Crestron Residential Systems

Security Reference Guide

Crestron Electronics, Inc.

The original language version of this document is U.S. English.
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Regulatory Model: [[[Undefined variable TP-Variables.RegulatoryModel]]]

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Introduction

Crestron® systems should be secured against potential security risks. Crestron security results in a safe, stable system, protected from unauthorized access, but only when the proper guidelines are followed. This guide can help ensure your customers' sites are safe.

This document describes how to secure a Crestron residential installation for the following platforms:

- 3-Series® control system platform (version 1.601 or later)
- Crestron Home® OS platform (all released versions)
- Crestron Pyng® OS platforms (all released versions)

> **NOTE:** 4-Series® control systems ship with authentication enabled by default and do not require any end user setup. Users are prompted to create an admin account username and password upon connecting to the device for the first time using a web browser or Crestron Toolbox™ software.

The following resources may also be referenced:

- For detailed information about security features, see the Crestron Security website (https://www.crestron.com/en-US/Security/Security-at-Crestron).
- For information about the MyCrestron Dynamic DNS Service, visit https://www.crestron.com/en-US/Support/Tools/Applications/MyCrestron-Dynamic-DNS-Service.
- For information about MyCrestron Residential Monitoring services, visit https://www.crestron.com/en-US/Support/Tools/Applications/MyCrestron-Residential-Monitoring-Service.

Secure a 3-Series® Control System

Use the following procedures to secure a 3-Series control system with Crestron Toolbox software.

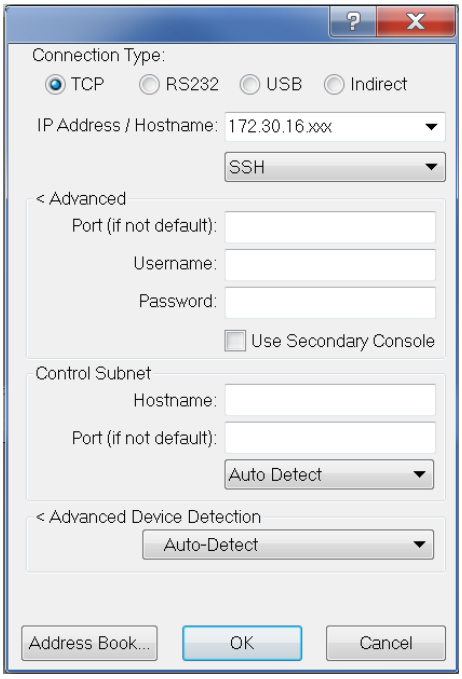
> **NOTE:** For more information on configuring authentication and security settings for a 3-Series control system, refer to the 3-Series Control System Reference Guide.

Verify the Firmware Version

To verify the firmware version of the 3-Series control system:

1. Open Crestron Toolbox™ software.
2. Navigate to **Tools** > **EasyConfig**. The **EasyConfig** tool is displayed.
3. Click the pencil icon at the bottom of the **EasyConfig** tool. A dialog box for editing the connection type is displayed.

   Connection Type Dialog Box

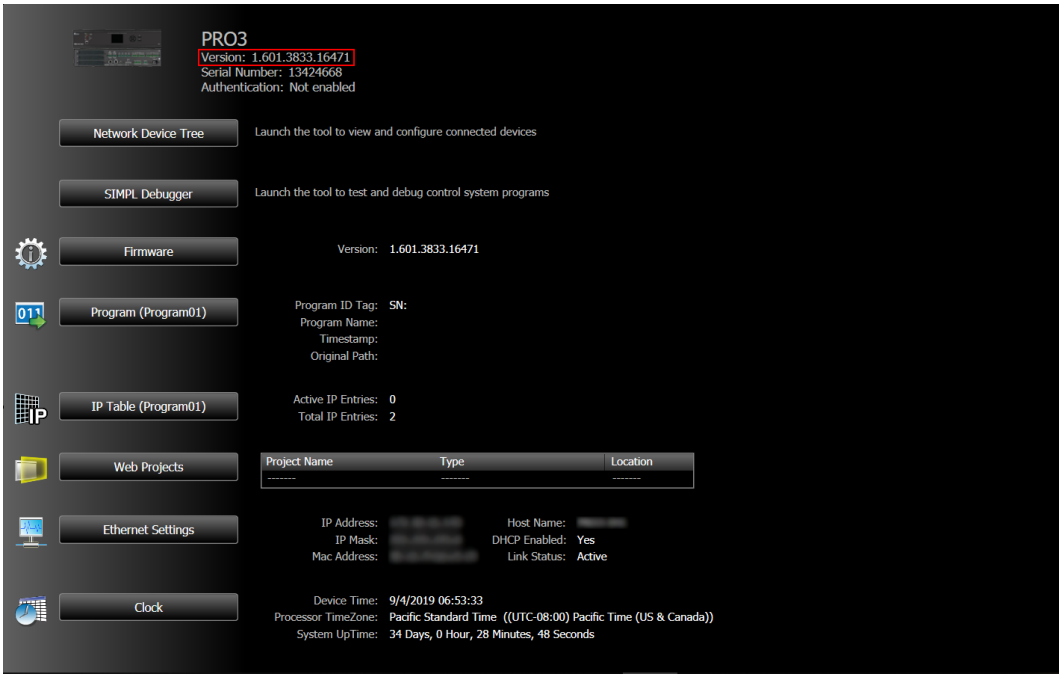
4. Select the **TCP** button under **Connection Type**.
5. Enter the control system IP address or hostname in the **IP Address / Hostname** field.

6. Select **SSH** from the drop-down menu under the **IP Address / Hostname** field.

   > **NOTE:** SSH uses port 22 by default.

7. Configure any additional TCP connection settings as needed.
8. Click **OK**. The **EasyConfig** tool is displayed with information about the 3-Series control system.

   EasyConfig Tool



9. Verify that the firmware version (listed next to **Version** at the top of the tool) is at least 1.601. For the latest security patches, apply the latest firmware available.

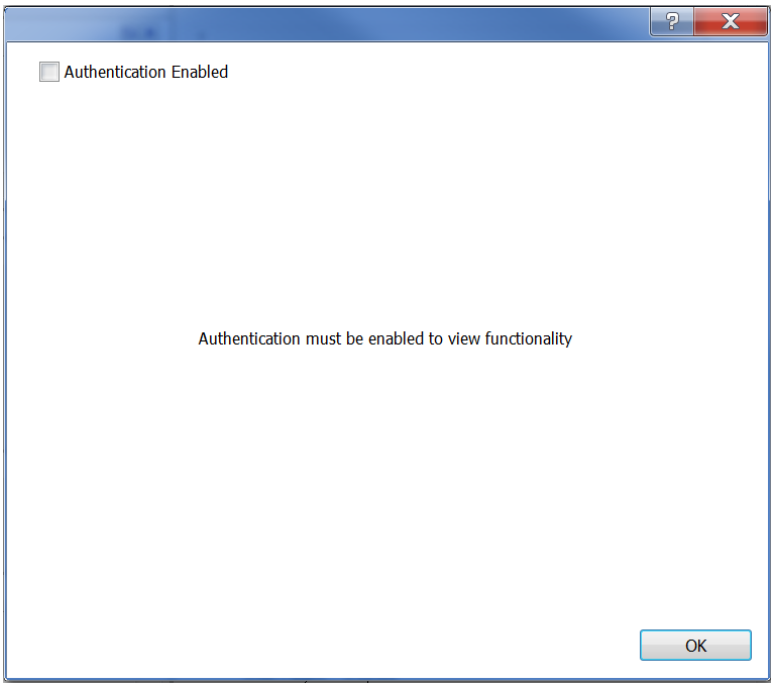
Create an Administrator Account

> **NOTE:** If authentication is already enabled on the control system, an administrator account already exists and this procedure is not required. An administrator user name and password is required to access the device in Crestron Toolbox.

The first step in securing the processor is the creation of an administrator account. To create an administrator account:

1. In Crestron Toolbox, open the **EasyConfig** tool for the 3-Series control system by following steps 1–8 of Verify the Firmware Version on page 6.
2. Navigate to **Functions** > **Authentication**. A dialog box for configuring authentication settings is displayed.

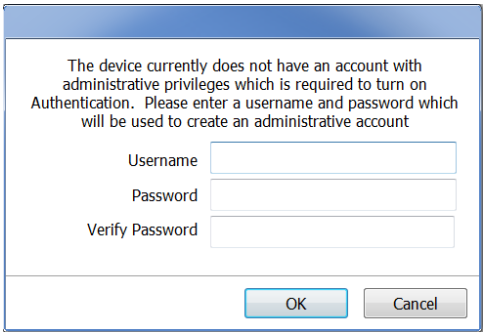
Authentication Dialog Box



3. Click the checkbox next to **Authentication Enabled**.

   If authentication is enabled for the first time on the 3-Series control system, a dialog box for creating an administrator account is displayed.

Create Administrator Account Dialog Box



4. Enter a user name in the **Username** field.
5. Enter a password in the **Password** field. The password rules are as follows:
   - The password length must be between 8 and 13 characters.
   - The password must contain at least one of each of the following:
     - Uppercase letter
     - Lowercase letter
     - Numeric digit
     - Special character: ` ~ ! @ $ % ^ & * ( ) _ + = { } [ ] | ; " < > , .
6. Enter the password created in step 5 in the **Verify Password** field.

7. Click **OK**. The 3-Series control system reboots automatically, and the new settings take effect following the reboot.

> **NOTE:** After multiple incorrect login attempts (the default is 3), the control system locks out any additional login attempts from the same IP address for a 24-hour period. Any incorrect login attempt over a USB connection is blocked for 5 minutes. For more information, see the Crestron Secure Deployment Guide at www.crestron.com/en-US/Security/Security-at-Crestron.

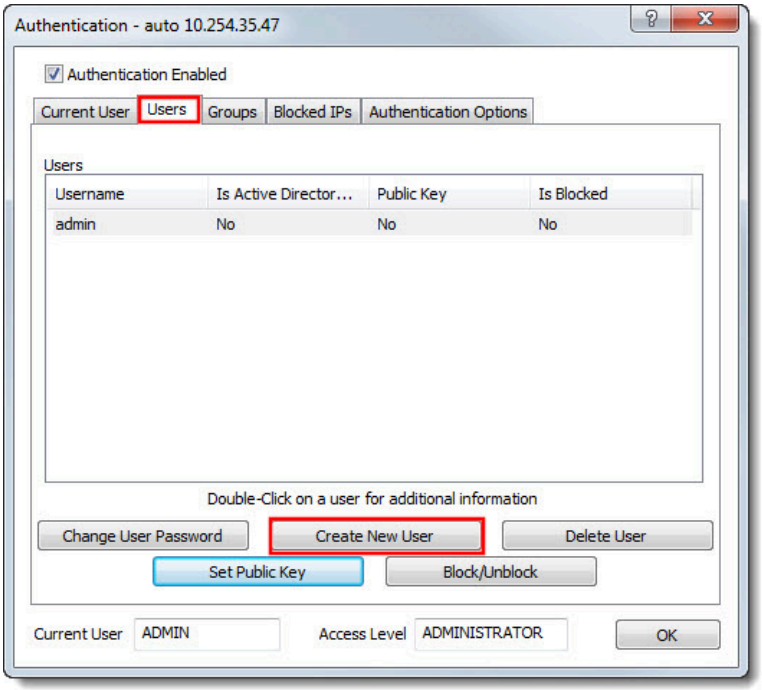
Add a User for SSL

Once authentication is enabled, the administrator may create new users and groups, add users to groups, set permissions, and change user passwords.

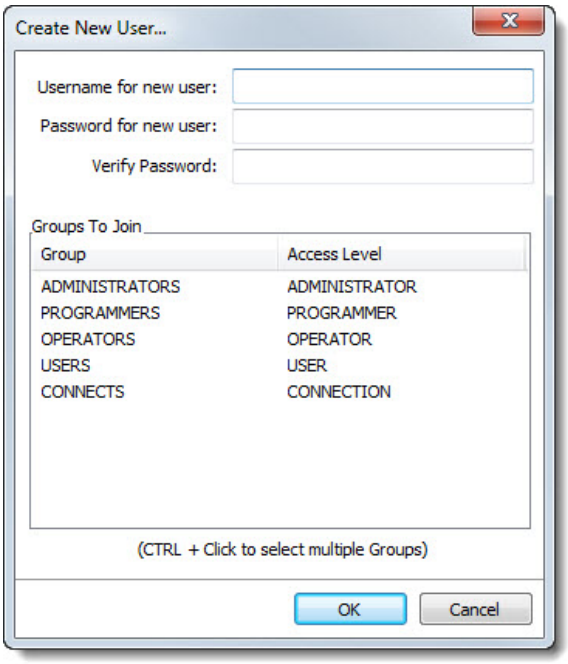
It is highly recommended that at least one additional account is created and added to the Users group. This account should be used in the SSL settings of the mobile applications. For more information, refer to the following sections.

To create a new user:

1. Access the authentication dialog as described in Create an Administrator Account on page 7.
2. In the **Authentication** window, click **Create New User**.



3. In the **Create New User...** dialog box, enter the user information in the **Username for new user**, **Password for new user**, and **Verify Password** text boxes.



4. In the **Groups to Join** box, click the **USERS** group to assign the new user to it. The user inherits the groups's access level/rights. Use **Ctrl+click** to assign the new user to multiple groups.
5. Click **OK**.

Enable SSL on the Crestron Mobile App

> **NOTE:** This is not required with Crestron Home® OS or Pyng® OS.

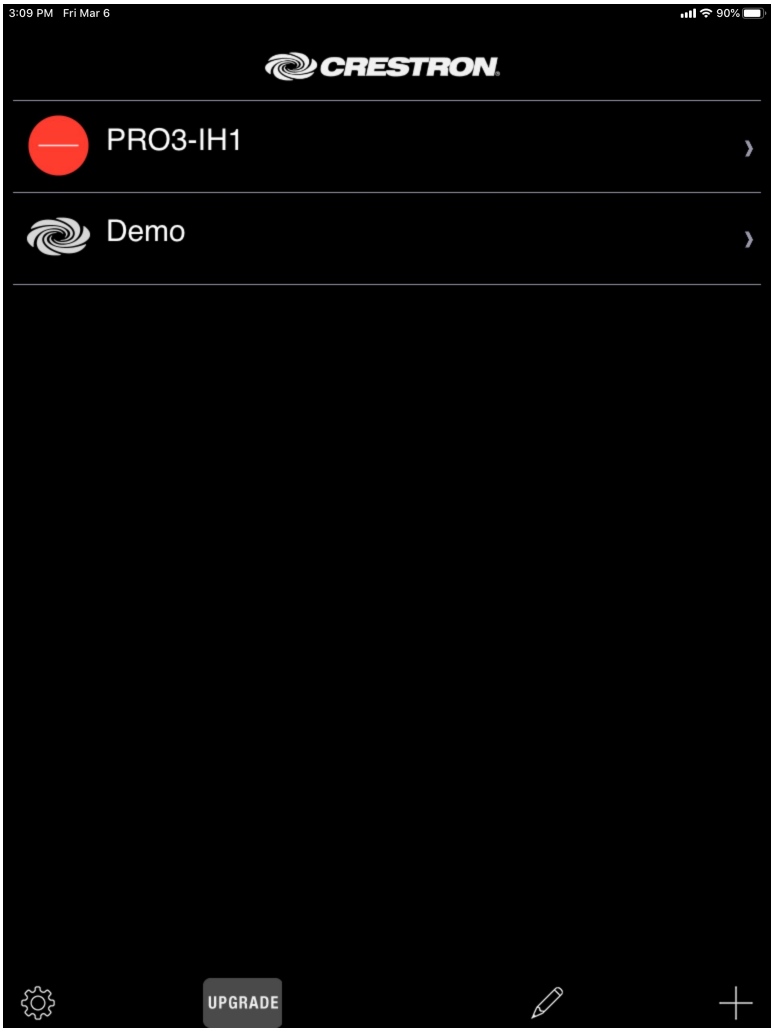
The Crestron Mobile App icon is shown below.

Once authentication is enabled on the control processor, SSL must be enabled on the Crestron mobile app in order for it to properly connect to the system. To enable SSL on the Crestron mobile app for Crestron control systems:

1. From Crestron Toolbox, click the pencil icon in a supported tool (such as **EasyConfig**) to access the control system connection settings for use later in this procedure.

2. From the Crestron App, tap the pencil icon at the bottom of the screen.

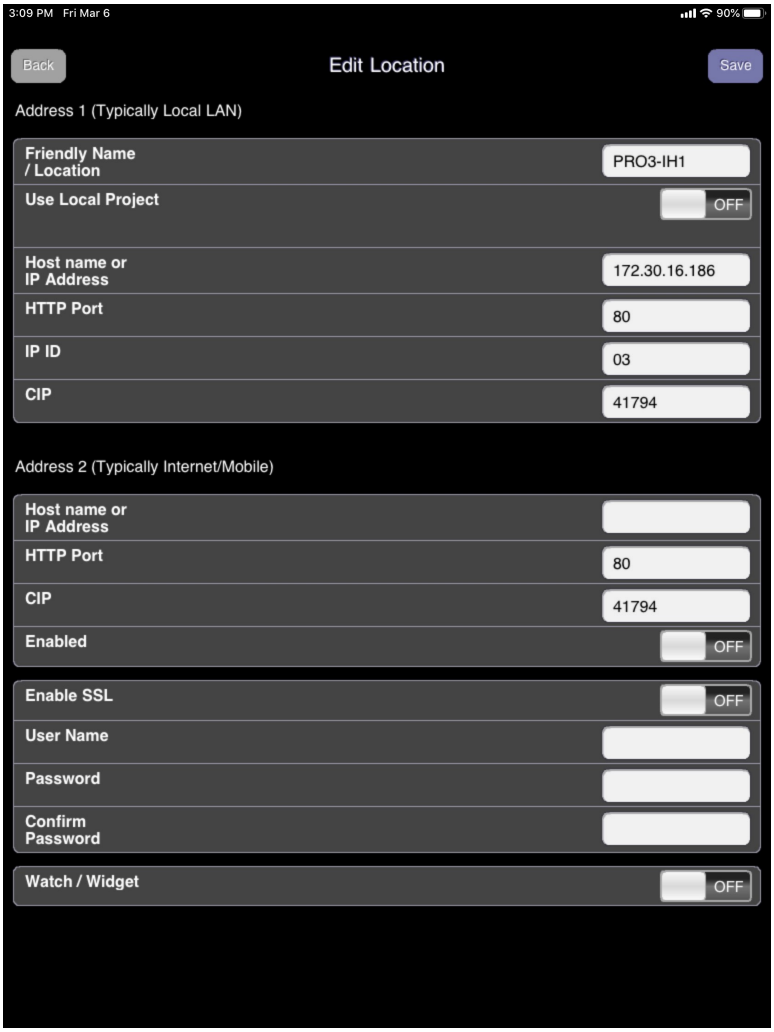
Connection List



3. Select the control system connection.

The **Edit Location** dialog box is displayed.

Edit Location Dialog Box



4. Tap the switch next to **Enable SSL** to set it to **ON**.
5. Change the HTTP port for Addresses 1 and 2 from 80 to 443 and the CIP port from 41794 to 41796.
6. Enter the SSL User account username and password created for the control system in the **User Name** and **Password** fields, respectively.
7. Enter the SSL User account password again in the **Confirm Password** field.
8. Click **Save**. SSL is enabled immediately.

Secure a Crestron Home OS System

The following sections describe how to secure a Crestron Home OS system.

Crestron Home OS Security Features

New Crestron Home OS systems running on the CP4-R or MC4-R are secured by factory default:

- Creston Home OS enables authentication and SSL by default on the CP4-R and MC4-R. SSL is also enabled by default on the Crestron Home app.
- Crestron Home OS uses self-signed certificates.
- Upgrading to Crestron Home OS from Crestron Pyng® OS 2 secures the system automatically during the upgrade:
    - If the CP4-R running Crestron Pyng OS 2 is secured and then upgraded to Crestron Home OS, the credentials are migrated during the upgrade.
    - If the CP4-R running Crestron Pyng OS 2 is not secured and then upgraded to Crestron Home OS, the username is set to "admin" and the password is set to the serial number of the CP4-R or MC4-R (case-sensitive). For more information, refer to the Crestron Home OS Product Manual.

Enable a Remote Connection

To enable connection from outside the home, the following ports must be opened on a router for external control of the Crestron Home and Crestron Home Setup apps.

> **NOTE:** Only open ports are required for the necessary functions. Crestron recommends port remapping for enhanced security. For more information on mapping, see Enable Remote Access on page 23.

- To enable end-user access, open port 50001.
- To enable dealer access, open ports 443, 843, and 41796.

> **NOTE:** Remote use of XPanel via a web browser is NOT recommended as it does not meet Crestron's minimum security standards. Instead, Crestron recommends using the Crestron Home Setup app on an iPad® tablet.

Secure a Crestron Pyng OS System

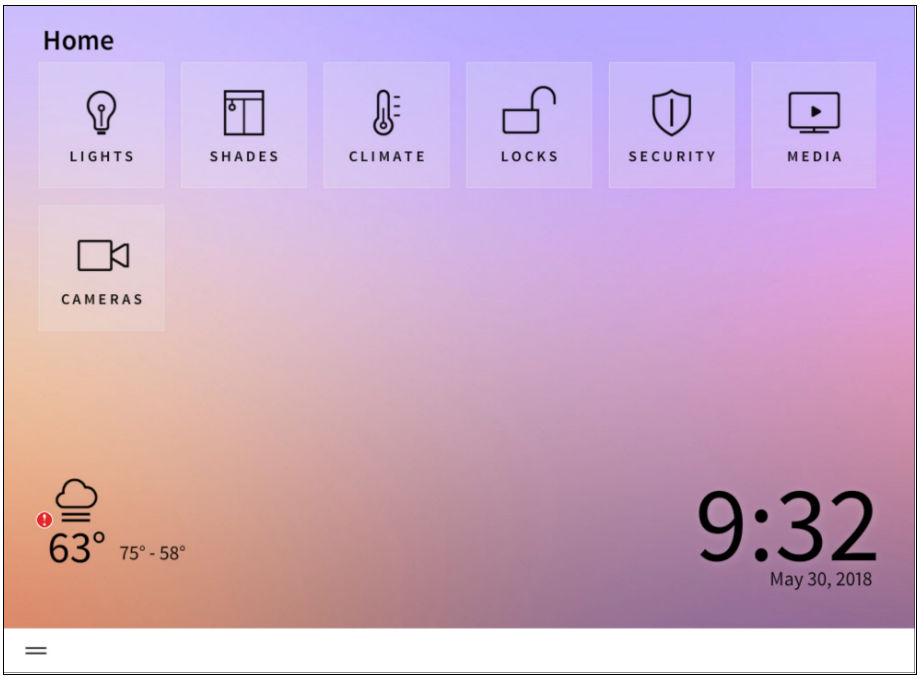
The following sections describe how to secure a Crestron Pyng system running on the PYNG-HUB (Crestron Pyng OS 1) and the CP4-R or MC4-R (Crestron Pyng OS 2).

> **NOTE:** New Crestron Home systems running on the CP4-R are secured by factory default. Upgrading to Crestron Home from Crestron Pyng OS 2 also secures the system automatically during the upgrade. The procedures in this section are for legacy Crestron Pyng applications.

To secure a Crestron Pyng system:

1. Open the Crestron Pyng application. The **Home** screen is displayed.

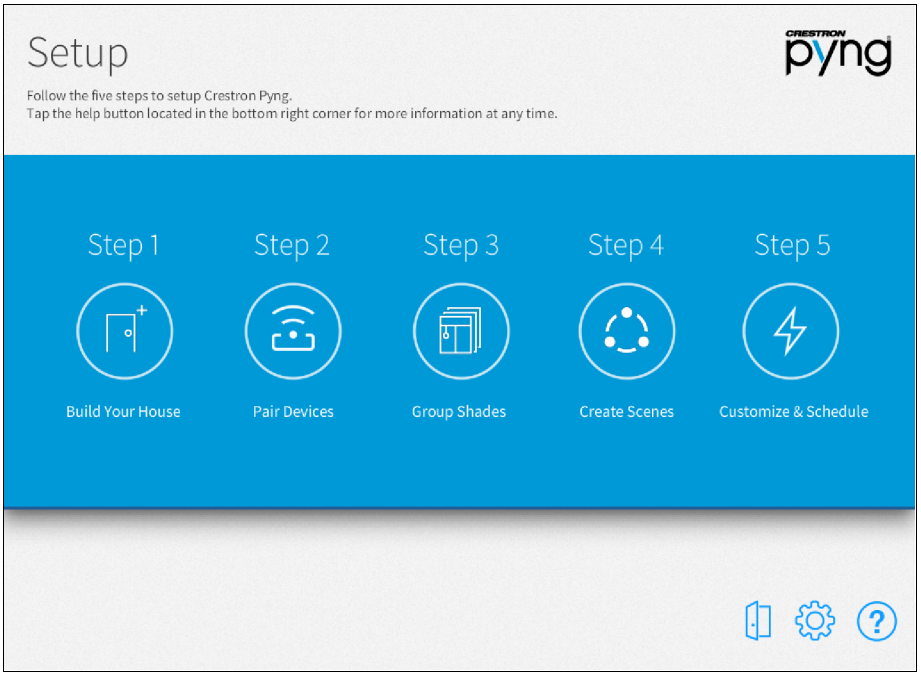
   Home Screen (Crestron Pyng OS 2)

2. Select **Settings** from the collapsible side menu.

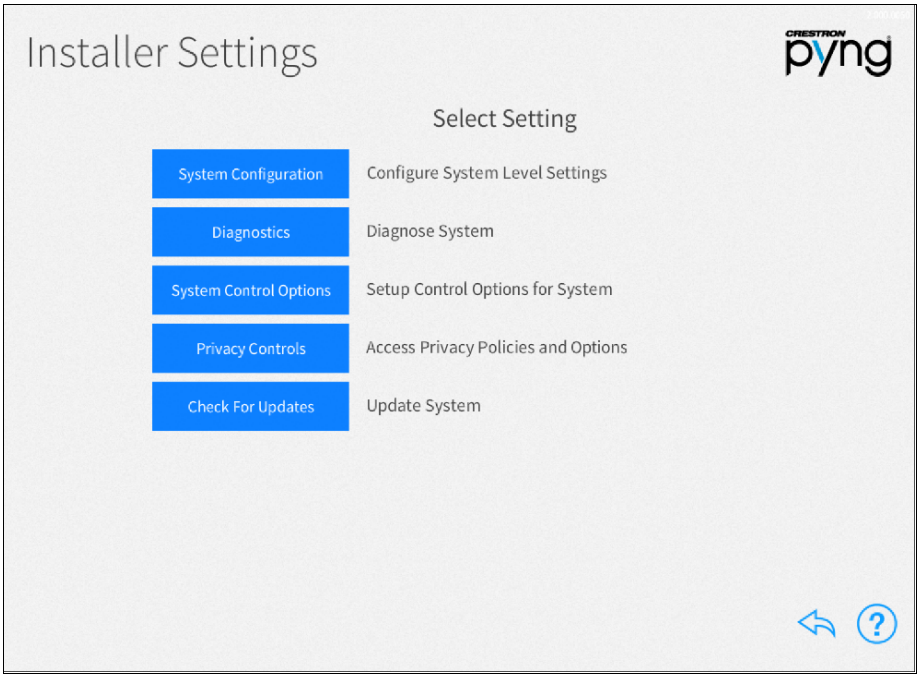
3. Enter the installer password when prompted, and then tap **OK**. The main **Setup** screen is displayed.

Setup Screen (Crestron Pyng OS 2)



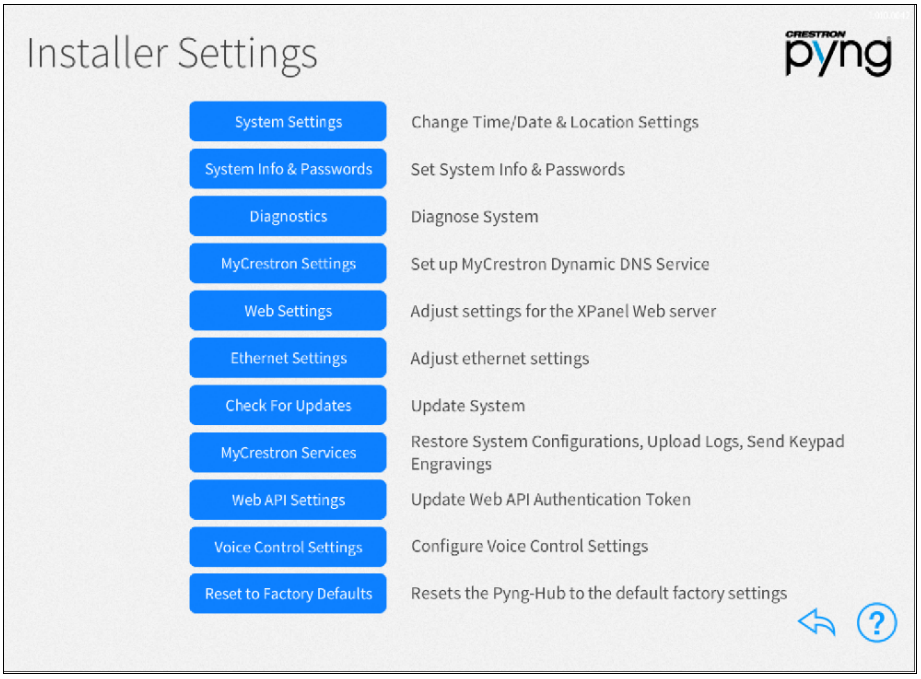
4. Tap the gear button to display the **Installer Settings** screen.

Installer Settings Screen (Crestron Pyng OS 2)



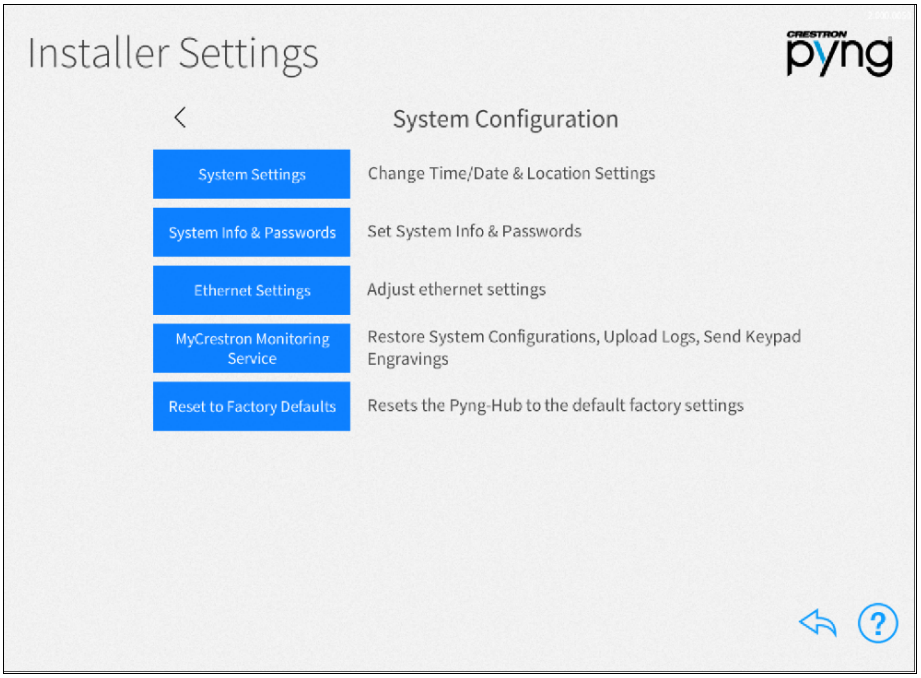
5. Navigate to the **Ethernet Settings** screen.
   - For a Crestron Pyng OS 1 system, tap **Ethernet Settings**.

     Installer Settings Screen (Crestron Pyng OS 1)



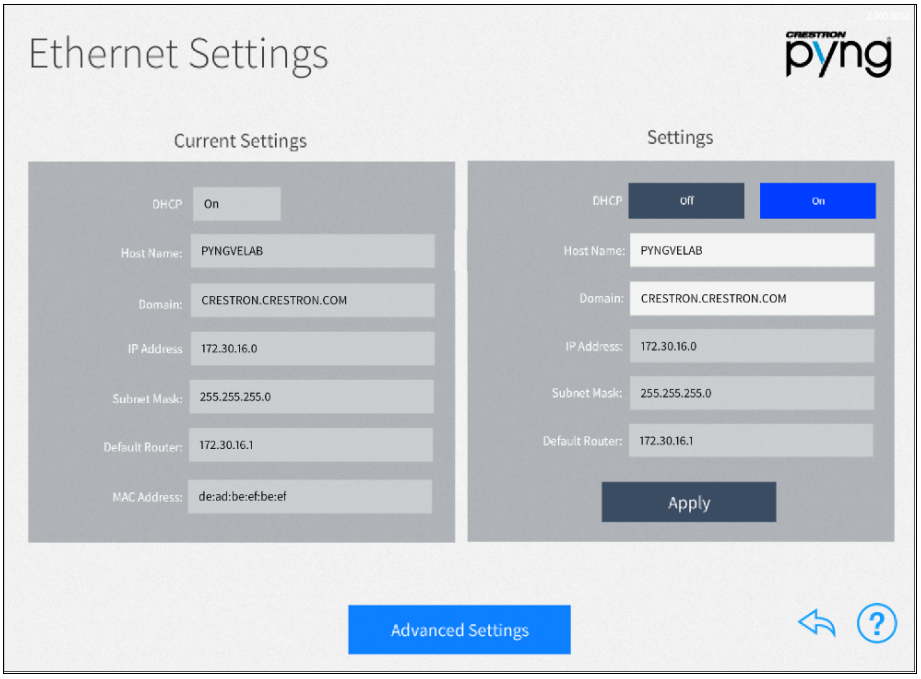
   - For a Crestron Pyng OS 2 system, tap **System Configuration** and then tap **Ethernet Settings**.

     Installer Settings - System Configuration Screen (Crestron Pyng OS 2)



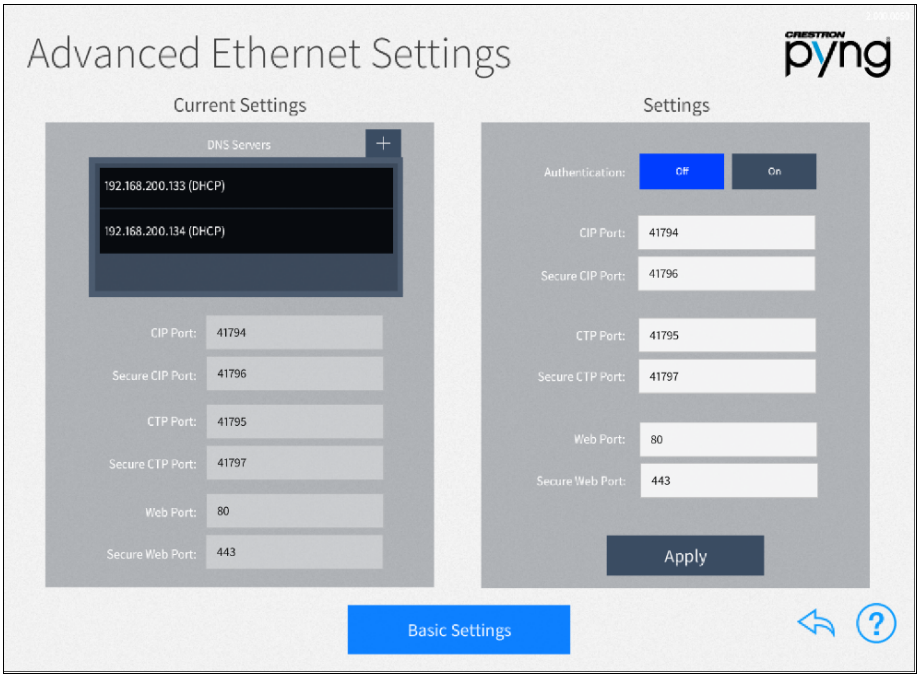
The **Ethernet Settings** screen is displayed.

Ethernet Settings Screen



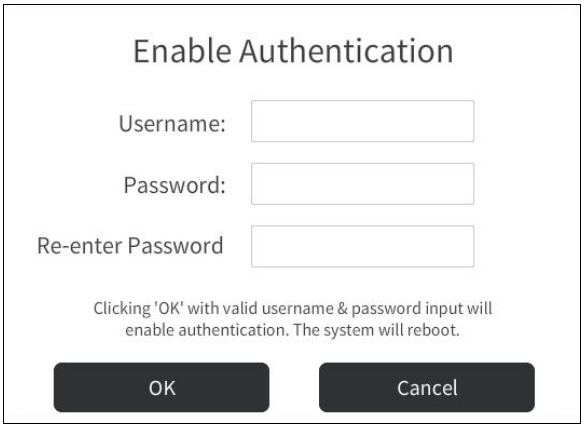
6. Tap **Advanced Settings** at the bottom of the screen to display the **Advanced Ethernet Settings** screen.

Advanced Ethernet Settings Screen



7. Tap **On** next to **Authentication** to enable authentication. The **Enable Authentication** dialog box is displayed.

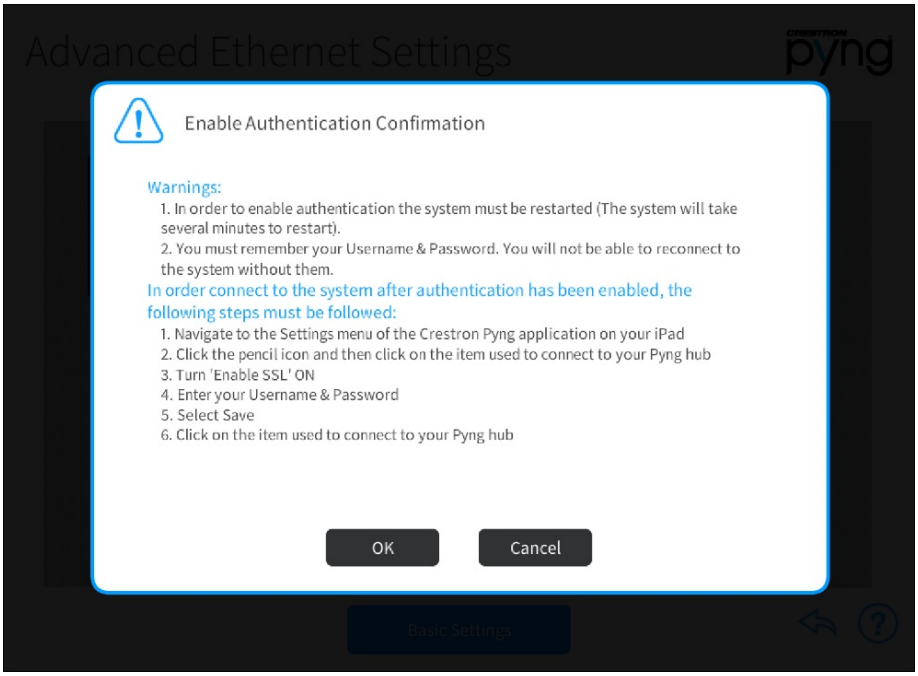
Enable Authentication Dialog Box



8. Enter a user name in the **Username** field.
9. Enter a password in the **Password** field. The password rules are as follows:
   - The password length must be between 8 and 13 characters.
   - The password must contain at least one of each of the following:
     - Uppercase letter
     - Lowercase letter
     - Numeric digit
     - Special character: ` ~ ! @ $ % ^ & * ( ) _ + = { } [ ] | ; " < > , .
10. Enter the password created in step 9 in the **Re-enter Password** field.

11. Tap **OK**. The **Enable Authentication Confirmation** dialog box is displayed.

Enable Authentication Confirmation Dialog Box



12. Tap **OK**. A message is displayed stating that authentication is enabled, and the system reboots. The new settings take effect following the reboot.

After authentication has been enabled:

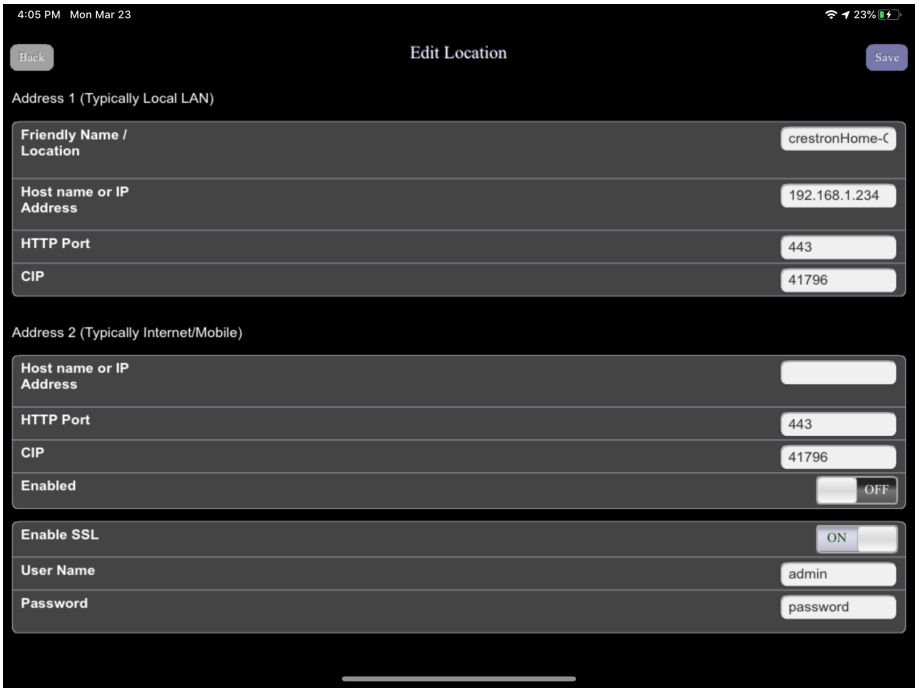
1. Navigate to the **Settings** menu of the Crestron Pyng application on your iPad.
2. Tap the pencil icon at the bottom of the screen.

Connection List

3. Select the control system connection.

   The **Edit Location** dialog box is displayed.

Edit Location Dialog Box



4. Tap the switch next to **Enable SSL** to set it to **ON**.

5. Enter the SSL User account username and password created for the control system in the **User Name** and **Password** fields, respectively.
6. Tap **Save**.
7. Click the item used to connect to your Crestron Pyng system.

Enable Remote Access

To enable remote access, the following ports must be opened on a router.

NOTES:

- Only open ports are required for the necessary functions. Crestron recommends port remapping for enhanced security.
- Remote use of XPanel via a web browser is NOT recommended as it does not meet Crestron's minimum security standards. Instead, Crestron recommends using the Crestron Home Setup app on an iPad.

Many routers do not allow for direct port forwarding of common ports, including 80, 443, and 23. Port mapping is ideal in this scenario, as an arbitrary external port is forwarded to the internal port being used. For example, port 80 (internal) to port 80 (external) may be blocked, but mapping from port 8080 to port 80 or port 8081 to port 80 is allowed.

For 3-Series and 4-Series:

Port Number	Function	Notes
22	SSH	Secure Shell is a secure network protocol used for Ethernet communication over unsecured networks.
443	HTTPS	Used for Crestron mobile projects and XPanel web support. If neither of these features is in remote use, do not forward.
843	Policy Server	Used for XPanel Browser support. This feature is not recommended for remote use. Do not forward unless required.
41794	CIP	Cresnet over Internet Protocol. Used for XPanel Browser support. This feature is not recommended for remote use. Do not forward unless required.
41796	SCIP	Secure Cresnet over Internet Protocol. Used for Crestron mobile projects.

For Crestron Home:

Port Number	Function	Notes
443	HTTPS	Used for Crestron Home Setup application and XPanel web support. If neither of these features is in remote use, do not forward.
843	Policy Server	Used for XPanel Browser support. This feature is not recommended for remote use. Do not forward unless required.
41794	CIP	Cresnet over Internet Protocol. Used for XPanel Browser support. This feature is not recommended for remote use. Do not forward unless required.
41796	SCIP	Used for Crestron Home Setup application. If the feature is not in remote use, do not forward.
50001	Crestron Home	Used by Crestron Home end-user application

For Crestron Pyng:

Port Number	Function	Notes
443	HTTPS	Used for Crestron Pyng applications
843	Policy Server	Used for XPanel Browser support. This feature is not recommended for remote use. Do not forward unless required.
41794	CIP	Cresnet over Internet Protocol. Used for XPanel Browser support. This feature is not recommended for remote use. Do not forward unless required.
41796	SCIP	Secure Cresnet over Internet Protocol. Used for Crestron Pyng Applications

Do the following to enable remote system access for your customers:

- Change the external ports so they are not the same as the internal ports. Remapping the external ports minimizes the number of attempts to access the system. A hacker will be unable to scan well-known ports for entry and must instead scan all ports and then determine what protocols are supported before attempting to log in to the system.
- Most home routers allow different external and internal ports to be set. An example of a home router setup page is provided below.

  Home Router Setup Page Example

  Single Port Forwarding

Application Name	External Port	Internal Port	Protocol	To IP Address	Enabled
None	---	---	---	192 . 168 . 194. 0	☐
None	---	---	---	192 . 168 . 194. 0	☐
None	---	---	---	192 . 168 . 194. 0	☐
None	---	---	---	192 . 168 . 194. 0	☐
None	---	---	---	192 . 168 . 194. 0	☐
CIP	9699	41796	TCP	192 . 168 . 194. 99	☑
SSH	2299	22	TCP	192 . 168 . 194. 99	☑
eControl	4499	443	TCP	192 . 168 . 194. 99	☑
Policy File	843	843	TCP	192 . 168 . 194. 99	☑

- Use external port numbers that are not commonly used. The actual number is not important; it simply must match the entry in the mobile app configuration.
- To enable XPanel web support, the **Internal Port** and **External Port** must be set to 843.
- Open only ports that are required. For example, if mobile applications or XPanel applications are used, open only the secure CIP port (default is 41796) and HTTPS port (default is 443). Ensure that SSL settings are used in the mobile application.
- If XPanel browser support is required, the unsecured CIP port (default is 41794) must be used. The system is still secured because the user is prompted to enter their credentials prior to running the project. The XPanel browser requires port 843 to be routed to the system.
- If ports 41795 or 41797 were opened for external use, reroute the external ports to port 22 and use the SSH console.

Crestron Electronics, Inc.
15 Volvo Drive, Rockleigh, NJ 07647
Tel: 888.CRESTRON
Fax: 201.767.7656
www.crestron.com

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