard only allows the creation of 20 zones initially. You can create more zones after the setup is complete.

The Zone Wizard appears next. The number of zones that you can create depends upon your product license. However, regardless of what size system license purchased, the Zone Wizard will only assist in creating a maximum of 20 zones. (Additional zones, if desired and licensed, can be added via the Admin Web UI after the initial setup is complete.) If you have purchased up to 20 zones, the system will automatically generate the zones.

You can delete an automatically generated zone by selecting the red X next to the zone you want to delete.

You can also make edits to a zone by selecting a hyperlink in any of a zone's parameters except for the number:

Name Identifies the zone by the user-created name. The name can be alphanumeric (such as Bldg 1) and contain up to 255 characters.

Type Identifies the zone as being able to receive paging, time, audio, or a combination of paging, time, or audio.

Volume	Sets the volume level for announcements. The volume level can range from 0 to 10.
Audio Distribution Volume	Sets the volume level for audio distribution playing to stations in the zone. (See <i>"Using Audio Distribution" on page 270.</i>)
Pre-Announce Tone	Identifies what, if any, tone should play before an announcement.
Multicast IP Address	Identifies the IP address for multicast calls to the zone.
Multicast Port Number	Identifies the port number for multicast calls to the zone.

For some parameters (Type and Pre-Announce Tone), you can select from the drop-down menu that appears; for others, type the change and select the check box when done.

Or, you can select **Skip Wizard** and create your zones later through the Admin Web UI. After all zones have been created, select **Save**.

Setup Wizards Complete

Click Continue to go to Expert Setup and start using the Nyquist System.

Continue

Once you complete all of the setup wizards, you can select **Continue** and the Nyquist C4000 logon screen appears.



Your connection is not private

Attackers might be trying to steal your information from **10.10.10.168** (for example, passwords, messages, or credit cards). [Learn more](#)

NET::ERR_CERT_AUTHORITY_INVALID

Help improve Safe Browsing by sending some [system information and page content](#) to Google.
[Privacy policy](#)

Advanced

Back to safety

The first time you try to log on to your Nyquist C4000 system, you will get the notice that your connection is not private. Click **Advanced**.

Note: Selecting **Advanced** will prompt you to select the hyperlink to proceed to the URL.

3

Best Practices Best Practices

This section details recommendations and best practices to use when:

- Updating the Nyquist C4000 system software to a new software release
- Updating Nyquist appliance or device firmware
- Using System Backups

3.1 Updating Nyquist C4000 Software

New Nyquist C4000 server software may include patches to address known issues or new releases that provide additional features. The latest software can be accessed by going to the C4000 product website (<http://www.bogen-ip.com/>) and selecting **RESOURCES** from the **SUPPORT** tab.

Note: System backups created by older versions of the server software are not compatible with the newer releases and should **not** be used to restore configuration data.

When updating to a new Nyquist C4000 software release, use the Admin web UI to perform a system update unless directed otherwise by Bogen Technical Support (1-800-999-2809). Performing a system update ensures that all configuration data, call detail records, recordings, voice mail, and all upload announcements, alarms, tones, and songs are retained and are available after the system software update.

To perform a system update:

- Step 1 From the navigation bar, select **System Parameters**.
- Step 2 From the System Parameters page, select **System Update**, locate the System Update file, and then select **Import**.

Perform the server system update process before updating Nyquist appliance software.

For more information, refer to the *Nyquist C4000 System Administrator Manual*.

3.2 Updating Appliance Firmware

When Nyquist C4000 software is installed or upgraded, the appliance firmware on any installed Nyquist appliance is automatically upgraded to the appropriate firmware compatible with the Nyquist system software installed. Also during the installation or upgrade, the appropriate version of firmware included with the new server application software is copied to the firmware folder and an entry is added to the firmware list available on the web UI.

Nyquist appliance firmware can be updated for specific Nyquist appliances and devices through the Admin web UI or directly through the appliance's web UI. For information about the appliance's web UI, refer to the device's configuration manual.

Through the Admin web UI, you can upload a firmware file to the system, download firmware to a Nyquist appliance or device, view a list of appliances and devices that are linked to a firmware name, set default firmware for any appliances and devices to be added, and delete firmware entries. For information about using the web UI, refer to the *Nyquist C4000 System Administrator Manual*.

The latest C4000 software can be accessed by going to the C4000 product website at <http://www.bogen-ip.com/> and selecting **RESOURCES** under the **SUPPORT** tab.