web.EMS

User Manual

Code Dynamics, Inc.

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Chapter 1 – Getting Started

Introduction

web.EMS is a browser-based interface between the Andover system and you.

web.EMS provides a clean front-end that allows you to do the following:

- Monitor your system through friendly, customized views
- Modify points, schedules, and alarms
- Collect and display historical data
- Manage and edit system programs
- Backup and Restore your system's memory

Product Features

Open Platform

- Browser interface
- No special software required on user PCs
- Unlimited licenses (no user limit)

Secure and Reliable Access

- True multi-user access
- User level access (three levels of permission)
- User activity monitoring and logging
- Internal messaging between users

Intuitive User Interface

- Customized navigation and user defined views
- Customized graphics
- User defined point naming (friendly point names)
- Easy point searching and program control lookup

Practical Programming (Based on Access Level)

- Easy access to view or modify control programs
- Cut and paste programming
- Ability to copy a program within or between controllers
- Ability make point name substitutes within programs
- Real-time viewing of program position and values

Intelligent Data Collection

- Extended history accumulation and archives
- Graphical trending of point values
- Auto-ranging and multi-interval graphing

Dependable Alarming

- Email (requires Internet access)
- Controller offline status or memory loss alarm

Easy Backup and Reloads

- Scheduled automatic backups
- Single-click backups and reloads

System Requirements

The only requirement to access the web.EMS is a web browser. Approved browser brands are Internet Explorer, Edge, Firefox, Chrome, Safari and Opera. Many other brands will probably work but as of this printing, have not been verified. Connectivity does not depend on the operating system or device that the browser is running on. No custom software is needed on the user's device.

How to Use This Manual

In this manual, a section may apply to multiple user levels, or a section may apply to only one user level. Each section heading lists the user levels that apply. If your user level is **View Only**, a section that specifies **Standard** user level would not apply to you. Sections that state **All** apply to all users.

Logging into web.EMS

To access web.EMS, type your web.EMS server's IP address in your Internet browser. From the login page, type your **User ID** and **Password** and select **[Login]** or press **[Enter]** on your keyboard. (*Figure 1.1*)

- **Note:** The Manager **User ID** is _____ and the default **Password** is _____. Managers, please change the password as soon as possible to avoid unauthorized access (see page 7 for information on how to change passwords).

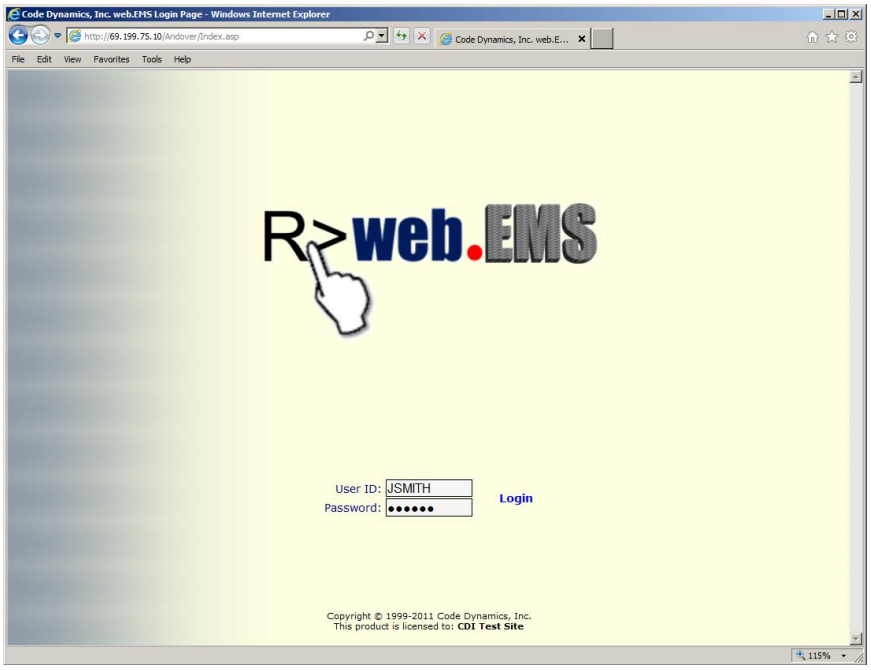


Figure 1.1

Main Screen and Basic Navigation

After logging into web.EMS, the main screen will appear. The welcome page displays the web.EMS logo, your user name, and a record of your last session. If there are multiple Andover masters in your systems, you may access your session log by selecting the Andover master from a drop-down menu. *(Figure 1.2)*

Navigating web.EMS is accomplished via the Navigation Tree, housed in the yellow column on the left of a page at all times. This tree is your portal to all system data, programming options, and user management. Terms on this tree are referred to as **branches**; branches may signify a specific page or a grouping of pages.

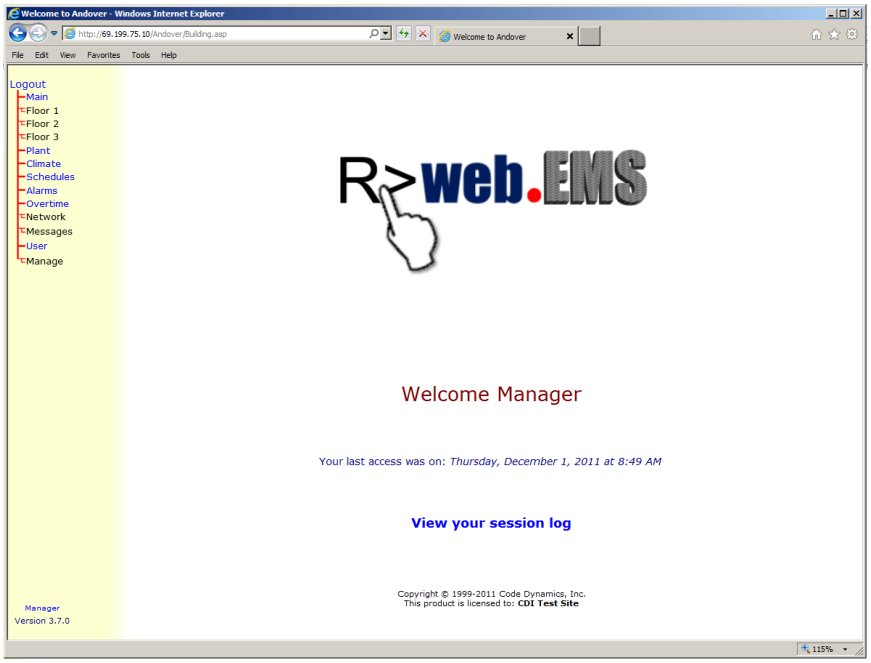


Figure 1.2

Chapter 2 – Access

Creating Users

User Level: Manager

Users are created and managed through the **Access** page, a sub-branch of the **Manage** branch. To create a new user, first select **[New User]** in the top right corner of the editing table. Type the new **User ID**, **Name**, **Password**, **Password Retype**, and **Email Address** in the corresponding fields. Although the **User ID** cannot be changed once created, the user **Name, Password and Email address** can. Select the desired permissions from the drop-down box and select **[Save Changes]** to finalize. *(Figures 2.1 and 2.2)*

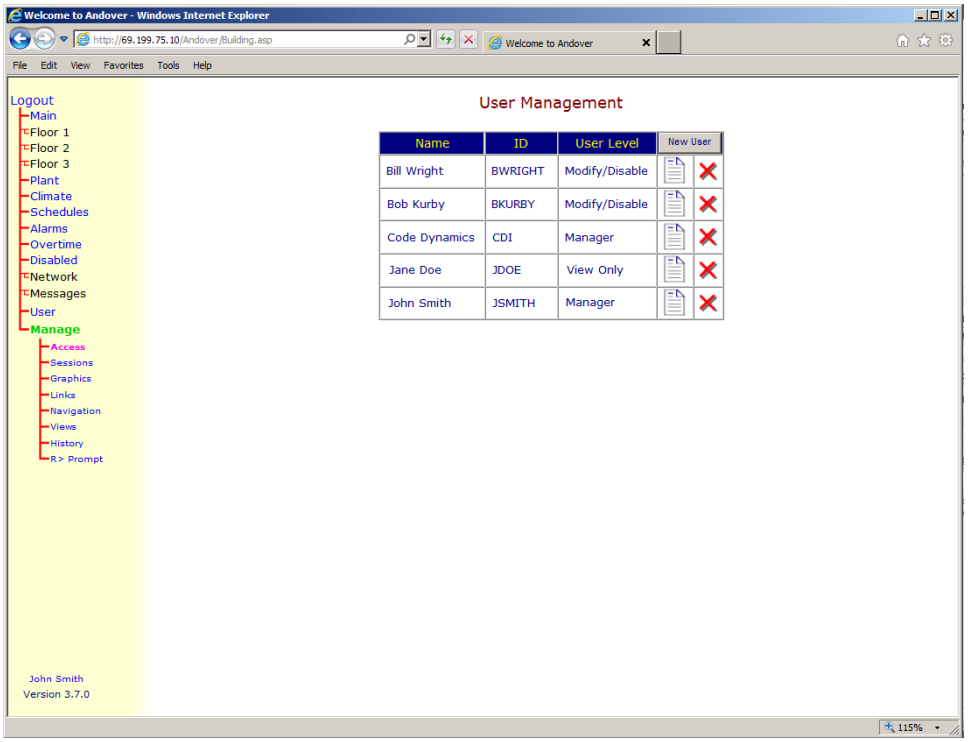


Figure 2.1

Permissions

User Level: Manager

The four different user levels and their corresponding permissions are as follows:

- No Access – Allows you to temporarily disable a user from access without deleting his or her **User ID**. Deleting the **User ID** will permanently remove the session log for that user. A **No Access** user level may also be used by users, such as security companies, who must receive email alarms but do not need further access to the system.

- View Only – Allows the user to view data from the Andover only. A user at this level cannot make changes to the system.
- Standard – Allows the user to view all point properties and disable and change point values. Most users will fall into this permission category.
- Manager – Allows the user to have the permissions of the Standard user with the added ability to change programs, change variable calculations, modify the page views and manage users. This is the highest level of access in the system.

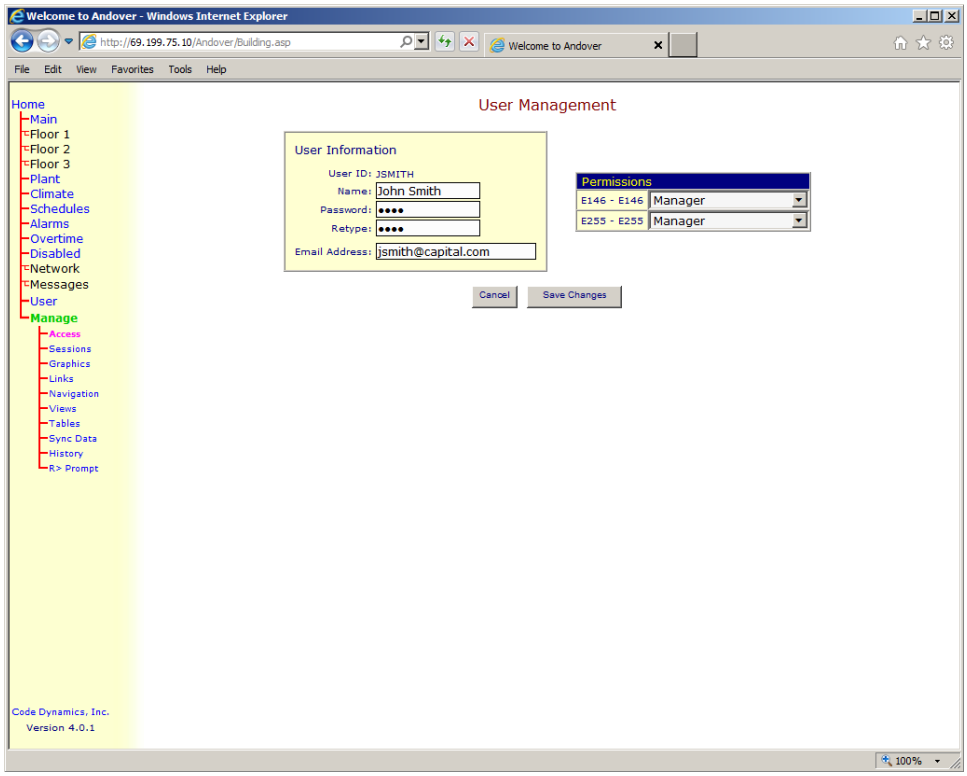


Figure 2.2

Modifying and Deleting Users

User Level: Manager

To edit a user's Name, Password, Email address or Permission level, select the page icon to the right of the user's information. Make the desired changes and select **[Save Changes]** to finalize the modifications.

To delete a user, select the red **[X]** to the right of the user's name. *(Figure 2.1)*

Changing Your User Name, Password, or Email Address

User Level: All

The User page allows you to modify your user **Name**, **Password**, or **Email Address**.

Your **Name** is different from your **User ID**. Your name is displayed with messages and on session logs, while your **User ID** is used to log into web.EMS. Your **Name** can be modified in the future. Your **User ID** cannot be modified but can be deleted.

To change your **Name**, type the new name in the **Name** field and select **[Save Changes]**. To change your **Password**, simply type the new password in both **Password** fields and select **[Save Changes]**. Please do not cut and paste your new **Password** into the **Retype** field, as this action does not prevent typographical errors. Your **Email Address** can be changed in the same manner. *(Figure 2.3)*

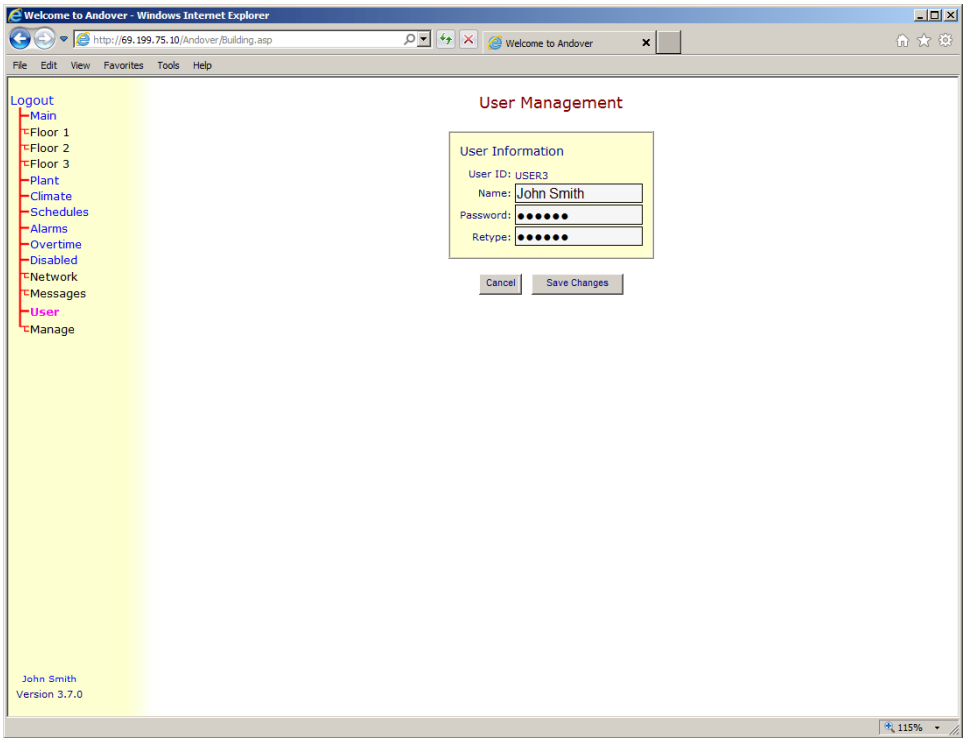


Figure 2.3

Session Logs

User Level: Manager

The **Sessions** page, a sub-branch under the **Manage** branch, allows you to view user sessions. This page details each user, the date and time of the user's last session, and the user's current online status. If the sphere next to a name is red, that user is currently offline; if the sphere is green, the user is currently online. You can also view a more detailed session log by selecting **[View Log]** to the right of the user's name. *(Figure 2.4)*

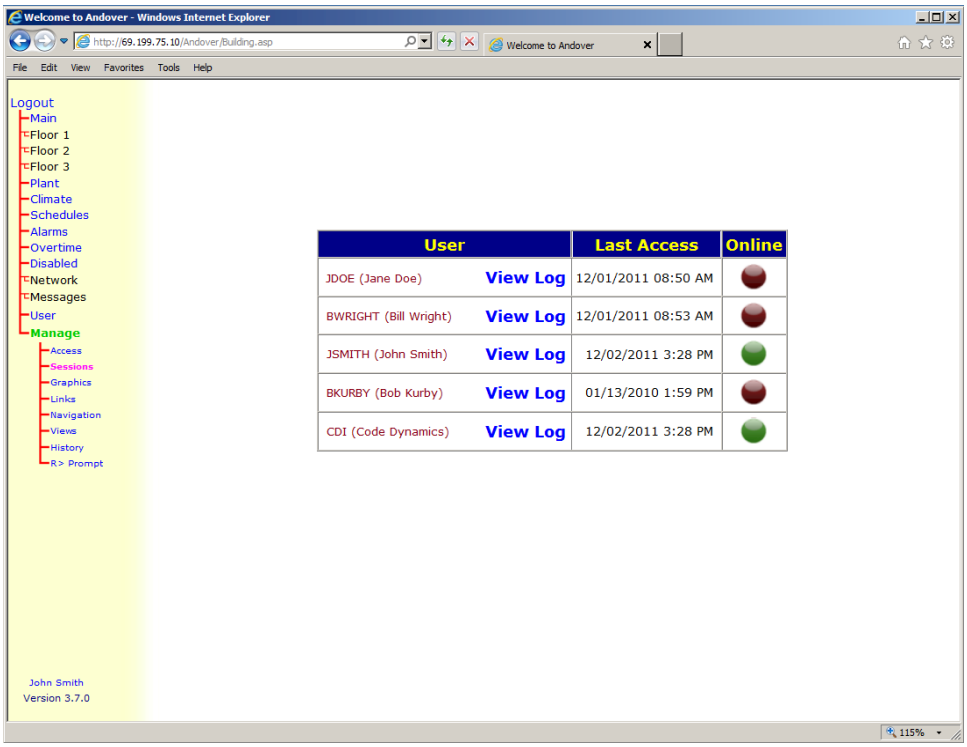


Figure 2.4

Messages

User Level: All

The **Messages** page allows one user to communicate with another user within the web.EMS system. The purpose for this might be to notify another user about a control point being disabled intentionally while work is performed. To send a message, first select the **Send** sub-branch and then select the users you wish to address. If you wish to send a message to more than one user, hold **[Ctrl]** while selecting each subsequent user. Type your message in the box and select **[Click here to send]**. The recipients will receive notification of the pending message upon their next login. *(Figure 2.5)*

To view messages addressed to you, select the **View** sub-branch. All past messages sent to you or sent by you are displayed, along with the date and time of the transmission.

If you have a new unread message addressed to you, an envelope will appear in the bottom of the Navigation Tree area, directly above your user name. Click the envelope to view your new message.

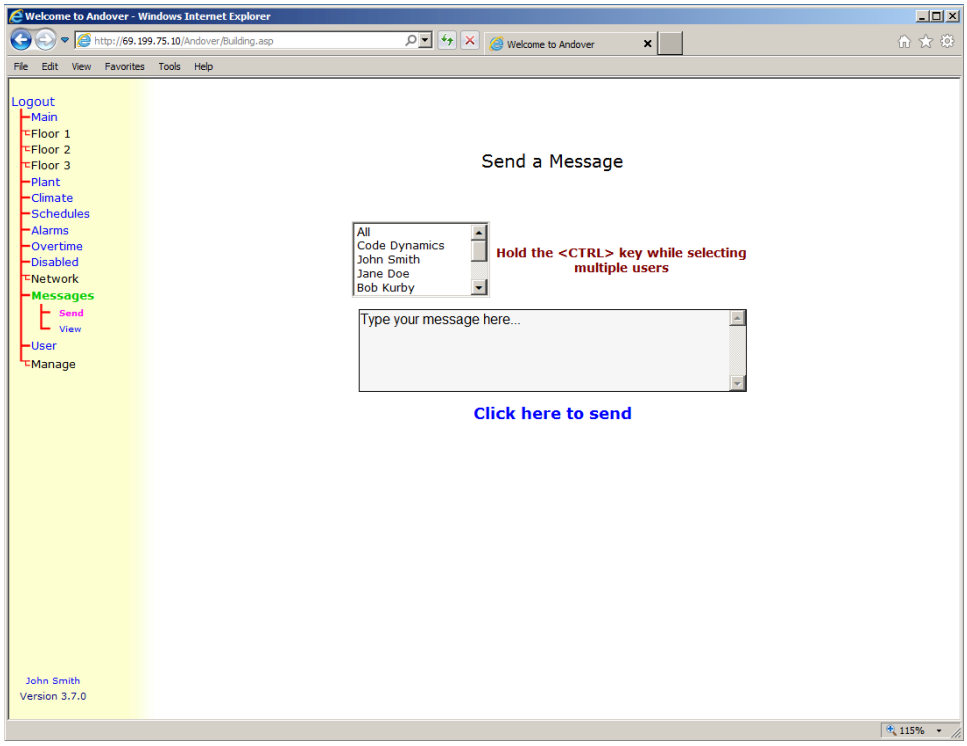

Welcome to Andover - Windows Internet Explorer
http://69.199.75.10/Andover/Building.asp
Welcome to Andover
File Edit View Favorites Tools Help
Logout
Main
Floor 1
Floor 2
Floor 3
Plant
Climate
Schedules
Alarms
Overtime
Disabled
Network
Messages
Send
View
User
Manage
John Smith
Version 3.7.0
Send a Message
All
Code Dynamics
John Smith
Jane Doe
Bob Kurby
Hold the <CTRL> key while selecting multiple users
Type your message here...
Click here to send
115%

Figure 2.5

Chapter 3 – Pages

Creating Pages

User Level: Manager

Pages are created from the **Navigation** page, a sub-branch under the **Manage** branch. The **Navigation** page displays an editing table for the Navigation Tree.

- **Note:** You can only create, modify, or delete one branch at a time. Only one row may be edited at a time in the editing table.

To create a branch page, type the name of the new branch in the **Label** field on the left. Next, select the desired type from the **Branch Type** drop-down box. The three options are as follows:

- **Tree Branch** – Provides a link for a sub-branch grouping.
- **Summary/Link** – Provides point information and a way to link to other pages; however, point details cannot be modified on this page.
- **Detail Page** – Provides a detail page for viewing and accessing points within the Andover system.

You can also choose to give your new page a Parent page association. This association can be seen as a link when viewing the page. *(Figure 3.1)*

Branches that have the Tree Branch link option have sub-branches. These branches are represented by the blue branch symbol in the editing table. To manage sub-branches, click the blue branch icon associated with that branch. Sub-branches are added and modified similarly to main branches.

Modifying and Deleting Pages

User Level: Manager

To modify a branch, make any adjustments needed and select **[Update]**. To delete a branch, select **[Delete]**. (*Figure 3.1*)

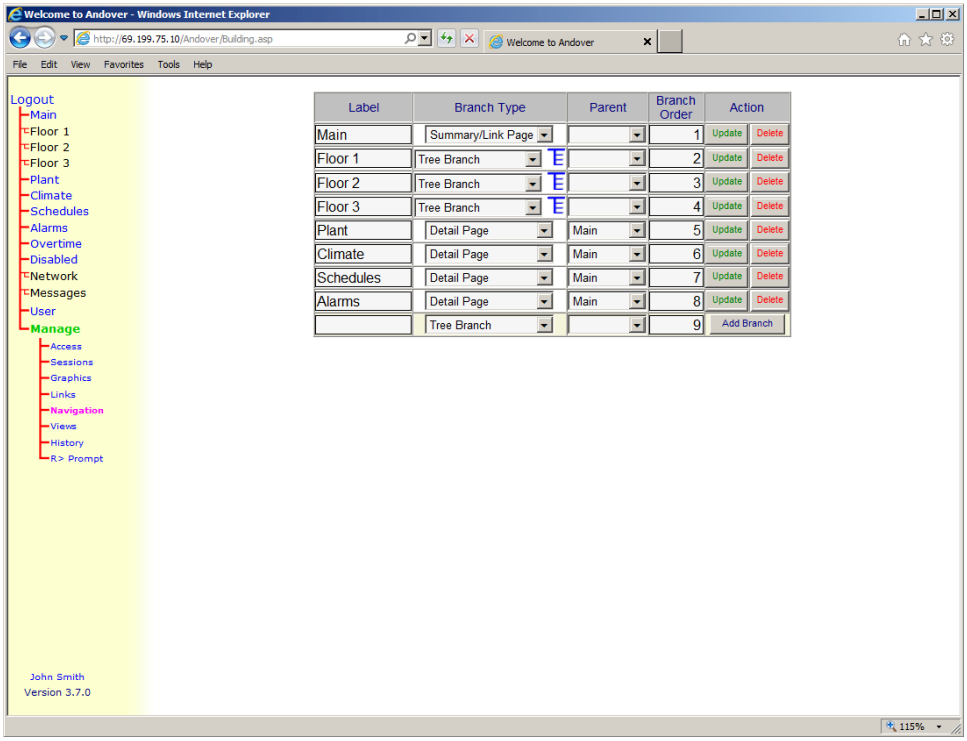


Figure 3.1

Links

User Level: Manager

The **Links** page, a sub-branch of the **Manage** branch, allows you to manage links to other web.EMS systems or to user files. To add a link to web.EMS, enter the description in the editing table, select the link **Type** from the drop-down box (WWW, Local, or webEMS), enter the **URL/Filename**, and enter the **Target** location. To finalize, select **[Add Link]**. To upload files into the web.EMS system, use the **[Upload]** button below the editing table. You can also rename and/or delete files at the bottom of the **Links** page. *(Figure 3.2)*

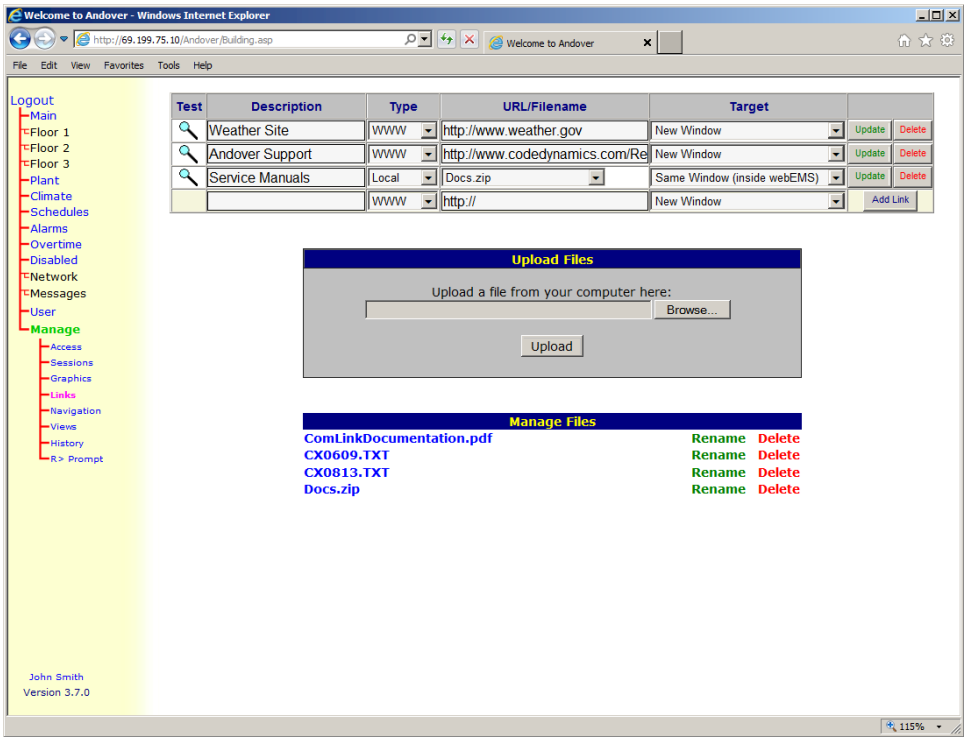

Welcome to Andover - Windows Internet Explorer
http://69.199.75.10/Andover/Building.asp
Welcome to Andover
File Edit View Favorites Tools Help
Logout
Main
Floor 1
Floor 2
Floor 3
Plant
Climate
Schedules
Alarms
Overtime
Disabled
Network
Messages
User
Manage
Access
Sessions
Graphics
Links
Navigation
Views
History
R> Prompt
John Smith
Version 3.7.0
Test
Description
Type
URL/Filename
Target
Weather Site
WWW
http://www.weather.gov
New Window
Update
Delete
Andover Support
WWW
http://www.codedynamics.com/Re
New Window
Update
Delete
Service Manuals
Local
Docs.zip
Same Window (inside webEMS)
Update
Delete
WWW
http://
New Window
Add Link
Upload Files
Upload a file from your computer here:
Browse...
Upload
Manage Files
ComLinkDocumentation.pdf
Rename
Delete
CX0609.TXT
Rename
Delete
CX0813.TXT
Rename
Delete
Docs.zip
Rename
Delete
115%

Figure 3.2

Chapter 4 – Points

Andover points include inputs, outputs, variables, and flags.

Assigning Point Names to Variables and Flags

User Level: Manager

All the available variables and flags in your Andover system will be available as sub-branches of the **Master** branch. From here, you can manage all of the point properties for each of the variables or flags within the system. *(Figure 4.1)*

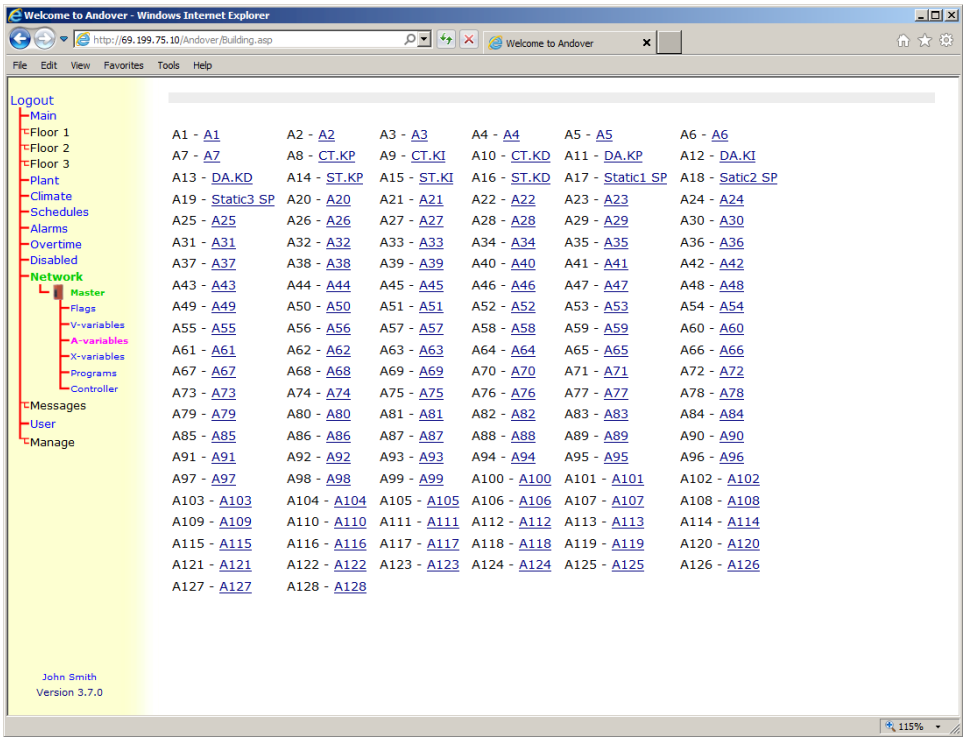


Figure 4.1

Adding Inputs and Outputs to Andover

User Level: Manager

Adding inputs and outputs is accomplished from the **Network** sub-branches. By selecting the associated IOU's **Inputs** and/or **Outputs** or by selecting the AC-Net device's **Points** page, you can add inputs and outputs. At the bottom of the input or output list, select the ID (channel) number for the associated point in the drop-down box you wish to add. Next, select the type of point to be assigned and a unique Andover point name and click Add.

Inputs can be voltage, temperature, digital, or counter. Outputs can be digital, tri-state, current, or voltage based on the particulars of the hardware. Valid Andover point names can be up to 8 characters in length and can contain dots "**.**" and/or underscores "**_**". All alpha-numeric characters A – Z and 0 – 9 can be used; however, numerals cannot be used as the first or second character in the name. *(Figures 4.2 and 4.3)*

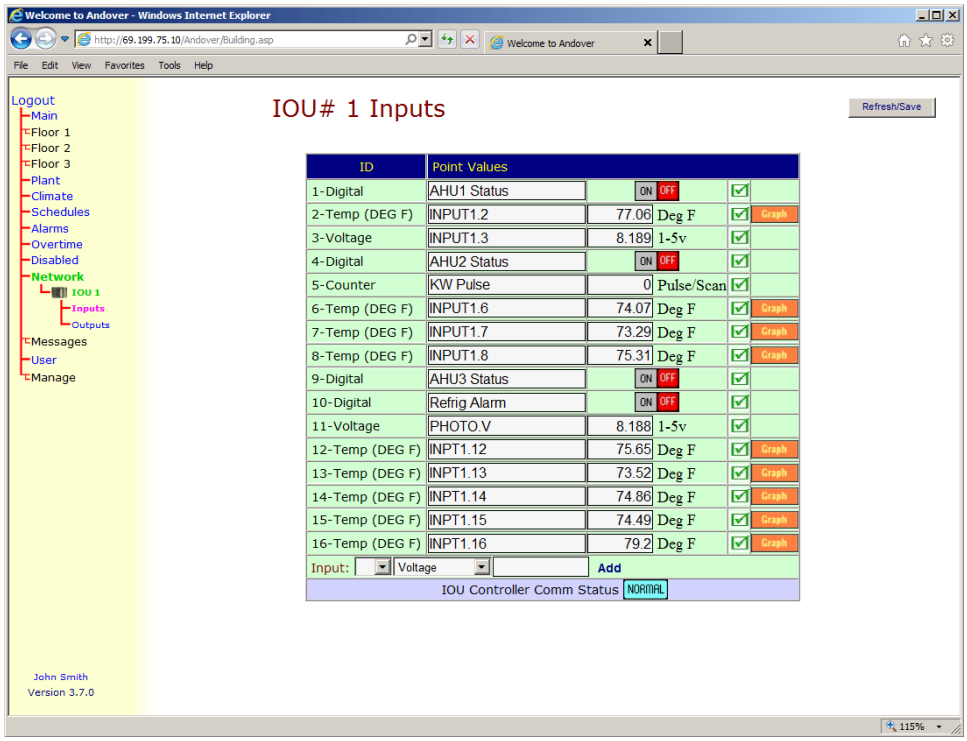


Figure 4.2

Once the point name is assigned, you can open the associated property page to give it additional properties describing how that point will be represented in the system.

To delete an input or output, select the **[Delete]** button in the point properties page.

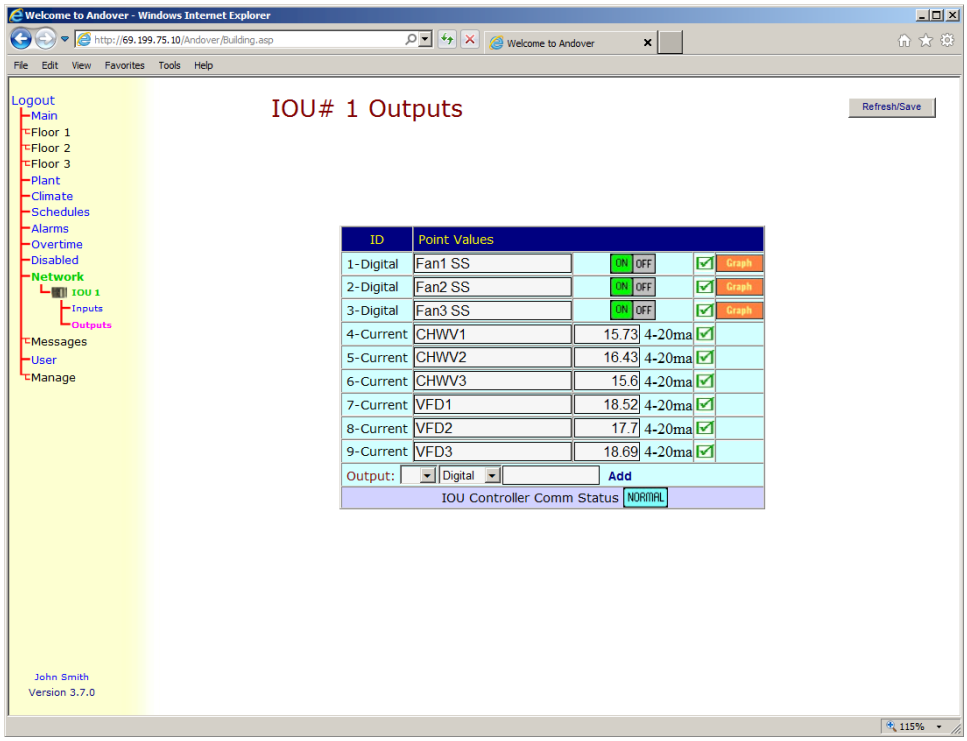


Figure 4.3

Adding Points to a Page

User Level: Manager

Adding a point reference to a page is done by clicking the tool icon at the lower right-hand corner of a page. This will bring you to the editing table page. *(Figure 4.4)*

From the editing table page, locate the point you wish to add from the Point List at the bottom of the page. First select the **Controller** in which your point resides from the **Controller** drop-down box. This will reload the **Point List** drop-down boxes to the right. *(Figure 4.5)*

Points will be grouped by inputs, outputs, variables, and flags (if links have been created, a fifth list containing the system links will be available). Locate the point and click the **[Add]** button below the corresponding list to bring the point into the editing table above. From the editing table, assign the appropriate **Class** and **Units** (if applicable) and add the point by clicking the **[Add Point]** button to the right.

If desirable, you can assign a unit of measure to be displayed alongside data. The unit of measure is user defined in the **Unit** field. Examples are “Deg F” and “Hz”. *(Figure 4.5)*

The columns listed will vary based on the page type. For a table page, the columns will be **Point Reference**, **Class**, **Units**, and **Order**. For a graphical page, the columns will be **Point Reference**, **Class**, **Units**, **Top**, and **Left**.

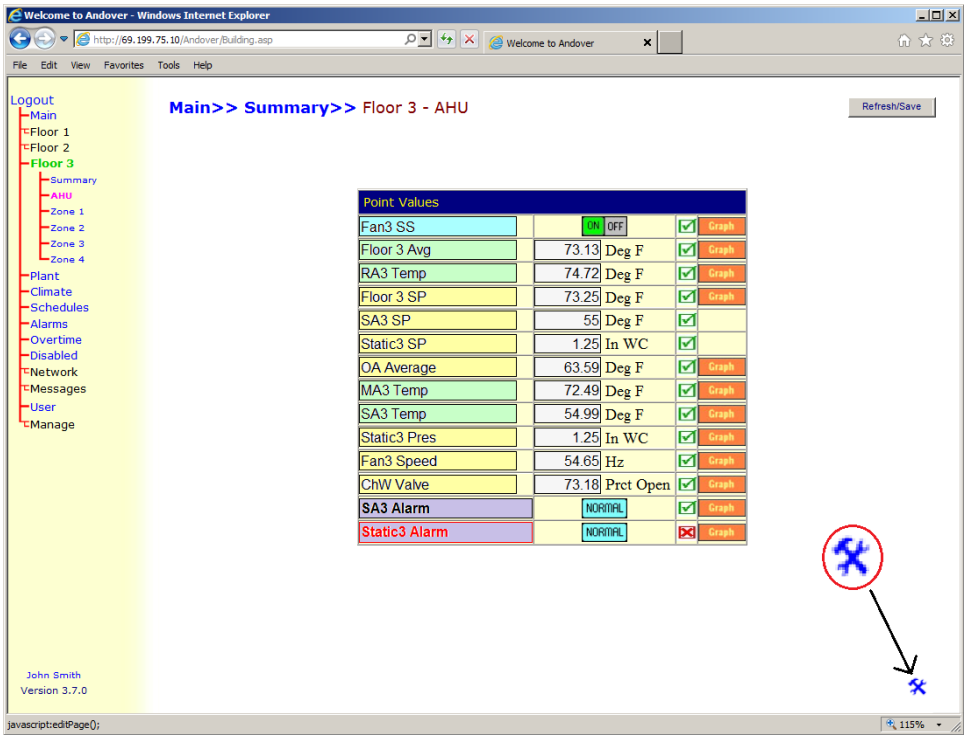


Figure 4.4

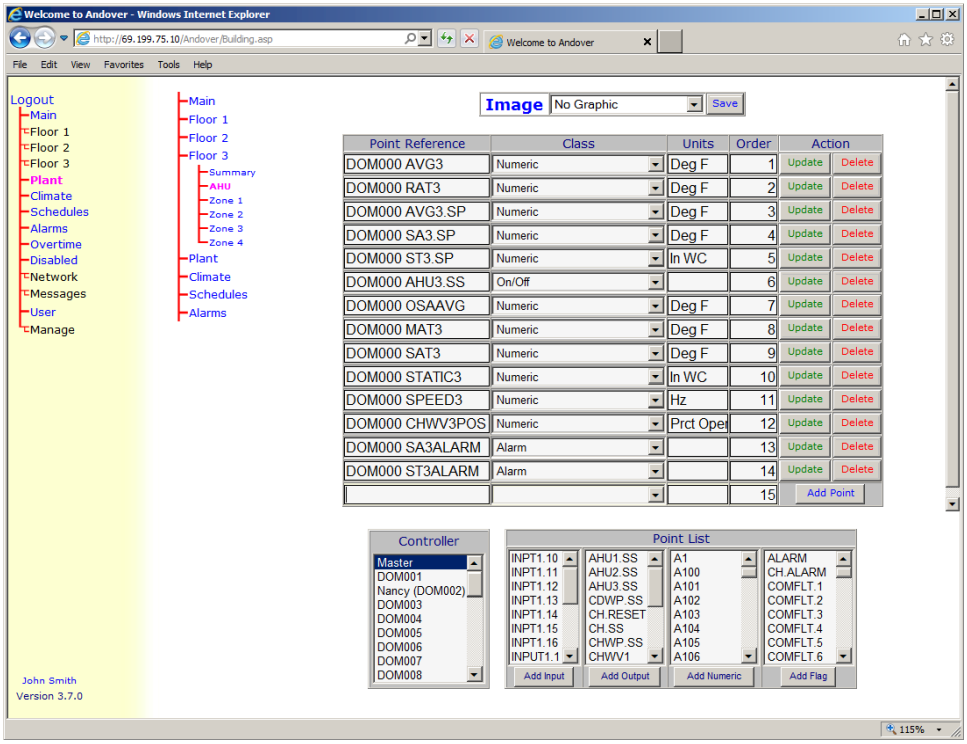


Figure 4.5

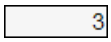
Point Classes

The **Class** property defines the format in which a point value is represented when displayed within web.EMS. The following are the different **Class** types and how they might be viewed:

- ***Alarm***
  - 

when the Andover value **= 0** or **= Off.**
  - 

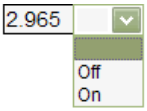
when the Andover value **≠ 0** or **= On**.

- ***Counter Input*** – Text showing the actual Andover value. 

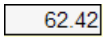
- ***Digital Input***
  - 

when the Andover value **= 0** or **= Off.**
  - 

when the Andover value **≠ 0** or **= On**.

- ***Digital Output*** – Text showing the actual Andover value in addition to a drop-down selection for **Off** and **On**. 

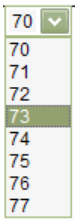
- ***Equipment Setpoint*** – Text showing the actual Andover value. 

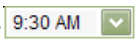
- ***Numeric*** – Text showing the actual Andover value. 

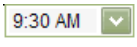
- ***On/Off***
  - 

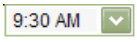
when the Andover value **= 0** or **= Off**.
  - 

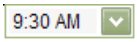
when the Andover value **≠ 0** or **= On**.

- ***Room Setpoint*** – A drop-down selection showing whole number Andover values between 70 and 77. *The Room Setpoint class will be replaced by the User Defined class in future versions.* 

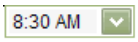
- ***Start Schedule (13 = 1PM)*** – A drop-down selection of 30-minute increments showing *Midnight* where the Andover value **= 0** through *OFF* where the Andover value **= 24**. A time of 1:30 PM is shown where the Andover value **= 13.5**. 

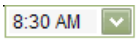
- ***Start Schedule (1300 = 1PM)*** – A drop-down selection of 30-minute increments showing *Midnight* where the Andover value **= 0** through *OFF* where the Andover value **= 2400**. A time of 1:30 PM is shown where the Andover value **= 1330**. 

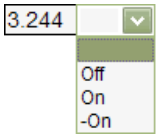
- ***Stop Schedule (13 = 1PM)*** – A drop-down selection of 30-minute increments showing *OFF* where the Andover value **= 0** through *Midnight* where the Andover value **= 2400**. A time of 1:30 PM is shown where the Andover value **= 1330**. 

- ***Stop Schedule (1300 = 1PM)*** – A drop-down selection of 30-minute increments showing *OFF* where the Andover value **= 0** through *Midnight* where the Andover value **= 24**. A time of 1:30 PM is shown where the Andover value **= 13.5**. 

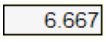
- ***Temperature Input*** – Text showing the actual Andover value. 

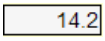
- ***Time (13 = 1PM)*** – A drop-down selection of 30-minute increments showing *00:00* where the Andover value **= 0** through *24:00* where the Andover value **= 24**. A time of 1:30 PM is shown where the Andover value **= 13.5**. 

- ***Time (1300 = 1PM)*** – A drop-down selection of 30-minute increments showing *00:00* where the Andover value **= 0** through *24:00* where the Andover value **= 2400**. A time of 1:30 PM is shown where the Andover value **= 1330**. 

- ***Tristate Output*** – Text showing the actual Andover value with a drop-down box selection of **Off**, **On**, or **–On**. 

- ***True/False***
  - 
 when the Andover value **= 0** or **= Off.**
  - 
 when the Andover value **≠ 0** or **= On**.

- ***Voltage Input*** – Text showing the actual Andover value. 

- ***Voltage Output*** – Text showing the actual Andover value. 

- ***Yes/No***
  - 
 when the Andover value **= 0** or **= Off.**
  - 
 when the Andover value **≠ 0** or **= On**.

- ***User Defined*** – A drop-down selection of user-defined references that are associated with Andover values.

- ***Read Only*** – *This is the same as the User Defined class but does not provide a drop-down selection for changing the value.*

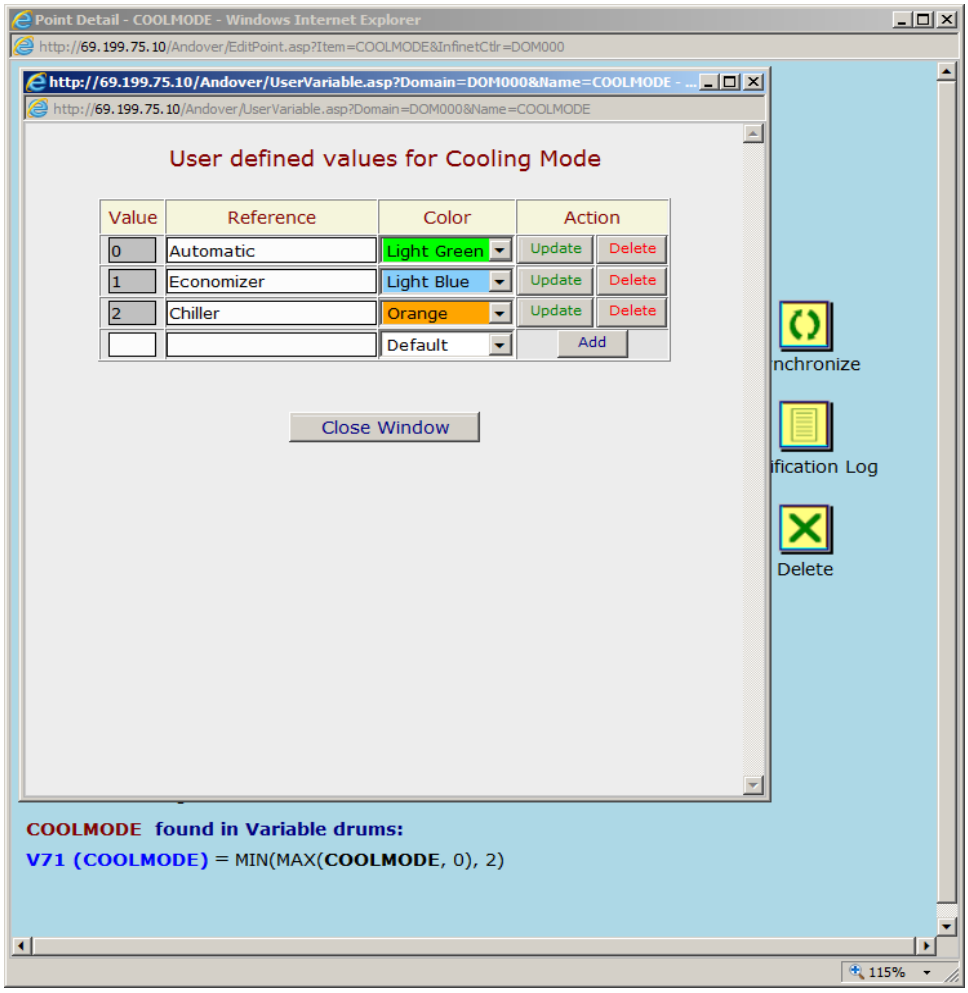


Figure 4.6

To specify the user-defined values, select the ellipsis box next to the "User Defined" class selection from the point's Properties page to open the user-defined editing table. Enter the Andover value, the user-defined reference, and the desired reference color. web.EMS will display the user-defined reference in the selected color based upon the Andover value given. *(Figure 4.6)*

Viewing Data

User Level: View Only

Page Refreshing

You can refresh data through three different methods:

- Click the **[Refresh]** button in the top right corner of the page.
- Right-click anywhere on the page and click **[Page Refresh]**.
- Re-select the branch from the Navigation Tree.

Trending

If trending has been enabled for a point, a selection for graphing will be available. Graphs are accessed by right-clicking on top of a point from the graphics page and selecting **Graph [*point name]*** *(Figure 4.7),* or by selecting the orange Graph button from a table.

Real-time Viewing

Data can be automatically refreshed every ten seconds through **Realtime** viewing. By turning this feature on, Andover populates those values onto the corresponding fields without reloading the page. To turn on real-time viewing, click the **[Realtime]** icon at the top right corner of the page. While in real-time viewing, the **System in Use** will appear in red at the top of the page when the server is requesting values from Andover. If you are attempting to change values on a page, you should turn off real-time viewing first. Not doing so could allow the system to reset your changes before they can be saved. You may turn off real-time viewing by clicking the **[Realtime]** icon again. *(Figure 4.7)*

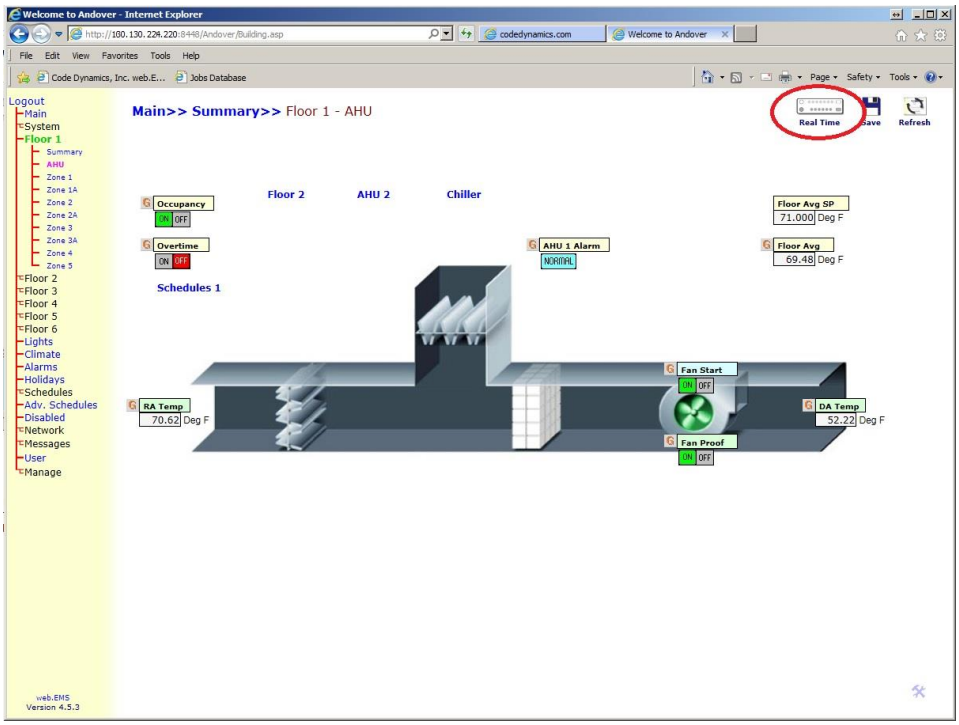


Figure 4.7

In addition to page refreshing, trending and real-time viewing, Standard and Manager users have additional options available.

Enabling/Disabling a Point

To Enable or Disable a point, right-click the point reference, select **Enable [*point name*]** or **Disable [*point name*]** and then click **[Refresh/Save]**. On a table page, you can also click on the ☑ or ☒ and click the **[Refresh/Save]** button. The green ✓ indicates an enabled status, and the red X indicates a disabled status.

Accessing Point Properties

To view a point's properties, you may double-click the point reference or you may right-click the point reference and click **Properties [*point name*]**. Point properties are displayed in a new window. (*Figure 4.9)*

Setting Point Values

Point values on a page can be modified by changing the values represented on the page and clicking the **[Refresh/Save]** button; however, changes will not be saved if the Andover programming controls the point value. In such a case, the point will need to be disabled prior to making a change to the value.

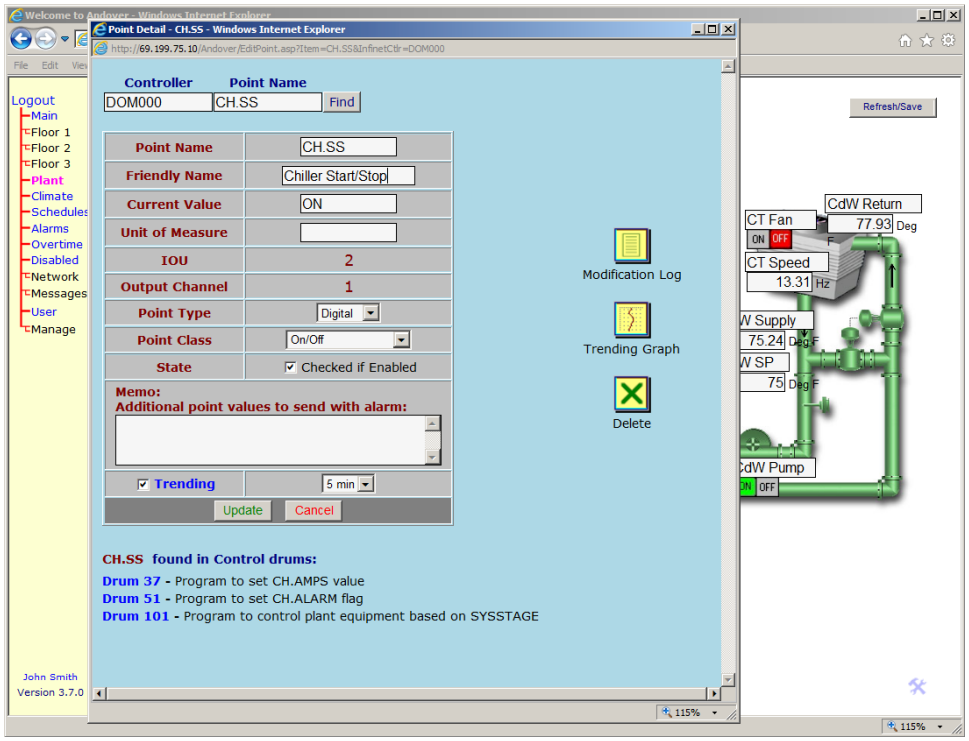


Figure 4.9

Point Properties Page

User Level: Standard and Manager

The properties page is made up of multiple functions that are associated with the particular point.

- The point properties displayed will vary based on the type of point being viewed. In the gray box, changes can be made to the properties and saved by clicking the **[Update]** button at the bottom. Properties include (but are not limited to) Point Name, Friendly Name, Current Value, Unit of Measure, Point Type, Point Class, State, Memo, and Trending.
- The Point Reference Locator can be found below the gray box with links to the associated programs. A listing of every reference to the point can be found here.
- The Synchronize  is used to re-request Andover for point information and refresh the database.
- The Modification Log  shows every change to the point: what change was made, when it occurred, and who made the change.
- The Trending Graph  , when trending is enabled, opens a graphical representation of the point's historical values.
- The Delete  removes the point from the system.

  - **Note:** Standard users may view the point properties but cannot make changes.

Chapter 5 – Graphics

Adding Images to the web.EMS System

User Level: Manager

The **Graphics** page shows every image that is currently available in your web.EMS system. From this page, you can upload new images, rename current images, or delete an image. To add a new image, scroll to the bottom of the page and upload the image from your computer. Browse for the desired image and click **[Upload]**. For quick page loading, the best file types to use are ***JPG*** and **GIF**. To rename an image, click **[Rename]** beneath the image you wish to rename. Type the new name in the field and click **[Submit]**. To delete an image, simply click **[Delete]** beneath the image you wish to delete. *(Figure 5.1)*

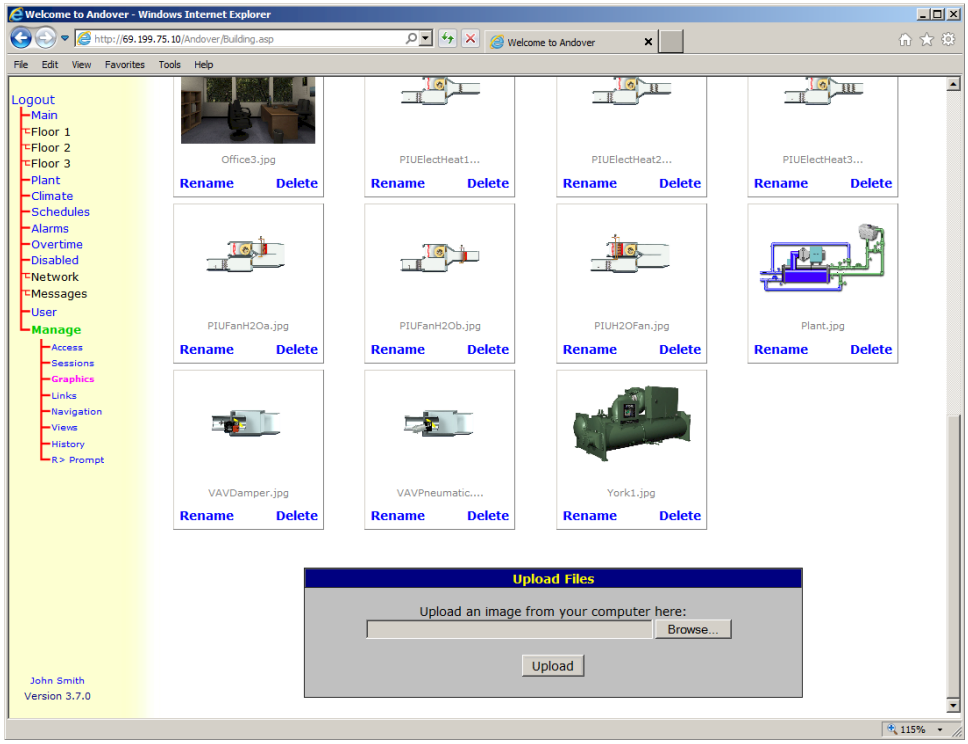


Figure 5.1

Adding an Image to a Page

User Level: Manager

To add an image to a page, go to the page you wish to add the image and click the . At the top, select an image from the drop-down box. To see what the selected image looks like, click the **[Image]** button to the left. Once the desired image is selected, click the **[Save]** button to the right.

- **Note:** If no graphic is selected for a page, all the points on the page will automatically format into a table.

Positioning Points on a Graphic

User Level: Manager

If you have selected a graphic for your page, the points must be positioned on the image. Positioning is accomplished by setting the **Top** and **Left** fields of the editing table. The top left-hand corner of the page would be represented with a **Top** value of 0 and **Left** value of 0. The bottom right-hand corner of the page would be represented with a **Top** value of 600 and a **Left** value of 600.

The best way to initially position a point is directly from the **Layout Page**. Access this page by selecting the **[Layout Page]** button at the top of the editing table page. Here, you can click and drag the point references to the desired positions and click **[Update]**. The server automatically enters the corresponding values into the **Top** and **Left** fields for you. You can also position a point on a graphic page by entering the **Top** and **Left** values manually on the editing table page. *(Figure 5.2)*

- **Note:** If your page does not have an image, web.EMS automatically formats the data into a table.

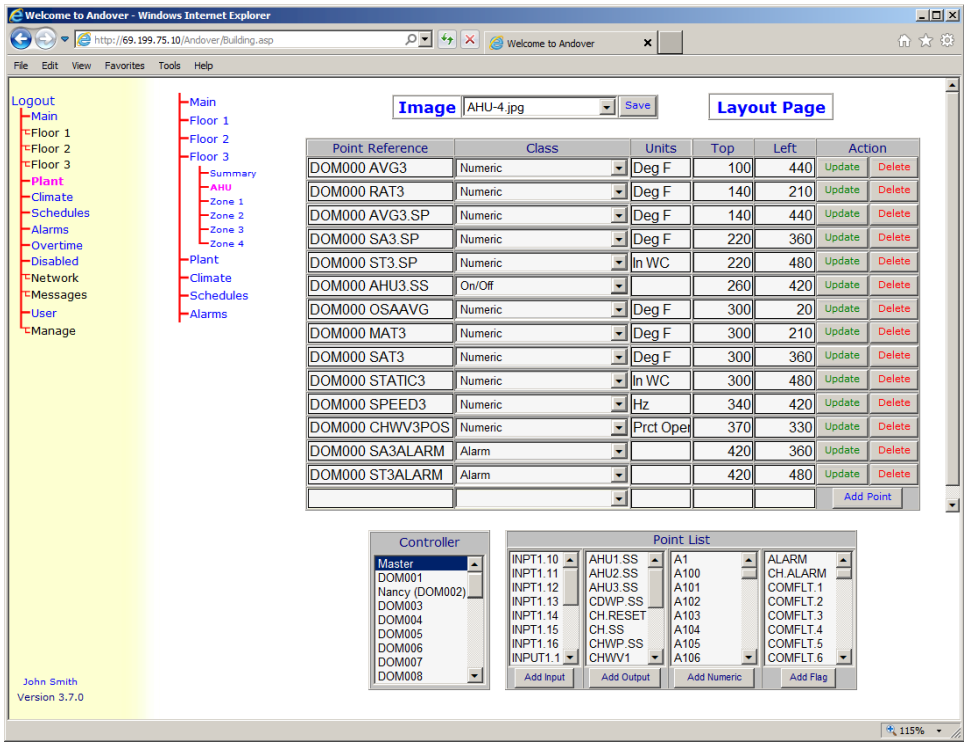


Figure 5.2

Chapter 6 – Trends

Enabling or Disabling Trending

User Level: Manager

Trending can be enabled or disabled from the point's properties page. To enable trending, select the drop-down box next to **Trending** and specify the trending time increments and the logging type. To disable trending, select "None" in the **Trending** drop-down box. Remember, any changes you make to the **Properties** page will need to be saved by clicking the **[Update]** button. *(Figure 6.1)*

Trending Graphs

User Level: All

If trending has been enabled on a point, a selection for graphing will be available. Graphs are accessed by right-clicking a point reference and clicking **Graph [*point name*]** or by clicking the 

button from a table. You can also view trending graphs by clicking the  button on the point's properties page.

History – (applies to AC256 systems)

User Level: Manager

The **History** page, a sub-branch of the **Manage** branch, displays a table that houses all the points for which trending has been enabled. This page is a graphical representation of point history and shows how many history pages are available to other, non-trending points. There are 256 trending points available in the Andover AC256+ system and only 112 available in the AC256. You can open the point's **Properties** page by clicking the on the point's name referenced in the table.

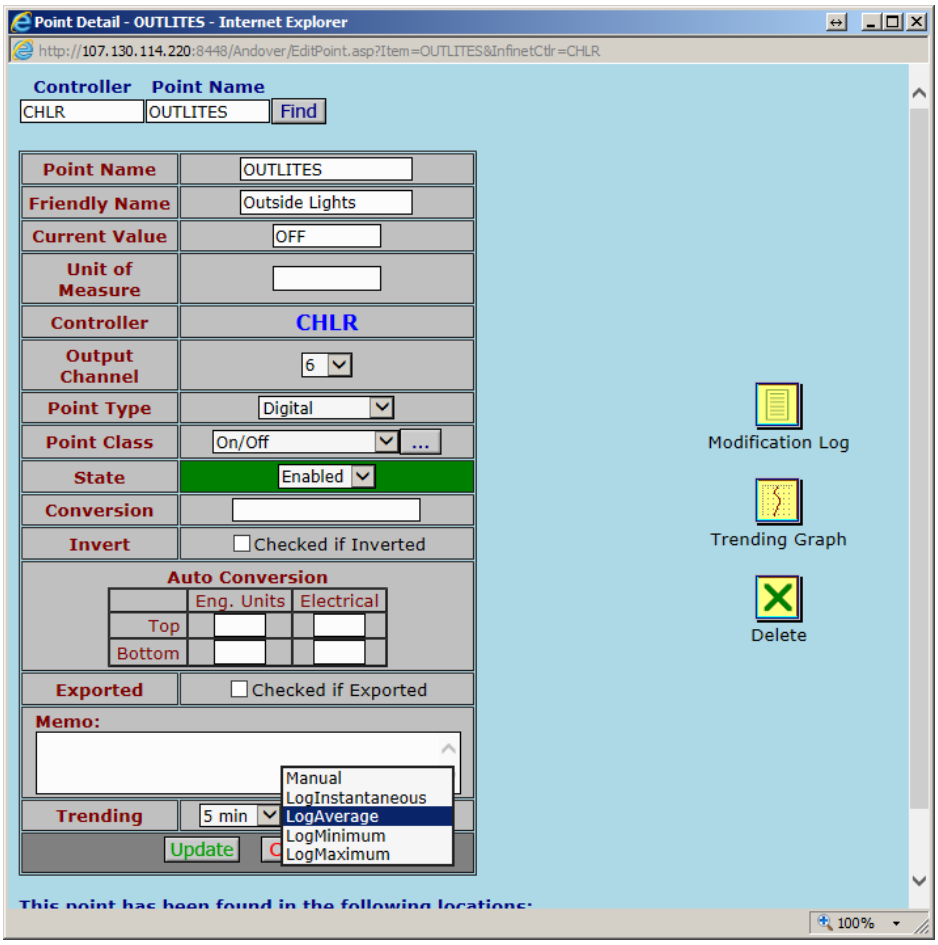

Point Detail - OUTLITES - Internet Explorer
http://107.130.114.220:8448/Andover/EditPoint.asp?Item=OUTLITES&InfinetCtlr=CHLR
Controller
Point Name
CHLR
OUTLITES
Find
Point Name
OUTLITES
Friendly Name
Outside Lights
Current Value
OFF
Unit of Measure
Controller
CHLR
Output Channel
6
Point Type
Digital
Point Class
On/Off
...
State
Enabled
Conversion
Invert
Checked if Inverted
Auto Conversion
Eng. Units
Electrical
Top
Bottom
Exported
Checked if Exported
Memo:
Trending
5 min
Manual
LogInstantaneous
LogAverage
LogMinimum
LogMaximum
Update
Modification Log
Trending Graph
Delete
100%

Figure 6.1

Chapter 7 –Network Management

Master Controller

User Level: Manager

Under the Master sub-branch there will be listed Flags, V-variables, A-variables (if the system is an AC256+), and X-variables. From these links, you can open the associated pages for these point types.

(For AC256 systems)
The master controller's programs are located through the **Master** sub-branch under the **Network** branch. The **Programs** sub-branch displays all the drums (programs) for your Andover system. To view or edit an existing drum, select the associated drum link. This will open the drum for viewing and/or programming. To create a new program drum, select the desired drum listed in the **Open a New Drum** box and click **[Open]**. You will then be taken to a blank drum page.

You can also copy an existing drum into a new drum at the bottom of the **Programs** page. Simply select the domain and drum of both the source and of the destination drum, then click **[Copy Drum]**. *(Figure 7.1*)

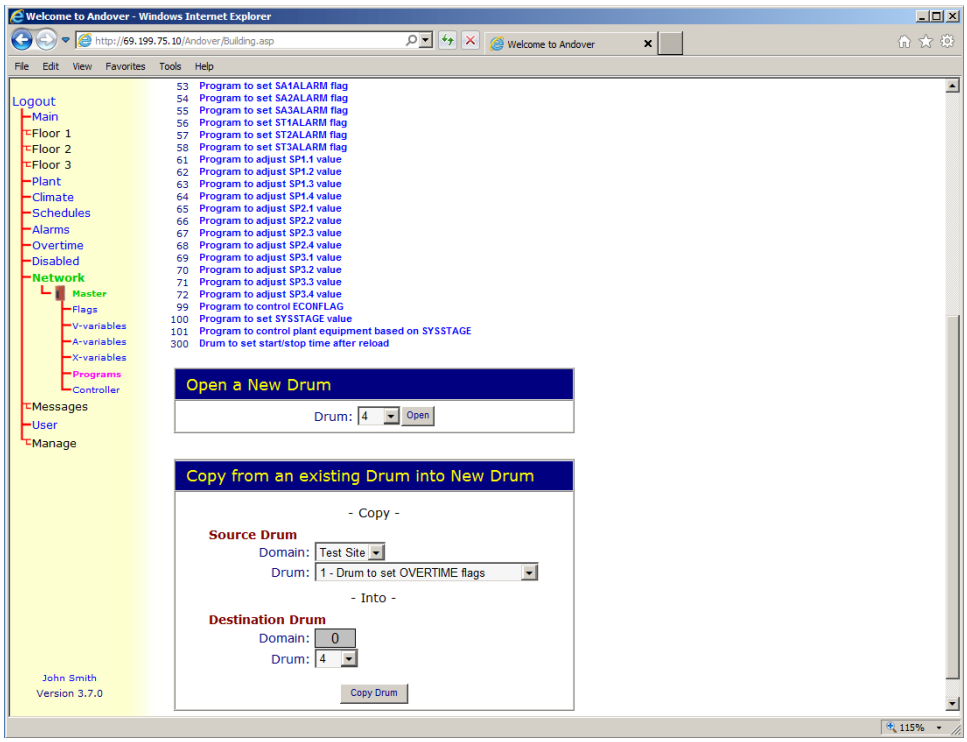


Figure 7.1

(For Infinity and Continuum systems)
The master controller's programs are located through the **Master** sub-branch under the **Network** branch. The **Programs** sub-branch displays all the programs for your Andover system. To view or edit an

one, select the associated program **[Edit]** link. This will open the program for viewing and/or programming. To create a new program drum, type the new program name into the text box at the top of the page and click **[Add]**. You will then be taken to a blank program page.

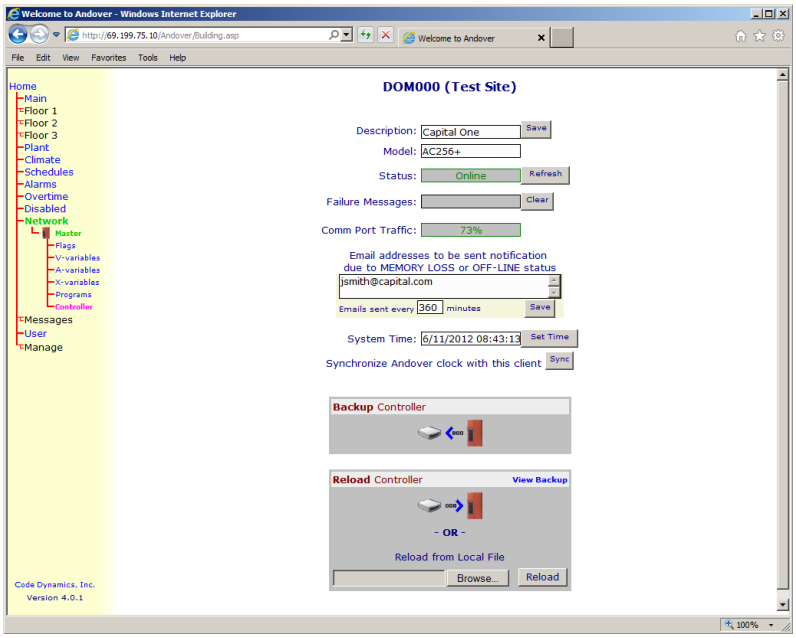


Figure 7.2

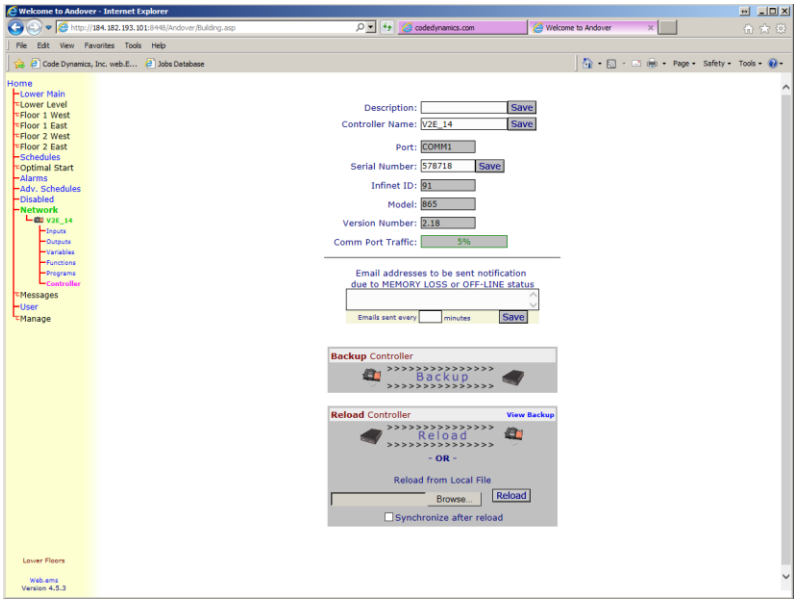


Figure 7.3

IOU Boards

User Level: Manager

The next sub-branches listed beneath the **Network** branch detail your system's IOU boards. Select an IOU board branch, and sub-branches appear for the **Inputs** and the **Outputs** of the board. To view properties of a specific IOU's input or output, double-click the point reference or right-click and select **Properties [*point name*]**. Graphing, disabling, and enabling can be accomplished right from the table.

Sub-Controllers

(AC256 devices such as LCUs, PCUs, TCUs, TMUs, and DIUs)
(Infinity/Continuum devices such as TCX, LCX, SCX controllers)

User Level: Manager

Sub-controllers are listed beneath the IOU boards. Unless friendly names are specified, controllers will be listed numerically by their technical names. If friendly names have been assigned, controllers will be listed alphabetically by their friendly names. Controllers that do not have friendly names assigned will be listed numerically below the others.

Sub-controllers are navigated similarly to the master controller. Add points (inputs, outputs, and variables) to a sub-controller through the controller's **Points** sub-branch. View drums through the **Programs** sub-branch. View controller details through the **Controller** sub-branch. (*Figure 7.3*)

Reloading and Backing Up Memory

User Level: Manager

To backup the memory, select the desired **Controller** sub-branch. From the **Backup** gray box on this page, click  . *(Figure 7.3)*

To reload the memory, select the desired **Controller** sub-branch. From the **Reload** gray box on this page, you can reload the memory by clicking  and selecting the particular file you wish to reload. *(Figure 7.3)*

Chapter 8 – Programming

User Lever: Manager

The Andover system's programming areas are called **drums**. Depending on the type of system you have, there could be as many as 320 independent drums. Each drum can be used to accomplish a specific control function. For example, you might write one program drum to control a fan and another to control a damper. Throughout this section, the term drum is used to reference a control program.

Drum Structure

Every drum is structured to contain a Comment line, 99 possible Control lines, and an Emergency line.

The **Comment line** is just what it implies. You can type any text you wish on this line as a reference to the drum's purpose. The content of the Comment line does not affect the drum's operation.

The **Control lines**, numbering from 1 – 99, contain the main instructions of the control program. These lines contain all program calculations as well as the sequences of operation.

The **Emergency line** is a unique control line that can perform a special task no matter what line the program is currently positioned in. This line will be discussed in more detail later.

Control Lines (AC256 systems only)

Each control line can contain two types of "statements": *Action statements* and *Exit statements*.

Action statements are instructions that perform some type of action within the program. The action could be used to turn on a control point or to perform a mathematical calculation on a variable. A line can contain multiple Action statements to be performed in the order in which they are written.

The most common instruction in an Action statement is the "value transfer" instruction, represented by the "greater than" symbol "**>**". You would write the statement as ***Value > Point*** where the *Value* would be ON, OFF, or a numerical calculation and the *Point* would be any output or variable within the system.

Examples include the following:

ON > HEATER
The value ON is transferred to the output named HEATER, turning the output On.

OFF > FAN
The value OFF is transferred to the output named FAN, turning the output Off.

65 > HEATSP
The value 65 is transferred to the variable named HEATSP, setting the value of the variable to be 65.

(HEATSP + 3) > HEATSP2
The value of (HEATSP + 3) is transferred to the variable named HEATSP2, setting the value of the variable to be 3 more than HEATSP.

Exit statements tell the program what line to move to under a certain condition. Each Exit statement consists of two parts: the line number to go to and the condition that must be true in order to leave the line it is on.

Examples include the following:

Exit to line 5 If (ZONE1 < 68)
This statement tells the drum to move to line 5 if the value of ZONE1 is less than 68.

Exit to line 12 if (HEATER = OFF)
This statement tells the drum to move to line 12 if the value of HEATER is Off.

Exit to line 10 If
This statement tells the drum to move to line 10 no matter what conditions exists.

Emergency Line

Every control drum has a single Emergency line: Line E. The instructions within the Emergency line can interrupt the normal control sequence from another line in the program. If an Exit statement within the Emergency line meets the condition set, the control drum will move the normal operation to the new line stated within the Emergency line's Exit statement.

Some examples include the following:

Exit to line 5 If (FIREALRM = ON)
This statement forces the control drum to line 5 indefinitely or until the FIREALRM flag is OFF.

Exit to line 1 If (CL = 0)
This statement moves the control drum to line one (1) if the current line "CL" is at line zero (0).

web.EMS allows for easy programming of drums within a browser format. Unlike in the command prompt programming style, you will be able to see the entire contents of the drum as you write the program.

Andover Points (All Andover systems)

The programmer will reference point names within the drums. Andover points can be actual inputs or outputs of the system or they can be variables within the system.

Inputs (All Andover systems)

Andover **Input** values are determined by the classification of the input when it is assigned. The four classifications for Andover inputs are as follows.

Temperature	From -327 to 327 degrees Fahrenheit
Voltage	From 0 to 8.192 volts
Digital	On or Off
Counter	Read in pulses per scan up to 10 Hz

Outputs (All Andover systems)

An output can receive the values of ON, OFF, -ON, or positive or negative numbers. For a digital output, it can be set to ON, OFF, or a number corresponding to a pulse in seconds. For a tri-state output, it can be set to ON, OFF, -ON, or a number (positive or negative) corresponding to a pulse in seconds. For a universal output, it can be the same as a digital output in addition to a number corresponding to a voltage or a current signal.

Variables (All Andover systems)

There are two types of Andover variables that can have a real number value: fixed variables (X-variables and A-variables) and calculation variables (V-variables). Both fixed and calculation variables can take any value between -9999 and 9999. (Strictly speaking, calculation variables can have values above and below those limits; however, they will be represented with a value of OVRFLOW to the user.)

Flags (AC256 systems only)

Andover also has user-defined variables called **flags**. Flags are numerically Boolean where the value can only be ON or OFF.

Predefined System Variables (AC256 systems only)

Predefined system variables are preset within the Andover and cannot be modified or disabled. A list containing all Andover predefined system variables with the numerical values that they represent appears on the following page.

Variable Name	Value	Reference
APR	4	April
AUG	8	August
CL	0 – 99	Returns the current drum line
DEC	12	December
DOM	1 – 31	Returns the system time – day of the month
FALSE	0 or OFF	Returns the logical OFF or the numerical value of 0
FEB	2	February
FRI	5	Friday
JAN	1	January
JUL	7	July
MAR	3	March
MAY	5	May
MIN	0 – 59	Returns the system time – minute of the hour
MON	1	Monday
MTH	1 – 12	Returns the system time – month of the year
NOV	11	November
OCT	10	October
OFF	0 or OFF	Returns the logical OFF or the numerical value of 0
ON	1 or ON	Returns the logical ON or the numerical value of 1
OUR	0 – 23	Returns the system time – hour of the day
SAT	6	Saturday
SC	1>	Returns the time in seconds of the most recent drum scan
SEC	0 – 59	Returns the system time – seconds of the minute
SEP	9	September
SUN	7	Sunday
TD	0 – 255	Returns the number of days that a drum has been on a line
TH	0 – 255	Returns the number of hours that a drum has been on a line
THU	4	Thursday
TM	0 – 255	Returns the number of minutes that a drum has been on a line
TOD	0 – 2359	Returns the system time of day in format (OUR * 100) + MIN
TRUE	1 or ON	Returns the logical ON or the numerical value of 1
TS	0 – 255	Returns the number of seconds that a drum has been on a line
TUE	2	Tuesday
WED	3	Wednesday
WKD	1 – 7	Returns the system time – day of the week

Programming Operators

Mathematical

+	Adds the right side expression to the left side expression
-	Subtracts the right side expression from the left side expression
*	Multiplies the right side expression by the left side expression
/	Divides the right side expression by the left side expression

Comparative

>	Returns TRUE or numerical 1 if the value of the left side expression is greater than the value of the right side expression
<	Returns TRUE or numerical 1 if the value of the left side expression is less than the value of the right side expression
=	Returns TRUE or numerical 1 if the value of the left side expression is equal to the value of the right side expression
#	Returns TRUE or numerical 1 if the value of the left side expression is NOT equal to the value of the right side expression
>=	Returns TRUE or numerical 1 if the value of the left side expression is greater than OR equal to the value of the right side expression
<=	Returns TRUE or numerical 1 if the value of the left side expression is less than OR equal to the value of the right side expression

- **Note** – Due to rounding off for display purposes, some values may appear to be equal but are not. For example, the values of **49.9999** and **50.0001** both are represented as **50** to the user, but they will NOT be equal to each other in an equation.

Logical

&	AND – returns TRUE if both expressions are TRUE
!	OR – returns TRUE if either expression is TRUE
^	XOR – returns TRUE if exactly one expression is TRUE

Other Operators

-	Returns an expression whose value is negative of the original expression
@	Returns the absolute value of the expression
~	Returns the reverse (opposite) of the expression
$	Returns the square root of the expression
MIN	Returns the minimum value of all expressions within the statement
MAX	Returns the maximum value of all expressions within the statement
MINNO	Returns the argument position with the minimum value in the statement
MAXNO	Returns the argument position with the maximum value in the statement

Order of Evaluation

Andover calculates expressions from left to right; therefore, it is important to use parentheses when calculations could be misinterpreted. The result of the expressions would be as follows.

Expression	Yields
4 * 3 + 2	14
4 * (3 + 2)	20
2 * 3 + 4	10
2 * (3 + 4)	14

Saving Memory within the Andover

The Andover memory storage is directly related to the number of characters used in the programming drums. Many expressions can be replaced with shorter formats, as in the following examples.

Original Format	Shorter Format
(FAN = ON) & (HEATER = ON)	FAN & HEATER
(FAN = OFF) ! (HEATER = OFF)	~FAN ! ~HEATER
WKD = SAT	WKD = 6
(WKD = MON) ! (WKD = TUE) ! (WKD = WED) ! (WKD = THU) ! (WKD = FRI)	WKD < 6

Order of Drum Line Operation (AC256 systems only)

A line's **Action statements**, if any, will be performed in the order of listing. In the following example, the HEATER output will never be turned ON within the line. The second Action statement finalizes the value of HEATER at the completion of the scan.

LINE 5
1A) ON > HEATER
2A) OFF > HEATER
1X) Exit to Line 10 If (TOD > 1700)

The following line will result in a value of 70 for TEMP.SP.

LINE 12
1A) 68 > TEMP.SP
2A) MAX(TEMP.SP, 70) > TEMP.SP
1X Exit to Line 15 If

A line's **Exit statements** will be performed in the order of listing. If an Exit statement becomes TRUE, any following Exit statements will be ignored. The line will use the first Exit statement that becomes TRUE during the scan. In the following example, the point named LEAD.1 is a flag with the value of ON. As long as the FAN, HEATER, and LEAD.1 are all ON, the drum will use the first Exit statement to line 10 even though the second Exit statement is also be true. It would only exit to line 15 if both the FAN and HEATER are ON and the LEAD.1 flag is OFF.

LINE 5
1X) Exit to Line 10 If (FAN = ON) & (HEATER = ON) & (LEAD.1 = ON)
2X) Exit to Line 15 If (FAN = ON) & (HEATER = ON)

In the next example, the drum would always exit from here to line 10 because the first statement would always be TRUE when the second statement is TRUE.

LINE 5
1X) Exit to Line 15 If (FAN = ON) & (HEATER = ON)
2X) Exit to Line 10 If (FAN = ON) & (HEATER = ON) & (LEAD.1 = ON)

web.EMS Drum Programming (AC256 systems only)

To create a new program drum in the system, select the desired drum number listed in the **Open a New Drum** box and click the **[Open]** button. You will then be taken to a blank drum page.

Creating the Comment Line (AC256 systems only)

The first entry box, at the top, is for the Comment line. It is usually used to describe the program you are about to write. After typing in the Comment line, click the green Update link to apply the comment. (*Figure 8.1*)

Creating a Control Line (AC256 systems only)

Locate the "Add Line" selection at the bottom of the page and choose the line number you wish to create from the drop-down box. Choose either an Action statement in the box with the label "1A)" or an Exit statement with the label "1X) Exit to Line". After typing your new statement, click the Add Statement link next to the new statement. When the page refreshes, you will see your Action or Exit statement in a grayed portion of the box. The blue portion is for new statements to be entered. (*Figure 8.1*)

Once the programming is complete, you will need to start the drum by one of two methods. You may either click the appropriate Rotate Drum to Line … link or you can add an auto-start-up function in the Emergency line (Line E). To do this, add an Exit statement to the Emergency line exiting to the line of your choice with the condition of "**CL = 0**". This condition states that the drum is currently on line 0 or not running. The Emergency line is checked at every scan, and if the drum is on line 0 (not running), then it will immediately rotate the drum to the new line stated and the drum will now be running. (*Figure 8.1*)

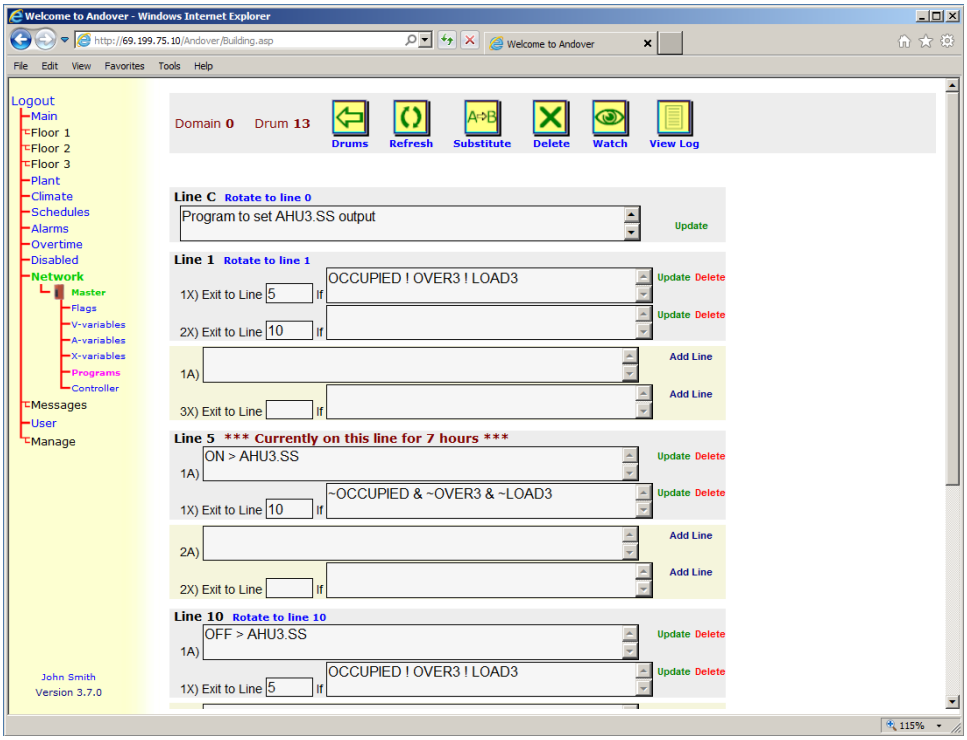

Welcome to Andover - Windows Internet Explorer
http://69.199.75.10/Andover/Building.asp
Welcome to Andover
File Edit View Favorites Tools Help
Logout
Main
Floor 1
Floor 2
Floor 3
Plant
Climate
Schedules
Alarms
Overtime
Disabled
Network
Master
Flags
V-variables
A-variables
X-variables
Programs
Controller
Messages
User
Manage
John Smith
Version 3.7.0
Domain 0 Drum 13
Drums Refresh Substitute Delete Watch View Log
Line C Rotate to line 0
Program to set AHU3.SS output
Update
Line 1 Rotate to line 1
1X) Exit to Line 5 If OCCUPIED ! OVER3 ! LOAD3
Update Delete
2X) Exit to Line 10 If
Update Delete
1A)
Add Line
3X) Exit to Line If
Add Line
Line 5 *** Currently on this line for 7 hours ***
1A) ON > AHU3.SS
Update Delete
1X) Exit to Line 10 If ~OCCUPIED & ~OVER3 & ~LOAD3
Update Delete
2A)
Add Line
2X) Exit to Line If
Add Line
Line 10 Rotate to line 10
1A) OFF > AHU3.SS
Update Delete
1X) Exit to Line 5 If OCCUPIED ! OVER3 ! LOAD3
Update Delete
115%

Figure 8.1

Special Drum Functions (AC256 systems only)

There are a set of seven icons at the top of the drum-programming page used for shortcuts to many tasks that are performed while either viewing or programming drums. They are described below.

The **[Drums]**  button is used to reload the controller's drum list page.

The **[Refresh]**  button is used to request the drum from Andover and reload the page.

The **[Substitute]**  button is used to make point name substitutions within the drum.

The **[Delete]**  button is used to erase the entire drum from the Andover program.

The **[Watch]**  button is used to see the drum's current line position and point values.

The **[Help]**  button is used to show a list of all Andover point names within the system.

The **[View Log]**  button is used to see all recorded modifications to the drum.

Appendix

R> Prompt

User Level: Manager

The **R>** prompt page is for single command transactions with the Andover. This page can be used for obtaining specific information from the Andover controller through a single entry or transaction. Type your command in the text field to the right of the **R>**, then press **[Enter]**. You can select the **[Send without <CR>]** button if you wish to send the text without the **ASCii (13)** carriage return character. You can also select the **[Send <CR> only]** button if you wish to send an **ASCii (13)** carriage return only without the text. The **Wait for Response** value represents the number of seconds the system waits for Andover's response to complete before returning the result. The default value is one (1) second. *(Figure A)*

- **Note:** The **R>** prompt function cannot be used to edit drums or any other process that requires more than one transaction to complete. This limitation exists because the system now allows multiple users to request data simultaneously. All multi-transaction functions can now be performed within the graphical interface of the browser. There is really no need for the option of **R>** prompt level commands with web.EMS, but it is included as a way for the user to directly request information from the controller if desired.

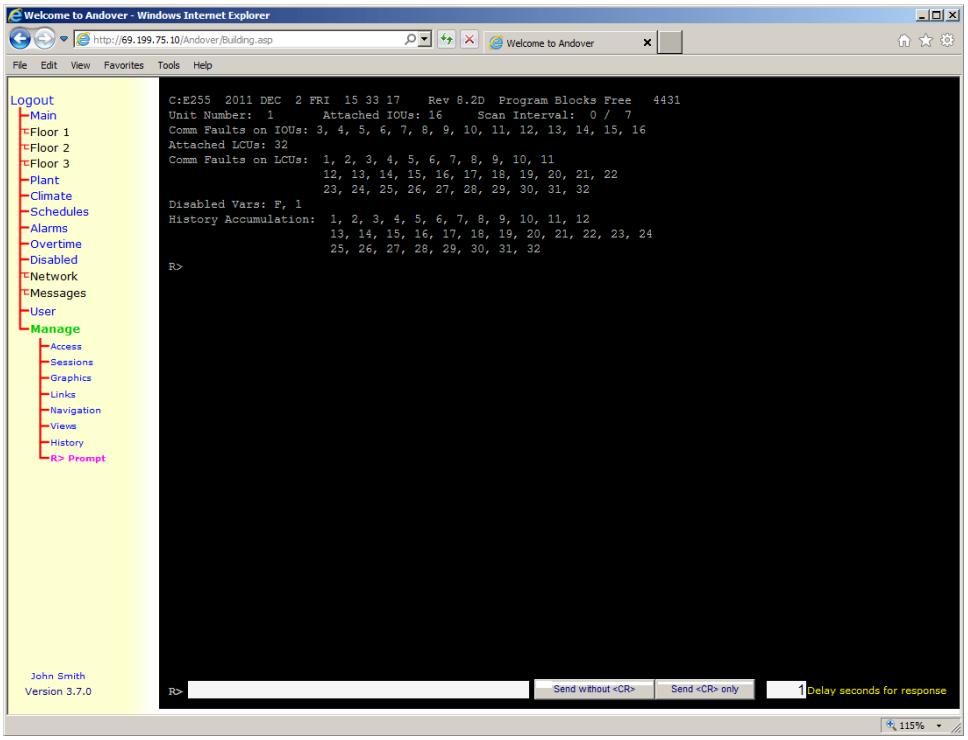


Figure A

Technical Support

If you are having problems with web.EMS, contact you web.EMS representative or the following address for support:

Code Dynamics, Inc.
P.O. Box 25
Woodstock, GA 30188
(770) 592-7402 – Voice (Monday through Friday – 9AM to 5PM EST)
(678) 445-8193 – Fax
www.codedynamics.com – Web Address
support@codedynamics.com – Email

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