



SiteController User's Guide

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1 Introduction

Bibaja's SiteController provides unparalleled remote control and monitoring for your irrigation and outdoor lighting. Our built-in web interface simplifies configuration.

This User's Guide describes basic installation and setup procedures. The introduction describes system requirements, and defines some terms we use to discuss the SiteController. The Installation chapter provides installation instructions for mounting the controller, wiring power and zones, and configuring your system. Finally we provide references for the web interface, LCD interface, and the hardware. These references offer screen shots and more in-depth information about the user interface and hardware.

We welcome your feedback to help us improve our product and our documentation. Please submit feedback online at:

<http://www.bibaja.com/xyzyy.php>

Software developers looking for information about developing extensions for the application may send requests via the link above.

1.1 System Requirements

There is no software to install on your computer. You only need a computer with a web browser. Your computer (PC or Mac) must have one of the following supported web browsers installed:

- Firefox
- Internet Explorer (Preferably IE7 or newer, although IE6 mostly works)
- Safari

If you encounter difficulties with any of the supported web browsers listed above, please let us know.

JavaScript must be enabled.

Opera has not been tested, but may work.

1.2 Definitions

This section provides definitions for some key terms we use when discussing the SiteController.

1.2.1 System

A **system** may consist of a master valve, water meter, and a group of zones. One and only one zone is allowed to run at a time. The master valve is used to shut off the water in case a zone valve fails or a pipe breaks within the irrigation system. The meter is required to support fault detection and alerts. To get the maximum benefit from your SiteController, Bibaja recommends both a master valve and an electronic water meter.

1.2.2 Zone

A **zone**, sometimes called a station, is a group of plants with similar water requirements. Water flow to the zone is controlled using a 24 volt irrigation valve. Water may be delivered to the zone using sprinklers, bubblers, drip, soaker hoses, or other water delivery system.

1.2.3 Cycle

A **cycle** is the duration of time water is delivered to a zone. During a cycle, the master valve and zone valve are activated to enable water to flow to the zone.

1.2.4 Cycle and Soak

Cycle and soak helps reduce water runoff and eliminate waste by splitting the irrigation cycle into smaller cycles. In between the small cycles, the controller guarantees a minimum soak time to allow water to be absorbed into the soil. For example: A zone scheduled to run a cycle of 30 minutes, with maximum cycle duration of 10 minutes, and minimum soak time of 20 minutes would run three 10 minute cycles with at least 20 minutes of soak time between each cycle for a total of 70 minutes. (70 minutes = 10 cycle + 20 soak + 10 cycle + 20 soak + 10 cycle).

2 Installation

2.1 Package Contents

Contents of your SiteController package:

- SiteController plus expansion cards selected when ordering (Part #ISC24-A)
- 120/208/240 volt AC to 24 volt AC, 50VA Transformer (Part #TR50VA009)
- Four (4) #6 truss head 1¼ inch long self tapping screws for wall mounting
- Two (2) rubber washers for bottom two wall mounting holes
- Four (4) #8 Phillips pan head ¼ inch long machine screws for mounting the transformer
- User's Guide

2.2 Selecting the Controller Location

When installing the SiteController outdoors, select a location on a vertical wall shaded from direct sunlight and water runoff from the roof. Avoid mounting the controller under water downspouts.

For convenience, choose a mounting height between shoulder and eye level for easy access to the LCD user interface for testing and maintenance.

Make certain both AC power and twisted pair Ethernet are available at the controller's mounting location.

2.3 Mounting to the Wall

After selecting the controller location, mount to the wall as follows:

1. Determine the location for the conduits for the Ethernet, valve wires, and AC power. **NOTE:** Power entry conduit should be located centered around the transformer input wires to simplify installation. Mark the conduit entry locations on the enclosure and cut the openings using a hole saw. Clean out all plastic debris after cutting the holes.
2. To access the top two mounting holes, remove the lid and the modesty cover of the SiteController. Open the lid all the way and lift up at the hinge to remove the lid. Unscrew the two thumbscrews and unplug the terminal blocks and any wires to remove the modesty cover.
3. Mark a level line on the wall for the two top mounting screws. Hold up the SiteController so the line is visible through the top mounting holes. Mark the two hole locations, set aside the SiteController, and drill the pilot holes for the top mounting screws. Install wall anchors if necessary. Install the screws leaving enough room between the screw heads and the wall to slide the keyholes in the enclosure over the screws.

4. Slide the enclosure's top two mounting keyholes over the screws and mark the locations for the bottom two holes. Remove the enclosure and drill pilot holes installing wall anchors if required. If installing outdoors, use the rubber washers provided with the #6 truss head screws in the bottom two mounting holes for a proper seal. Hang the enclosure over the top mounting screws and secure in place using the two bottom mounting screws. Tighten the top mounting screws. Replace the modesty cover and the terminal blocks, then reattach lid.

2.4 Connecting AC Power

The SiteController transformer accepts 120, 208, or 240 volt AC power. Follow local electrical code when wiring the SiteController transformer to AC power.

1. Determine which wires to use for the transformer. For 120 volts, use White/Black. For 208 volts, use Red/Black. For 240 volts, use Orange/Black. Cap or trim unused wires.
2. Make sure power is switched off at the breaker, and that no one can turn the power on until you are finished. Connect AC power using wire nuts or connectors meeting local electrical codes.
3. Loosen the conduit nut on low voltage side of the transformer (yellow wires), and slide the transformer into the mounting box. Use four #8-32 ¼ inch machine screws (supplied) to mount the transformer. Tighten the conduit nut to the plastic.
4. Insert yellow wires into the two position pluggable terminal block. Plug the terminal block into the connector labeled "24VAC- L N" on the SiteController.
5. Turn on the power at the breaker and confirm that the blue power LED is lit.

If you are required to ground the SiteController, connect the ground to one of the two built-in gray terminals labeled TW N (which stands for Two-Wire Neutral).

2.5 Connecting Valves, and Master Valve or Pump Relay

The SiteController may control 48 valves using the three expansion cards (16 valves per 16-zone expansion card). Valves are ordered 1 through 48 from left to right. Labels on the modesty cover guide you in making the connections. Use industry standard 24 volt AC valves with your SiteController.

Ten (10) commons are built-in to the SiteController for convenience (black connector in line with valve connections on the right side).

You may use any zone output to control a master valve or pump start relay. SiteController zone outputs are rated for driving 24 volts AC at 1 amp maximum current. Always use a relay with a 24 volt AC coil to control devices requiring higher voltage and amperage. You may also drive a 12 volt DC pump start relay using the built-in open collector (OC) output.

1. Always use appropriate gauge wire for the valve connections (18AWG solid wire will do for most installations).
2. Strip the common wire insulation ½ inch, and push the wire into the black connector labeled "COMMONS," located on the lower right of the SiteController.

3. Strip the zone valve wire insulation ½ inch, and push the wire into the gray connector on the 16-zone card. If you wish to test the zone valve wiring, make sure the common is connected, and touch the zone valve wire to the gray connector labeled TW N next to common connections. Two connections are provided for each zone on the 16-zone card. The second connection may be used for an irrigation remote control.

2.6 Connecting the 10/100 Ethernet Network

Ethernet premise wiring may be wired according to either T568A or T568B standards. Confirm which standard is used for your network wiring before proceeding if you plan to terminate an Ethernet cable for your SiteController.

RJ45 Pin	T568A	T568B	SiteController Function
1	Green/White	Orange/White	TX+
2	Green	Orange	TX-
3	Orange/White	Green/White	RX+
4	Blue	Blue	None
5	Blue/White	Blue/White	None
6	Orange	Green	RX-
7	Brown/White	Brown/White	None
8	Brown	Brown	None

1. Terminate the CAT5 or CAT6 cable with an RJ45 male connector following the appropriate wiring standard for your network. If wiring an RJ45 female socket, follow the appropriate wiring standard for your network when wiring the socket and use a short patch cable to connect the SiteController. **IMPORTANT:** If unfamiliar with Ethernet wiring, please refer installation to a qualified installer.
2. Connect the Ethernet cable to the SiteController and apply power. Make sure the far end of the cable is attached to a hub or switch.
3. Confirm the “LINK” LED is lit once SiteController starts. SiteController may take a minute or two to start.

2.7 Configuring the Network

Most networks will use the default “Automatic” setting (DHCP). To manually configure the network from the LCD interface:

1. Press the **Down Arrow** key to navigate to the Network menu and press the **OK** key.
2. Press **OK** to toggle from “Auto” to “Manual,” then press the **Down Arrow** key.
3. Press **OK** to change the IP address of the controller. Use **Up/Down Arrow** keys to change each number. Press **OK** to save each number. Pressing **OK** after the last number exits IP edit mode and returns the cursor to the start of the IP address. Press the **Down Arrow** key for next screen.
4. Adjust the netmask by pressing **OK** to edit, **Up/Down Arrow** keys to change, and **OK** to save the changes. Press the **Down Arrow** key to access the next screen.
5. Edit the IP address of the gateway using the same method described in step 3, then press the **Down Arrow** key to access the next screen.

6. Enter at least one Domain Name Server (DNS) IP address using the same method described in step 3. Press the **Down Arrow** key for more DNS entries (3 supported). Leave the value at 0.0.0.0 for unused entries. Press the **Down Arrow** key when finished with DNS entries until you see “HTTP Port.”
7. Modify the HTTP and HTTPS ports by pressing **OK** to edit, the **Up/Down Arrow** keys to change, and press **OK** to save the changes.
8. When you are finished changing network settings, press the **Back** key. Answer “Yes” to save changes and “Yes” to restart now. The SiteController will restart with the new network settings.

2.8 Connecting to the Web Interface and Registering Your SiteController

To connect to your SiteController’s web interface, you will need a PC or Mac computer and one of the following supported web browsers: Internet Explorer 7, FireFox 2 or newer, or Apple Safari. Opera may work, but it is untested.

If you configured a static IP address in section 2.9 “Configuring the Network”, or you used the LCD interface to get the IP address of the controller, enter that address manually in your web browser’s address bar. For example, if the IP address is “192.168.0.1”, then enter this in the address bar:

<http://192.168.0.1>

Replace “192.168.0.1” with the IP address of your controller.

If UPnP is enabled on your PC, Open “My Network Places.” The SiteController should show up as “Bibaja SiteController” under “Local Network.” Double-click on “Bibaja SiteController” to launch a web browser and connect to your SiteController.

On your Mac, open Safari or another supported web browser and enter:

<http://sitecontroller.local>

“sitecontroller.local” will also work on a Windows machine with Bonjour installed.

You will be presented with a warning about the security certificate. Choose “Continue to this website” on IE7. On FireFox, select OK when presented with the security error dialog. The SSL certificate used for encrypting your traffic is valid, but it does not match the name (in this case, the IP address) you are using to access your SiteController.

Enter the “User name:” and “Password:” to log on to your controller. The factory default user name and password are:

User name: admin

Password: admin

Once connected, you will be presented with the user registration screen. Enter your name, email address, phone number, and street address. You will also be prompted for the new “admin” user password. Choose a 6 character long password that you can remember.

NOTE: We strongly suggest that you complete registration. Skipping registration will leave the admin password as “admin,” which is insecure, leaving your SiteController vulnerable to unauthorized access or attack.

The **Skip Registration** button is provided only for accessing the network configuration menu of your SiteController.

Click **Register** to complete registration. You will receive an email to activate your account with bibaja.com. Click the link in the email to activate your account.

2.9 Creating a System and Zones

To create your system and add zones:

1. Click the **Zones & I/O** tab, and then click the **Irrigation** sub-tab if it isn't selected.
2. Click **Create New System**.
3. Type a name for your system into the box labeled **System Name:**.
4. Select the output used to control the master valve or pump start relay, if any.
5. Select the input for the water meter if a water meter is connected. Enter the scale factor for the meter. This scale factor specifies how many pulses are required for each unit of water. Some flow meters output 1 pulse per US gallon. Consult the manufacturer's specifications for your water meter to determine the scale factor.
6. For meter form, enter **form A** if your meter outputs 1 count for each pulse (where a pulse is defined as a contact closure and open), or enter **form C** if your meter outputs 2 counts for each pulse (contact closure equals 1 count, contact open equals another count). Most water meters are **form A**. Consult the specification for your meter.
7. For weather station, select an attached weather station for automatic weather based control of irrigation zones (This is not currently enabled, but will be added in a future release.)
8. Click "Save" in the upper right corner to save the System and continue to the **Add Zones** menu.
9. Select zone outputs by clicking the **Add** checkbox and entering the name. Then click **Next→**.
10. For each zone, configure the **Cycle & Soak** and **Flow Check** parameters. **Cycle & Soak** should be used to reduce water runoff for zones with sloped or clay soils that cannot readily absorb water. **Flow Check** should be used to monitor flow rate. Click **Flow Check Enable** and **Flow Auto Learn** to learn the flow rate for the zone.
11. Click **Finished** to save the zone settings.

2.10 Creating a Schedule

To create a schedule after creating a system and configuring the zones:

1. Click the **Schedules** tab and make certain the **Irrigation** sub-tab is selected.
2. Click **Create New Schedule**.
3. Enter a name for the schedule and select the irrigation system used for this schedule.
4. In the **Months** entry, define the range of days when the schedule is allowed to run starting **From** a particular month/day and continuing **To** a particular month/day. The default is to run the schedule from 1/1 (January 1st) to 12/31 (December 31st).
5. In **Days**, click the boxes to set checks for each weekday the schedule will run. Click on **Every Day** to select all days, or **Clear Days** to select no days.

6. **Time Window** defines the window of time when the schedule starts and will be stopped. Select whether the start time is absolute or relative to sunrise or sunset. Then enter the hour:minute for absolute (or hours:minutes before/after for sunrise/sunset relative.) Repeat for the stop time. The stop time is when the schedule will be forced to stop if it has not finished. If you want to give the schedule 24 hours to run, enter the start time minus 1 minute. For example: Start=12:00am, Stop=11:59pm will give a schedule all day to complete. Click **Next→**.
7. Select the zones to add and enter the duration for the irrigation cycle in minutes. Make certain **Add** and **Enabled** are both checked (they will be automatically checked when you edit the **Duration** field.) Click **Next→**.
8. Review the new schedule and the zones. Click **Finished** to save the schedule.

3 Web User Interface Reference

This reference provides an overview of the menus and functions available in the web user interface. Use this section to learn more about the functions available in the user interface including configuration options not covered in Chapter 2. Screenshots and details about the user interface may help clarify text instructions from Chapter 2.

3.1 Logging In



Login

User name:

Password: ([Forgot password?](#))

Sunrise: 5:47AM Saturday, 6/14/2008 1:42 AM Sunset: 8:29PM

Figure 1: Login Screen

To log in, enter your user name in the **User name** field, enter your password in the **Password** field, and click the **Login** button. If you are logging in for the first time, enter **admin** as the initial user name, and use **admin** for the password.

If you forgot your password, click the **[Forgot password?](#)** link. Enter your registered email address in the **Forgotten Password** box and click **Reset Password**. Your password will be set to your <http://my.bibaja.com> password. The controller must be able to connect to the internet and Bibaja.com to retrieve your password. The password is not stored as plaintext and is not sent to the controller in plaintext for your protection.

Upon logging in, you will see the **Status → Irrigation** sub-tab. Each tab displays a number of sub-tabs as seen below.

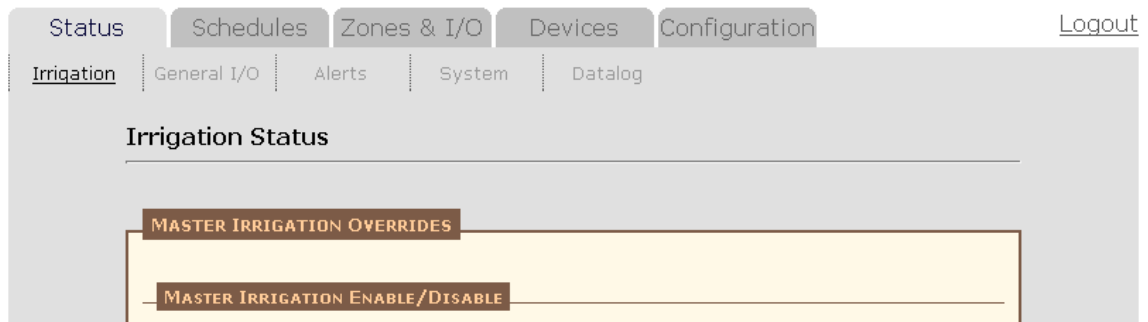


Figure 2: Initial Status – Irrigation Screen

3.2 Status Tab

The **Status** tab displays five sub-tabs:

- **Irrigation**
- **General I/O**
- **Alerts**
- **System**
- **Datalog**

By default, the **Status → Irrigation** sub-tab is displayed.

3.2.1 Status - Irrigation

The **Status → Irrigation** sub-tab displays Master Irrigation Overrides, Active Zones, Upcoming Irrigation Activity, and 7 Day Irrigation History.

Irrigation Status

MASTER IRRIGATION OVERRIDES

MASTER IRRIGATION ENABLE/DISABLE
Irrigation is enabled. ([Change This](#))

IRRIGATION DELAY
No irrigation delay. ([Change This](#))

ACTIVE ZONES:
Rows highlighted green are running.

SYSTEM	ZONE	DURATION	STATUS	STOP
--------	------	----------	--------	------

[Stop All Zones](#) [Stop Selected Zones](#) [Select All](#) [Select None](#)

UPCOMING IRRIGATION ACTIVITY

SCHEDULE NAME	TIME	ACTION
---------------	------	--------

7 DAY IRRIGATION HISTORY

TIME	DESCRIPTION	DATA
Friday, 2008/6/13 14:42:32	Zone Flow Rate, Pond Fill Valve	13.449427 Gallons per minute
Friday, 2008/6/13 14:42:32	Zone Water Use, Pond Fill Valve	43.48648 Gallons

Figure 3: Irrigation Status Screen

3.2.1.1 Master Irrigation Overrides

This area displays whether irrigation system is enabled or disabled, and whether an irrigation delay has been set. To change the current status, click **Change This** next to the override you want to change. The **Configuration → Irrigation** sub-tab will appear where you can change the settings.

3.2.1.2 Master Irrigation Enable/Disable

This shows whether the irrigation schedules are enabled or disabled. When irrigation is disabled, no automatic irrigation will occur. This setting, unlike the irrigation delay, will remain set until re-enabled. To delay irrigation for a few days (such as a rain delay or for a special event or party), set the **Irrigation Delay** instead. This setting only affects automatic irrigation schedules. One-time schedules are not affected by the master irrigation disable.

3.2.1.3 Irrigation Delay

This shows whether there is an irrigation delay set. Irrigation delay is used to delay all irrigation until some date/time in the future. This is useful to skip irrigation for construction, landscape maintenance, or parties and special events. Irrigation will resume at the specified date and time. This setting affects all automatic irrigation schedules. One-time schedules are not affected by the irrigation delay. To disable specific zones, use the **Enable** check box in the schedule.

3.2.1.4 Active Zones

This shows active and pending irrigation cycles for Zones in table format.

You can select zones from the list and click the **Stop Selected Zones** button to stop those zones, or you can stop all zones by clicking the **Stop All Zones** button. It will take several seconds for the zones to disappear from the Active Zones table. Click the **Irrigation** sub-tab to refresh the display after a few seconds to confirm all zones have stopped.

3.2.1.5 Upcoming Irrigation Activity

This shows upcoming scheduled irrigation activity.

3.2.1.6 7 Day Irrigation History

This shows irrigation activity from the last seven days. Activity includes cycle run duration in minutes, water usage, and flow rate if a water meter is installed.

3.2.2 Status – General I/O

The **Status → General I/O** sub-tab displays upcoming scheduled general I/O activities.

To make changes, navigate to **Schedules → General I/O**.

General I/O Status		
UPCOMING SCHEDULED ACTIVITY		
SCHEDULE NAME	TIME	ACTION
Pond Pump	7:47	start
Pond Pump	18:29	stop

Figure 4: General I/O Status

3.2.2.1 Schedule Name

Schedule Name indicates the name of the general I/O schedule.

3.2.2.2 Time

Time designates the time in 24 hour format when the scheduled action will occur.

3.2.2.3 Action

Action indicates the action to be taken (either start or stop) when the time arrives.

3.2.3 Status - Alerts

The **Status → Alerts** sub-tab displays recent alerts including when the alert occurred, alert status, and the alert description.

Alert Status		
ALERT HISTORY		
TIME	STATUS	DESCRIPTION
Sunday, 2008/6/1 12:35:51	SENT	System Bibaja Headquarters, Zone Pond Fill Valve, Zone valve stuck open. Repair may be required.
Friday, 2008/5/30 2:00:08	SENT	System Bibaja Headquarters, Zone Garden North, Low flow detected.
Thursday, 2008/5/29 22:01:58	SENT	System Bibaja Headquarters, Zone Front Yard, High flow detected. Repair may be required.
Thursday, 2008/5/29 21:30:21	SENT	System Bibaja Headquarters, Zone Front Yard, High flow detected. Repair may be required.

Figure 5: Alert Status

3.2.3.1 Time

The day, date, and time the alert occurred. The most recent alerts are show first.

3.2.3.2 Status

Indicates whether the alert is **NEW** or **SENT**.

NEW means the alert was logged but there was an error communicating with the alert server at bibaja.com. The email for the alert may have been sent successfully. Occasionally high load on the server will cause an alert to be logged as **NEW** even though the alert was successfully forwarded to your email.

SENT indicates the email alert was sent successfully.

3.2.3.3 Description

This is the description of the alert. This is the same information sent via email to registered users. The description should provide enough information to help you track down and repair the problem that triggered the alert condition.

In the screenshot above, on Thursday, 2008/5/29 at 22:01:58, zone “Front Yard” in system “Bibaja Headquarters” detected high flow. This indicates something may be broken in the zone such as a missing sprinkler or a broken irrigation pipe. Inspect zones carefully to locate the problem. If no problem is found, then make adjustments to the zone settings in **Zones & I/O → Irrigation**.

3.2.4 Status - System

The **Status → System** sub-tab displays the current system status, including serial number, Linux version, total and free memory numbers, and the length of time the SiteController has been running continuously (Uptime). This sub-tab also displays recent system log messages.

The screenshot shows a web interface titled "System Status". It contains several sections: "SYSTEM" with sub-sections for "SITECONTROLLER SERIAL NUMBER" (3900003b05ff5c01), "LINUX VERSION" (Linux version 2.6.17.14bbj (ms@colinux) (gcc version 4.1.1) #2 Fri Jan 19 02:00:55 PST 2007), "MEMORY" (Total Memory: 63016 kB, Free Memory: 48452 kB), and "UPTIME" (1 days, 2 hours, 41 minutes). Below these is a "SYSTEM MESSAGE LOG" section displaying a list of log entries. Each entry follows the format: "Feb 17 23:19:29 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb ...". The log entries are repeated for several seconds. The interface has a light yellow background with brown borders and a scroll bar on the right side of the log section.

System Status

SYSTEM

SITECONTROLLER SERIAL NUMBER

Serial Number: 3900003b05ff5c01

LINUX VERSION

Linux version 2.6.17.14bbj (ms@colinux) (gcc version 4.1.1) #2 Fri Jan 19 02:00:55 PST 2007

MEMORY

Total Memory: 63016 kB

Free Memory: 48452 kB

UPTIME

1 days, 2 hours, 41 minutes

SYSTEM MESSAGE LOG

```
Feb 17 23:19:29 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:19:39 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:19:49 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:19:59 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:20:09 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:20:19 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:20:29 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:20:39 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:20:49 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:20:59 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
Feb 17 23:21:09 bibaja daemon.info lighttpd[627]: 192.168.0.1 - - [17/Feb
```

Figure 6: System Status

3.2.4.1 SiteController Serial Number

This is the serial number of the SiteController hardware.

3.2.4.2 Linux Version

The SiteController is running the Linux operating system. This field lists the operating system version.

3.2.4.3 Memory

The total system memory and the amount of free memory listed in kilobytes (kB).

3.2.4.4 Uptime

The length of time the SiteController has been continuously running, listed in days, hours, and minutes.

3.2.4.5 System Message Log

This field displays all the system log messages for the system. The system log has a maximum size, and is rotated after 200kB. Bibaja technical support may ask for a copy of this log if you call to report a problem with your SiteController. Capture a copy of this log if you think there's a problem with your controller and include it with your problem report to support at bibaja.com.

3.2.5 Status - Datalog

The **Status → Datalog** sub-tab allows you to download a selected group of data points as a comma separated value (CSV) text file. You may use this file in programs like Microsoft Excel or Open Office to generate charts and reports showing water use in your landscape.

Datalog Status

DOWNLOAD DATALOG

Select data points and date/time range to download from the datalog as a comma separated value (CSV) file. CSV files are convenient for charting information from the datalog in Microsoft Excel or similar programs.

Data points are bits of information recorded in the datalog including irrigation zone run duration, water use, and more.

SELECT DATA POINTS

POINT ID	POINT NAME	I/O NAME	UNITS	SELECT
1	Zone Run Duration	Front Yard	minutes	<input type="checkbox"/>
2	Zone Run Duration	Orchard	minutes	<input type="checkbox"/>
3	Zone Run Duration	Garden North	minutes	<input type="checkbox"/>
4	Zone Water Use	Front Yard	Gallons	<input type="checkbox"/>
5	Zone Run Duration	Garden South	minutes	<input type="checkbox"/>
6	Zone Water Use	Orchard	Gallons	<input type="checkbox"/>
7	Zone Water Use	Garden North	Gallons	<input type="checkbox"/>
8	Zone Run Duration	Pond Relay	minutes	<input type="checkbox"/>
12	Zone Run Duration	Pond Fill Valve	minutes	<input type="checkbox"/>
13	Zone Water Use	Pond Fill Valve	Gallons	<input type="checkbox"/>
14	Zone Flow Rate	Front Yard	Gallons per minute	<input type="checkbox"/>
15	Zone Flow Rate	Orchard	Gallons per minute	<input type="checkbox"/>
16	Zone Flow Rate	Garden North	Gallons per minute	<input type="checkbox"/>
17	Zone Flow Rate	Pond Fill Valve	Gallons per minute	<input type="checkbox"/>
				<input type="button" value="Set All"/> <input type="button" value="Clear All"/>

Figure 7: Datalog Status

3.2.5.1 Select Data Points

Select the data points to download by click on the check box next to the point. Use the **Set All** and **Clear All** buttons to quickly set or clear all check boxes.

3.2.5.2 Start Date/Time

Set the starting date/time for the datalog CSV download. Data points with a timestamp greater than or equal to the start date/time will be included in the downloaded CSV.

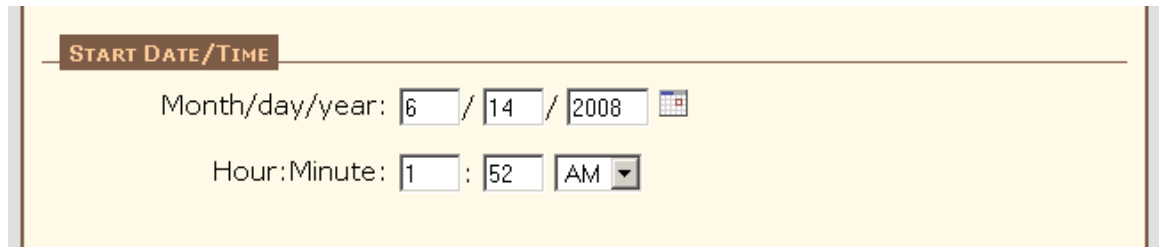
The screenshot shows a web interface for selecting a start date and time. At the top, there is a tab labeled "START DATE/TIME". Below the tab, the date is set to "Month/day/year: 6 / 14 / 2008" with a calendar icon to the right. The time is set to "Hour:Minute: 1 : 52" with a dropdown menu showing "AM".

Figure 8: Select Datalog Download Start Date/Time

3.2.5.3 End Date/Time

Set the ending date/time for the datalog CSV download. Data points with a timestamp less than or equal to the end date/time will be included in the downloaded CSV file.

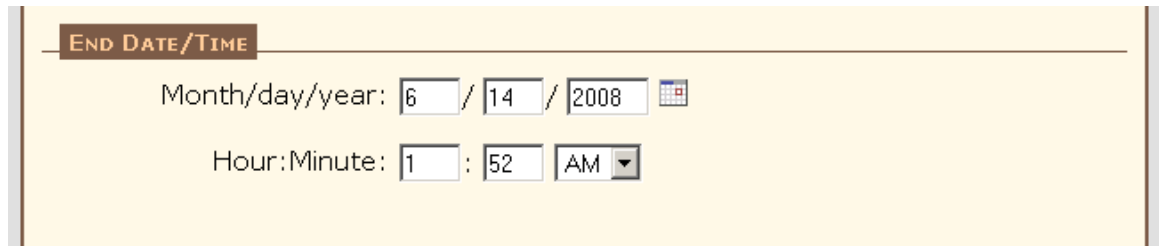
The screenshot shows a web interface for selecting an end date and time. At the top, there is a tab labeled "END DATE/TIME". Below the tab, the date is set to "Month/day/year: 6 / 14 / 2008" with a calendar icon to the right. The time is set to "Hour:Minute: 1 : 52" with a dropdown menu showing "AM".

Figure 9: Select Datalog Download End Date/Time

3.2.5.4 Create and Download Datalog File

After selecting data points, specifying the start/end time range, click **Create and Download Datalog File** to generate the CSV file and download a copy to your computer. You may open the CSV file using Microsoft Excel or Open Office and generate charts to show water use and create reports.

The timestamp field is in seconds since January 1, 1970 12:00am GMT. To convert this timestamp to date/time in Microsoft Excel format, use the following equation:

$$=(\text{timestamp}+\text{offset})/(1440*60)+25569$$

Offset is seconds from GMT. For example, if you are in the Pacific time zone, the offset is $-8 \text{ hours} * 60 \text{ minutes/hour} * 60 \text{ seconds/minute} = -28800$. Right click on the cell and click **Format cells...**, and then select date, time, or custom from the category list to format the timestamp for your report.

3.3 Schedules Tab

The **Schedules** tab displays two sub-tabs:

- **Irrigation**
- **General I/O**



By default, the **Schedules** → **Irrigation** sub-tab is displayed.

3.3.1 Schedules - Irrigation

The **Schedules → Irrigation** sub-tab allows the user to create one time schedules to test zones or add more water, view details of established irrigation schedules, and to create new irrigation schedules.

Irrigation Schedules

Create One-Time Schedule

Schedule Summary:

NAME	START	STOP	SU	MO	TU	WE	TH	FR	SA
Weekly Irrigation	1:00AM	12:59AM		✓		✓		✓	

Jump To

Weekly Irrigation

Create New Schedule

SCHEDULE NAME: WEEKLY IRRIGATION

Months:

From: 1/1 To: 12/31

Days:

Sun ☐ Mon ☒ Tue ☐ Wed ☒ Thu ☐ Fri ☒ Sat ☐

Time Window:

Start at: 1:00 AM End By: 12:59 AM

Zones

ZONE	NAME	DURATION	ENABLED	DELETE
Zone 49	Front Yard	28 minutes	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Zone 52	Garden North	20 minutes	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Zone 50	Orchard	20 minutes	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Edit Schedule

Add Zones

Delete Selected Zones

Delete Schedule

Figure 10: Schedules - Irrigation Sub-tab

3.3.1.1 Create One-Time Schedule

Click **Create One-Time Schedule** to create a schedule that will run once. One-time schedules are useful for testing zones, adding extra water on hot days, or manually filling a swimming pool, fountain, or pond.

CREATE ONE-TIME SCHEDULE

Create a one-time schedule to test zones, top off a pond or pool, or add a little extra water when things get too dry. One-time schedules start as soon as they are saved and run only once.

Enter run duration in minutes for each zone below, then drag zones to set run order.

DURATION (MINUTES)	ZONE	SYSTEM
<input type="text" value="0"/>	Front Yard	Bibaja Headquarters
<input type="text" value="0"/>	Orchard	Bibaja Headquarters
<input type="text" value="0"/>	Garden North	Bibaja Headquarters
<input type="text" value="0"/>	Garden South	Bibaja Headquarters
<input type="text" value="0"/>	Pond Fill Valve	Bibaja Headquarters
<input type="text" value="0"/>	Zone 54	Bibaja Headquarters

Start One-Time Schedule

Enter the duration of time in minutes to run each zone. Drag and drop zones in the list to set the order zones will run. Finally, click **Start One-Time Schedule** to start the irrigation cycles.

3.3.1.2 Schedule Summary

The Schedule Summary table provides an overview of all scheduled irrigation activity. Each row displays the schedule name, start and stop time, and the days the schedule runs.

Schedule Summary:

NAME	START	STOP	Su	Mo	Tu	We	Th	Fr	Sa
Weekly Irrigation	1:00AM	12:59AM		✓		✓		✓	

This example shows the schedule named **Weekly Irrigation** will start at 1:00AM and is allowed to run until 12:59AM (about 24 hours.) The round check marks indicate the schedule runs on Monday, Wednesday, and Friday mornings.

Click on the **Name** of the schedule to jump to the detailed schedule information.

3.3.1.3 Jump To Button

Click the pull-down menu to locate the schedule you wish to review, then click on the name. If necessary, click the **Jump To** button to jump to the detailed schedule information. The SiteController allows you to create many schedules. The schedule summary table and the jump-to features allow you to quickly navigate long lists of schedules. The **Jump To** button is repeated above every schedule entry for quick access.

3.3.1.4 Create New Schedule Button

Creating a new irrigation schedule is a three part process.

To create a new irrigation schedule:

1. Click the **Create New Schedule** button and the following screen will be displayed:

Create New Schedule - Step 1 of 3


1 2 3 Cancel Next →


CREATE NEW SCHEDULE

Schedule name:

Irrigation System:

MONTHS

From (month/day): / 

To (month/day): / 

DAYS

Sun ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐ Sat ☐

TIME WINDOW


Start Time is:

Start at (hh:mm): :

Stop Time is:

End By (hh:mm): :

2. Enter a name of the schedule in the **Schedule name** field.
3. Select the **Irrigation System** to use for this schedule.

4. Select the range of months/days from the **Months** area. You may define different schedules to run at different times during the year to achieve a coarse level of water savings based on past needs. Click the  calendar icon to open a calendar to quickly select month/day.
5. From the **Days** area, select the days of the week for this schedule to run. Follow local watering restrictions when choosing the days of the week. If drip irrigation is allowed to run at any time, make sure to create a separate schedule for the drip zones.
6. From the **Time Window** area, select whether the start and stop time are absolute, or relative to the sunrise and sunset. Based on your selection, choose the start and stop time, either by setting the specific time of day, or the relative amount of time before or after the sunrise and sunset. Again refer to local watering restrictions when configuring the time window. Make certain to allocate enough time for scheduled irrigation to complete. If the time window is too short, irrigation will be terminated leaving you with under-watered or dry zones. Confirm irrigation cycles are completing properly by monitoring the 7 day irrigation history on the **Status → Irrigation** page.
7. Click **NEXT→** to proceed to the second step. The following zone selection page will appear:

Create New Schedule - Step 2 of 3

← Prev
1 2 3
Cancel Next →

ADD ZONES TO SCHEDULE SCHEDULE 5

ADD	ZONE	NAME	DURATION	ENABLED
<input checked="" type="checkbox"/>	Zone 50	Orchard	25	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Zone 51	Garden South	0	<input type="checkbox"/>
<input type="checkbox"/>	Zone 52	Garden North	0	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Zone 49	Front Yard	40	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Zone 53	Pond Fill Valve	0	<input type="checkbox"/>
<input type="checkbox"/>	Zone 54	Zone 54	0	<input type="checkbox"/>
<input type="button" value="Select all"/>				<input type="button" value="Select all"/>
<input type="button" value="Clear all"/>				<input type="button" value="Clear all"/>

8. Select the zones from the system that are involved in this schedule and edit the run duration. Make sure that all new zones you add have both **Add** and **Enabled** checked, and that you specify the number of minutes you want each zone to run (duration).

NOTE: You can add a zone but disable it from running by clicking the **Enabled** box to clear the check mark. This is useful when a zone is unfinished but should be included in this schedule when the system is completed.
9. Click **NEXT→** to proceed to the third step:

Create New Schedule - Step 3 of 3

← Prev

1

2

3

Cancel

Finished

REVIEW SCHEDULE SCHEDULE 5

Review schedule, use steps above to go back and make changes. Select "Finished" to add schedule.

MONTHS

From (mm/dd): 3 / 1

To (mm/dd): 10 / 31

DAYS

Sun

Mon

Tue

Wed

Thu

Fri

Sat

TIME WINDOW

Start at (hh:mm): 1 : 00 AM

End By (hh:mm): 1 : 00 After Sunrise

ZONES ADDED TO SCHEDULE

ZONE	NAME	DURATION	ENABLED
Zone 50	Orchard	25	<input checked="" type="checkbox"/>
Zone 49	Front Yard	40	<input checked="" type="checkbox"/>

- Review your new schedule. If your schedule is correct, click **Finished**. To make changes, click on the numbered steps **1** or **2** to go back and adjust your schedule, or click **Prev** to return to the previous page. Once you click **Finished**, the scheduler reloads and determines what schedules are active. Schedules are only triggered when the clock passes through the **Start at** time. So if you added the schedule above at 1:02AM on Monday morning, it will not start since 1:00AM has already passed.

3.3.1.5 Editing a Schedule

You may edit the schedule and zone cycle durations, add zones, or delete zones from the schedule detail view:

SCHEDULE NAME: WEEKLY IRRIGATION

Months:
From: 1/1 To: 12/31

Days:
Sun ☐ Mon ☒ Tue ☐ Wed ☒ Thu ☐ Fri ☒ Sat ☐

Time Window:
Start at: 1:00 AM End By: 12:59 AM

Zones

ZONE	NAME	DURATION	ENABLED	DELETE
Zone 49	Front Yard	28 minutes	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Zone 52	Garden North	20 minutes	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Zone 50	Orchard	20 minutes	<input checked="" type="checkbox"/>	<input type="checkbox"/>

To edit the schedule, click **Edit Schedule**. A page will appear allowing you to edit the months, days, time window, and zone run durations and zone enables. Click **Enabled** to clear the checkbox to disable zones that need repair or are currently undergoing maintenance. This is a convenient way to disable zones without permanently removing them from a schedule.

To add new zones to an existing schedule, click **Add Zones**. Available zones from the current irrigation system will be displayed. Enter the run duration for the newly added zones and make certain the **Add** and **Enabled** boxes are checked.

To delete zones from the schedule, click the **Delete** check boxes next to zones you wish to delete then click **Delete Selected Zones**. Click **OK** on the dialog box to confirm you wish to delete the zones, or click **Cancel** to keep the zones.

To delete the schedule entirely, click **Delete Schedule**. Click **OK** on the dialog box to confirm that you wish to delete the schedule, or click **Cancel** to keep the schedule.

3.3.2 Schedules - General I/O

The **Schedules → General I/O** sub-tab allows the user to view details of general I/O schedules, and to create new general I/O schedules. General I/O schedules are used for lighting and ornamental feature controls. In the example below, the recirculating pump of a pond turns on every day 2 hours after sunrise, and then turns off 2 hours before sunset. Scheduling ornamental features and lighting to run only when required can help reduce energy costs.

NAME	START	STOP	Su	Mo	Tu	We	Th	Fr	Sa
Pond Pump	Sunrise +2:00	Sunset -2:00	✓	✓	✓	✓	✓	✓	✓

Jump To: Pond Pump Create New Schedule

SCHEDULE NAME: POND PUMP

Months:

Figure 11: Schedules – General I/O Sub-tab

3.3.2.1 Schedule Summary

The schedule summary lists the general I/O schedules, with start and stop time, and the days the schedule runs. Circular gray check marks indicate the days of the week the schedule will run.

Clicking on the name of the schedule takes you to the schedule details where you can make changes to the schedule.

3.3.2.2 Jump To Button

The **Jump To** button allows you to jump to the selected general I/O schedule details. When the list of general I/O schedules becomes very long, the schedule summary and jump-to features make managing the long list of schedules simpler by providing shortcuts for finding the schedule you are interested in editing.

3.3.2.3 Create New Schedule Button

Creating a new general I/O schedule is almost identical to creating an irrigation schedule. The **Months**, **Days**, and **Time Window** parameters are identical. Refer to section 3.3.1.4 steps 1 through 6 for how to configure these schedule parameters.

After entering the name, months, days, and time window, click **Next→**. You will be presented with a dialog similar to this:

Create New Schedule - Step 2 of 3

< Prev
1 2 3
Cancel
Next >

ADD SCENES AND I/O

SELECT SCENES

ADD	SCENE NAME
<input type="checkbox"/>	All Off
<input type="checkbox"/>	All On

SELECT I/O

ADD	I/O NAME	STATE
<input type="checkbox"/>	Open Collector Output	On ▾
<input type="checkbox"/>	0-20ma Output	<input type="text"/>
<input type="checkbox"/>	Zone 55	On ▾
<input type="checkbox"/>	Zone 56	On ▾
<input type="checkbox"/>	Pond Relay	On ▾
<input type="checkbox"/>	Zone 58	On ▾
<input type="checkbox"/>	Zone 59	On ▾
<input type="checkbox"/>	Zone 60	On ▾

Select the scenes and I/O to be turned on by this schedule when it starts. Scenes are defined in the **Zones & I/O → Scenes** sub-tab. Click the **Add** box to make the check appear for each I/O or scene you are adding.

For the I/O outputs, you may also modify the state that is set when the schedule starts. By default, the state is **On** for digital outputs such as zones or relay outputs. For analog outputs, such as the 0-20ma output, you must set a value in the range 0.5 to 20.0ma.

When the schedule stops, all scenes and I/O will be turned off.

When finished adding scenes and I/O to your new schedule, click **Next→** and review the schedule.

Finally click **Finished** if you are satisfied with the schedule. You may navigate back through previous steps to make changes.

3.4 Zones & I/O

The **Zones & I/O** tab displays three sub-tabs:

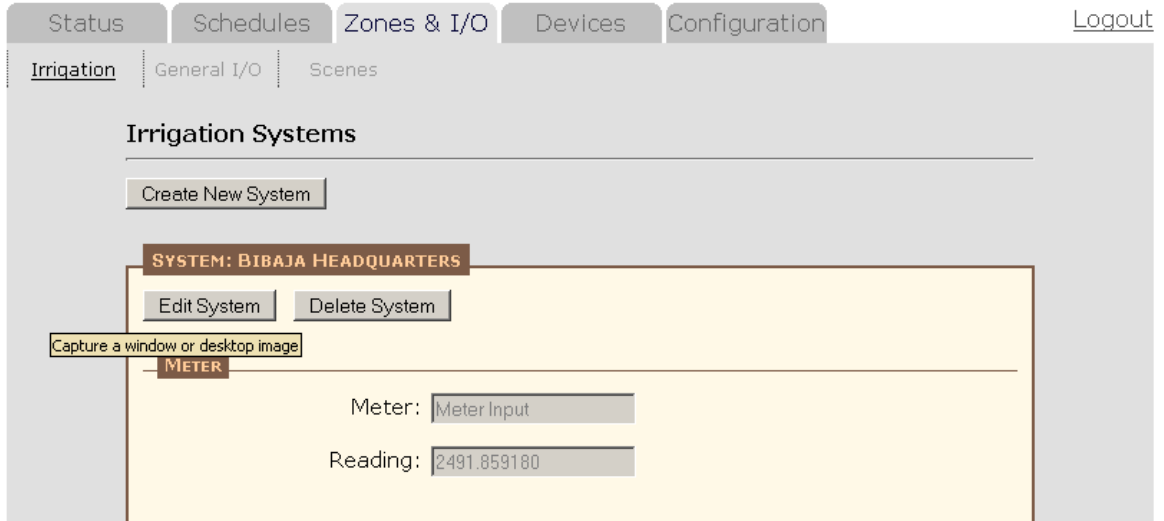
- **Irrigation**
- **General I/O**
- **Scenes**

Use this tab to create new irrigation systems, manually test irrigation zones, monitor I/O states, test general I/Os, change general I/O names, and to create scenes.

By default, the **Zones & I/O → Irrigation** sub-tab is displayed.

3.4.1 Zones & I/O - Irrigation

The **Zones & I/O → Irrigation** sub-tab allows the user to view and edit irrigation systems, and to create new irrigation systems.



3.4.1.1 Create a New Irrigation System

To create a new irrigation system, click the **Create New System** button. You will be presented with this screen:

Create New System

Cancel

Save

Master valves are useful because they allow the controller to shut off the system in case of emergency, such as a zone valve failing to close or a pipe break. Configure the output used to control the master valve, or set to no master valve to disable this feature for this system.

Meters allow the system to monitor water usage and detect abnormally high or low usage. Configure the input where the meter is attached, or set to no meter to disable metering for this system.

A local or remote weather station allows the controller to adjust irrigation based on weather data, typically evapotranspiration and rainfall. Select a configured weather station to use, or set to no weather station.

CREATE NEW SYSTEM

System Name:

Master Valve Output:

No Master Valve

Meter Input:

No Meter

Meter Scale Factor:

200.0

Pulses per

US Gallon

Meter Form:

A (One Count per Pulse)

Weather Station:

No Weather Station

Enter the **System Name**, and select a **Master Valve Output** if one is wired into your system. If your system has a pump start relay, use the **Master Valve Output** to control the pump start relay. This will start the pump while the irrigation system is running cycles.

If you have a water meter, select the **Meter Input** where the meter is connected. For most systems, the meter will be connected to the terminal block labeled “PULSE IN” which is the “Meter Input” in the web interface. Users who have the 12 isolated input card have the built-in meter input plus 12 additional meter inputs to choose from. Once a meter is used in a system, it may not be used in another system (meters may not be shared by systems).

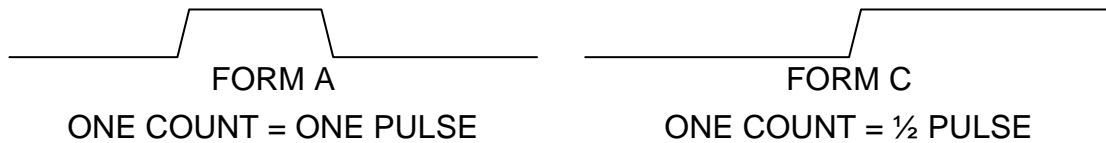
Meter Scale Factor defines how many pulses the meter outputs per unit of measure. Meters like the FTB6110-PS from Omega.com output 60 pulses per US Gallon. Refer to the documentation for your meter to determine the number of pulses your electronic meter outputs for each unit of water.

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Meter Form configures how many pulses or “counts” are generated from the meter pulse output. Water meters are typically FORM A meaning one count equals one complete pulse. FORM C meters outputs are more typical in electricity meters. For FORM C meters, one complete pulse is two counts or units of energy. Put another way, a single edge or half of the pulse is 1 count. Refer to your meter manufacturer’s datasheet for your meter’s form.



The final value used for metering is determined using these equations:

Form A:

Units of water = meter value * scale factor

Form C:

Units of water = (meter value * 2) * scale factor

We use the 2x multiplier for FORM C because the hardware assumes FORM A. We correct for this single count from the hardware in software when we have a FORM C meter by multiplying by 2.

Weather Station is reserved for use when we enable weather-based irrigation control in a future release.

Once you’ve finished entering information, click **Save**. You will automatically be taken to the **Add Zones** screen.

3.4.1.2 Add Zones to a System

After creating a system, you will automatically be taken to this screen to add zones to the system. You may also reach the **Add Zones** screen by clicking the **Add Zones** button in the system summary on the **Zones & I/O → Irrigation** page.

Add Zones to Bibaja Headquarters, Step 1 of 2

1 2

Next →

Select "Add" to add zones from the list of available I/O outputs.

Enter the name for your new zone.

Select "Auto" to enable automatic control of a zone by weather (evapotranspiration) or soil moisture measurements.

ADD	I/O NAME	NAME	AUTO
<input type="checkbox"/>	Open Collector Output	<input type="text" value="Open Collector Output"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Zone 55	<input type="text" value="Front Yard"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Zone 56	<input type="text" value="Shrubbery"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Zone 57	<input type="text" value="The Larch"/>	<input type="checkbox"/>
<input type="checkbox"/>	Zone 58	<input type="text" value="Zone 58"/>	<input type="checkbox"/>
<input type="checkbox"/>	Zone 59	<input type="text" value="Zone 59"/>	<input type="checkbox"/>
<input type="checkbox"/>	Zone 60	<input type="text" value="Zone 60"/>	<input type="checkbox"/>

Enter **Name** for each zone. The **Add** box will be automatically checked when you enter the name. If **Add** is not checked, click on the box to set the check so the zone will be added. Click **Next→** or click 2 to continue to step 2.

ZONE 55

ZONE INFORMATION

Name:

Automatic: ☐

CYCLE & SOAK

Enable Cycle and Soak: ☐

Run Cycle: minutes

Soak Cycle: minutes

FLOW CHECK

Flow Check Enable: ☐

Flow Auto Learn: ☐

Typical Flow Rate: gallons per minute

Flow Variation: %

In step 2, you may edit the name of the zone, enable **Cycle & Soak**, and enable **Flow Check** if a meter is installed.

Cycle & Soak helps prevent runoff for zones with sloped or clay soils. Set **Run Cycle** to the duration of time in minutes where water will just begin to pool on the surface of the soil. Set the **Soak Cycle** to the duration of time in minutes required for the water to soak into the soil deep enough to make room for the next irrigation cycle. A properly configured cycle & soak will apply water at a rate matching the soil infiltration rate.

Flow Check monitors the rate water flows to each zone. Click the box next to **Flow Check Enable** to set the check mark and enable flow check. Click **Flow Auto Learn** to set the check mark and enable the controller to learn the flow rate on the first iteration. If you know the typical flow rate, you may enter it. Otherwise the system will automatically learn the flow rate and enter it for you.

For **Flow Variation**, we recommend entering 10% to start with. If you see a lot of variation in the flow rate reading and the zone is working ok, you may need to set the flow variation higher to prevent false alarms.

NOTE: Short irrigation cycles, particularly for low flow zones with 1 pulse per gallon meters, may see larger variation. For a 1 gallon per minute zone with a 5 minute cycle and a 1 pulse per gallon meter, the minimum **Flow Variation** value should be 20% or you will see false readings. When possible, use longer and less frequent irrigation cycles to encourage deeper roots and improve drought tolerance.

3.4.1.3 Edit Zones

To edit zones in a system, click on the boxes in the **Edit** column to set the checks to select each zone you wish to edit. You may also click on the **Edit** column header to select all zones. Then click **Edit Selected Zones**.

Make changes to the zone name, cycle & soak settings, or flow check settings as required then click **Save**.

3.4.1.4 Delete Zones

To delete zones from a system, click on the box next to each zone you wish to delete in the **Delete** column, or click on the **Delete** column heading to select all zones. Click the column heading again and all checks will clear. Then click **Delete Selected Zones** to remove the zones from the system. You will be prompted with a dialog asking **Delete selected zones?**. Click **OK** if you are sure you wish to delete the selected zones from the system and all schedules, otherwise click **Cancel**.

3.4.2 Zones & I/O - General I/O

The **Zones & I/O → General I/O** sub-tab allows you to see if the I/O is on or off and test I/O outputs by clicking the **On/Off** buttons. You may also edit the I/O names.

General I/O				
NAME	I/O NAME	DEVICE	STATE/TEST	EDIT
Open Collector Output	Open Collector Output	Card 0	Off	<input type="checkbox"/>
0-20ma Output	0-20ma Output	Card 0	0.000000	<input type="checkbox"/>
Zone 55	Zone 55	IVC24 4	Off	<input type="checkbox"/>
Zone 56	Zone 56	IVC24 4	Off	<input type="checkbox"/>
Pond Relay	Zone 57	IVC24 5	Off	<input type="checkbox"/>
Zone 58	Zone 58	IVC24 5	Off	<input type="checkbox"/>
Zone 59	Zone 59	IVC24 5	Off	<input type="checkbox"/>
Zone 60	Zone 60	IVC24 5	Off	<input type="checkbox"/>
				<input type="button" value="Select All"/> <input type="button" value="Select None"/> <input type="button" value="Edit Selected"/>

3.4.2.1 Edit I/O Names

To edit I/O names, click the boxes in the **Edit** column to set checks next to each I/O you wish to edit. You may use the **Select All** and **Select None** buttons to set or clear all checks.

Click **Edit Selected** to edit I/O names for checked I/Os:

General I/O Editor

I/O NAMES

NAME	I/O NAME	DEVICE
<input type="text" value="Open Collector Output"/>	Open Collector Output	Card 0
<input type="text" value="0-20ma Output"/>	0-20ma Output	Card 0
<input type="text" value="Zone 55"/>	Zone 55	IVC24 4
<input type="text" value="Zone 56"/>	Zone 56	IVC24 4
<input type="text" value="Pond Relay"/>	Zone 57	IVC24 5
<input type="text" value="Zone 58"/>	Zone 58	IVC24 5
<input type="text" value="Zone 59"/>	Zone 59	IVC24 5
<input type="text" value="Zone 60"/>	Zone 60	IVC24 5

Edit the name for each I/O and click **Save**. Click **Cancel** or navigate away to discard changes.

3.4.2.2 Test I/O Outputs

To test I/O outputs, click the **On/Off** button next to the output. The button will change state and color when the SiteController confirms the output has changed to on or off. For analog outputs, enter the new value and click outside the box or press the tab key to move to the next field.

3.4.3 Zones & I/O - Scenes

The **Zones & I/O → Scenes** sub-tab allows you to create, view, and edit scenes.

Scenes are groups of outputs triggered together to create a scene or setting. Scenes are typically used for landscape lighting groups. For example, if you have 6 landscape lighting zones, you may want to group them together in a single scene to simplify scheduling. If you run the landscape lighting scene in multiple schedules, it is much simpler to add a single scene to each schedule instead of adding 6 individual outputs to each schedule. This logical grouping makes maintaining the schedules simpler. Changing one scene to add or remove an output affects all schedules that trigger the scene versus changing all schedules to modify the outputs.

I/O outputs may be used in multiple scenes.

Scenes

Create New Scene

SCENE: ALL OFF

Test Scene:

Scene On

Scene Off

SCENE MEMBERS

I/O NAME	SCENE SETTING	DELETE
Open Collector Output	Off	<input type="checkbox"/>
0-20ma Output	0.000000	<input type="checkbox"/>
Zone 58	Off	<input type="checkbox"/>
Zone 59	Off	<input type="checkbox"/>
Zone 60	Off	<input type="checkbox"/>
		<div>Set All</div> <div>Clear All</div>

Add I/O

Edit Scene

Delete Scene

Delete Selected I/O

3.4.3.1 Create a New Scene

Click **Create New Scene** to create a new scene. You will be presented with a dialog similar to this:

Create New Scene

CREATE NEW SCENE

Name:

SELECT OUTPUTS FOR SCENE

Add	I/O NAME	STATE SETTING
<input type="checkbox"/>	Open Collector Output	State: <input type="text" value="On"/>
<input type="checkbox"/>	0-20ma Output	State: <input type="text" value="1"/>
<input type="checkbox"/>	Zone 55	State: <input type="text" value="On"/>
<input type="checkbox"/>	Zone 56	State: <input type="text" value="On"/>
<input type="checkbox"/>	Pond Relay	State: <input type="text" value="On"/>
<input type="checkbox"/>	Zone 58	State: <input type="text" value="On"/>
<input type="checkbox"/>	Zone 59	State: <input type="text" value="On"/>
<input type="checkbox"/>	Zone 60	State: <input type="text" value="On"/>

Click the **Add** check box next to each output you wish to use in this scene and enter the desired state for each output. Use the **Add All** and **Add None** buttons to set or clear all **Add** checks respectively. Use **All On** and **All Off** to set the state of all digital outputs to “On” or “Off” respectively. Typically you will leave outputs as “On”.

For analog outputs, such as the 0-20ma output shown here, you must enter a value. The output value depends on the analog I/O. For our “0-20ma Output”, the valid range of values is 0.5 to 20.0 ma, with the value 0.0 being completely off. The analog output may be used to control dimmable electronic ballasts in lighting applications. The original application for the analog output is to control a variable speed pump.

Click **Save** to save the settings. Click **Cancel** or navigate away to discard changes.

3.4.3.2 Scene Testing

After creating a scene, you may test it by clicking **Scene On** and **Scene Off**. **Scene On** will send the state setting you entered to each output. Clicking **Scene Off** will turn off all outputs (sending “off” to digital outputs and 0.0 to analog outputs.)

3.4.3.3 Add I/O to Scene

Click **Add I/O** to add outputs to an existing scene. The dialog will appear similar to the **Create New Scene** dialog above. Choose the outputs and enter the state setting for the scene. Then click **Save** to add I/O to the scene. Click **Cancel** or navigate away to discard changes.

3.4.3.4 Edit a Scene

Click **Edit Scene** to edit the name and state settings for a scene. Click **Save** to save changes.

3.4.3.5 Delete a Scene

Click **Delete Scene** to delete the entire scene. You will be prompted to confirm you wish to remove the scene. Click **OK** to remove it. This will remove the scene from all schedules.

3.4.3.6 Delete I/O from a Scene

Click the boxes in the **Delete** column to select I/O to delete from the scene.
Click **Delete Selected I/O** to remove the checked I/Os from the scene.

3.5 Devices

The **Devices** tab displays all expansion cards and two-wire devices installed in your SiteController. From here you will be able to confirm devices are present and working properly. If a device is not working properly, you may replace it. Old devices that are no longer used may be deleted. Deleting a device deletes all I/O associated with that device, including zones, meters, and general purpose I/O in scenes and general I/O schedules.

[Status](#) [Schedules](#) [Zones & I/O](#) [Devices](#) [Configuration](#) [Logout](#)

Expansion Cards

NAME	DEVICE TYPE	DRIVER VERSION	SERIAL NUMBER	
Card 0	Built In I/O	2007-05-11	f8000035f2346001	Delete

Two-Wire Devices

[Add Two-Wire Device](#)

NAME	DEVICE TYPE	DRIVER VERSION	SERIAL NUMBER		
Two-Wire	Two-Wire Interface	2007-05-11	05004b89ce00	Replace	Delete
IVC24 3	4-Zone Output Unit	2007-05-11	05002783e900	Replace	Delete
IVC24 4	4-Zone Output Unit	2007-05-11	050027a7b500	Replace	Delete
IVC24 5	4-Zone Output Unit	2007-05-11	050027a7ca00	Replace	Delete

3.5.1 Expansion Cards

The **Expansion Cards** table displays all expansion cards installed in your SiteController. The **Delete** box will be grayed out (disabled) if the card is present and working properly.

If the card is missing or is not working properly, the **Delete** box will be activated allowing you to delete the card and all associated I/O. **DO NOT** delete a card if you intend to replace it.

Replacing a card is as simple as removing the old card and inserting a new one. (See hardware reference section for how to replace a card.) The replacement card will be automatically installed for you, no reconfiguration required.

NOTE: You only want to delete an expansion card if you do not intend to replace it. Deleting a card removes all I/O from irrigation systems, schedules, scenes, etc.

3.5.2 Two-Wire Devices

The **Two-Wire Devices** table displays all two-wire devices installed in your SiteController. The first entry will be the two-wire interface. The two-wire interface is required to communicate with two-wire devices.

3.5.2.1 Add a Two-wire Device

To add a two-wire device, install the device and power it up. Click **Add Two-Wire Device** and wait for the scan to complete. When complete, click the **Add** box next to devices you wish to add. If the device does not appear, enter the serial number manually and click **Add To List**. If the new device still does not appear in the list, check the connections and monitor the TX/RX LEDs to confirm the devices are communicating.

Once added, your new two-wire device will appear in the device table and the device's I/Os will appear in the **Zones & I/O → General I/O** sub-tab.

3.5.2.2 Replace a Two-wire Device

To replace a two-wire device, install the replacement device on the two-wire bus and click **Replace**. The new device should appear in the table. If it doesn't, manually enter the device's serial number in the **Serial Number:** box and click **Add To List**. If the device still does not appear, check the connections to the device, make certain it is powered on, and watch the TX/RX LEDs to confirm it is communicating. Also make sure the new device is a matching replacement for the original device. You cannot replace an IVC24-04 (4 zone irrigation controller) with a SMP24-40 (4 input soil moisture probe sensor).

If more than one valid replacement device was discovered, select the replacement from the list and click **Replace**. The replacement device will be installed in place of the original device. All I/O settings will be preserved (schedules, zones, systems settings.)

3.5.2.3 Delete a Two-wire Device

If you are trying to replace a failed device, use **Replace** instead of **Delete**. **Delete** permanently removes the device and all I/O from all schedules, systems, and scenes.

To delete a device, with the device still installed and powered on (when possible) click the **Delete** button next to the Two-Wire device in the Two-Wire Devices table. After clicking **OK** to confirm delete, the device and all I/O will be deleted from all schedules, systems, and scenes.

Any data logged for this device will be retained in the datalogger and must be manually deleted if you wish to remove it.

3.6 Configuration

The **Configuration** tab displays five sub-tabs:

- **Irrigation**
- **Alerts**
- **Users**
- **Network**
- **System**

By default, the **Configuration → Irrigation** sub-tab is displayed.

Most configuration settings, with the exception of irrigation enable/disable, will be set once and left alone.

We recommend going through the configuration menus carefully, particularly the **System** menu, to make certain your settings are correct for your location. To properly configure the astronomical clock for your location, you must set the latitude/longitude and time zone under the **System** sub-tab.

3.6.1 Configuration - Irrigation

The **Configuration → Irrigation** sub-tab allows the user to disable irrigation completely or to delay irrigation until a future date and time.

The screenshot displays the 'Irrigation Configuration' web interface. At the top, there is a navigation bar with tabs: 'Status', 'Schedules', 'Zones & I/O', 'Devices', 'Configuration', and 'Logout'. The 'Configuration' tab is active, and the 'Irrigation' sub-tab is selected. Below the navigation bar, the 'Irrigation Configuration' section is visible. It contains two main options: 'MASTER IRRIGATION DISABLE' and 'IRRIGATION DELAY'. The 'MASTER IRRIGATION DISABLE' option has a 'Disable Irrigation' checkbox. The 'IRRIGATION DELAY' option has a 'No irrigation delay.' label and a 'Delay irrigation until:' section. This section includes fields for 'Month/Day/Year' and 'Hour:Minute', with a calendar pop-up showing June 18, 2008, selected. At the bottom of the 'IRRIGATION DELAY' section, there are 'Save Irrigation Delay' and 'Clear Irrigation Delay' buttons. The footer of the page shows 'Sunrise: 5:47AM', 'Wednesday, 6/18/2008', and 'Sunset: 8:30PM'.


3.6.1.1 Master Irrigation Disable

The master irrigation disable is useful if you must turn the system off, but do not know how long the system needs to stay off. By clicking the **Disable Irrigation** checkbox, all irrigation is disabled until you enable the system again by unchecking the box.

Changes are automatically saved as soon as you click the check box.

3.6.1.2 Irrigation Delay

The **Irrigation Delay** will prevent irrigation until a future date and time. This is useful for parties and other special events, and for entering a manual rain/weather delay. If the forecast calls for rain, enter an irrigation delay for a few days and create one-time schedules as necessary if you don't received enough rainfall.

To set an irrigation delay, fill in the date and time fields or click the calendar icon  to lookup a date, then click the **Save Irrigation Delay** button.

To remove delay, click the **Clear Irrigation Delay** button or set the date/time in the past.

3.6.2 Configuration - Alerts

The **Configuration → Alerts** sub-tab allows you to subscribe to alerts, enable and disable alerts, and to change the alert level.

Alert Configuration

USER NOTIFICATION

Select which users will receive e-mail alert notifications:

USERNAME	E-MAIL	NOTIFY
mstubbs	mark@bibaja.com	<input type="checkbox"/>
admin	ms@bibaja.com	<input checked="" type="checkbox"/>

Save Changes

SYSTEM ALERTS

Change alert level and enable for system defined alerts

DESCRIPTION	LEVEL	ENABLE
Slow Water Leak	WARNING	<input checked="" type="checkbox"/>
Fast Water Leak	ERROR	<input checked="" type="checkbox"/>
High Water Flow	ERROR	<input checked="" type="checkbox"/>
Low Water Flow	WARNING	<input checked="" type="checkbox"/>
No Water Flow	WARNING	<input checked="" type="checkbox"/>
Stuck Zone Valve	ERROR	<input checked="" type="checkbox"/>
Stuck Master Valve	CRITICAL	<input checked="" type="checkbox"/>

Save Changes

3.6.2.1 User Notification

Click the **Notify** checkbox to select which registered users receive alerts for your controller, and then click **Save Changes**. In order for a user to be able to receive an alert, the user must have completed registration with <http://my.bibaja.com>. Users may opt out of alerts at any time.

3.6.2.2 System Alerts (Set Levels and Enable/Disable Alerts)

The system alerts table shows alerts defined by the irrigation control system. You may modify the level or severity of the alert and choose if the alert is enabled.

Alert levels determine the action taken by the irrigation scheduler in case of error. Levels and their actions are:

Level	Action Taken
CRITICAL	All active zones for this irrigation system are cancelled.
ERROR	Irrigation zone is cancelled. All other zones continue to operate (if possible).
WARNING	Alert is sent and system continues as if the alert condition is not present. This is useful to prevent false alarms from terminating irrigation cycles when performing initial controller adjustment/configuration.
INFORMATION	Alert is for information purposes only. Controller will send email, but no action is taken.

Disabling an alert prevents an email notification. However, an alert will still be logged and will be shown in the **Status → Alerts** sub-tab. To disable an alert, click on the check box to clear the check next to the alert.

There are 7 system defined alerts as of this writing. These alerts are:

Alert	Details
Slow Water Leak	<p>After opening a master valve to start irrigation, the system monitors for water flow. If there is a slow flow (defined as less than or equal to 0.25 gallons per minute), this alert will be triggered indicating there is a slow leak wasting water while the irrigation system is active.</p> <p>Locating a slow leak of 0.1GPM will save you 24 gallons for each 4 hour irrigation schedule.</p>
Fast Water Leak	<p>After opening the master valve, a leak faster than 0.25GPM was detected. The 0.25GPM leak threshold is configurable if necessary.</p> <p>This type of fault will cause the irrigation system to abort if the level is ERROR or CRITICAL. You may choose to force the irrigation system to continue in spite of the error by lowering the alert level to WARNING or INFORMATION.</p>
High Water Flow	<p>This alert occurs when high water flow is detected in an irrigation zone. After an averaging time has passed, the system measures the flow rate and compares it to the typical flow rate +/- % variation. Anything above typical flow rate + % variation is considered a high flow and the zone will be aborted.</p> <p>High flow, when properly configured, may be able to detect pipe breaks and missing sprinkler heads. It is particularly effective when the zone uses 75% or less of the maximum flow available from the water mains.</p> <p>False alerts may be reduced by adjusting the % variation or measuring the flow rate over a longer period of time (by downloading a CSV of datalogged flow rate history for the zone) to determine a valid median</p>

	flow rate and % variation.
Low Water Flow	<p>This alert occurs when low water flow is detected in an irrigation zone during a cycle. This could indicate drip emitters are becoming plugged or a sprinkler head is failing to popup or is clogged.</p> <p>Low water flow may also occur temporarily if there is a spike in water use inside the residence or building.</p> <p>Typically this type of alert is set to the “WARNING” level so irrigation will continue uninterrupted. If the alert occurs consistently, it may be wise to inspect the problem zone to make certain water is being delivered uniformly to all plants. If the inspection determines everything is operating ok, then you may wish to adjust the variation % or the median flow rate to prevent false alarms on the zone.</p>
No Water Flow	<p>During a zone irrigation cycle, no water flow was detected. The water may have been shut off completely, the master valve may have failed shut, or the zone valve may have failed.</p> <p>Typically the level is set to “WARNING” to continue trying to water this zone. You may wish to raise this level to “ERROR” to abort this zone and move on to the next. Make certain to resolve this problem quickly during hot weather to prevent damage to sensitive landscape plants.</p>
Stuck Zone Valve	<p>After completing an irrigation cycle, the zone valve is closed and flow rate is monitored for up to 30 seconds. If flow doesn’t stop within 30 seconds, this alert is triggered to indicate a zone valve is stuck open.</p> <p>You may choose to lower this alert to a “WARNING” level, but if you do, you may end up with two zone valves open in parallel for the duration of the irrigation cycle. This means less water will be available for the next zone cycle and the cycle that just finished may still continue to receive water and be flooded.</p> <p>Best practice is to set this alert to “CRITICAL” level so all zones will be aborted and the master valve will be shut off to stop water flow.</p> <p>Immediate repair of the zone valve is required to restore proper operation to the irrigation system.</p>
Stuck Master Valve	<p>After completing an irrigation schedule, or in case of a stuck zone valve and we are aborting an irrigation schedule early, we will shut off the master valve to prevent water from reaching the irrigation system.</p> <p>If the master valve will not shut off, then we send this alert. Immediate response is required to prevent flooding and erosion in the landscape from the uncontrolled water flow.</p> <p>The irrigation schedule is ending when this alert is triggered, so the</p>

	<p>alert level has no effect apart from setting the subject of the email for the alert. (IE: There's no difference between the actions taken for CRITICAL, ERROR, and WARNING. The schedule will end no matter what.)</p>
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3.6.3 Configuration - Users

The **Configuration → Users** sub-tab allows you to add, edit, and delete users of your SiteController. Users may change their passwords or update their contact information in the controller. This provides a contact list of key users for the controller including landscape maintenance personnel, property owners, and property managers.

The screenshot shows the 'User Configuration' page. At the top, there's a navigation bar with tabs: Status, Schedules, Zones & I/O, Devices, and Configuration. Below this is a sub-navigation bar with links: Irrigation, Alerts, Users (highlighted), Network, and System. The main content area is titled 'User Configuration' and contains a table with the following data:

USERNAME	NAME	E-MAIL	PHONE	GROUP		
mstubbs	Mark Stubbs	mark@bibaja.com	831-588-8146	Administrators	Edit	<input type="checkbox"/>
admin	Mark Stubbs	ms@bibaja.com	831-588-8146	Administrators	Edit	<input type="checkbox"/>

Below the table are four buttons: Add User, Delete Selected, Select All, and Select None. At the bottom of the page, there's a status bar showing 'Sunrise: 5:48AM', 'Thursday, 6/19/2008 12:21 AM', and 'Sunset: 8:30PM'.

3.6.3.1 Add User

To add a new user:

1. Click the **Add User** button to go to the **Add User** page.
2. Complete **User Information** entry
3. Enter a **Username** and **Password**.
4. Reenter the password.
5. Select a group from the **Group** drop-down box.

Available groups are:

Administrators: May modify and change everything, including installing hardware and reconfiguring zones and irrigation systems.

Users: May modify schedules, but may not modify network settings or reconfigure the irrigation system.

Guest: May view everything, but may not modify anything.

6. Click **Save** to save the new user settings, click **Cancel** to cancel and return to the **User Configuration** page.

3.6.3.2 Edit User

1. Click the **Edit User** button to go to the **Edit User** page.
2. Change fields as required.
3. Click **Save** to save the changes, click **Cancel** or navigate away to discard changes.

3.6.3.3 Delete User

To delete users:

1. Check the box in the row of any user you want to delete.
To select all users, click the **Select All** button.
To deselect all users, click the **Select None** button.
2. Click the **Delete Selected** button. Click **OK** to confirm you wish to delete selected users.

NOTE: You may not delete the admin user.

3.6.4 Configuration - Network

The **Configuration → Network** sub-tab allows the user to review and change internet network settings.

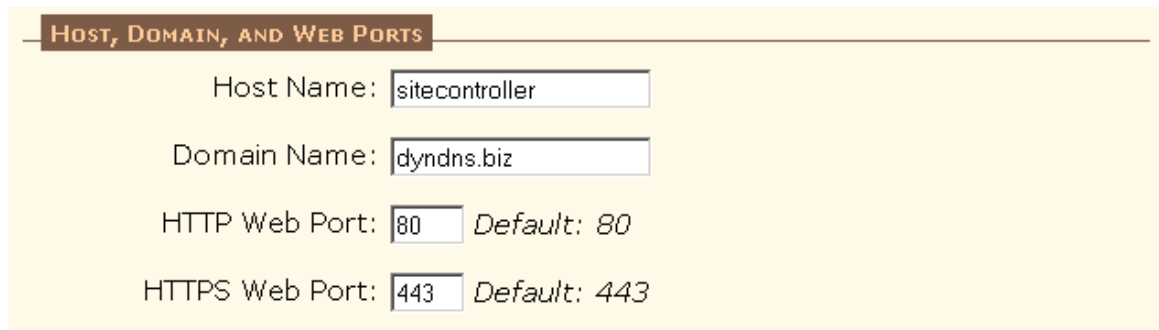
NOTE: Most users will use the defaults and will not need to change the network settings. Errors in network settings can seriously affect SiteController performance.

To change network settings:

1. Change the network settings you want to change.
2. Click the **Save Settings** button to save your changes, click the **Cancel Changes** button to cancel. The SiteController will ask if you wish to restart now or later. Network changes do not take effect until the SiteController has been restarted (either by restarting from the web interface or by power cycling.)

3.6.4.1 Host, Domain, and Web Ports

Edit the host name, domain name, and web ports as necessary for your application:



HOST, DOMAIN, AND WEB PORTS

Host Name:

Domain Name:

HTTP Web Port: Default: 80

HTTPS Web Port: Default: 443

Hostname:

Hostname used to identify the SiteController on your network. Names consist of characters a-z, 0-9, +, -, and the period character. No other characters are allowed.

Domain Name:

Name used to identify the domain of your SiteController. Characters allowed are a-z, 0-9, +, -, and "." to separate fields. Examples of domain names include "google.com" and "yahoo.com." Often you will use your ISP domain or your corporate network domain here. It is safe to leave this field blank or leave the default value "bibaja.com" if you don't know what to put here.

HTTP Web Port:

Port 80 is the default non-secure port used to communicate with the web interface. For interactive web sessions, we recommend using only the HTTPS (secure) interface. HTTPS provides encryption that helps protect your username and password and keeps your data private. HTTP may be used as a convenience to establish the initial connection (which immediately redirects to the secure HTTPS port.)

HTTPS Web Port:

Port 443 is the default secure port used to communicate with the web interface. You may need to change this when configuring port forwarding on your firewall. Port forwarding on your firewall allows remote access to the SiteController from the internet. If you have multiple web-enabled devices on your network you need to access from outside your firewall, you will need to set up port forwarding for each device. Each device will need a different port address for port forwarding on your firewall. Once configured, access your SiteController from the outside network using a URL of this format:

`http://your_network_ip:https_port/`

`your_network_ip` is the IP address or host name used to access your network from the internet, and `https_port` is the value you configure for HTTPS web port.

You may use services such as dyndns.com or no-ip.com to create a “friendly” name for your controller. You will still need to remember the HTTPS port used to access your controller.

3.6.4.2 Domain Name Server (DNS)

DOMAIN NAME SERVERS (DNS)	
Name Server 1:	<input type="text" value="68.87.76.178"/>
Name Server 2:	<input type="text" value="68.87.78.130"/>
Name Server 3:	<input type="text"/>

Name Server 1, 2, and 3 are the IP Addresses of the name servers for your network. If you are using automatic (DHCP) configuration, these should be automatically configured. For manual configuration, you will need to specify the name servers for your network. Name servers are used to lookup names such as www.bibaja.com or www.google.com to find IP addresses to communicate with remote hosts. The SiteController uses name servers to find www.bibaja.com to send email alerts and check for updates.

3.6.4.3 10/100 /Ethernet

10/100 ETHERNET

Enabled: ☒

TCP/IP SETTINGS

Configuration: Automatic-DHCP

IP Address: 192.168.0.103

Netmask: 255.255.255.0

Gateway: 192.168.0.2

Choose whether the Ethernet interface is configured automatically using DHCP (meaning it will acquire its IP address from your router automatically), or manually. Manual configuration means you will supply the IP address, netmask, and gateway settings.

For most users, the default “Automatic-DHCP” setting will work fine.

The 10/100 Ethernet connection cannot be disabled, so the **Enabled** check box will always be checked.

3.6.5 Configuration - System

The **Configuration → System** sub-tab allows you to change registered owner, backup or restore configuration, set the date and time, set the controller’s latitude and longitude for the astronomical clock, check for updates, and manually restart the SiteController.

3.6.5.1 Change Registered Owner

REGISTRATION

CURRENT REGISTERED OWNER

Name: Mark Stubbs

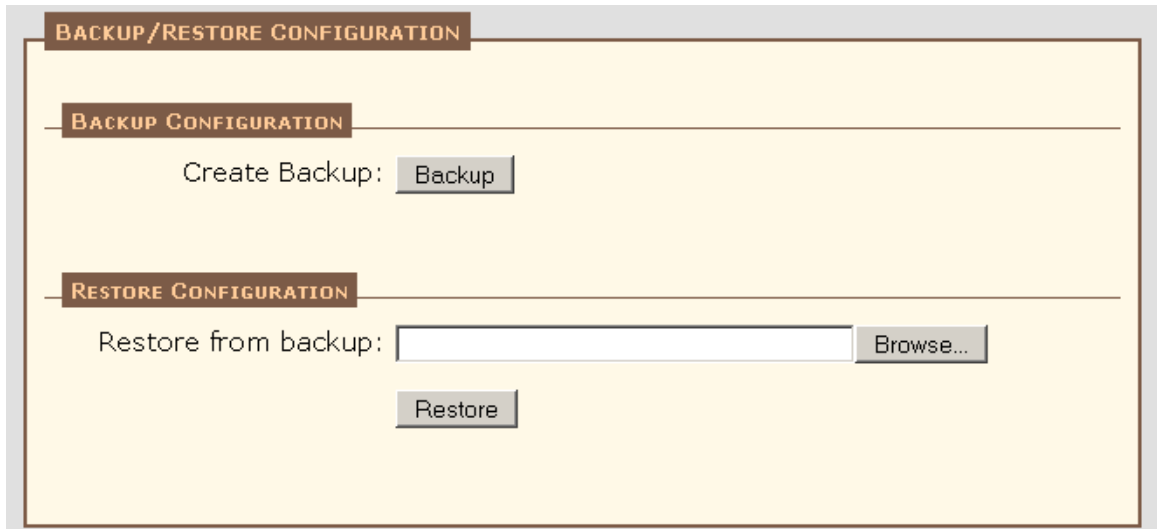
E-Mail: ms@bibaja.com

Change or Transfer Registration

Click **Change or Transfer Registration** to change the registered owner of this SiteController. This will take you back through the initial registration process for the SiteController and may

create a new account on <http://my.bibaja.com>. Use this option when the SiteController or the property it controls changes owners or property managers.

3.6.5.2 Backup/Restore Configuration



The screenshot shows a web interface titled "BACKUP/RESTORE CONFIGURATION". It contains two main sections: "BACKUP CONFIGURATION" and "RESTORE CONFIGURATION". In the "BACKUP CONFIGURATION" section, there is a label "Create Backup:" followed by a button labeled "Backup". In the "RESTORE CONFIGURATION" section, there is a label "Restore from backup:" followed by a text input field and a "Browse..." button. Below the input field is a button labeled "Restore".

Use this form to make a backup of your SiteController configuration when you have created your irrigation systems, schedules, and scenes. Then if you ever make a mistake configuring your controller, you can restore from a backup. If your controller ever dies and needs to be replaced, you can restore your backup and be up and running again quickly.

To make a backup configuration file, click the **Backup** button. Your web browser will prompt you for what to do with the backup file. The backup file will have a name similar to this: "backup_2008_06_19_011643.tgz". If you are curious, this is a tar/gzip archive of an SQLite database used to hold the SiteController's configuration information.

To restore a backup, click **Browse...** to find a backup image, then click **Restore** to upload the backup to the controller. The controller will shut down the web application, install the configuration from the backup, and then restart the web application.

NOTE: Restoring a backup will overwrite your most recent configuration changes. If you are not certain, always make a fresh backup before restoring an older backup file. This way you can recover if the backup was too old. The restore process checks configuration database versions to prevent very old backups from overwriting the current active configuration.

3.6.5.3 Time Settings

The screenshot shows a web interface for 'TIME SETTINGS'. It has a header 'TIME SETTINGS' and a sub-header 'DATE AND TIME'. Under 'DATE AND TIME', there is a 'Timezone:' dropdown menu set to '(GMT-08:00) Pacific Time (USA & Canada)'. Below this are two radio buttons: 'Set time automatically:' (which is selected) and 'Set time manually:'. A 'Save Time Settings' button is at the bottom of this section. The second section is 'SET DATE AND TIME', which is currently inactive. It contains 'Date (mm/dd/year):' fields with values '6 / 19 / 2008' and 'Time (hh:mm):' fields with values '12 : 57 AM'. A 'Set Date/Time' button is at the bottom of this section.

By default, time and date are set automatically from the internet. All you need to do is select the correct time zone from the **Timezone** drop-down box then click **Save Time Settings**.

To set the time and date manually:

1. Click the **Set time manually** radio button. The **Date** and **Time** entry fields will become active.
2. Enter the month, day and year, and the correct hour and minute values.
3. Click the **Set Date/Time** button to save your changes.

3.6.5.4 Latitude and Longitude

The screenshot shows a web interface for 'LATITUDE/LONGITUDE'. It has a header 'LATITUDE/LONGITUDE' and a sub-header 'Lookup Latitude/Longitude'. Below this are two text input fields: 'Latitude:' with the value '37.106050' and 'Longitude:' with the value '-122.05530'. A 'Save Latitude/Longitude' button is at the bottom.

To lookup Latitude and Longitude:

1. Click the **Lookup Latitude/Longitude** link.
The **Lookup Latitude/Longitude for Address** page will appear. The current address and latitude and longitude will be displayed.
2. If necessary, enter the correct address in the **Street Address to Locate** fields,
and click the **Lookup Latitude/Longitude** button. The screen will refresh showing the latitude and longitude for the address entered.
3. To save the new settings, click the **Set SiteController Latitude/Longitude** button. If the set fails for some reason, make a note of the correct Latitude/Longitude and enter them manually and click **Save Latitude/Longitude**.

3.6.5.5 Checking for Updates



UPDATES

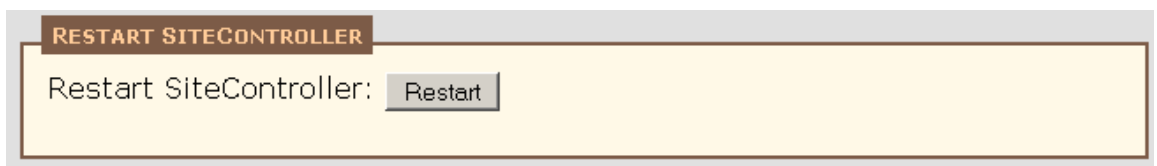
Application Version: 2008.06.09

Database Version: 2008.05.11

Every time you log in to your SiteController, it will check for updates. If an update is present, it will show a blue box in the header of the page asking if you wish to update now. You may choose to update now or clear the blue box until the next update. Our goal is to minimize nags for updates. We won't keep popping up annoying messages asking you to restart every 10 seconds.

To manually check for SiteController updates, click the **Check for Updates** button. If an update is available, you will be asked if you wish to update now. If you click **OK**, the SiteController will stop the web interface, download the update, backup your settings, and apply the update. Your web browser should automatically redirect back to the SiteController when the update has completed. Be patient, it can take several minutes to complete a full update.

3.6.5.6 Restart SiteController



RESTART SITECONTROLLER

Restart SiteController:

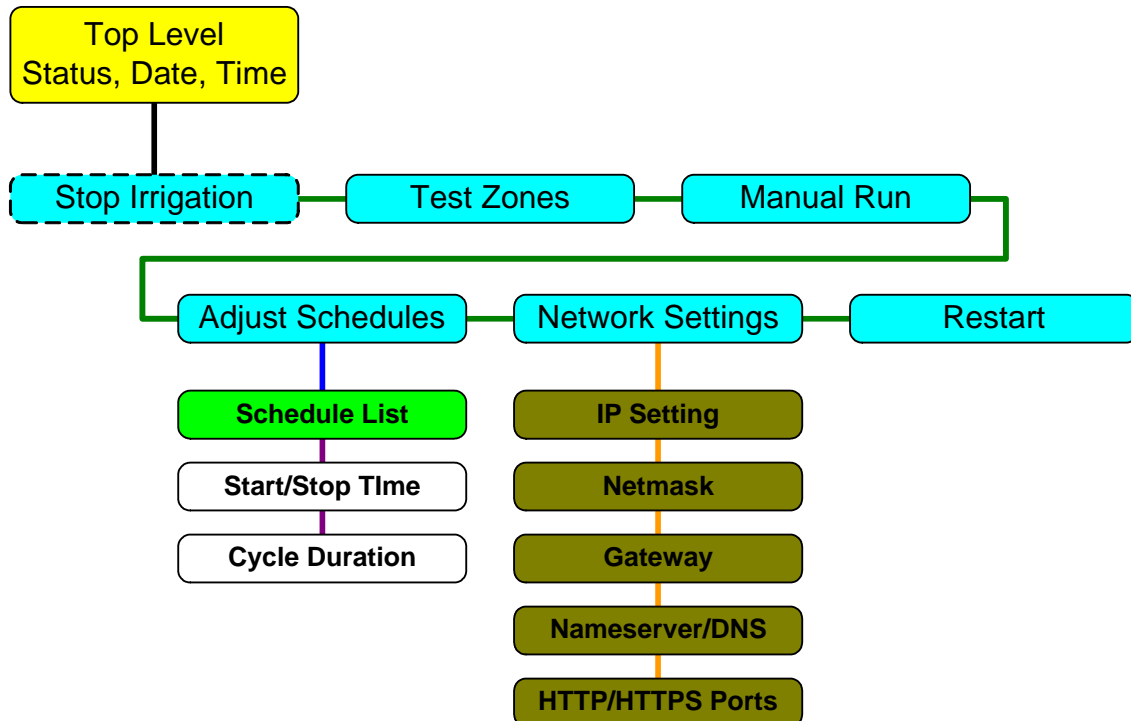
To restart the SiteController, click the **Restart** button. If you made changes to the network settings and choose to restart later after making a few other changes, then you may manually restart by clicking here.

4 LCD Interface Reference

The LCD interface provides a limited set of functionality for testing and initial SiteController configuration. To access all settings, you must use the web interface.

The primary purpose of the LCD interface is for diagnostics (turning zones on and off) and for initial configuration of the network settings.

The menu structure for the LCD user interface looks like this:



At the top level, the irrigation system Status, Date and Time are displayed.

Pressing one of the **Down**, **Up**, or **OK** keys will take you to the menu beneath the top level status display. The **Stop Irrigation** menu is shown with a dashed line because it is only present when the irrigation system is active.

All zones are listed flat (with no system structure) underneath the **Test Zones** and **Manual Run** menus.

The **Adjust Schedules** and **Network Settings** menus show more detail to help you quickly find where to make simple changes to schedules or set your initial network configuration.

4.1 LCD Keypad

The LCD keypad has five keys. The exact behavior of the key depends on the menu currently displayed. For example, if you are editing a numeric entry, the **Up** key increment and the **Down** key decrements the numeric entry. If you are on a menu, the **Up** and **Down** keys scroll through the menu.



4.1.1 Cancel Key (X)

The Cancel key (**X**) will always return you to the top level Status/Date/Time screen. If you are editing network settings or making changes to a schedule and decide you want to exit without saving the changes, press the **X** key to cancel out of everything and return to the status screen.

NOTE: You will not be prompted to save your changes if you press the **X** key. This action will discard all the changes you have made and return you to the top level Status screen.

4.1.2 Back Key

The **Back** key will either ascend one level in the menu tree (for example, go up from the network settings editor to the menu above) or will exit from edit mode and discard the changes. For example, if you are editing the IP address and decide to stop part way through, press the **Back** key. If you have made changes to any settings and press the **Back** key, you will be asked if you wish to save the changes.

4.1.3 Up/Down Keys

The **Up** and **Down** keys are used to navigate between menus, increment/decrement numeric entries, and scroll through lists of options when making changes to settings.

Press and hold the **Up** or **Down** key to quickly move through lists or to quickly increment or decrement numeric entries.

4.1.4 OK Key

The **OK** key is used to toggle on and off fields, select fields for editing, save changes when you finish editing, and to open menus.

4.2 LCD User Interface Cursors

There are two cursors used in the LCD user interface to mark the location you are editing and whether you are viewing or editing a field.

The first cursor is the greater than symbol (>). This cursor is used to mark the active entry or menu item on the screen. Pressing the **Up** or **Down** keys will scroll through the list (moving the list while the > cursor remains on line 1 of the display) or it will move the > cursor through entries on the display.

The second cursor is the underscore sign (_). This cursor marks an entry that may be toggled or that is in edit mode. For example, for an IP address entry, it will appear like this when you first move to the entry:

```
IP: >192.168.0.1
```

When you click **OK** to edit, the underscore cursor will appear under the portion of the entry you are editing:

```
IP: >192.168.0.1
```

Pressing the **OK** key in this case saves changes to the first field and opens the second field of the IP address for editing:

```
IP: 192.>168.0.1
```

Pressing the **OK** key 3 more times will move the > cursor back to the start of the IP field and exit edit mode:

```
IP: >192.168.0.1
```

For toggles like output **On/Off**, you will see an entry that looks like this:

```
Zone 1: >Off
```

The > shows the **Off** entry is active and the underscore shows you can change it by pressing the **OK** key. Pressing **OK** will change **Off** to **On**:

```
Zone 1: >On
```

Pressing the **Up** or **Down** arrow key will move from a toggle entry to the next entry. For numeric entries such as the IP example above, you can only move away from the entry if it isn't in edit mode. Remember, to get out of edit mode, press the **OK** key three or more times.

4.3 Stop Irrigation

The **Stop Irrigation** menu only appears when an irrigation system is active. To stop irrigation, navigate to the **Stop Irrigation** menu by pressing the **Up/Down** keys:

```
>Stop Irrigation
Test Zones
```

Press **OK** to open the menu and you will see this screen:

```
Stop Irrigation?
>Yes No
```

Press **OK** with the > cursor pointing to **Yes** as shown to stop irrigation. Press the **Down** key to move the > cursor to **No** if you change your mind, or press the **Back** or **X** key to cancel.

4.4 Test Zones

The **Test Zones** menu allows you to turn zones on and off at the controller for testing and maintenance. All irrigation zones are shown in one list. To navigate the list, press the **Up/Down** keys. To turn a zone on or off, press the **OK** key.

To access the menu, select **Test Zones** and press the **OK** key:

```
>Test Zones
v Manual Run
```

The first zone will appear:

```
Orchard
v Zone 50: >Off
```

The “v” indicates more zones are available below. Press the **OK** key to toggle the **Off** to **On**. Press the **Down** key to go to zones further down the list:

```
^ Garden South
v Zone 51: >Off
```

Note the up indicator “^” and the down indicator “v” on the left indicate that more zones are above and below these entries. When you get to the last zone, only the “^” up indicator appears:

```
^ Front Yard
Zone 54: >On
```

Master valves and pumps will be automatically activated when you test zones. When you exit the **Test Zones** menu, all zones will automatically turn off.

4.5 Manual Run

The **Manual Run** menu is used to trigger a sequence of irrigation cycles manually from the LCD user interface. Enter the cycle duration in minutes for each zone you wish to water.

Enter the menu by pressing the **OK** button with **Manual Run** selected on the LCD user interface:

```
^ >Manual Run
v Adjust Schedules
```

Zones are presented as a list of screens. Scroll through the screens by pressing the **Up/Down** keys. The “^” indicator at the beginning of the line means there are more zones above. The “v” indicator means there are more zones below:


```
Orchard
v Zone 50: >0 mins
```

Press **OK** to edit the cycle duration using the **Up/Down** keys:

```
Orchard
v Zone 50: >5 mins
```

When finished, press the **OK** key to save the cycle duration. Use the **Up/Down** keys to move through all zones and edit the cycle duration for each zone.

Press the **Back** button when finished.

4.6 Adjust Schedules

The **Adjust Schedules** menu allows you to edit a limited set of parameters for existing irrigation schedules. You may not create new schedules or change the days the schedule will run from this menu. Those changes must be made from the web interface.

From this menu you may adjust the start and stop time for the schedule window, and you may adjust irrigation cycle duration for each zone in a schedule.

Select the menu from the list and press **OK**:

```
^ >Adjust Schedules
v Network Settings
```

Next you are presented with a list of schedules. Use the **Up/Down** keys to scroll through the list and press **OK** to select a schedule to edit:

```
^ >Grasses
v Shrubs
```

Adjust the start and stop time for the schedule window. Remember when the schedule window closes, all pending zone cycles will be aborted. Make the schedule window long enough for all the zone cycles to be completed:

```
Start: > 1:00
v Stop: 0:59
```

To edit the hours and minutes (HH:MM), press **OK** for edit mode. Use the **Up/Down** keys to change the hours. Press **OK** to save the hours and advance to edit the minutes. Press the **Up/Down** keys to change the minutes, and finally press **OK** to save the HH:MM value. Use the **Up/Down** keys to advance to the stop entry and make adjustments. Press the **Down** key to move down to the first zone in the schedule:

```
^ Front Yard
v Zone 49: >28 mins
```

Press **OK** to edit the minutes, use the **Up/Down** keys to adjust the minutes, and press **OK** to save. Repeat for each zone in the schedule.

Press the **Back** key to return to the list of schedules. Press the **X** key to return to the root menu. Changes are automatically saved as you edit the schedules.

4.7 Network Settings

When first configuring your SiteController, you may need to use the **Network Settings** menu to adjust the IP address and configure communications. If your network is configured to support DHCP (automatic IP address configuration), then your SiteController will retrieve an address automatically. You may use this menu to view the automatically configured address to enter in your web browser to access the controller.

If you need to configure a static IP address, you may do so using this menu. To configure a static IP address and manually enter network settings, click **OK** on the **Network Settings** menu:

```
^ >Network Settings
v Restart
```

The first screen shows the current IP address and allows you to switch between automatic (DHCP) and manual address configuration:

```
IP Config: >Auto
v 192.168.0.103
```

Press **OK** to toggle between **Auto** and **Manual**. Press the **Down** key to move to the IP address field:

```
IP Config: >Manual
v >192.168.0.103
```

Press **OK** to edit the IP address. Use the **Up/Down** keys to change the numbers. The underscore cursor () appears under the entry being edited. The greater than cursor (>) also moves to the number you are editing. Keep changing numbers and pressing **OK** until the greater than cursor (>) returns to the start and the underscore cursor () disappears, indicating you are out of edit mode.

Press the **Down** key to advance to the next screen to adjust the netmask:

```
^ Netmask:
v >255.255.255.0
```

Press **OK** to edit the netmask, use the **Up/Down** keys to scroll through the options, and then click **OK** when you finish editing. Press the **Down** key to advance to the gateway setting:

```
^ Gateway:
v >192.168.0.1
```

The gateway IP address is the gateway to the internet for the SiteController. Press **OK** to edit the gateway IP address. Use the **Up/Down** keys to adjust each number. Press and hold the **Up/Down** keys to move quickly through the numbers. Press **OK** after editing each of the four numbers. When finished, the greater than cursor (>) will return to the start of the gateway IP address. Press the **Down** key to advance to the Nameserver/DNS settings:

```
^ Nameserver/DNS 1:
v >192.168.1.1
```

Click **OK** to edit, use the **Up/Down** keys to change the numbers, and click **OK** to save after changing each number. You may enter up to three name server IP addresses. Press the **Down** key after editing each entry. You may leave entries 2 and 3 blank (0.0.0.0). Finally move to the HTTP Port/HTTPS Port screen by pressing the **Down** key:

```
^ HTTP Port: >80
  HTTPS Port: 443
```

Press **OK** to edit the HTTP port. The default is 80. The HTTP port is used by your web browser to communicate with the SiteController to establish initial communications. For example, if your IP address is 192.168.0.1, and the port is 105, you would enter this in your web browser:

```
http://192.168.0.1:105
```

The SiteController uses HTTPS (secure HTTP) for most communications. The default port of 443 should be ok for your internal network. However, if you need to expose the SiteController through a firewall, you may need to use an alternate port. Press the **Down** key to move the greater than cursor (>) to the HTTPS port field, and press **OK** to edit, use the **Up/Down** keys to adjust the port, finally press **OK** to save changes. Remember you can change numbers faster by pressing and holding the **Up/Down** keys.

If you changed the HTTPS port to 4433, you would connect using your web browser like this:

```
https://192.168.0.1:4433
```

You may also register your network with dyndns.org or no-ip.com to use a friendly and free name to access your cable or DSL high speed internet connection remotely. For example, if you register for “sitecontroller.dyndns.biz”, you can use this friendly name to access your controller from anywhere on the internet (provided you open the port back through your firewall/router to the SiteController):

```
https://sitecontroller.dyndns.biz:4433
```

Remember your port settings. If you use the default port settings of 80/443, then you only need to enter http or https + the ip address of your controller to establish the connection:

```
https://192.168.0.1 (443 is assumed, no need to type :443)
```

After you finish editing the network settings, press the **Back** key. You will be asked if you want to save changes:

```
Save Changes?
>Yes No
```

Press **OK** over **Yes** to save changes, or use the **Down** key to move to **No** to discard changes.

If you choose **Yes** to save changes, you will be asked if you wish to restart now. Network settings take affect when the controller restarts:

```
Restart Now?
Yes >No
```

To restart now, press the **Up** key to select **Yes** and press **OK**. To restart later, press **OK** with **No** selected.

4.8 Restart

If you need to manually restart the controller, you may use the **Restart** menu or unplug power from the controller.

To restart, choose the **Restart** menu:

^ >Restart

Then select yes or no using the **Up/Down** keys and press **OK**:

Restart Now?
Yes >No

The controller will take a few minutes to restart. Restart is complete when the display shows the Status/Date/Time screen.

5 Hardware Reference

This hardware reference provides specifications and detailed pin assignments for the SiteController hardware.

5.1 Expansion Cards

Expansion cards are available to add more inputs and outputs to your SiteController. Typically cards are factory installed. You may order cards to add zones or additional inputs such as motion sensors, float switches, or rain click type devices for water conservation. A variety of expansion cards are available to order from Bibaja to extend the functionality of your SiteController hardware.

Have an idea for a new expansion card? We'd love to hear them. Submit your ideas to Bibaja on our web page at <http://www.bibaja.com/xyzzzy.php>.

5.1.1 Adding Expansion Cards

1. Power down the Site Controller.
2. Remove the Ethernet cable, meter input, open collector output terminals, and the power terminal.
3. Loosen the two thumbscrews in the modesty cover, tilt it back to expose the electronics and set it aside.
4. Align the new expansion card over the guides in the first empty expansion slot from the left, pushing down until it seats against the plastic. Carefully slide it forward making sure the connector pins are lined up, and seat the card firmly in place. The plastic PCB retainer will snap in place behind the expansion card.
5. Reinstall the modesty cover, plug the Ethernet cable back in place, reconnect the meter input and the open collector output, and then reconnect the power. The new card will show up automatically in the list on the **Devices** tab of the web interface.

5.1.2 Removing Expansion Cards

Power down, remove the modesty cover, press down with both thumbs on the PCB retainer to disengage, and pull the card back with the tips of your fingers. The card should disengage from the motherboard and easily lift straight up once aligned with the plastic guides. Reinstall the modesty cover, plug the ethernet back in, reconnect the meter input and open collector output, and then reconnect the power. Expansion cards that have been removed may be deleted by clicking the **Devices** tab of the web interface, then clicking **Delete** next to the removed card.

5.2 Two-wire Expansion

Two-wire expansion allows adding additional zones and sensors using a pair of 24 volt AC wires. Two-wire devices such as Bibaja's IVC24-04 add four zones across a pair of wires. Using existing valve wiring, a single pair of zone wires may be repurposed turning two zones into 4 zones. This allows expanding the number of zones without trenching back to the controller – preventing the labor of trenching and keeping the established landscape intact.

5.2.1 Installing a Two-wire Interface

A two-wire interface is required before installing any two-wire device. The two-wire interface may be ordered factory installed with your initial order, or ordered later.

Power down, remove the modesty cover, line up two-wire module's 2x9 and 1x6 pin connectors with mating connector and standoffs in the upper right corner of SiteController motherboard. Press gently to seat against the standoffs. Install three #6-32 screws to hold the card securely in place. Reinstall the modesty cover, plug all cables back in, and restore power. The new card will appear automatically in the **Devices** tab of the web interface.

Connect the two-wire network to the TW L/N connections in the lower right of the SiteController (Black and Gray connectors). Strip the wire at least ½ inch in length and push into connector.

5.2.2 Installing a Two-wire Device

To install a two-wire device, such as an IVC24-04 4-zone expansion unit, attach it to the TW L/N terminals at the SiteController (for convenience) or go ahead and install the IVC24-04 unit in the field. Make sure unused zone wires are capped off and not shorted together.

Confirm the power LED is lit, and record the numbers and letters that appear between the two asterisks (**) on the barcode label.

On the SiteController, click the **Devices** tab of the web interface, and then click **Add Two-Wire Device**. The controller will scan for new devices and list any that are found. Once the controller shows **Scan Complete**, confirm the new IVC24-04 you added shows up in the list.

If the IVC24-04 does not appear in the list, try adding it manually by typing the twelve numbers and letters found between the asterisks (**) on the label into the **Serial Code** field, then click **Add To List**. If the IVC24-04 still does not show up, confirm the IVC24-04 is connected to the SiteController's two-wire interface terminals, confirm the IVC24-04 power LED is lit, and watch the TX/RX Two-Wire status LEDs to confirm that the SiteController is transmitting and the IVC24-04 is receiving. You can also magnetically activate the service pin of the IVC24-04 device to see if it is transmitting and being received by the SiteController.

Click the **Add** checkbox next to the two-wire devices you wish to add, and then click **Add Selected Devices**.

The 4 zones of the newly added IVC24-04 will appear in the **General I/O** sub-tab under the **Zones & I/O** tab.

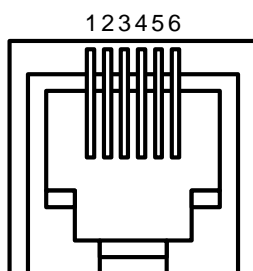
5.2.3 Removing a Two-wire Device

With the device still installed and powered on (when possible) choose **delete** from the **Two-Wire Devices** table on the **Devices** tab. This will delete the device and all I/O from all schedules, scenes, etc.

5.3 Serial Ports (AUX and CONSOLE)

The SiteController includes two serial ports (AUX and CONSOLE). The pin assignments of these serial interfaces match the Davis weather station.

The pin assignments for the RJ12 serial ports are:



RJ12 Pin #	Pin Name DTE	Direction	DB9 Male DTE Pin #	DB9 Female “Null Modem” Pin #
1	CTS	DTE←DCE	8	7
2	TX	DTE→DCE	3	2
3	RX	DTE←DCE	2	3
4	GND	GND	5	5
5	DTR	DTE→DCE	4	6 (DSR)
6	RTS	DTE→DCE	7	8

Serial cables and DB9 connectors are available for purchase from Bibaja.com’s online store.

5.3.1 CONSOLE RJ12

The CONSOLE RJ12 serial port defaults to 115200 bits per second, 8 data bits, no parity, 1 stop bit (115200-8-N-1). Through the CONSOLE serial port, you may monitor the boot sequence for embedded Linux, and modify settings in the u-boot boot loader. Authorized developers with unlocked controllers may use this port to log in and make changes to the controller’s firmware.

In the future, the CONSOLE RJ12 may be used for serial expansion.

5.3.2 AUX RJ12

The AUX RJ12 serial port is reserved for future expansion and support of serial attached devices.

5.4 10/100 Ethernet Interface

The 10/100 ethernet interface (labeled **ETHERNET** on the modesty cover) includes two status LEDs and one RJ45 twisted pair ethernet plug.

The status LEDs indicate:

TX/RX: Blinks when there is transmit or receive activity on the ethernet network

LINK: Is lit when the ethernet network link is active

The pin assignments looking into the RJ45 connector (numbered 1-8 left to right):

RJ45 Pin	T568A	T568B	SiteController Function
1	Green/White	Orange/White	TX+
2	Green	Orange	TX-
3	Orange/White	Green/White	RX+
4	Blue	Blue	None
5	Blue/White	Blue/White	None
6	Orange	Green	RX-
7	Brown/White	Brown/White	None
8	Brown	Brown	None

Your premise wiring will either follow the T568A or T568B wiring standard. You will need to follow the correct standard if you need to terminate a twisted pair cable yourself for making the connection to the SiteController. If you are plugging into an existing ethernet port, you need a standard straight-through ethernet patch cable available from your local supplier.

5.5 USB Target

The USB target interface is reserved for future use. It may not be used as expansion for the controller since it acts as a target (as opposed to a host).

5.6 20x2 LCD Interface and Keypad

The daylight readable 20x2 LCD interface is used for initial configuration and diagnostic tests of the controller.

The keypad includes 5 keys for navigating the LCD user interface. The keys are:

Cancel (X): Exits current menu and takes user to the top level status display

Back: Exits current menu and takes user up one menu level

Up/Down: Scrolls through menu list or increments/decrements number entries

OK: Accepts changes, enters or exits edit mode

5.7 Meter Input Port

The meter input port is a three (3) terminal port with pins from left to right labeled on the modesty cover:

- **12V:** 12V power for meter, maximum current 750ma.
- **PULSE IN:** Meter input from cold contact or NPN open collector meters.
- **GND:** Ground for meter or cold contact

In the software, the **PULSE IN** input is labeled **Meter Input**. This input supports pulse rates up to 1 kHz (1000 pulses per second.) For irrigation applications, we recommend finding a meter with a high rate of pulses per unit of water. One pulse per gallon meters are fairly common (see omega.com for a variety of positive displacement meters with pulse output.) We originally specified the FTB6207-PS for moderately sized residential applications. This meter, now

discontinued, output 200 pulses per gallon of water. As of this writing, omega.com has the FTB6110-PS in stock. The FTB6110-PS outputs 60 pulses per gallon.

NPN open collector meters require connection to all three pins.

Cold contact style meters are connected between **PULSE IN** and **GND**.

Maximum current draw from the 12V power is 750ma (combined current draw of 750ma from the meter port and the open collector/0-20ma 12V output.)

Wire gauge range is 26 to 16AWG. (0.3 to 1.4mm diameter) Strip 6mm of insulation from wires for optimum connection.

5.8 Open Collector/0-20ma Output Port

The open collector/0-20ma output port provides four (4) pins from left to right labeled on the modesty cover:

- **12V:** 12V power for relay coil
- **OC OUT:** NPN Open collector output for driving relay coil
- **0-20ma OUT:** 0-20ma analog output, 0.1ma steps
- **GND:** Ground reference for 0-20ma output and 12V power

The open collector output may be used as a master valve or pump relay control output. Relays or solenoids with 12V coils may be connected between **12V** and **OC OUT**. Maximum continuous current sink into **OC OUT** is 500ma. Maximum combined current draw from the **12V** power output is 750ma (combined current of 750ma with the Meter Input Port 12V terminal).

The 0-20ma output provides an analog signal in the range of 0.5ma to 20ma in 0.1ma steps. The value 0.0 turns off the output completely. This output is useful for setting the speed control for a variable frequency drive (VFD) pump and for controlling other analog outputs such as a proportional valves, electronic ballasts, analog panel meters, etc.

The combination of **OC OUT** and **0-20ma OUT** provide a complete set of signals to control most VFD pumps. **OC OUT** is used to enable the pump or set the direction, and **0-20ma OUT** is used to set the pump speed.

Wire gauge range is 26 to 16AWG. Strip 6mm of insulation from wires for optimum connection.

5.9 24VAC Power Input

The SiteController accepts 12-30VAC power at the input labeled **24VAC-L N**. When idle, the SiteController draws less than 2 watts of power. Active power depends on the amount of power required to drive the valves and relays attached to the zone outputs.

The internal 20x5mm fuse is rated for 3.15A/250VAC fast blow. Replace this with a similar fuse for continued protection of SiteController circuitry.

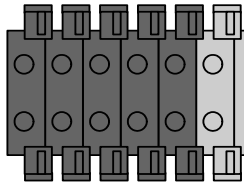
Wire gauge range is 28 to 16AWG. Strip 6mm of insulation from wires for optimum connection.

5.10 Operating Temperature and Humidity

Operating temperature range is -20C to 70C.

Operating relative humidity is 90%, non-condensing. If condensation inside the enclosure is observed, we recommend installing ventilation in the base of the enclosure to allow moisture to escape.

5.11 Commons and Two-Wire Connections



The commons and two-wire connections are made to this terminal block in the lower right corner of the main PCB. The black commons and TW L are all connected to the 24VAC line through the 3.15A fuse.

The two (2) grey terminals are both connected to 24VAC neutral. If you need to ground the controller, insert the ground wire into one of these two grey terminals.

The two-wire connections are made between the black and the grey terminals. This sends 24VAC power across the two-wires along with communications from the two-wire interface installed in the upper right corner of the main PCB.

The black/grey terminals always have 24VAC power available. You may use these terminals to test valve wiring. During configuration, you might insert an irrigation flag into the grey terminal to touch valve wires to for testing connections.