webEMS

User Manual

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Chapter 1 – Getting Started

Introduction

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

webEMS 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 webEMS 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 webEMS

To access webEMS, type your webEMS 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*)

- o **Note:** The Administrator **User ID** is _____ and the default **Password** is _____.
  Please change the password as soon as possible to avoid unauthorized access (see page 8 for information on how to change passwords).

Figure 1.1

Main Screen and Basic Navigation

After logging into webEMS, the main screen will appear. The welcome page displays the webEMS logo, your user name, and a record of your last session. *(Figure 1.2)*

Navigating webEMS is accomplished via the Navigation bar on the left of a page at all times. This is your portal to all system data, programming options, and user management. Terms on the Navigation bar 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 **User Accounts** page found within the **Manage** page. *(Figure 2.1)* From the User Accounts page, you can create a new user by clicking the **New User** button. (Figure 2.2)

To create a new user, first click the **[New User]** button the top right corner of the editing table and a new page will appear. Type the new **User ID**, **Name**, **Password**, **Retype (Password)**, 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 click the **[Save]** button to finalize. *(Figure 2.2)*
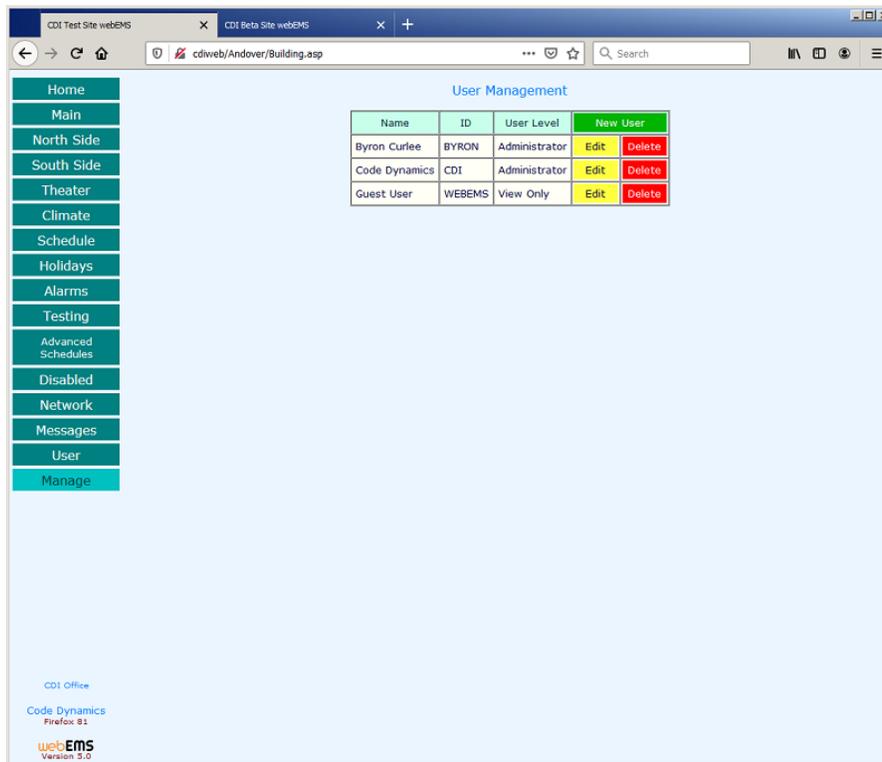

Figure 2.1
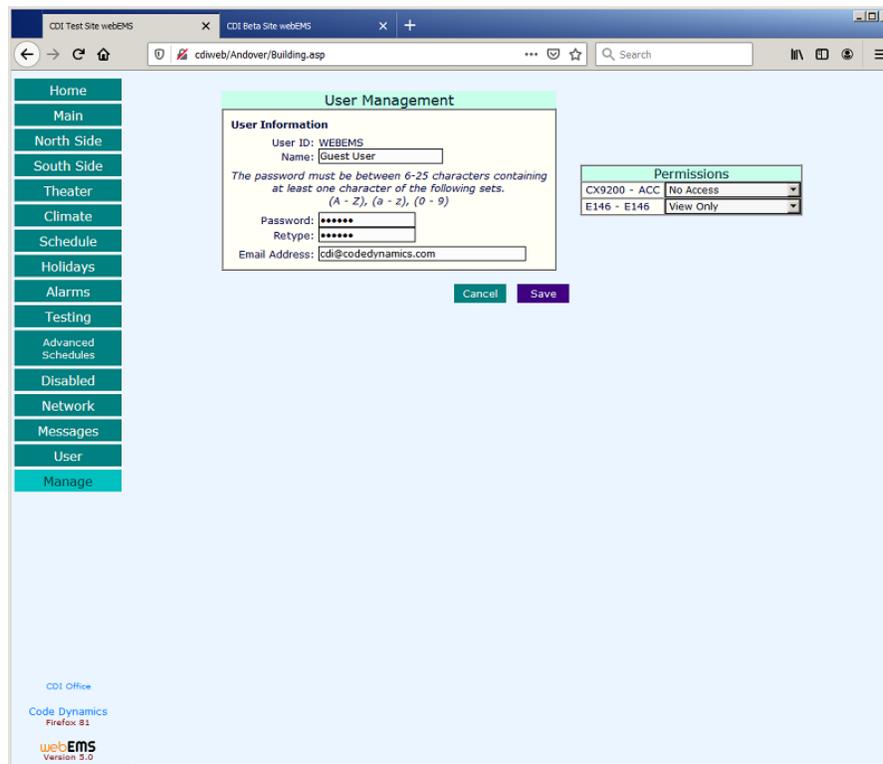
Figure 2.2

Permissions

User Level: Administrator

The five 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 a user entirely 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 **View Only** user cannot make changes to the system.
- Standard – Allows the user to view all point properties and disable and change point values. Most users fall into this permission category.
- Manager – Allows the user to have the permissions to create, delete and modify programs and variable calculations.
- Administrator – Allows full access to all options of the system. This user level is required to create, delete or manage user accounts. This is the highest level of access in the system. **The system can have multiple administrators but there must be at least one.**

Modifying and Deleting Users

To edit a user's Name, Password, Email address or Permission level, click the **[Edit]** button to the right of the user's information. Make the desired changes and click the **[Save]** button to finalize the changes.

To delete a user, click the **[Delete]** button to the right of the user's name. *(Figure 2.1)*

Changing Your User Name, Password, or Email Address

The User Management page found by clicking the **[User]** button in the Navigation bar allows you to modify your user **Name**, **Password**, or **Email Address**. *(Figure 2.3)*

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 webEMS. Your **Name** can be modified in the future. Your **User ID** cannot be modified but can be deleted.

To change your **Name**, modify the **Name** field and click the **[Save]** button. To change your **Password**, simply type the new password in both **Password** fields and click the **[Save]** button. 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)*
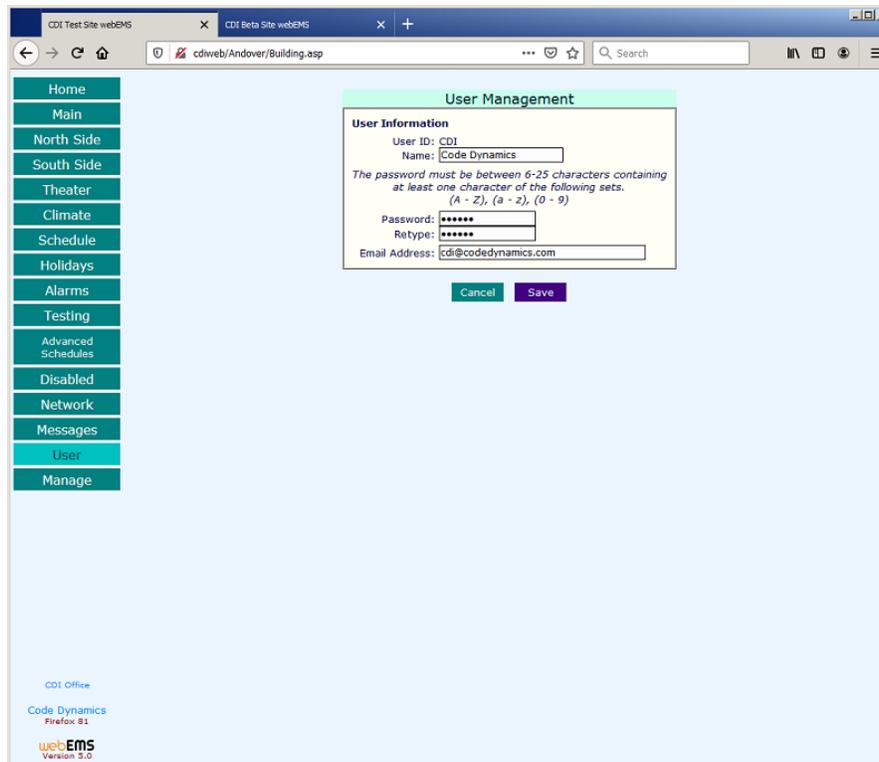

Figure 2.3

The **User Sessions** are found as a selection under User Management when you click on the **[Manage]** button in the Navigation bar. This page lists 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 clicking the **[View Log]** button to the right of the user's name. *(Figure 2.4)*
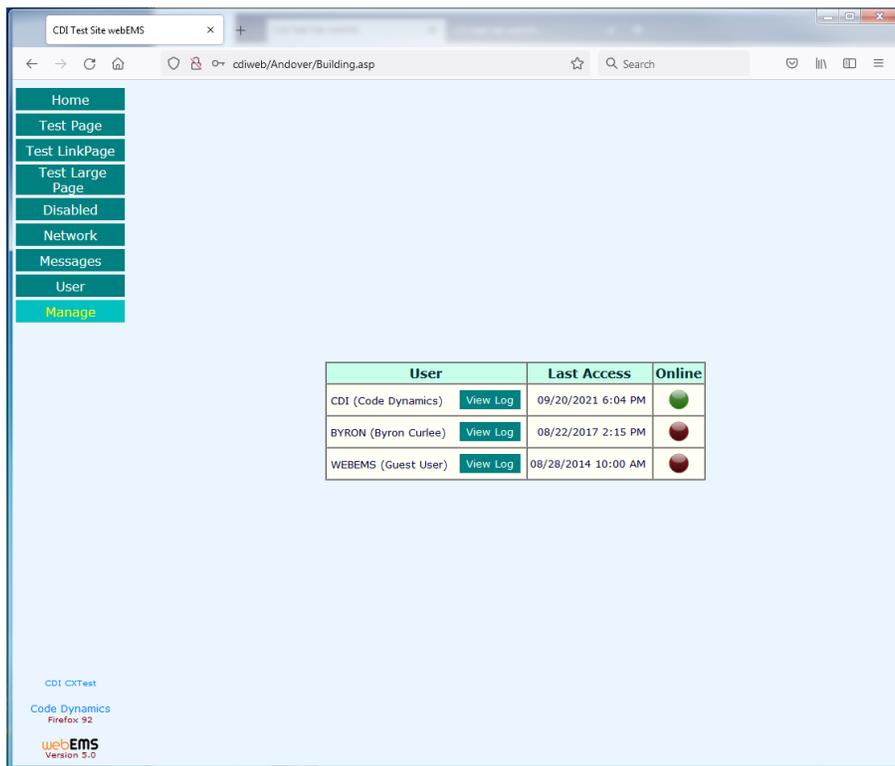
Figure 2.4

Messages

The Message Board page allows one user to communicate with another user within the webEMS system. You can get to it by clicking the **[Messages]** button in the Navigation bar. 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, select users you wish to address. If you wish to send a message to more than one user, hold the **<Ctrl>** key while selecting each subsequent user. Type your message in the box and click the **[Send Message]** button. The recipients will receive notification via email as well as a pending message envelope ⬚ upon their next login. *(Figure 2.5)*

If you have a new unread message addressed to you, an envelope will appear in the bottom of the Navigation bar area, directly above your user name. Click the ✉ envelope to view your new message.
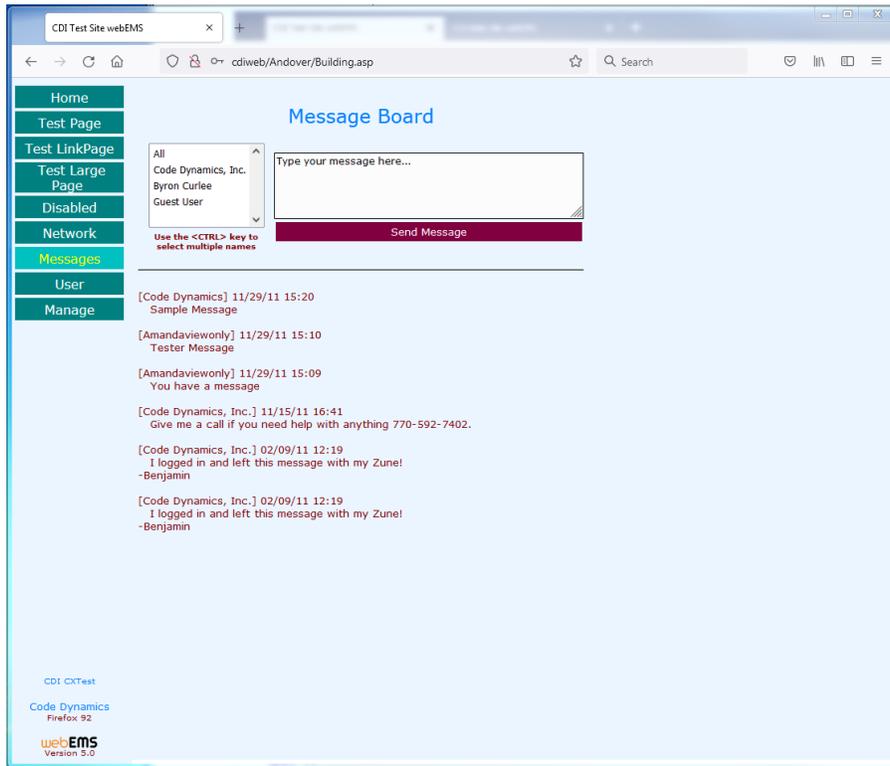
Figure 2.5

Chapter 3 – Navigation and Pages

Creating and Modifying the Navigation Bar

User Level: Administrator

Pages are created through the **Navigation** page found after clicking the **[Manage]** button in the Navigation bar. The Navigation page displays an editing table for creating the Navigation bar. Page buttons added to the Navigation bar can be one of three types. *(Figure 3.1)*

- o **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 page, put the reference you wish to see in the **Label** field. Next, select the desired page Type from the drop-down box. The three options are as follows:

- **Grouping** – Provides an icon list of pages found within the group.
- **Summary/Link Page** – Provides references and point values as links to other pages.
- **Detail Page** – Provides a detail page for viewing and accessing points within the Andover system.

Grouping pages have a button labeled [Open] to add pages that reside within the group. Both Summary/Link and Detail pages have a Page Graphic field to add the page's background image.
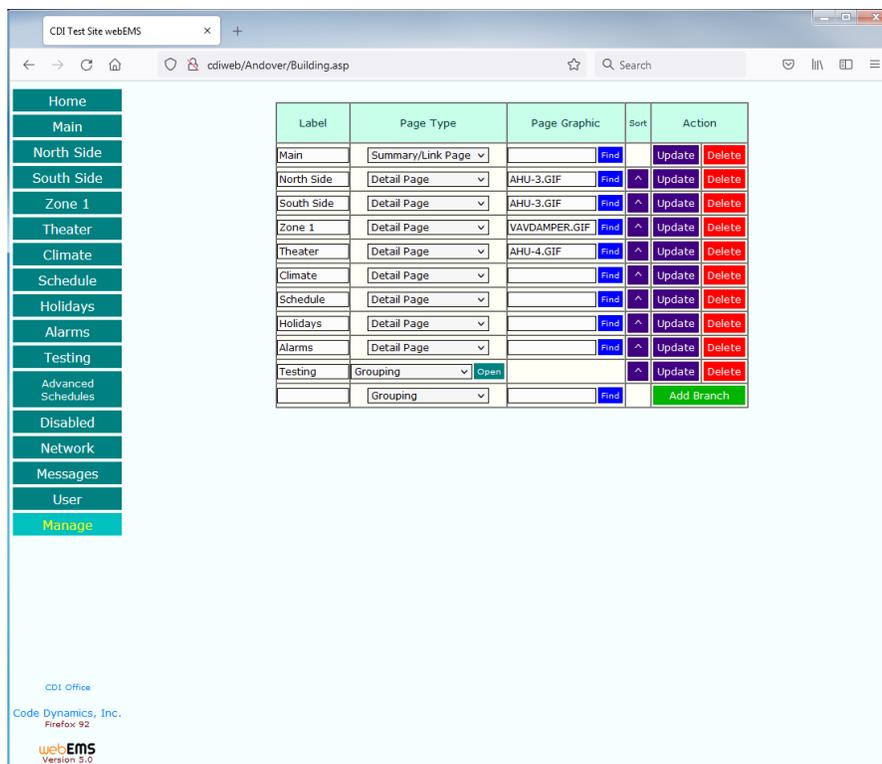
Figure 3.1

You can manage pages through the **[Manage]** button on the Navigation bar by selecting the **[Page Views]** option. The Page management is separated into three sections within this page. The left side contains a virtual Navigation bar to locate and select the page you wish to manage. The lower section provides a way to find any Andover point reference or Link reference in the system. After you choose the Controller, the other point types will populate with the corresponding names of that controller. Once the point or link is selected, click the **[Add]** button below the box and it will be added to the Page objects list in the top-center section. *(Figure 3.2)*

While in this management page, you can select from the drop-down list of images found to be the background image library. If "No Image" is selected, the points will be displayed on the page in a table form. When a background image is selected, a [Page Layout] button will appear. *(Figure 3.3)* From here you can move the page objects around over the background image to the desired location. *(Figure 3.4)*

The page has a virtual pixel array of 600 x 600. The fields **Top** and **Left** refer to that pixel positioning. The top left corner of the page would be Top-0 & Left-0 while the bottom right corner would be Top-600 & Left-600. Use these fields to position points more accurately after you have set their initial positions using the Page Layout tool. *(Figure 3.3)*

Figure 3.2

Figure 3.3

Figure 3.4

The **Files and Links** page, found from the **[Manage]** button in the Navigation bar, allows you to upload files and manage links that can be placed on pages. To add a link to webEMS, enter the description in the editing table, select the link **Type** from the drop-down box (WWW, Local File, or webEMS Link), enter the **URL/Filename**, and enter the **Target** location for the link to launch within. To finalize, click the **[Update]** button. To upload files into the webEMS system, click the **[Locate File for Uploading]** button below the editing table. You can also rename and/or delete uploaded files in this page. *(Figure 3.5)*
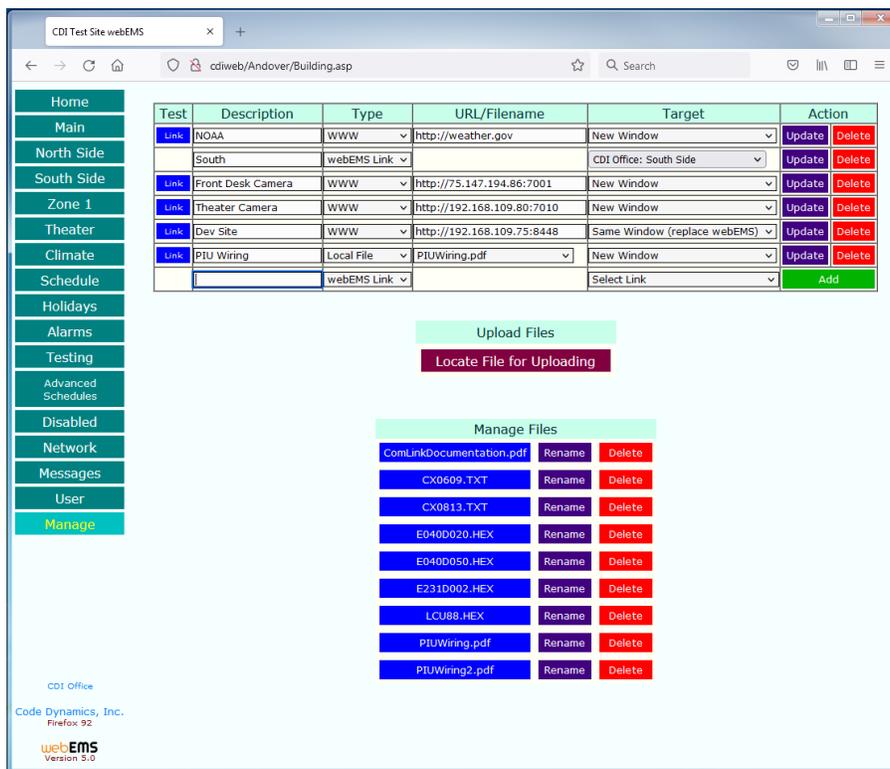
Figure 3.5

Chapter 4 – Points

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

Assigning and Managing Variables and Flags

User Level: Manager

All the available variables and flags in your Andover system can be found by clicking the **[Network]** button in the Navigation bar and selecting the particular controller you wish to manage. The points available to that controller will be listed as buttons (**[Flags], [V Drum], [X Drum], [A Drum]**) on the controller's page.   From here, you can manage all of the point properties for each of the variables or flags within the system. *(Figure 4.1)*
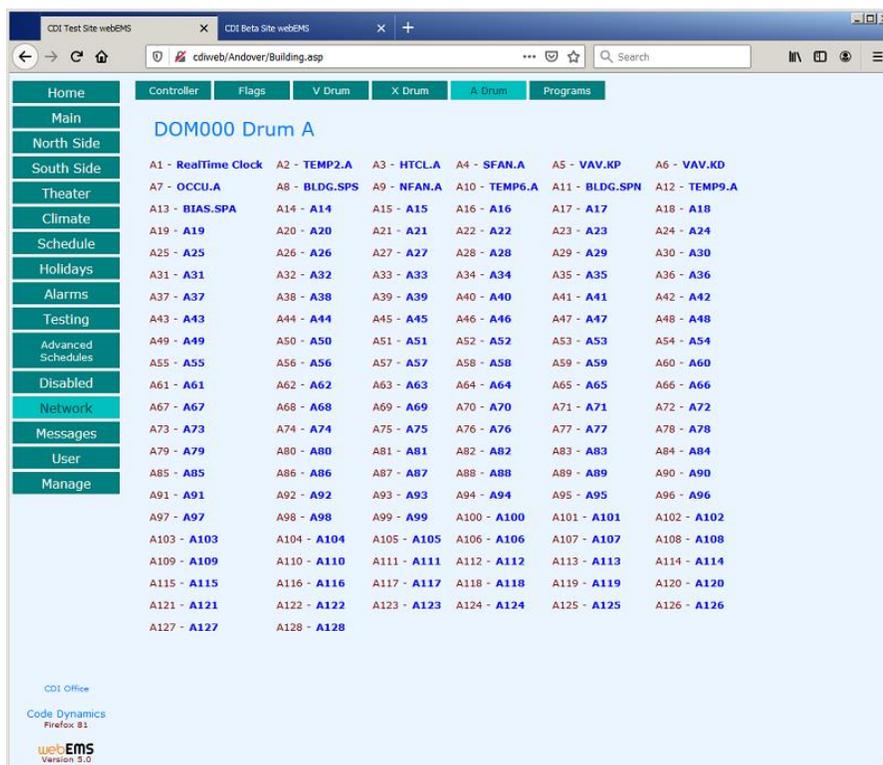
Figure 4.1

All the available inputs and outputs in your Andover system can be found by clicking the **[Network]** button in the Navigation bar. Inputs and Outputs can reside within either an IOU panel or within an AC-Net controller. Click on the particular icon that applies. If it's an IOU panel, you will go to the Input/Output management page for that IOU. (Figure 4.2) If it's within an AC-Net device, a separate button will be available for both **[Inputs]** and **[Outputs]**.

You can select the appropriate IOU type from the drop-down list at the top. Doing this will display the proper image and provide the correct selections for the output types for that IOU model.
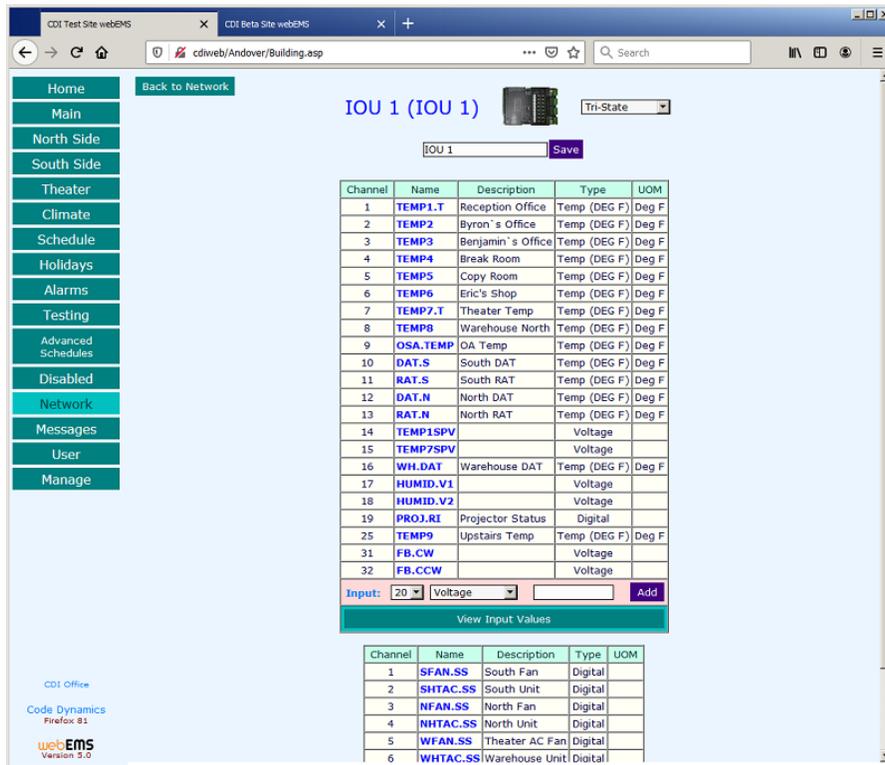
Figure 4.2

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 a point name.

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, click the **[Delete]** button found in the point's property page.

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 directly to the page management for that page. *(Figure 4.3)*
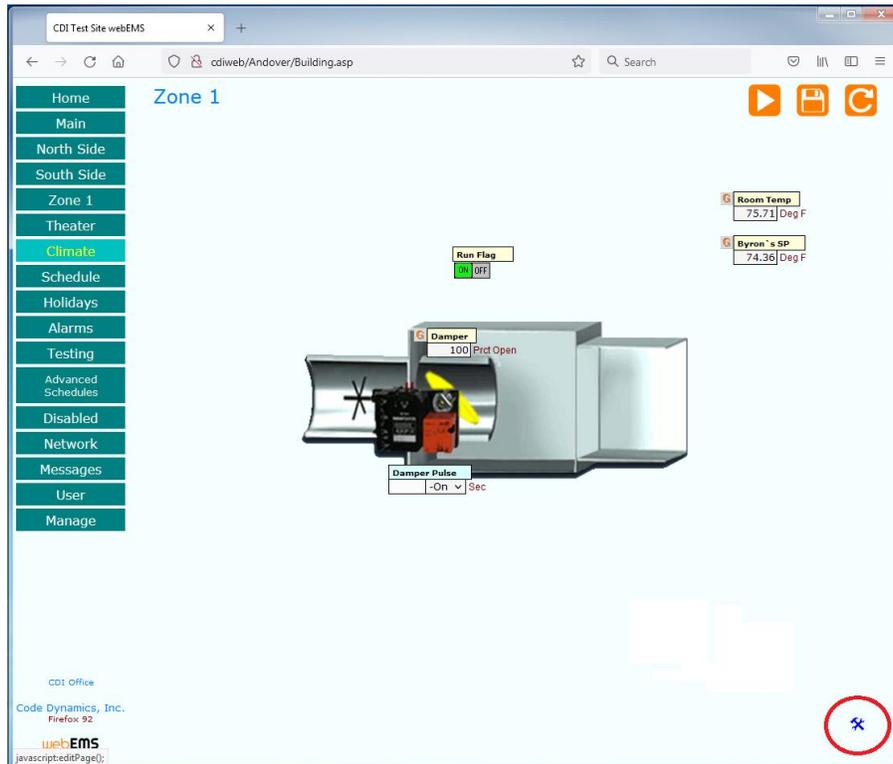
Figure 4.3

Point Classes

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

- *Alarm*
  - NORMAL when the Andover value **= 0** or **= Off.**
  - ALARM when the Andover value **≠ 0** or **= On**.

- *Counter Input* – Text showing the actual Andover value. `3`

- *Digital Input*
  - ON OFF when the Andover value **= 0** or **= Off.**
  - ON 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**.

  `2.965` Off / On
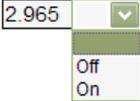
- *Equipment Setpoint* – Text showing the actual Andover value. `42`

- *Numeric* – Text showing the actual Andover value. `62.42`

- *On/Off*
  - ON OFF when the Andover value **= 0** or **= Off**.
  - ON 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.*

  `70 / 71 / 72 / 73 / 74 / 75 / 76 / 77`
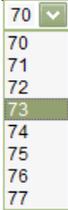
- *Start Schedule (13 = 1PM)* – A drop-down selection of 30-minute increments showing *Midnight* where the Andover value **= 0** through *OFF* where the Andover value **= 24**. A time of 1:30 PM is shown where the Andover value **= 13.5**. `9:30 AM`

- *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**. `9:30 AM`

- *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 **= 24**. A time of 1:30 PM is shown where the Andover value **= 13.5**. `9:30 AM`

- *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 **= 2400**. A time of 1:30 PM is shown where the Andover value **= 1330**. `9:30 AM`

- ***Temperature Input*** – Text showing the actual Andover value. `70.22`

- ***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**. `8:30 AM ▾`

- ***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**. `8:30 AM ▾`

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

  `3.244 ▾`
  `Off`
  `On`
  `-On`

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

- ***Voltage Input*** – Text showing the actual Andover value. `6.667`

- ***Voltage Output*** – Text showing the actual Andover value. `14.2`

- ***Yes/No***
    - o `No` when the Andover value **= 0** or **= Off.**
    - o `Yes` 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.*

To specify the user-defined values, click the **[Define]** button 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 (how you want that value to appear as), and the desired reference color. webEMS will display the user-defined reference in the selected color based upon the Andover value given. *(Figure 4.4)*
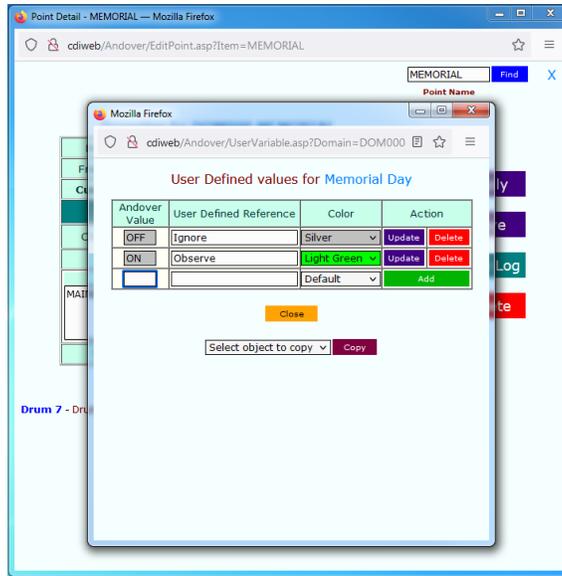
Figure 4.4

Viewing Data

User Level: View Only

Page Refreshing

You can refresh data through two different methods:

- Click the refresh button in the top right corner of the page.
- Re-select the page from the Navigation bar.

Trending

If trending has been enabled for a point, a graph icon will show next to the point name on a graphical page. For pages that have no graphical background, a graph icon will show up to the right of the point's information.

Real-time Viewing

Data can be automatically refreshed every ten seconds through **Real-time** 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 icon at the top right corner of the page. While in Real-time viewing, the **System in Use** message will appear in red when the server is requesting values from Andover. You may turn off real-time viewing by clicking the pause icon .

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 on a table page (no background image) you can click on the check box in the State column of the particular point. Checked is Enabled and unchecked is Disabled. After making your change, click on the save icon 💾 at the top right of the page to apply the changes. Once changes have been saved, you will see the point name in the color Black if it's **Enabled** and in the color Red if it's **Disabled**.

If the point is within a graphical page, you can click on the point name to open its Properties Page. From there you can select State (Enabled or Disabled) and click the [Save] button to apply the change. The main page window will need to be refreshed 🔄 in order to see the affected change.

Accessing Point Properties

To view a point's properties, you can click the point name. The point's properties are displayed in a new window. (*Figure 4.5)*

Setting Point Values

Point values on a page can be modified by changing the values represented on the page and clicking the save icon 💾 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 4.5

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. Changes can be made to the properties and saved by clicking either the **[Apply]** button or the **[Save]** button. **Apply** will save changes while keeping the window open. **Save** will save changes and close the window when done.
- The **[Sync]** button is used to re-request Andover for point information and refresh the database.
- The **[View Log]** button shows every change to the point: what change was made, when it occurred, and who made the change.
- The **[Graph]** button opens a trending window showing a graphical representation of the point's historical values.
- The **[Delete]** button removes the point from the system.
- The Point Reference links can be found at the bottom showing every place the point is used in the system.

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

Chapter 5 – Graphics

Adding Images to the webEMS System

<div align="right">

User Level: Administrator

</div>

From the **[Manage]** button on the Navigation bar, you can click on the **[Graphics]** button to go into the Graphics Management page. This shows every image that is currently available in your webEMS system. Here, 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 click the [Locate Image for Upload] button and upload the image from your computer. For quick page loading, the best file types to use are *PNG, JPG* and **GIF**. Images that exceed 250K in file size are highlighted with a message indicating that the image is too large. You should avoid large image files to prevent slow loads on pages. *(Figure 5.1)*
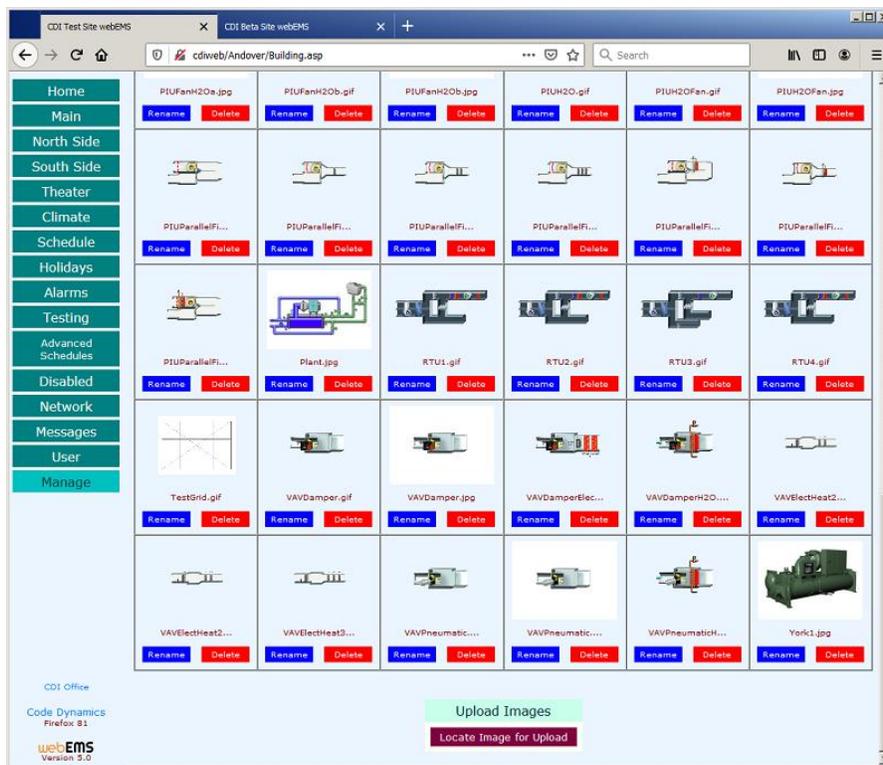
Figure 5.1

Adding an Image to a Page

To add an image to a page, go to the page you wish to add the image and click the ✹ icon in the lower right corner of the page. This takes you to the page's management tool. At the top, select an image from the drop-down box. To see what the selected image looks like, click the **[View Image]** button. Once the desired image is selected, click the **[Save Image]** button.

- o **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

After adding or changing a background image from the page's management tool, you can adjust the point objects over the new image. Click the **[Page Layout]** button to get to the page's layout tool. Initial positioning is accomplished by a click and drag method over the object references to the desired positions. Once all objects have been positioned, click the **[Save]** button. More accurate adjustments can be made from the page's management tool 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. *(Figure 5.2)*

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. 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 either the **[Apply]** or **[Save]** buttons. *(Figure 6.1)*
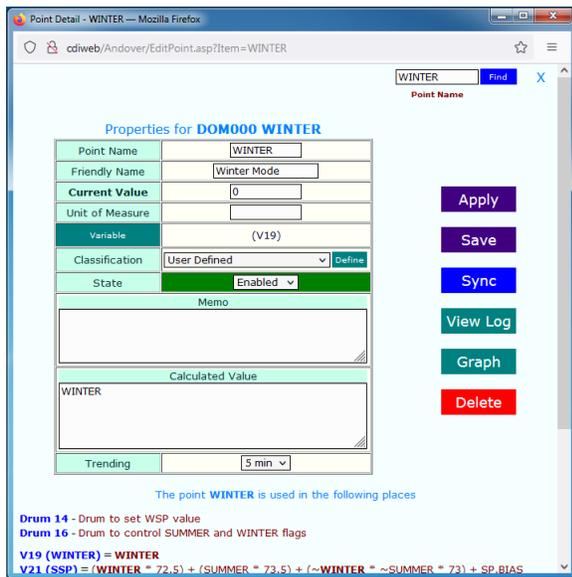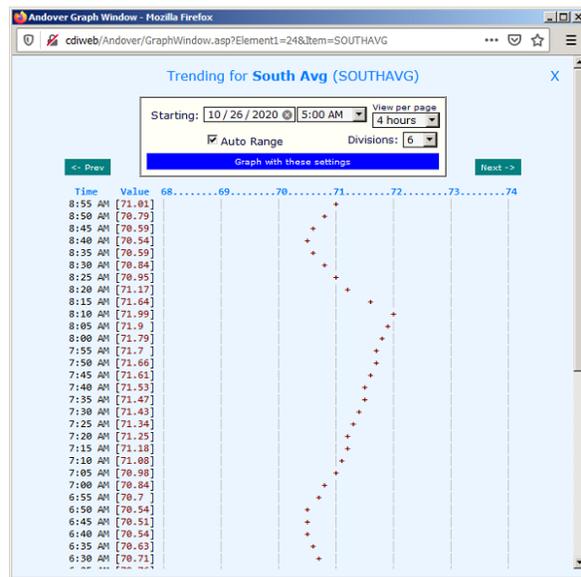
Figure 6.1	Figure 6.2

Trending Graphs

User Level: All

If a point's trending has been enabled, you can retrieve a trending graph from either the page where the point is displayed or by opening the point's Properties page if your user level allows. Trending graphs are accessed by clicking the **G** icon next to the point name on a graphical page or by clicking the **Graph** icon on a table page. *(Figure 6.2)*

History – (applies to AC256 systems)

User Level: Manager

History Pages, found by clicking the **[Manage]** button on the Navigation bar, 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-trended 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.

Chapter 7 –Network Management

Getting to the Network of Controllers

User Level: Manager

By clicking the **[Network]** button on the Navigation bar, you will be shown the entire network of devices for that particular master you are logged into. Icons will show up representing the type of device connected. If the icon shows itself greyed out or less opaque, it indicates the device is offline. A rectangular grey box labeled Unassigned IOU or Unassigned AC-Net indicates an available address for such a device can be used for future expansion. The AC565 Plus system with firmware v8.3 is capable of being configured for 16 IOUs and 127 AC-Nets however decreasing either the IOU count and/or AC-net count provides increased memory allocation and faster processing time within the master. *(Figure 7.1)*
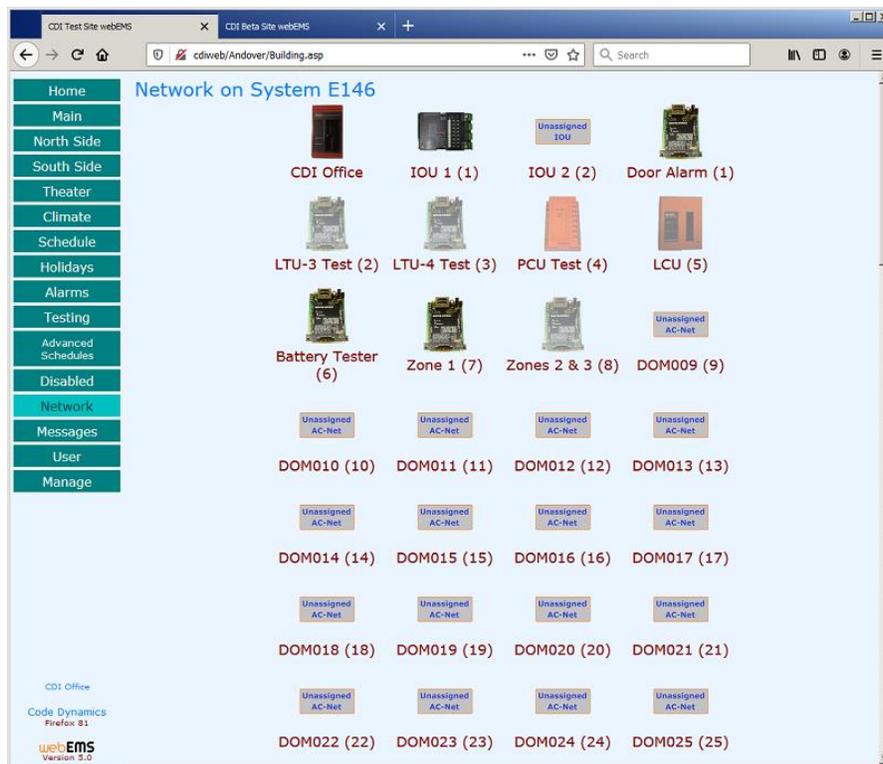
Figure 7.1

The Master controller will always show up as the top left icon on the Network. Clicking on the **Master** icon will provide you a method to manage the controller. You will be able to get to all objects and functions within the controller. All variables and programs can be accessed here. Additionally, this is where you either Backup or Reload the controller. *(Figure 7.2)*
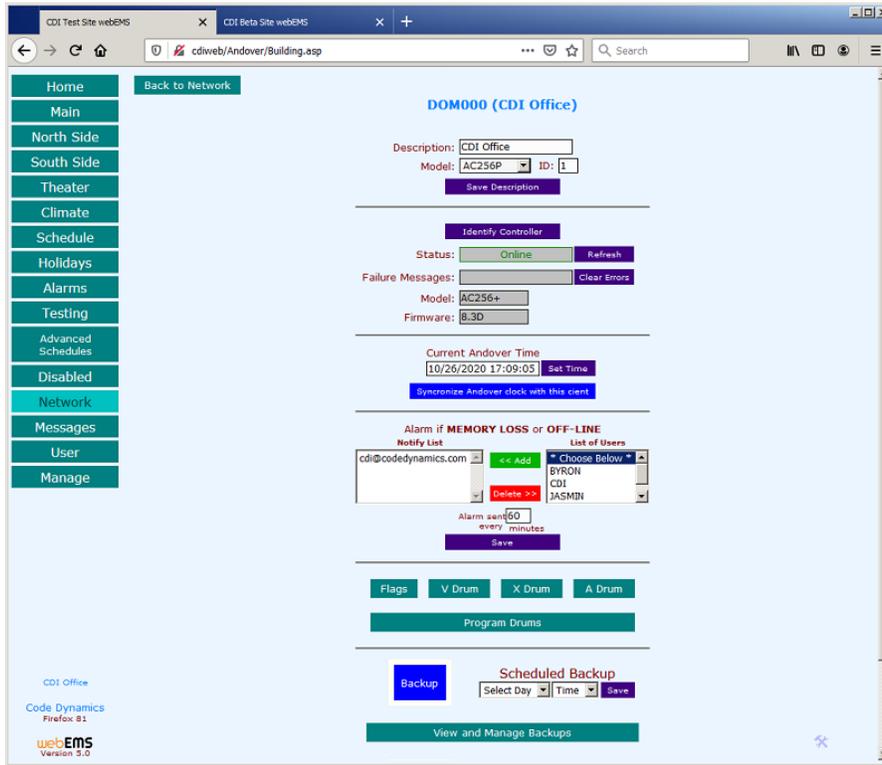
Figure 7.2

Clicking an **IOU** icon from the Network page will allow you to manage that IOU panel. All input and output assignments are made through this method.

Clicking an **AC-Net** icon will bring you into that device's management page. You can get to all variables and programs as well as being able to back up and reload the controller from here. *(Figure 7.3)*
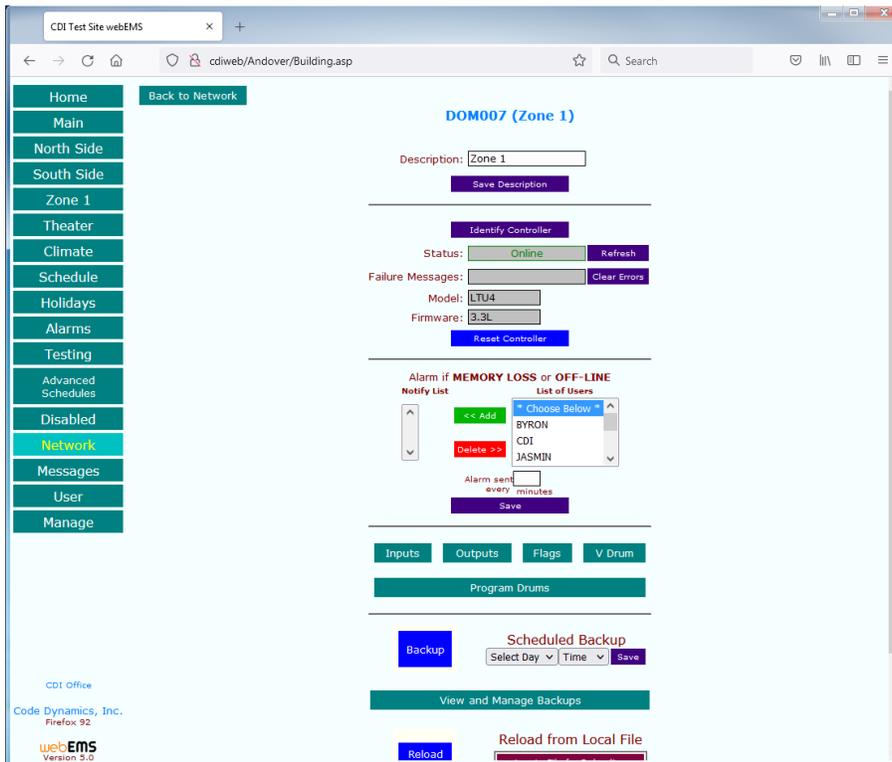
Figure 7.3

To perform a memory **Backup**, click on the desired **Controller** icon from the **Network** page. You can choose two ways to perform the task – click on the **[Backup Now]** button for an immediate backup or use the **Scheduled Backup** option to schedule the task to run automatically within 7 days out. *(Figure 7.4)*

To **Reload** the memory, click on the desired **Controller** icon from the **Network** page. You can choose two ways to perform the task – click on the **[Reload from DB]** button to pull the most recent backup from the server or you can click on the **[Upload File for Reloading]** button to select a backup file from your computer. *(Figure 7.4)*

Click on the **[View and Manage Backups]** button to manage and delete old backup files. The latest backup files are listed at the top of the list.
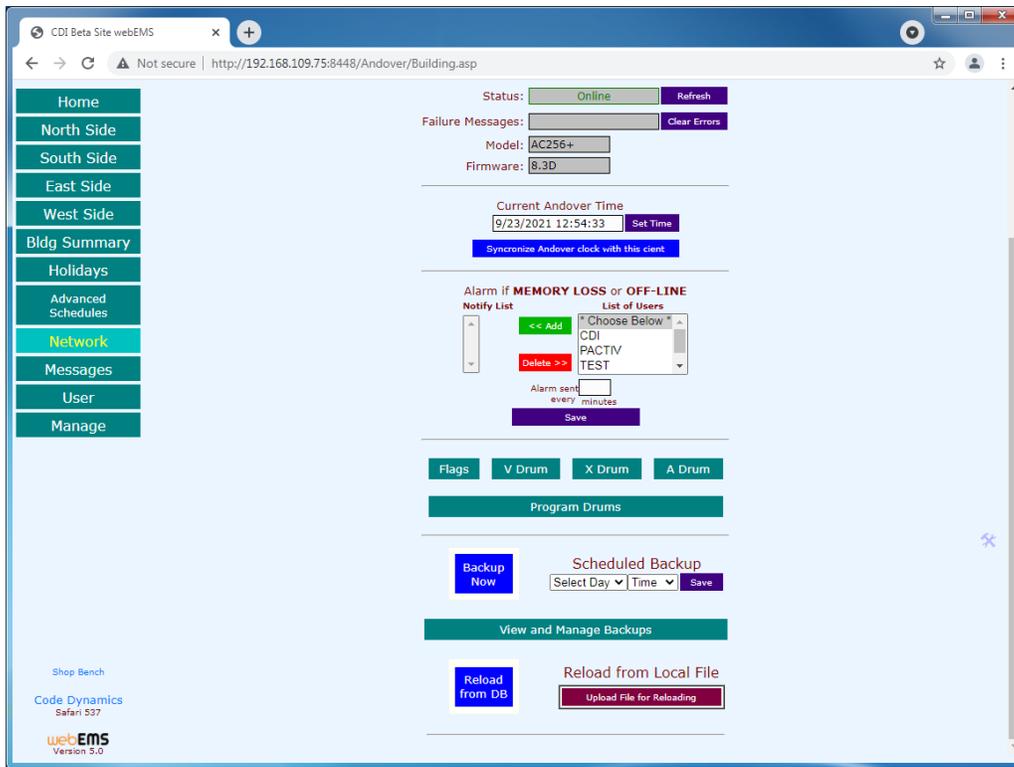
Figure 7.4

Chapter 8 – Programming

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).

webEMS 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

- o **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 15 because the first statement would always be TRUE even 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)**

webEMS Drum Programming (AC256 systems only)

To Create, Modify, Copy or Delete a program drum in the system, click the **[Program Drums]** button in controller's management page that can be found within the **Network**.
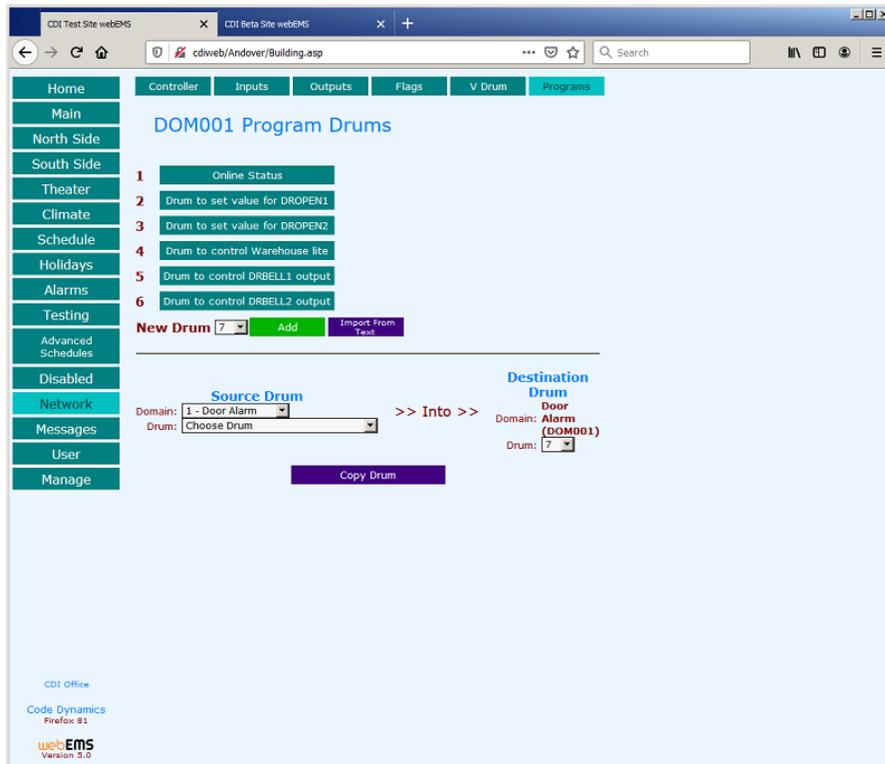

Figure 8.1

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 8.2*)

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 8.2*)

Once the programming is complete, you will need to start the drum by one of two methods. You may either click the appropriate <u>Rotate Drum to Line …</u> 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 8.2*)
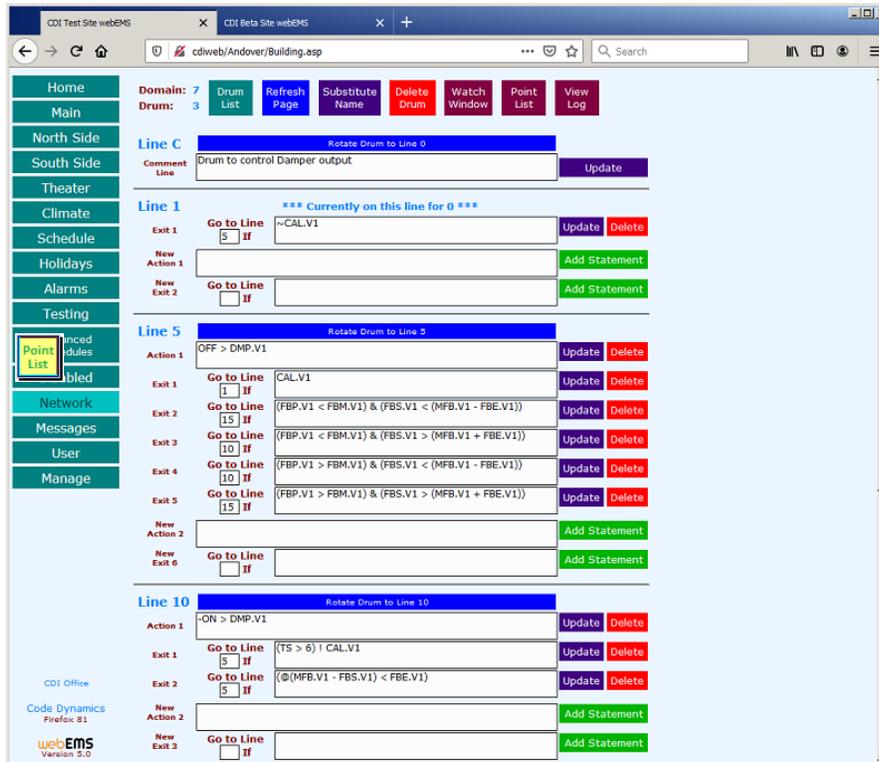

Figure 8.2

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 List]** button is used to reload the controller's drum list page.
The **[Refresh Page]** button is used to request the drum from Andover and reload the page.
The **[Substitute Name]** button is used to make point name substitutions within the drum.
The **[Delete Drum]** button is used to erase the entire drum from the Andover program.
The **[Watch Window]** button is used to see the drum's current line position and point values.
The **[Point List]** 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.

Chapter 9 – System Colors

User Lever: Administrator

From the **[Manage]** button in the Navigation bar, you can customize to look and feel of the system. Click on the **[Colors]** button to uniquely set the colors (Background, Text, Table, Button) for each master in the system. *(Figure 9.1)*
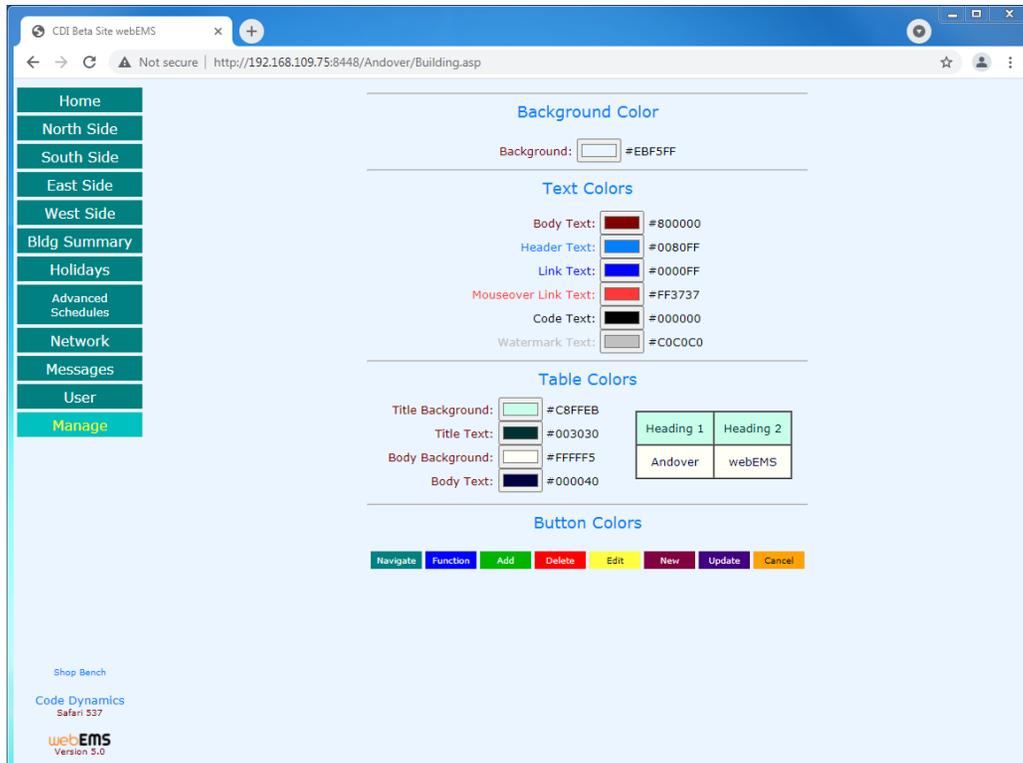
Figure 9.1

Appendix

R> Prompt

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 the **<Enter>** key. You can click the **[Send without <CR>]** button if you wish to send the text without the **ASCii (13)** carriage return character. You can also click the **[Send <CR> only]** button if you wish to send an **ASCii (13)** carriage return only without the text. The **delay 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 longer a need for **R>** prompt level commands with webEMS, but it is included as a way for the user to directly request information from the controller if desired.
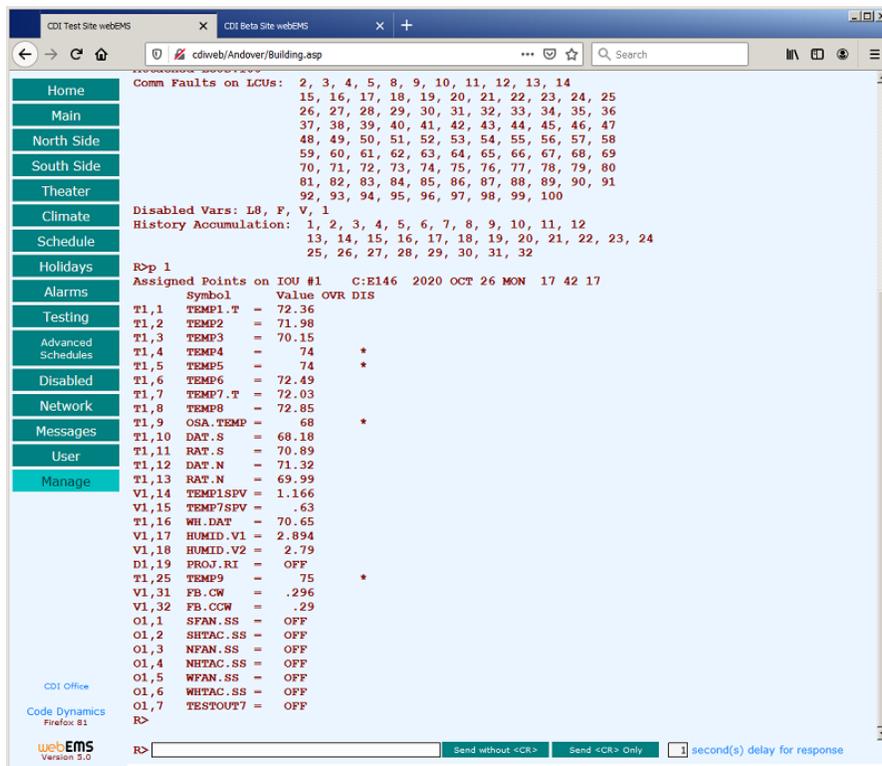
Figure A
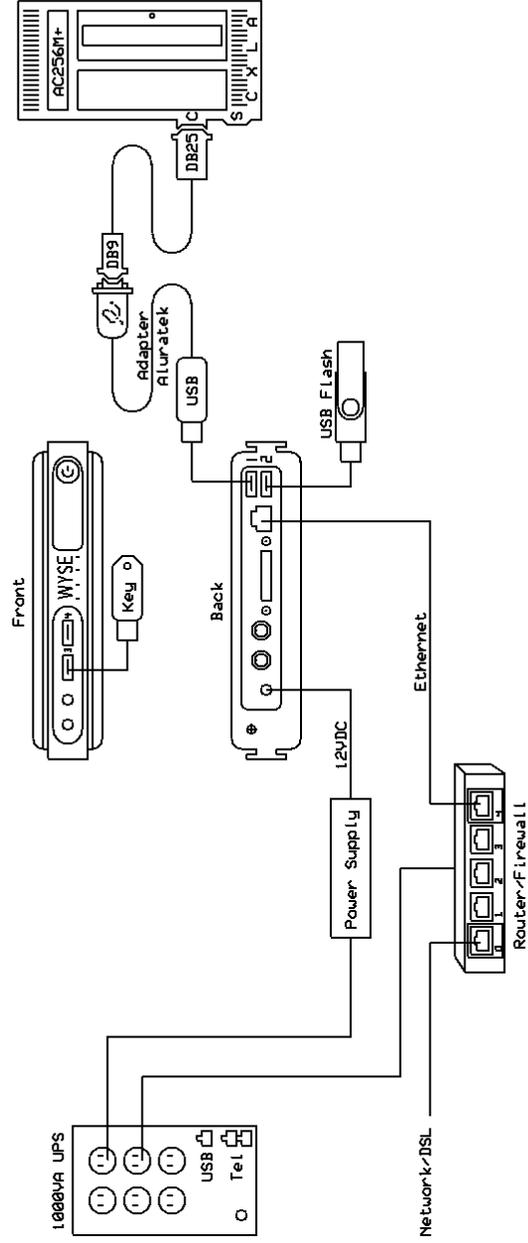
Andover Systems

webEMS Wiring Connections

Byron Curlee

Rev 1.0

01/27/2021

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AC256M+

S C X L A

DB25

DB9

Adapter
Aluratek

USB

USB Flash

Front

WYSE

Key

Back

Ethernet

12VDC

Power Supply

Router/Firewall

1000VA UPS

USB

Tel

Network/DSL

Smartphone

Laptop

Tablet

Desktop

World Wide Web

LAN/WAN/DSL

webEMS Server

Requests

webEMS Web Server

Results

Database

In

Out

Background Processes

Collects History Data
Sends Active Alarms
Runs Scheduled Backups

webEMS
Communications
Server

AC256M+

Infinity

Continuum

Andover Systems

webEMS System Pathways

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Technical Support

If you are having problems with webEMS, contact your webEMS representative or the following address for support:

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

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