BaseStation 6000 Site Controller

User Manual

January 16, 2012

Contents at a Glance

Customer Service 1-866-294-5847

Table of Contents

1 – PRE-INSTALLATION

Congratulations on purchasing the most capable centrally-controlled irrigation system in the industry. The BaseStation 6000 accommodates up to 4,000 zones with 500 soil moisture sensors and manages flow on up to 800 separate flow zones across 24 flow devices. You can create as many as 100 programs to water even the most complicated site.

In the BaseStation 6000 system, you can connect up to 20 Remote Base Units that take the place of individual controllers. A variety of connection options gives you ultimate flexibility for any project. You can connect the Remote Base Units to the central control computer with a serial connection, a two-wire connection (through a Bridge Unit), Ethernet, or Wi-Fi connection, or a mesh radio connection.

Every BaseStation 6000 comes standard with Baseline's powerful watering engine. The BaseStation 6000 can turn your system on or off and adjust the run time based on readings from Baseline's patented soil moisture sensors. You can easily see the effects that each cycle has on soil moisture content. You can set up ET-based watering zones. The BaseStation 6000 also makes all the system data available in log and report files that can be emailed to you each day. System alerts and warnings can be sent via text message or email and are easily accessible in the software.

System Components

Because Baseline provides a variety of configuration options for the BaseStation 6000™, the components that make up your system are specific to your requirements. The standard and optional components are described below. Due to the wide variety of connection options and wiring layouts, we have not attempted to document every variation in this user manual. For help understanding the various components that you have received, call Baseline Technical Support (866.294.5847).

BaseStation 6000™ Site Controller Standard Components

- Computer with BaseStation 6000 and BaseStation 6000 Report & Alert Mailer software pre-installed

    Recommended Computer Requirements

    - 500 GB hard drive
    - 3 GB RAM
    - Microsoft Windows 7 operating system
    - Dual core processor
    - Available serial port

    Minimum Computer Requirements

    Note: It is recommended that the PC be dedicated to BaseStation 6000 software. Do not run other programs on this machine. Refer to the Warranty Information on page 123 for more details.

    - 200 GB hard drive
    - 2 GB RAM
    - Microsoft Windows XP operating system – Service Pack 2
    - Dual core processor
    - Available serial port
- 20-inch monitor capable of 1600x1280 resolution
- Surge protector
- Serial cable

- Internet connectivity required for technical support and remote access

- Remote Base Unit™ – Each Remote Base Unit manages an electrically isolated irrigation sub-system and is able to support 200 valves

Optional Components

- Bridge Unit – When your system includes more than one Remote Base Unit, the Bridge Unit is located between the BaseStation 6000 computer and the Remote Base Units.

- biSensor™ Soil Moisture Sensor – A biSensor provides soil moisture and temperature data to the Baseline BaseStation Controller.

- Air temperature sensor – The Air Temperature Sensor for the BaseStation 6000 system provides two separate functions: It offers a convenient way to halt watering when the outside temperature drops below 38°F. It also enables ET-(evapotranspiration) based watering.

- Weather station – An on-site weather station collects data on temperature, humidity, solar radiation, and wind speed. The controller uses this data to adjust watering times. Contact Baseline for supported weather stations.

- Rain sensor or rain gauge – You can connect one of these devices so the system will shut down in the event of rain.

- Flow devices – Flow meters and sensors support flow management, flow learning, high-flow, low-flow, and no-flow alerts and shutdowns.

- Flow biCoder – The Flow biCoder is used to connect a flow sensor to the BaseStation 6000 system.

- Pause devices – These devices can be used to turn the system off or on when an event occurs. These events can be a user pushing a pause button to halt watering on a baseball field or a rainstorm activating a rain sensor.

- 1, 2, and 4 valve biCoders™ – The Baseline biCoder connected to the two-wire network activates valves by decoding signals sent from the Remote Base Unit.

- 12 and 24 valve powered biCoders™ are designed to retrofit into existing systems. These biCoders connect to the two-wire network and activate valves by decoding the signals sent from the Remote Base Unit. They are designed to drive traditional wiring where there is one wire per valve. Powered biCoders require 110v in order to run.

Upgrades

- Baseline Mobile Access™ – Upgrade the BaseStation 6000 system to support Mobile Access or Mobile Access Advanced. Baseline Mobile Access turns any web-enabled cell phone or other mobile device into a remote control and gives you full access to your BaseStation 6000 system.

Communication Options

You will use one of the following options to establish communication between the BaseStation 6000 computer and the rest of your system:

- RS232 serial cable – Direct connection between two devices with a maximum distance of 50 feet.

- RS485 dual conductor serial connector – Connect multiple devices on one "daisy chain" with a maximum distance of 2000 feet. Must have an RS485 adapter for each device at both ends.

- Wired backbone – Connect the computer to the Bridge Unit, and then connect the Bridge Unit to one or more Remote Base Units.

- Mesh radio – One transmitter is connected to the computer. The Bridge Unit or Remote Base Unit requires an antenna and receiver.

- Ethernet – Uses RJ45 Ethernet cable to connect to the local network or to the Internet. The BaseStation 6000 computer and the Remote Base Units must have wired access to the Local Area Network (LAN) or a Wide Area Network (WAN).

- Wi-Fi – Provides a short-range wireless solution. The BaseStation 6000 computer and the Remote Base Units must be able to connect to the Local Area Network (LAN) or a Wide Area Network (WAN).

Planning Your System Configuration

Perform the following tasks to help simplify the installation and configuration process:

- Use an existing site map or an as-built drawing that shows the location of each zone. If a site map is not available, draw something to the best of your ability. This map is one of the most valuable tools you can have.

- For existing systems, record the number of minutes each zone waters and how many days there are between watering cycles. Skip this step when you are configuring a new system.

- Walk around the site with the map and select locations for soil moisture biSensors in each hydrozone. Place the biSensor in an area that is an average representation of the rest of the hydrozone. Refer to Sensor Placement on page 22 for more information on biSensor placement and burial.

- Complete the Zone Group Organizer Worksheet found in the Reference section on page 116. Group the valves by hydrozones, plant type, head type, and micro-climates.

Retrofitting Existing Systems

You can retrofit existing systems by using the 12 or 24 valve powered biCoder to replace the different controllers.

Locating the Bridge Unit™

The following guidelines are recommended for Bridge Unit locations:

- The Bridge Unit connects to the computer with a serial RS232, RS485, or mesh radio.

- The Bridge Unit is in a supplied enclosure. You should install it in a secure location.

- The Bridge Unit enclosure does not have switches or other controls; however, there are several diagnostic LEDs. We recommend that you place the unit in a convenient location for troubleshooting purposes.

Locating the Remote Base Units™

Where you locate your Remote Base Units depends on your system configuration. For example, if you have just one Remote Base Unit that will be connected to the BaseStation 6000 computer with a serial cable, the RBU must be no further than 50 feet away from the computer. On the other hand, if you are setting up a wired backbone, your RBUs can be further away from the computer. The minimum requirements for the RBU locations are access to power and a place to mount the enclosure.

Planning the Backbone Layout and Wiring Details

The backbone refers to the two-wire system that connects the Bridge Unit to the Remote Base Units located throughout the site. The backbone is a unique wiring system, independent of any other wiring configurations. Backbone refers to the wiring topology and not to a specific type of wire. Refer to the Two-Wire Tech Spec on Baseline's web site (www.baselinesystems.com).

Use Polyethylene double-jacketed or UF-B UL PVC double-jacketed two-conductor solid core wire that is designed for direct burial systems between Remote Base Units and then to the Baseline Bridge Unit. Refer to the detailed specifications available on Baseline's web site (www.baselinesystems.com).

The Bridge Unit broadcasts a command to all Remote Base Units on the system. All the Remote Base Units "decode" the message but only the appropriate Remote Base Unit responds and activates its local two-wire activity.

You can set up the backbone with straight-line, star, combination, and looped configurations (similar to the Sample Wiring Topologies that are illustrated on page 6).

Backbone Wiring
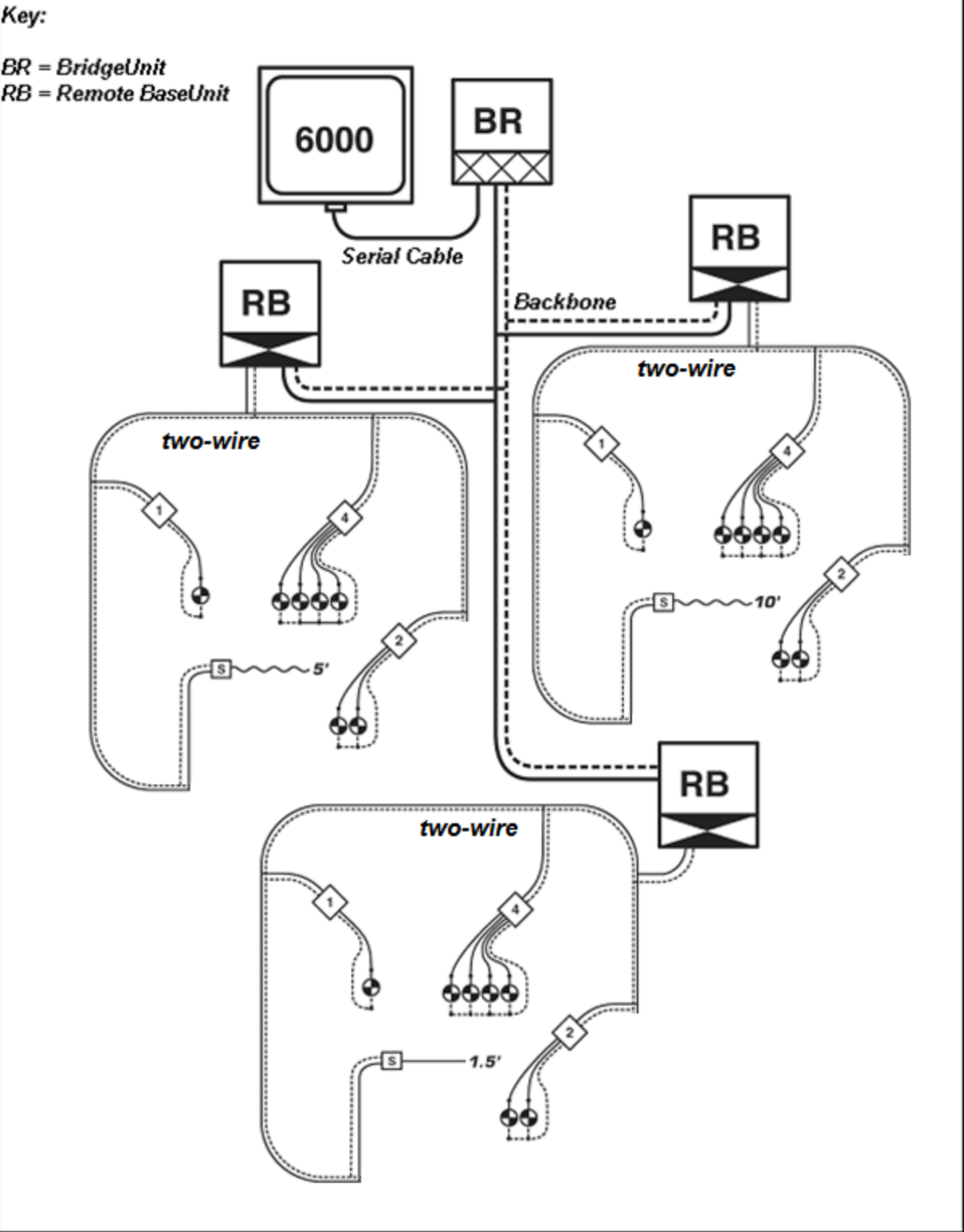
Planning the Two-Wire Layout for the Remote Base Unit

Baseline's two-wire communication protocol is called biLine™. The biLine protocol runs over the two-wire and provides a clear path for power and communication to travel throughout the site. The configuration and length of the wire runs determines what size of wire needs to be used. Please refer to the tables and other detailed information in the Two-Wire Tech Spec on Baseline's web site (www.baselinesystems.com).

The system supports straight-line, star, looped, and combination configuration. For examples of these wiring configurations, see Figure 1 - Straight Run, Figure 2 - Star, Figure 3 - Combination, and Figure 4 - Complete Loop topology.

For the purpose of this manual, all possible configurations are depicted. However, the Straight Run and the Star topology are the recommended layouts. To simplify the illustrations, only the last device is shown for most configurations. You can assume that other devices, both sensors and biCoders, are connected along the length of the two-wire path. On a star configuration, the topology has multiple last devices. Each device must separately meet the distance requirement.

While the Complete Loop topology might provide a more robust configuration, it is harder to trace the wiring errors that might occur. For this reason, Baseline recommends the other topologies over the Complete Loop.

If you decide to use Complete Loop topology, calculate your wire length using the following formula:

> The distance to the last device is the total length of the loop divided by two plus the length of the spur.
>
> Length = (Loop Length /2) + Longest Spur Length

After you select the topology, calculate the wire run lengths in feet or meters. Then use this information to select the appropriate wire size per wire length based on the Two-Wire Tech Spec on Baseline's web site (www.baselinesystems.com). In addition, calculate all runs of wires in order to determine the amount of wire that you need to purchase.

WARNING! The distance to the last device must meet the wire length specifications. Refer to the Warranty Information on page 123 for more information.

Sample Wiring Topologies

Figure 1 – Straight Run
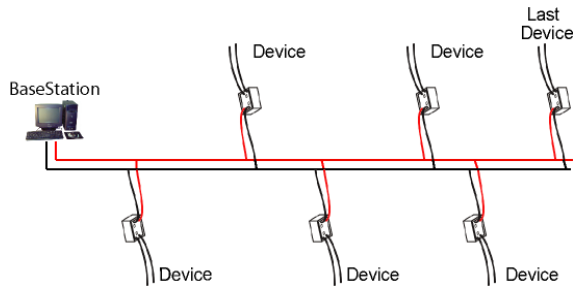
Figure 2 – Star
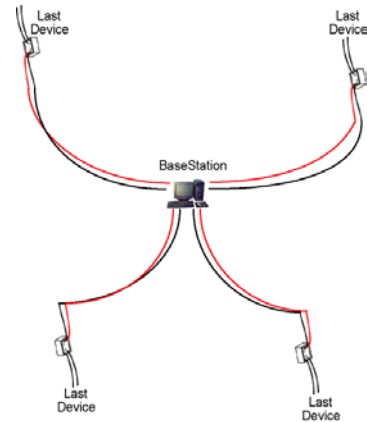
Figure 3 – Combination Topology

Loop Length = 1000 Feet
Spur Length = 500 Feet
Effective distance to the last device = 1000 feet
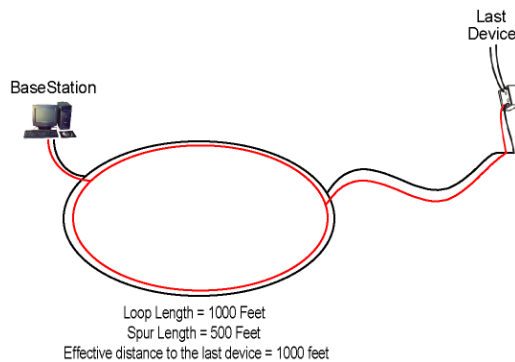
Figure 4 – Complete Loop
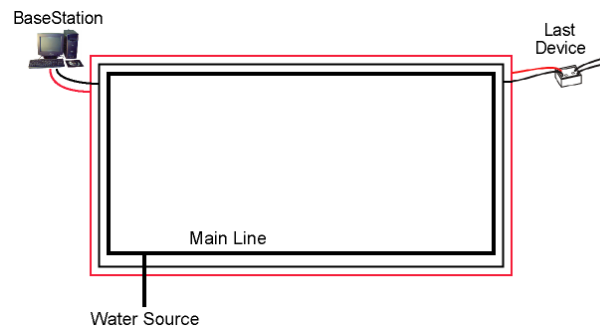
Wiring Hints

For wiring specifications, refer to the Two-Wire Tech Spec on Baseline's web site (www.baselinesystems.com). Use the appropriate wire type for your project. Typical PVC irrigation wire, without a second layer of insulation is not suitable. If you use an unspecified wire type, it will void your warranty. Make sure your backbone wire and field wires are two different colors.

Wiring Connections

Use wire connections that are DBR/Y-6 or equivalent on the two-wire side and on the valve side. Install all connections according to their manufacturer's instructions.

Note: Two-wire systems have constant power running through them. If a connection is not waterproof or has any contact with earth, the connections will quickly corrode. Your warranty will be voided if you fail to use the wire connections as described in the specification.

Inside the Valve Box
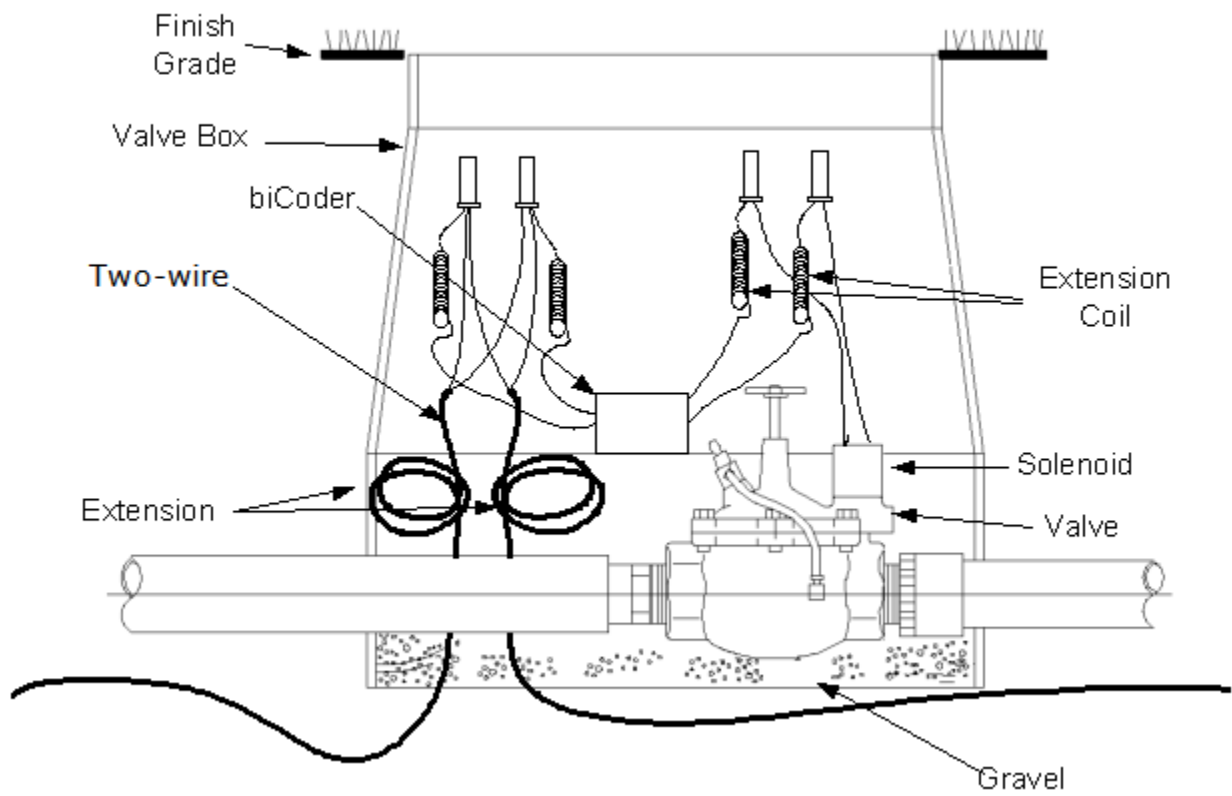
2 – HARDWARE INSTALLATION & CONFIGURATION

Installation Hints

To quickly configure the BaseStation 6000 Site Controller software and start watering, refer to the **Quick Start Guide**. This manual gives more detail for configuring the system and fine tuning the programming.

Initial Setup

This initial setup configures the devices within the system for use. After you have properly configured all the devices, you need to set up the watering strategies in the BaseStation 6000 software. Refer to Setting Up Programs (Establishing Water Windows) on page 30.

The BaseStation 6000 Site Controller works differently than traditional irrigation control systems. In traditional irrigation control systems, you specify exactly when and for how long you want the system to water. The BaseStation 6000 Site Controller can be used in this manner; however, you can also configure it to do much more.

Instead of telling the system when and how long to water for every situation, you specify when you **do not** want the system to water. BaseStation 6000 then intelligently chooses watering cycles that take these constraints into account. Because of these intelligent watering cycles, the site is watered only when needed (and allowed), and it does not require constant maintenance.

Existing Systems

Consider the following hints when you are configuring a conventionally wired system to work with the BaseStation 6000:

- Manually run all valves to verify that they are operating properly before you start the installation.

- Make any necessary repairs to the existing wiring, as needed.

- When you upgrade an existing system to a two-wire system using Powered biCoders, make sure you locate power and ground wires in order to correctly hook up the system. If you mix up the power and ground wires, you will create problems that can be difficult to diagnose. To simplify this process, make one or two connections, and then test. Using this method, you can easily find and repair any problems before they become hard to find.

- Run two-wire from the Remote Base Unit to the closest controller and replace the controller with a Baseline 12/24 Valve biCoder.

  Note: Before removing the wires from an existing controller, write down which zones they control and mark the wires. This information will help you determine which Baseline biCoder address is associated with the zone when you reconnect.

- If you have more than one controller, convert a single controller and all of its associated valves before moving to another controller. To connect an additional controller, you can run two-wire between the controller locations or between two valve boxes on the two systems.

All Systems

Consider the following installation hints when you are configuring any BaseStation 6000 system:

- Start by setting up the computer that will be running the BaseStation 6000 Controller software. Refer to Installing and Setting Up the Computer on page 9.

- Always add a few two-wire components at a time, and then test. This method makes it easier to find and correct any problems.

- Test components with the BaseStation 6000 Controller software before you bury anything. To find any failing zones, run the Quick Test All Zones option. Refer to Performing a Quick Test on All Zones on page 101.

- Provide enough extra wire length (24 - 36 inches) at valve boxes and any buried locations so that you can easily work with the wire, biCoders, and/or sensors. Keep in mind that seasonal conditions can have an effect on your wiring. Freezing and thawing can shift wiring, and if the extra wire length is not available, connections can be pulled apart.

Installing and Setting Up the Computer

As you unpack your system, you should have many of the following parts, depending on the particular options that you ordered.

Because Baseline provides a variety of configuration options for the BaseStation 6000™, the components that make up your system are specific to your requirements. Due to the wide variety of connection options, we have not attempted to document every variation in this user manual. For help connecting the various components that you have received, call Baseline Technical Support (866.294.5847).

Setting Up the Computer

- Connect the computer components (such as the keyboard, mouse, monitor, Ethernet cable, and surge protector) as defined in the quick setup guide found in the computer box.

- Determine your connection method, and then use one of the following options to connect the computer to the rest of the system:

    - **Serial cable:** Using the provided serial cable, connect the computer to the Remote Base Unit.
    - **RS485:** Using the provided RS485 serial cable, connect the computer to the Bridge Unit.
    - **Mesh radio:** Connect the radio transmitter to the computer.
    - **Ethernet:** Connect the RJ45 Ethernet cable to the computer and then to the local network or to the Internet. This connection option requires some IT and network setup.
    - **Wi-Fi:** This connection option requires some IT and network setup.

- Turn on the monitor, and then turn on the computer. The BaseStation 6000 Site Controller software and the BaseStation 6000 Report and Alert Mailer software start automatically.

    Note: If the software does not start automatically or if you accidentally close it, refer to Manually Starting the BaseStation 6000 Software on page 10.

- After the BaseStation 6000 software is running, we recommend that you set up the email notification system (refer to System Notification on page 82), and give the site a name (refer to Identifying Your Site on page 11).

- Ensure that the date and time (and your time zone) are set correctly on the computer because the BaseStation 6000 software synchronizes with the Microsoft Windows settings. To change the Microsoft Windows settings, click the time in the Notification area of the Windows Taskbar. The date and time information opens in its own window. Click the option to change the date and time settings. The Date and Time dialog box opens. Follow the steps to change the date and time and to change the time zone as needed.

Manually Starting the BaseStation 6000 Software

If the BaseStation 6000 Site Controller software does not start automatically when you turn on the computer or if you accidentally close the software, double-click the Baseline Irrigation Control Software icon on the computer's desktop.

Note: If you think that the BaseStation 6000 Site Controller software is running, but you do not see the main program window, it might be minimized and not visible on the desktop. If the software is running, you will see a small icon in the Windows taskbar at the bottom of the computer desktop. Click the icon to display the main program window.

If the BaseStation 6000 Report and Alert Mailer software does not start automatically when you turn on the computer or if you accidentally close the software, double-click the BaseVision Notify icon on the computer's desktop.
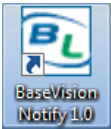
Note: When the BaseStation 6000 Report and Alert Mailer software is running, the main program window is typically minimized and not visible on the desktop. If the software is running, you will see a small icon in the Windows taskbar at the bottom of the computer desktop. Click the icon to display the main program window.

Important: After you have the BaseStation 6000 Site Controller software configured for watering and the BaseStation 6000 Report and Alert Mailer software configured for notifications, leave the software and the computer running at all times. If you shut down the software and/or the computer, your irrigation system will stop watering and notifications will not be sent.

Understanding the System Refresh

The BaseStation 6000 software is configured to automatically refresh (which means to update the program fields with new data) at the "top of the minute" according to the system's internal clock. If you type information in a field or make other changes to the configuration, you might need to wait several seconds before those changes take effect in the system.

Due to the automatic refresh, if you are typing an entry in a field when the system reaches the top of the minute, the field will revert to the former entry, and you will lose what you typed. If this happens while you are typing an entry, retype the entry as quickly as possible, and then press Enter on your keyboard to indicate that you have finished typing. At the next top-of-the-minute refresh, your entry will display as you intended.

The system time displays in hours, minutes, and seconds (1) in the **System Status Messages** group box at the bottom of the Main Page.

Important! Keep the system refresh schedule in mind whenever you are making changes to the BaseStation 6000 configuration.

Identifying Your Site

Before you start configuring various hardware components in the BaseStation 6000 software, we recommend that you type the name of your site in the **Local Site Name** (1) field at the bottom of the Main Page.
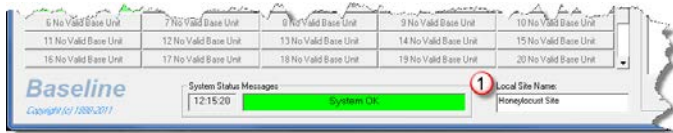
Configuring a Remote Base Unit

This section describes how to add a Remote Base Unit (RBU) to the BaseStation 6000 Site Controller. Each RBU manages an electrically isolated irrigation sub-system and is able to support 200 valves.

Note: If your configuration includes a Bridge Unit and backbone wiring, you need to set up your computer and have the Bridge Unit connected. Refer to Planning the Backbone Layout and Wiring Details on page 3 before adding a Remote Base Unit.

To configure an RBU

1. On the Main Page of the BaseStation 6000 software, click the **Base Unit** (1) tab.

2. If the BaseStation 6000 site controller connects to the RBU through a network, skip to Step 4. If the computer is connected with a cable, continue with Step 3.

3. Click the **Initialize Serial Ports** (2) button. The Serial Port Locator message box displays all available serial ports.

   - If the list of serial ports and the default displayed in the message box is correct, click **Yes**.

   - If the serial port is not correct, click **No**. The Select Alternate Port dialog box opens. Type the serial port number in the field, and then click **OK**. If you need help, consult with your IT department or call Baseline Technical Support (866.294.5847).

4. On the Base Unit tab, click the **Comm** (3) button located at the right end of the row for the first RBU.
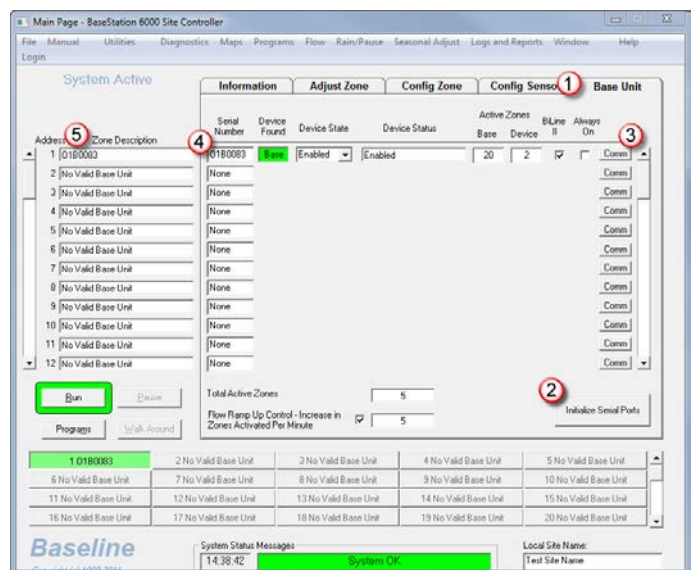
5. In the **Communication Setup** dialog box, select the Communication Type for the RBU.

If **Serial Port** is the Communication Type for the selected Remote Base Unit, select that option.	If a **Mesh Radio** is the Communication Type for the selected Remote Base Unit, select that option, and then type the MAC address that is listed on the Mesh Radio Module of the Remote Base Unit.	If **Network** is the Communication Type for the selected Remote Base Unit, select that option, and then type the serial port number and the IP address for your network.
	BL6111MR-X Configuration Serial Number: MRX1010020 MAC: 00-13-A2-00-40-46-D0-D6 BASE·LINE	
	Note: If your Communication Type is Radio to Radio to Bridge Unit, select the **Mesh Radio** option, and then select the **Bridge Unit** check box.	
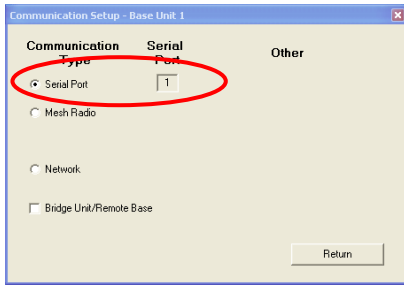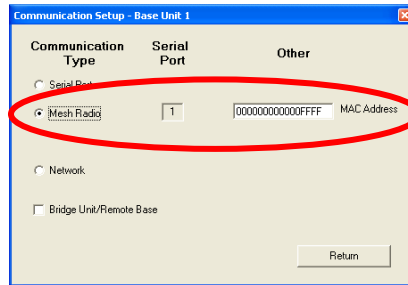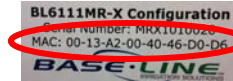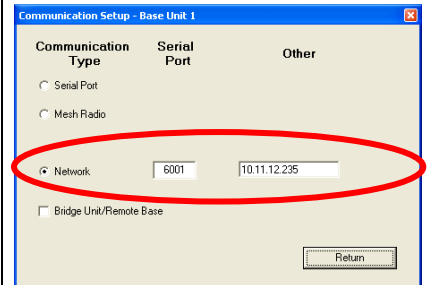
6. Click **Return** to save your changes and go back to the Base Unit tab.

7. Find the serial number of each RBU. The number is printed on a sticker that is located on the inside door panel of the RBU. The serial number format is RBXXXXXXX (where the Xs represent a series of seven numbers).

8. In the **Serial Number** (4) field, type the serial number for the first RBU, and then press **Enter** on the keyboard. The RBU information displays in the fields.

9. We recommend that you type a description in the **Description** (5) field so you can easily identify the RBU.

10. Repeat these steps for each RBU as needed.

Settings that Apply to Individual RBUs

- **Disable an RBU** – By default, the Device State option is set to Enabled. If you want to turn off all devices that are attached to a Remote Base Unit, set the **Device State** (1) for that RBU to Disabled.

- **Configure the number of zones that can be running at one time** – Under **Active Zones** (2), type a number in the **Base** field to represent the total number of zones that can be running at one time for this Remote Base Unit. Type a number in the **Device** field to represent the total number of zones that can be running at one time for each biCoder that is connected to this Remote Base Unit.

- **Select a different biLine protocol** – The BiLine II (3) check box is selected by default, and it means that the Remote Base Unit will use the biLine II protocol. If you want to change the protocol to biLine I, click the box to remove the check mark.
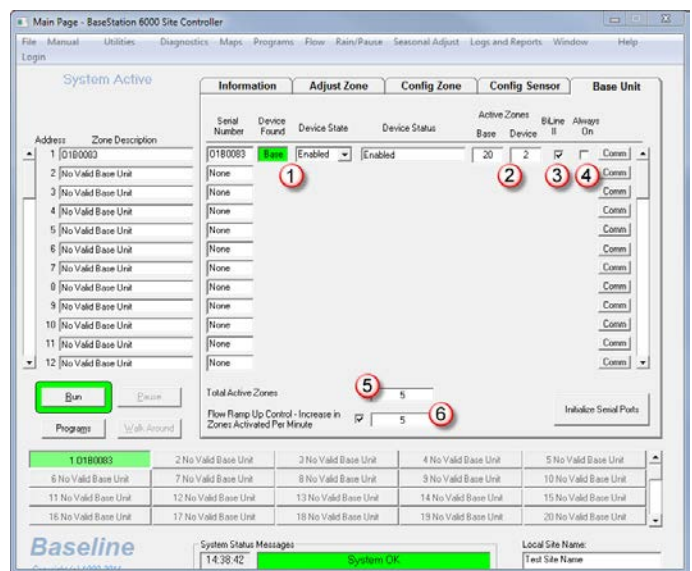
- **Set an RBU to always apply power** – If you have a sensor or other device that requires continuous monitoring attached to this RBU, select the **Always On** (4) check box to set the Remote Base Unit so it is always applying power to the two-wire system.

Settings that Apply to All of Your RBUs

- **Set the total number of zones that can run on the entire system at one time** – Type a number in the **Total Active Zones** (5) field to represent the number of zones that can be running on the entire BaseStation 6000 system at one time.

  During the initial configuration of your BaseStation 6000, we recommend that you **set the Total Active Zones to 1,** which limits the number of zones that can run at one time to only one**.**

- **Set the number of zones that can turn on at one time (concurrent zones)** – Use the Flow Ramp Up Control (6) option to prevent pump overload by setting the number of zones that will turn on each minute as an watering cycle starts. By default Flow Ramp Up Control is not enabled. To enable this option, select the check box, and then, in the next field, type the number of zones that can turn on.

Configuring a Bridge Unit

If your configuration includes a Bridge Unit and backbone wiring, you need to connect your BaseStation 6000 computer to the Bridge Unit. For the physical installation of the Bridge Unit, please refer to the "Installation Guide" that was included in the package.

The Communication Setup dialog box opens when you are installing and configuring the RBUs. When a Bridge Unit is part of your system configuration, select the check box on the Communication Setup dialog box for each RBU that is connected to that Bridge Unit.
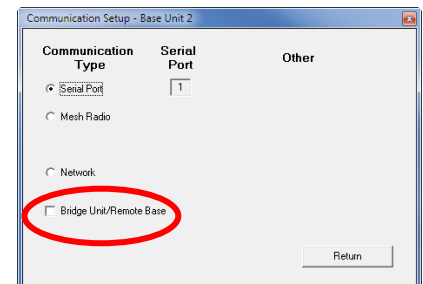
Adding Valve biCoders and Other Two-Wire Devices

This section describes how to complete the software configuration for the various two-wire devices that are available for the BaseStation 6000 Site Controller such as biCoders, biSensors, and water flowrate sensors. For the physical installation of the device in the field, please refer to the "Installation Guide" that was packaged with the device.

Note: We suggest that you attach and configure only a few devices at a time. The system checks your devices. If it detects a problem, do not add more devices until you correct that problem. Proceed with connecting, configuring, and checking until all devices are working properly.

Listing Attached Devices

After you have some devices physically connected in the field, you can use the List Devices option in the software to display the serial numbers of those devices.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that you want to list devices for.

2. Click the **Information** tab to activate the Main Menu.

3. Click the **Diagnostics** menu, and then click **System Diagnostics** (1). The System Diagnostics window opens.

4. Click the **Config Support** (2) tab.
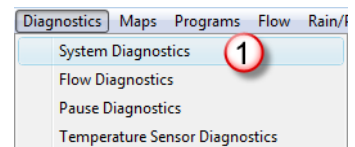
5. Click the **List Devices** (3) button. The attached devices display in the pane on the right. If one or more devices are not listed, troubleshoot the connections per the Troubleshooting section until the problem is found and corrected.

   Note: If you want to save the list of attached devices to a file, follow the steps in the next section before you close the list.

6. When you have finished reviewing the list of attached devices, click **Return** to close the System Diagnostics window and return to the Main Page.
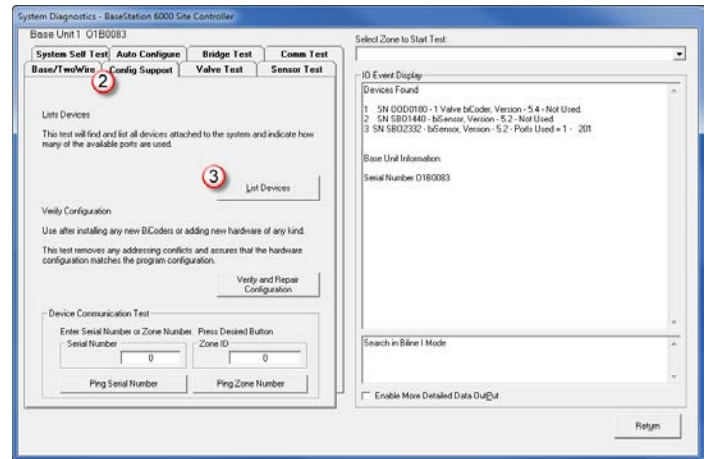
Saving the List of Attached Devices

You can save the list of attached devices to a file. Then you can print that file and use the list to help configure the devices in the software.

1. Follow the steps above to display the list of attached devices.

2. Position the cursor anywhere inside the list of devices, and then click the right mouse button.

3. On the menu, click **Select All**.

4. While the list is highlighted, position the cursor anywhere inside the list of devices, and then click the right mouse button again.

5. On the menu, click **Copy**.

6. Position the cursor anywhere on the computer desktop, and then click the right mouse button.

7. On the menu, click **New**.

8. On the menu, click **Text Document**. A new text document icon displays on the desktop.

9. Double-click the text document icon. The Notepad window opens.

10. Position the cursor anywhere in the blank space within the Notepad window, and then click the right mouse button.

11. On the menu, click **Paste**. The list of devices displays in the text document.

12. From the menu at the top of the Notepad window, click **File**.

13. On the menu, click **Save**. The file is saved to your computer desktop with the New Text Document.txt filename.

Searching for a Configured Device

If you know the serial number of a device, but you are not sure whether you have configured that device, you can search for the device in the software.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to search for devices.

2. Click the **Information** tab to activate the Main Menu.

3. Click the **Utilities** menu, and then click **Find Decoder using Serial Number**. The Find Device dialog box opens.

4. Type the serial number of the device in the field, and then click **OK**. If the system finds the device, the Find Serial Number message box opens. If the system does not find the device, the message box displays "No match found."
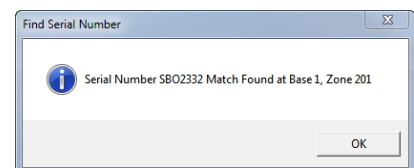
Adding Valve biCoders

A valve biCoder is a decoder used to activate valves in the field. Each biCoder has a unique serial number and address that identifies it to the Remote Base Unit. The Remote Base Unit broadcasts a command that activates a biCoder, which, in turn, activates a valve.

Tip: If you have groups of biCoders, leave a couple of blank fields between each group. While not necessary, it simplifies adding zones in the future, makes re-ordering zones in the scheduling group easier, and it is easier to visualize your groups when there is space between them.

Valve biCoders fall into two categories:

- **Valve biCoders connected with two-wire** – All the biCoders on the two-wire "decode" the message but only the appropriate biCoder responds and turns the attached valve on or off. The biCoder returns a status message to indicate whether the activation was successful.

- **Powered Valve biCoders connected with conventional wire** – You can use a powered biCoder to retrofit a conventional wire system with Baseline biCoder technology.

To add a valve biCoder

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit (1) that the valve biCoder is connected to.

2. Click the **Config Zone** (2) tab.

3. In the **Serial Number** column, type the serial number for the biCoder in an unused address line (3).

   Note: The serial number of the two-wire biCoder is located on the side of the unit. The serial number for the powered biCoder is located on the inside of the enclosure door.

4. Press **Enter** on your keyboard. The system searches for the device, tests the solenoid and the communication, and then displays the Configuration Status message box.

5. Click **OK**.

   Note: When you add a valve biCoder, the background color of the Zone Description field changes to red because the program associated with those zones is disabled by default. For information about enabling programs, refer to Setting Up Programs (Establishing Water Windows) on page 30.

6. Type a description of the biCoder in the **Zone Description** (4) field. Use the description to define the location or area that this valve is controlling. Now that the valve biCoder is configured in the BaseStation 6000 software, it is referred to as a zone.

   Note: The address numbers for biCoders range from 1 to 200.

Settings for Valve biCoders

After a valve biCoder is configured in the BaseStation 6000 software, it is referred to as a zone.

- **Define the mode of each zone** – Click the arrow in the **Device Mode** (1) field (see the illustration on the following page), and then click one of the following options to define the mode of each zone:
  - **Auto** – In order to use this mode, you must have a sensor (such as a soil moisture sensor) installed and configured. This mode associates the sensor with this zone.

- ▪ **Timed** – Enables you to set a zone to run based on its programmed times only.

- ▪ **Linked** – Sets a zone to use the same watering setting as a previously configured zone.

  Note: You are only able to link to a zone with a lower number.

- ▪ **Mirror** – Sets a zone to mimic the actions of another zone.

  Caution: This mode has a specialized function and is not recommended for general use.

- ▪ **Disabled** – Use this mode to disable the zone.

  Note: If other zones are mirrored or linked to this zone they will also be disabled.

- ▪ **M-Valve** – Use this mode to designate this zone as the master valve. It functions as a normally closed valve that turns on when the flow zone is activated.

- ▪ **M-Val NO** – Use this mode to designate this zone as a normally open master valve.

- ▪ **SprTime** – Use this mode to set this zone for "sprinkle time," which is a specialized, clock-based turn on/off mode. This mode is not recommended for general use.

ET-Time – Use this mode to configure the zone to water based on Evapotranspiration settings. In order to use this device mode, you must have a temperature sensor attached to the Remote Base Unit. Refer to Configuring an ET Primary Zone on page 55 for more information.

- • **Assign the zone to a program** – Type a number in the **Prog#** (2) field to associate this zone with a program.

- • **Connect the zone to a flow zone** – The fields under **FlowZone** (3) are set to default values, but you can change them. Refer to Setting Up Flow Monitoring for Flow Zones on page 61.

- • **Define the order for a "walk around" test** – Type a number in the **Walk Around Order** (4) field to define the order the zone will run in during a "walk around" test. Click the **Check Walk Around** (5) button to find zones with the same walk around number.

- • **Reorder the list of zones** – Select the **Advanced** (6) option, and then type a new value in the **Zone Reorder** (7) field to change the order of the zones. If you add a new zone that you want to use as a Linked or Mirrored zone, you will need to place the new zone above the others in the list. Use a decimal to move a zone between two others on the list. For example, type 3.5 in the Zone Reorder field to insert a zone between the number 3 and 4 zones. To apply and save your changes, click the **Reorder** button at the bottom of the column. To cancel any unapplied changes, click the **Cancel** button.

Adding a Master Valve

Any single valve biCoder can be used to operate a master valve. A master valve biCoder can be used to actuate a master valve.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that the master valve biCoder is connected to.

2. Click the **Config Zone** (1) tab.

3. In the **Serial Number** column, type the serial number for the master valve biCoder in an unused address line (2).

    Note: The serial number of the two-wire biCoder is located on the side of the unit. The serial number for the powered biCoder is located on the inside of the enclosure door.

4. Press **Enter** on your keyboard. The system searches for the device, tests the master valve and the communication, and then displays the Configuration Status message box.

5. Click **OK**.

6. Type a description of the master valve biCoder in the **Description** (3) field. Use the description to define the location or area that this master valve is controlling.

7. Click the arrow in the **Device Mode** (4) field, and then click one of the following options to define the mode of the master valve:

    - **M-Valve** – Used for a normally closed master valve that turns on when the flow zone is activated

    - **M-Val NO** – Used for a normally open master valve

8. In the **Flow Zone Number** (5) field, type the number of the flow zone that this master valve controls. Refer to Setting Up Flow Monitoring for Flow Zones on page 61.

Adding an Air Temperature Sensor

The air temperature sensor for the BaseStation 6000 system provides two separate functions. It offers a convenient way to halt watering (for all programs) when the outside temperature drops below 38 degrees F. It also enables ET-based watering. The air temperature sensor is read every 10 minutes.

For the physical installation of the device, please refer to the "Installation Guide" that was included in the package with the device.

IMPORTANT NOTE: Air temperature sensors can only be assigned to Remote Base Unit #1.

To configure an air temperature sensor

1. Click Remote Base Unit #1 (1).

2. Click the **Config Sensor** (2) tab.

3. Within the All Programs Temp Stop Watering group box, type the serial number of the Air Temperature Sensor in the **Serial Number** (3) field.

4. Press **Enter** on your keyboard. The system searches for the device, and then displays the Configuration Status message box.

5. Click **OK**.

6. The Air Temperature Sensor is enabled by default. If you want to disable the sensor, click the **Enable** (4) check box to remove the check mark.

7. To test the air temperature sensor, click the **Test** (5) button. The test verifies that the sensor is working and gives you the current temperature reading. You can use this to verify that the sensor is placed correctly.
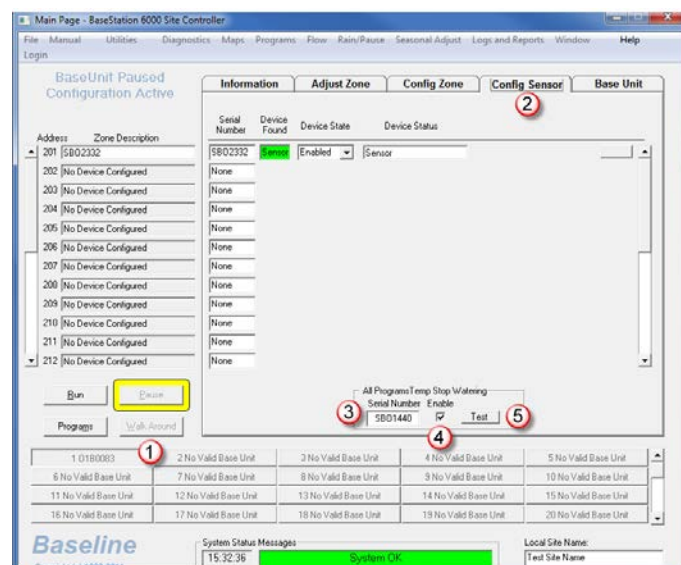
> **Note**: The Air Temperature Sensor does not give a reading if the temperature is below freezing.

Adding a Pause Device

A pause device provides a way to halt watering when an attached "switch" is activated. You can install these devices in any location where you have easy access to connect the device to the two-wire path.

Pause devices fall into two categories:

- **Pause biCoder** – These devices include, but are not limited to, wind, flow, rain, and pressure sensors. A single Pause biCoder per BaseStation 6000 system is all that is needed; however, you can connect up to five pause devices on each RBU.

- **Outside Operation Button** – Provides a convenient way to pause the irrigation system from multiple locations around large sites. You can install up to five outside operation buttons on each RBU.

To configure a pause device

1. Click the **Information** tab to activate the Main Menu.

2. Click the **Rain/Pause** menu, and then click **Configure** (1). The Flow BiCoder and Pause Device Management and Configuration dialog box opens.

3. Click the **Pause/Rain - This Base** tab.

4. Type the serial number of the pause device in an unused **Serial Number** (2) line. Notice that the top part of the list is for general pause devices. You configure the rain pause device in the fields under the Rain Pause Device heading.

5. Press **Enter** on the keyboard.

6. In the **Description** (3) field, type a description that defines the location of the pause device. You will find that defining the locations of your pause devices will be very useful in the ongoing management of your BaseStation 6000 system.
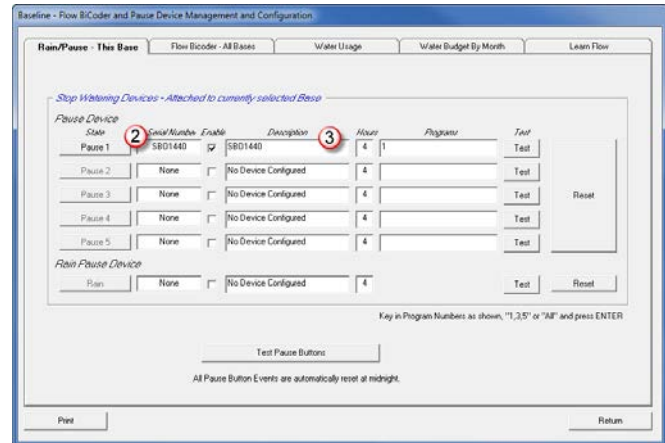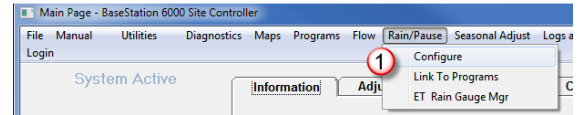
Settings for pause devices

- When you add a pause device, it is enabled by default. To disable the device, remove the check mark by clicking in the **Enable** (4) check box next to the pause device's serial number.

- To define the amount of time the system will pause the programs when the pause device is activated, change the value under **Hours** (5). By default, this field is set to 4 hours, but you can enter any value between 1 and 24 hours.

- To define what program this pause device will affect, type the program number in the **Programs** (6) field, and then press **Enter** to record that program number. If you want this pause device to affect multiple programs, type each program number followed by a comma. (For example, type 1,3,4,42) After you type the last program number, press **Enter**. You can also type the word "All" and then press **Enter** to have the pause device affect all programs.
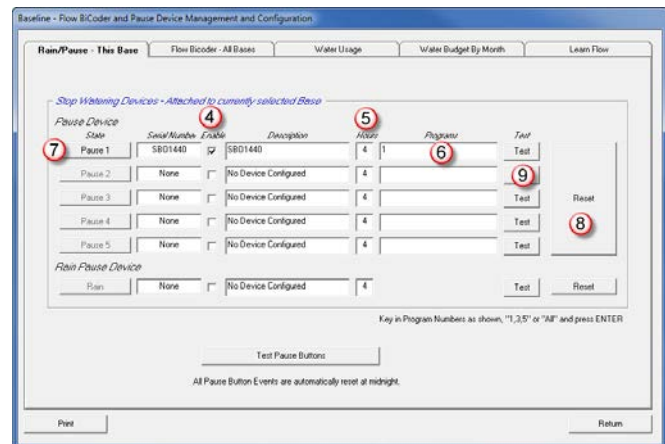
    Note: By default, the rain pause device affects all programs, so the Programs field is not available in this section.

- If you want to manually activate a pause device from the software, click the **Pause** (7) button to the left of the Serial Number field.

    Note: To undo an activated pause, click the Reset (8) button, but be aware that clicking Reset will clear all pause events.

- After you configure a pause device, test the device by clicking the **Test** (9) button for the device. The test checks connectivity and also tells you the state of the device and what programs it affects.

- To clear all pause events, click the **Reset** (8) button.

Adding Devices to Manage Start/Stop Conditions

You can add devices to your irrigation system and then configure them within the BaseStation 6000 to start or stop watering based on specific conditions.

Consider the following examples:

- You might install several moisture sensors at increasingly deeper positions in the soil and then use these moisture sensors to stop watering when the moisture penetrates to certain level.

- You can use an air temperature sensor to start the irrigation system when the temperature of an artificial playing surface rises to a specified level and then shut off the system when the temperature decreases to a specified level.

- You can install a switch and then configure it to start, stop, or pause watering based on whether the switch is open or closed.

    Note: You cannot use a pause button as a start/stop device.

When you want to use devices for these purposes, you need to add them to a specific range of addresses in the BaseStation 6000.

To add a start/stop device

IMPORTANT NOTE: If you are using soil moisture sensors as start/stop devices, follow the steps in the topic on configuring a biSensor on page 23 to add the sensors to the BaseStation 6000. For more information on this use of biSensors, refer to Starting/Stopping Irrigation Based on Tiered Soil Moisture Readings on page 49.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit (1) that the start/stop device is connected to.

2. Click the **Config Zone** (2) tab.

3. Use the scroll box (3) on the left to move to the range of addresses between 180 and 199.

4. In the **Serial Number** (4) column, type the serial number for the device in an unused address line between zones 180 and 199.

    Note: The serial number of the two-wire biCoder is located on the side of the unit.

5. Press **Enter** on your keyboard. The system searches for the device, tests the solenoid and the communication, and then displays the Configuration Status message box.

6. Click **OK**.

7. Type a description of the start/stop device in the **Description** (5) field.
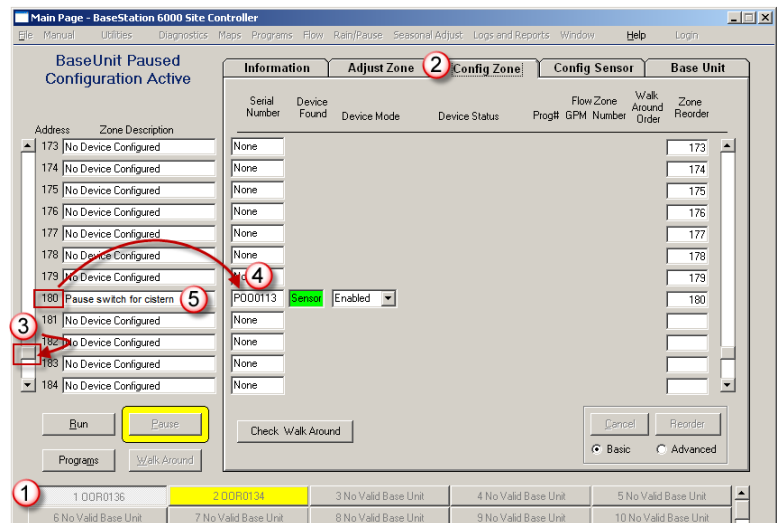
For instructions on setting up the start/stop conditions for your devices, refer to Starting/Stopping/Pausing Irrigation Based on Temperature Sensor Readings on page 50 and Starting/Stopping/Pausing Irrigation Based on Switch State on page 52.

Adding a Flow biCoder

Use a Flow biCoder to connect a Flow Sensor to a BaseStation 6000 system. A water flow measurement device helps you monitor actual water usage, and it protects your water delivery system by diagnosing failures in zones and heads.

To add a Flow biCoder

1. Click the **Information** tab to activate the Main Menu.

2. Click the **Flow** menu, and then click **Configure Flow Sensors** (1).

3. Click the **Flow BiCoder – All Bases** tab.

4. In the **Base Unit** (2) field, type the number of the Remote Base Unit that the Flow biCoder will be assigned to.

5. In the **Serial Number** (3) field, type the serial number of the Flow biCoder.

6. Press **Enter** on your keyboard.

   Note: After you add the Flow biCoder, the Flow and Usage fields are highlighted yellow. This highlighting is normal and does not indicate an error condition.

7. By default when you add a Flow biCoder it is enabled. If you want to disable the Flow biCoder, click in the **Enable Sensor** field to remove the check mark.

   Note: When you are adding a Baseline Flow Sensor (BL-PFS100 – 400), Baseline Flow Meter (BL-BFM075 – BL-BFM150), or Baseline Hydrometer (BL-BHM150 – 400 inc. NO option), the K Value, and Offset will be automatically configured for you.

8. In the **K Value** field, type the K value for the flow device that is connected to the Flow biCoder. This value is available in the flow device specifications.

9. In the **Off Set** field, type the offset value for the flow device that is connected to the Flow biCoder. This value is available in the flow device specifications.

10. After you have added the Flow biCoder to the BaseStation 6000 system, you need to configure the associated flow device to monitor the flow. Refer to the following topics:

    Viewing and Understanding Flow Device Readings on page 59

    Setting Up Flow Monitoring for the Entire System on page 60

    Setting Up Flow Monitoring for Flow Zones on page 61
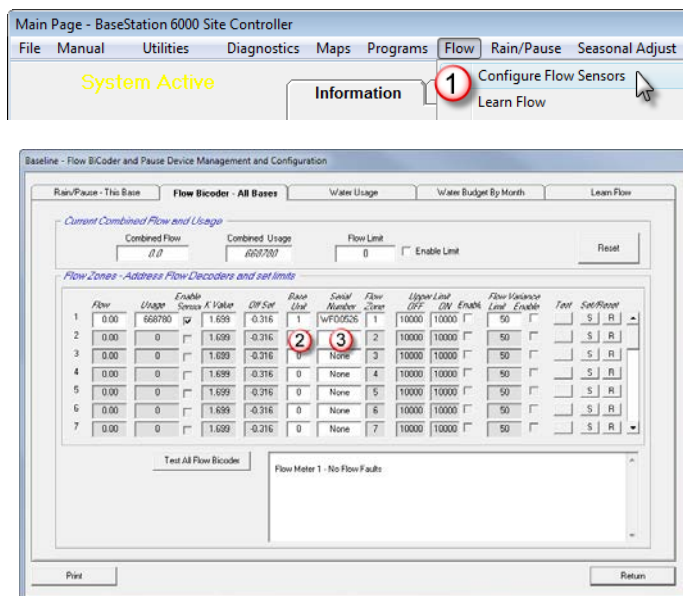
Adding a biSensor

Baseline's unique and patented soil moisture sensors provide continuous soil moisture measurements to the controller over conventional valve wires or two-wire. Using Baseline's patented Time Domain Transmission (TDT) technology, biSensors are highly accurate, durable, and self-calibrating for all soil types and conditions.

In addition to monitoring soil moisture content in your irrigation zones, you can also use biSensors to monitor water penetration at various soil depths and adjust your watering to avoid leaching. If you plan to use biSensors for this purpose, follow the instructions below to configure them in the system, and then refer to Starting/Stopping Irrigation Based on Tiered Soil Moisture Readings on page 49.

For the physical installation of the device in the field, please refer to the "Installation Guide" that was packaged with the device.

Sensor Placement

As you plan where to place the biSensors, make sure that you have considered the hydrozones that exist in your landscaping. A hydrozone is a grouping of plants that have similar water usage and delivery characteristics and can be watered the same. For example, each of the following landscaping areas would be a separate hydrozone:

- Grass in full sun with rotors
- Grass in full sun with sprays
- Drip zones in full sun

- Grass in shade with rotors
- Grass in shade with sprays
- Drip zones in shade
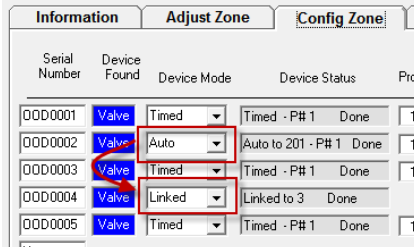
You can group the zones in your irrigation system into scheduling groups based on their common characteristics. Within the scheduling group, designate one zone to be the "primary" zone (configured within the BaseStation software as either Auto or Timed) and set up the watering days and times. You can link the other zones in the scheduling group to the primary zone so they will be watered more or less relative to it. These zones are called "linked" zones. For more information, refer to Setting up Scheduling Groups on page 29.

Sensor Installation and Configuration Tips

- When choosing the sensor location, take into account variables such as distribution rate, sun exposure or soil type, and other characteristics that may affect water holding capacity, or the rate at which plants use water.

- The sensor needs to be located in a place that gets average to below-average coverage. One thing to watch for is head placement. Sprinkler systems are designed for head-to-head coverage which means each sprinkler head sprays water far enough to hit the adjacent sprinkler head (this does not apply to drip zones). Be careful that you do not bury the sensor in an area that gets more water in comparison to the rest of the zone.

  Note: Make any adjustments or repairs to ensure the proper application of water to the sensor location.

- Bury the sensor mid-way between two sprinkler heads that are watering the location, but place it off of the centerline that the sprinklers create.

- Install the soil moisture sensor 2 - 3 inches below the plant or in the top third of the plants' root zone.

- Bury the soil moisture sensor so there are no air pockets or rocks in contact with the sensor.

- Mark the location of the soil moisture sensor so you can find it in the future and avoid damaging it when aerating.

- In the BaseStation 6000 software, you associate a sensor with a zone by setting the mode of the zone to Auto and then selecting the sensor from a list. This zone can then function as a primary zone and have other zones linked zones to it. You can deal with minor differences between the primary and linked zones by adjusting the percentage that the linked zone operates in relation to the primary zone.

- When you associate a sensor with a zone, make sure that the sensor is in a location that is watered by that zone.

To configure a biSensor

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit (1) that the sensor is connected to.

2. Click the **Config Sensor** (2) tab.

3. In the **Serial Number** column, type the serial number for the sensor in an unused address line (3).

    Note: If you are setting up a series of stacked sensors, we advise that you enter them into the software in order from top to bottom to simplify the management of the system.

4. Press **Enter** on your keyboard. The system searches for the sensor, and then displays the Configuration Status message box.

5. Click **OK**.

6. Type a description of the sensor in the **Description** (4) field. Use the description to define the location or area that this sensor is monitoring.

    Note: The address numbers for biSensors range from 201 to 225.

7. All biSensors are enabled by default. If you want to disable the sensor that you just added, click the arrow in the **Device State** field, and then click Disabled.
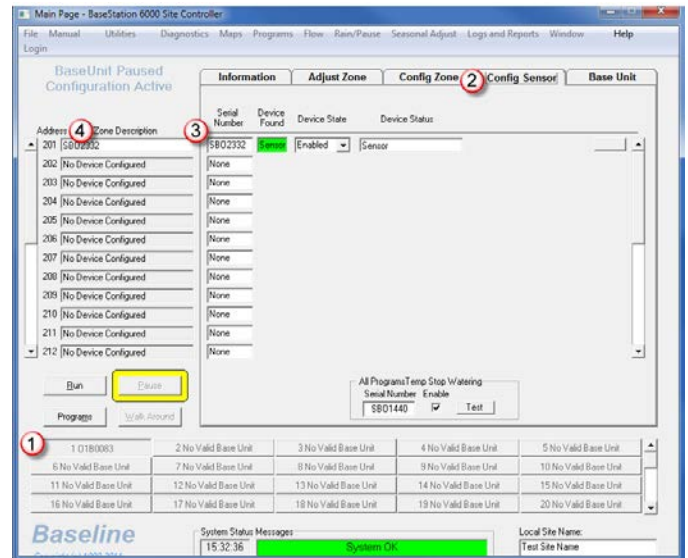
To view a biSensor Graph

The BaseStation 6000 generates beneficial graphs from the biSensor data. When you are using biSensors to manage and control watering, you refer to the graphs when calibrating the sensors and setting up your watering strategies as described below. When your sensor is associated with a zone, you access the graph for the sensor by clicking the **Graph** button on the **Adjust Zone** tab.
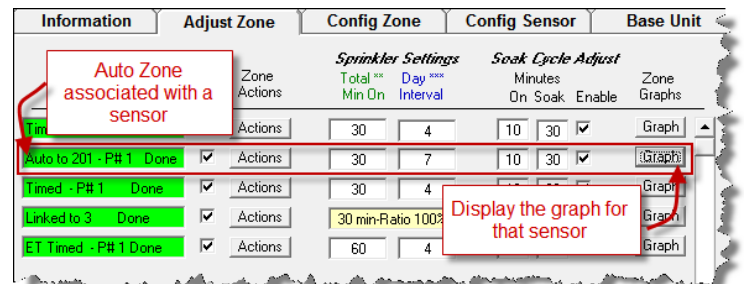
In some cases, you might configure a sensor in the BaseStation 6000 that will be used for a specialized purpose and is not connected to a zone. The system generates graphs for all sensors, but when the sensor is not connected with a zone, you access the graph for the sensor by clicking the graph button on the **Config Sensor** tab.

When the graph displays, you have many different tools for changing how the graph looks. Refer to Adjusting the Data View on a Graph on page 93 for details.
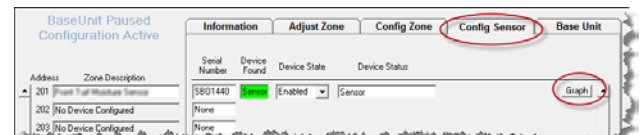
To calibrate a biSensor

When you are using biSensors to manage and control watering for auto and linked zones, the sensors need to be calibrated so that the system will water correctly based on thresholds that accurately represent the zone's needs. The calibration provides the settings for the upper and/or lower moisture levels (the upper threshold and lower threshold).

IMPORTANT NOTE! After you calibrate your sensors and get the settings for the upper and/or lower moisture levels, you need to program the run times for the zones so that the system will put down enough water to reach the upper moisture level and then allow enough time between watering cycles for the soil to dry out to the lower moisture level. Refer to Adjusting Individual Zones on page 39. The biSensors monitor soil moisture levels, but this data does not cause run times to be automatically adjusted in the system.

To perform the manual calibration, saturate the soil around the sensor by pouring approximately two gallons of water directly over the spot where the sensor is buried. Over the next several hours, the water will spread out through capillary movement. As a rule, it is best to wait 24 hours to get an accurate field capacity reading. Test the biSensor to get the moisture percentage reading, and then set the upper moisture level (upper threshold) at or slightly below this moisture reading. Refer to Testing Sensors on page 100.

The most common method for manually calibrating a sensor for the lower moisture level (lower threshold) is to let the landscape dry out to the point where watering is desired and then test the biSensor again to get the moisture percentage reading and use that reading as the lower moisture level (lower threshold).

For more information, refer to Adjusting Programming with biSensors on page 41, and refer to the Graphs section on page 92 for information about reading and interpreting the soil moisture graphs. When the graph displays, you have many different tools for changing how the graph looks. Refer to Adjusting the Data View on a Graph on page 93 for details.

To set the upper and lower moisture levels for a biSensor that is associated with an auto zone

1. Click the **Adjust Zone** (1) tab on the Main Page.

2. Click the **Graph** (2) button for the auto zone that you want to set the moisture levels for. The Automatic Zone and Sensor Management window opens.

   Note: When you adjust the auto zone, the new settings will be applied to all zones that are linked to it.

3. If you are using Water Strategy 1 or 2, use the slider (3) on the right side of the graph to set the Upper Moisture Level represented by the green line. The Upper Moisture Level refers to the field capacity of the soil. Set the Upper Moisture Level at or slightly below the biSensor reading that you took after allowing the water to soak in around the sensor for 24 hours.

4. If you are using Water Strategy 2 or 3, you can adjust the Lower Moisture Level with the slider (4) on the left of the graph. The Lower Moisture Level is represented by the red line. This setting represents how dry you will let the soil become before watering again.

5. Click **Return** (5) to close the window.
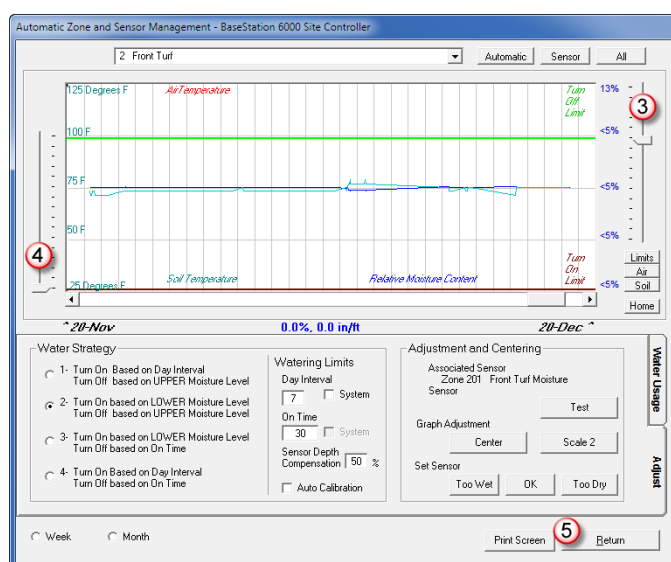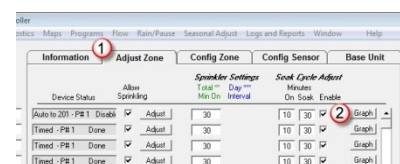
Continuous Calibration – The Auto Calibration option on the Automatic Zone and Sensor Management window enables the controller to continuously measure the field capacity of the soil. When you enable auto calibration, the controller applies water to the auto zone (the zone where the sensor is buried) during every run cycle until the response curve slows. After the controller has measured field capacity, it is able to use this data to set an upper or lower threshold based on this reading. You can then choose to use this threshold or reset it as needed.

If you have your thresholds precisely set, you can use continuous calibration to make minor adjustments that will improve plant health. Keep the following points in mind:

WARNING! Continuous calibration uses a lot of water while attempting to determine field capacity especially if the sensor is placed in a very dry area.

- If you enable continuous calibration when the soil moisture content is already high, the calibration will fail because the system must be able to detect a change in soil moisture content.

- If your run time is too short, not enough water is applied to the location and the sensor cannot detect a slowdown in the response curve. If the run time is not long enough to fill the soil to field capacity, the calibration will fail.

- If you are using Water Strategy 3 or 4, the Auto Calibration option is not available on the Automatic Zone and Sensor Management window.

For more information, refer to Adjusting Programming with biSensors on page 41, and refer to the Graphs section on page 92 for information about reading and interpreting the soil moisture graphs. When the graph displays, you have many different tools for changing how the graph looks. Refer to Adjusting the Data View on a Graph on page 93 for details.

1. Click the **Adjust Zone** (1) tab on the Main Page.

2. Click the **Graph** (2) button for the auto zone that you want to calibrate. The Automatic Zone and Sensor Management window opens.

   Note: When you adjust the auto zone, the new settings will be applied to all zones that are linked to it.

3. Select the **Auto Calibration** (3) check box. If you are using Water Strategy 3 or 4, this check box is unavailable.

4. Click **Return** (4) to close the window.
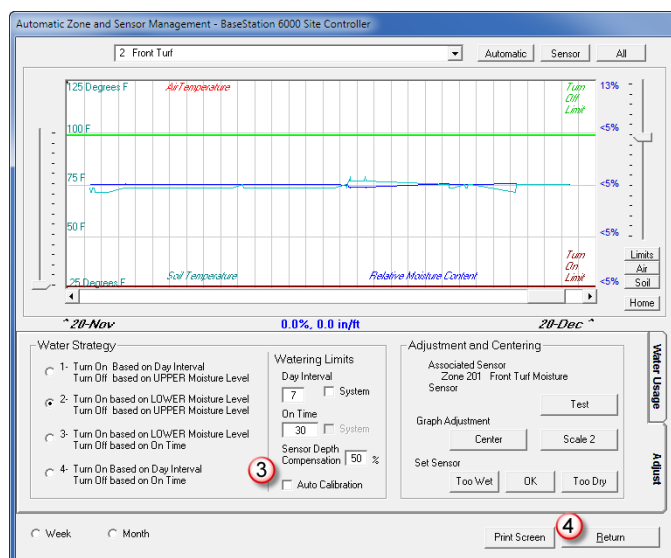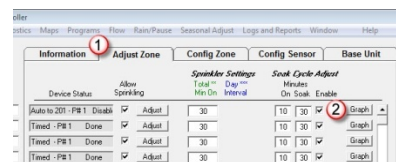
Quick Adjustments

After the system has been running, it is possible to make quick adjustments without having to manually adjust the moisture levels. You can use preconfigured settings to have the system react to a "Too Wet", "OK", or "Too Dry" situation.

1. Click the **Adjust Zone** (1) tab on the Main Page.

2. Click the **Graph** (2) button for the auto zone that you want to adjust. The Automatic Zone and Sensor Management window opens.

   Note: When you adjust the auto zone, the new settings will be applied to all zones that are linked to it.

3. In the **Adjustments and Centering** group box, click the button that matches the situation:

   - If the system is over watering or the ground is too wet, click the **Too Wet** (3) button. The system lowers the turn-on and turn-off thresholds, which effectively dries out the zone.

   - If the system is running correctly, click the **OK** (4) button. The system sets the limits to maintain the current moisture profile as shown in the moisture graphs.
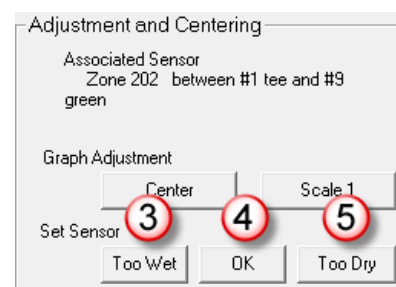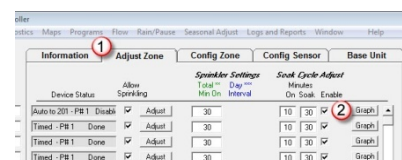
- If the system is not watering enough and the ground is drying out to quickly, click the **Too Dry** (5) button. The system starts a run cycle to increase the moisture.

  Note: When you click the Too Dry button, the Zone Description field for an auto zone displays a magenta background. This status color indicates that the system is watering the zone. To stop watering and clear the magenta background, go to the Adjust Zone tab and click Force Zone to Done on the Actions menu.

Adding a Tipping Bucket Style Rain Gauge

A tipping bucket style rain gauge is an open-top receptacle that collects and measures precipitation. When rain falls into the receptacle, it is funneled to a device that measures the quantity and generates a pulse that can be counted.

If you want to use a tipping bucket rain gauge as a precision rain shutdown device, you need to perform the steps below to add the rain gauge to the BaseStation 6000 using the Config Zone tab, and then configure the rain gauge in the ET Parameter Input window.

1. Ensure that the rain gauge is physically installed and connected to the two-wire.

2. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that the rain gauge is connected to.

3. Click the **Information** tab to activate the Main Menu.

4. On the Main Menu, click **Diagnostics** and then click **System Diagnostics**. The System Diagnostics window displays.

5. Click the **Config Support** tab.

6. Click **List Devices**. The connected devices display in the pane on the right.

7. Write down the serial number of the biCoder that is connected to the rain gauge.

8. Click **Return** to close the System Diagnostics window.

9. On the Main Page of the BaseStation 6000 software, click the **Config Zone** tab.

10. Use the scroll box on the left to move to the bottom of the Address list.

11. In the **Serial Number** column for address line 200, type the serial number of the decoder that is connected to the rain gauge.

12. Press **Enter** on your keyboard. The system searches for the rain gauge, and then displays the Configuration Status message box.

13. Click **OK**.

14. Configure the rain gauge on the **ET Parameter Input** window. Refer to Configuring a Precision Rain Shutdown on page 56.

3 – INITIAL PROGRAMMING

Quick Start / First Watering

To quickly configure the BaseStation 6000 Site Controller software and start watering, refer to the **Quick Start Guide**. This manual gives more detail for configuring the system and fine tuning the programming.

IMPORTANT NOTE: After you have the BaseStation 6000 Site Controller software configured for watering, leave both the software and the computer running at all times. If you shut down the BaseStation 6000 Site Controller software and/or the computer, your irrigation system will stop watering.

Planning Your Programming

Before you start programming your system, you need to have the following components installed:

- Your BaseStation 6000 Site Controller computer

- At least one Remote Base Unit

- One biCoder (Baseline's smart, two-wire decoder)

You need to know the serial numbers of your Remote Base Units and valve biCoders. It is also helpful to have a map or drawing of your irrigation system so you know where your zones are located.

Take Advantage of the Powerful Features in the BaseStation 6000

When you are considering how to program your BaseStation 6000, make sure that you plan to use these powerful features that will help you get the most out of your system:

- **Smart Watering**

  In the industry, "smart watering" usually refers to irrigation controllers that automatically adjust the irrigation schedule based on local weather and/or site conditions. While the BaseStation 6000 supports those smart watering features, it can also make other "smart watering" decisions. For example, if a program start time is reached while another program is active, the controller will reset the run times for all unfinished zones run those zones before any other zones.

- **Hydrozones, Primary Zones, and Scheduling Groups**

  A hydrozone is a grouping of plants that have similar water requirements and can be watered the same. Areas that require dissimilar water or scheduling requirements would be placed in separate hydrozones.

  Before you configure your Baseline system, identify the various hydrozones in your landscaping, and then identify the irrigation zones that are associated with those hydrozones. For the zones associated with a specific hydrozone, designate one zone as the primary zone, and then link the other zones to that primary zone – creating what is known as a scheduling group.

  The primary zone must have the following characteristics:

  - It is configured in the BaseStation 6000 system at an address with a lower number than the other zones within the same scheduling group. For example, if zones 1 – 50 are in one scheduling group, zone 1 would be the primary zone.

- It is configured as either Auto or Timed.
    - **Auto** – Requires that a sensor be connected
    - **Timed** – Sets the zone to run based on its timed scheduling only

After you have established the relationship between the primary and linked zones, you can specify what program the scheduling group will use for watering by simply assigning the program to the primary zone. You can also adjust how the group will run by adjusting the settings for the primary zone. If you notice that a zone within a scheduling group is being over or under watered, you can adjust how that zone runs based on a percentage of the settings for the primary zone.

You can establish up to 500 separate scheduling groups

- **Intelligent Soak Cycles™**

Make sure you understand how the BaseStation 6000 system uses Intelligent Soak Cycles. Soak cycling breaks the total run time into shorter water "cycles" (timed water applications) with "soak" periods in between to allow time for water to soak into the soil before applying more water. Soak cycles save water and avoid surface soil saturation and runoff by breaking the total run time for any zone into multiple cycles and soaks. One easy way to determine a good cycle time is to turn a zone on and watch for first signs of standing water or runoff. Set the "Minutes On" time of the soak cycle to be no more than this amount of time.

The BaseStation 6000 has built-in support for soak cycling and uses intelligent watering algorithms that apply cycles in the optimal order to maximize water penetration and minimize evaporation loss.

- **Concurrent Zones (Total Active Zones)**

The Total Active Zones setting on the controller allows more than one zone to water at once. The BaseStation 6000 uses a sophisticated watering engine that can use concurrent zone settings on multiple levels including the device level, program level, Remote Base Unit level, and system wide level. These settings require detailed information about the electric and hydraulic limits of the system.

Note: When the system runs the concurrent zones, it ignores any master valves, which could result in an overcurrent alert.

- **Watering with Sensors**

The BaseStation 6000 system accommodates many kinds of sensors that can be configured to monitor and control watering. First, you install the sensors and connect them to your irrigation system. Then you configure the watering programs in the BaseStation 6000 software, and finally you configure the system to control how those programs will water based on readings from the sensor.

For example, if you have a soil moisture sensor associated with a primary zone, you can configure that zone and all linked zones to turn on based on the low moisture reading (lower threshold) from the sensor and then turn off based on the upper moisture reading (upper threshold) from the sensor.

- **ET-Based Watering**

The BaseStation 6000 system includes advanced ET-based watering technology, which enables ET-based zones to be watered when needed rather than on a pre-set schedule.

- **Flow Management**

The BaseStation 6000 Site Controller gives you very precise control over flow zones and flow management, which enables you to carefully monitor and use your available water.

Setting up Scheduling Groups

Scheduling groups are made up of a primary zone and multiple linked zones within one hydrozone. After you have scheduling groups configured, you can easily make changes to large groups of zones.

Creating Scheduling Groups

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to create the scheduling groups.

2. Click the **Config Zone** (1) tab.

3. Find the line that corresponds to the zone that you want to establish as a primary zone.

4. Click the arrow in the field (2) under the **Device Mode** column, and then click either **Auto** or **Timed**. Remember that Auto requires that a biSensor be connected while Timed enables the zone to run based on its timed scheduling only.

5. Find the lines for the zones that you want to link to the primary zone. On each line, click the arrow in the field (3) under the **Device Mode** column, and then click **Linked**. The Select Primary Zone – Auto or Timed dialog box opens.

6. Click the arrow in the **Select Zone** (4) field, and then click the primary zone.

   Note: The primary zone must be at an address with a lower number than the linked zones.

7. Click the arrow in the **Tracking Ratio** (5) field, and then click the option that will enable the linked zone to water correctly. You can choose an option that is more or less than the primary zone.

8. Click **OK** (6).
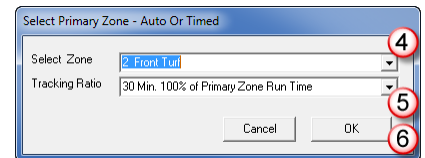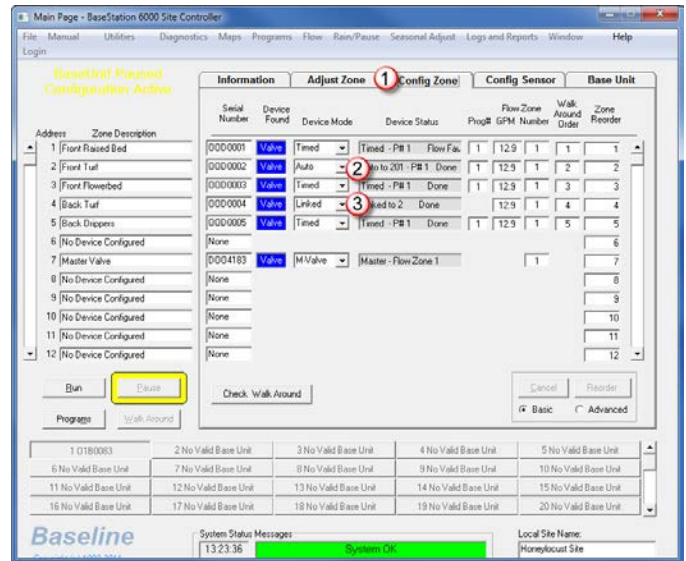
Programming a Scheduling Group

- After you create a scheduling group, notice that the **Prog#** field on the **Config Zone** tab is no longer active for the linked zones. If you want to change the program that the group is using for watering, change the number in the **Prog#** field for the primary zone.

- You can also adjust how a scheduling group runs by changing the **Sprinkler Settings** and **Soak Cycle Adjust** fields for the primary zone on the **Adjust Zone** tab. For more information on setting up your needed scheduling and watering patterns, refer to Grouping and Reordering Zones on page 30.

- If you notice that a zone within a scheduling group is being over or under watered, you can adjust how that zone runs based on a percentage of its primary zone. Refer to Adjusting the Tracking Ratio of Linked Zones on page 41.

Grouping and Reordering Zones

After you have set up your scheduling groups, it is helpful to order them so they are grouped visually. This grouping will simplify the management and troubleshooting of your system.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to group or reorder zones.

2. Click the **Config Zone** (1) tab.

3. Choose one of the following methods to reorder the zones:

   Change the order of existing zones

   a. Click the **Basic** (2) button.

   b. Type a new number in the **Zone Reorder** (3) field for a zone that you want to change. Repeat this step until you have updated all the numbers for the zones that you want to change. Keep in mind that your new sequence must include all the numbers that were in your original sequence.

   c. Click the **Reorder** (4) button.

   Insert a zone between two existing zones

   a. Click the **Advanced** (2) button.

   b. In the **Zone Reorder** (3) field for the zone that you want to move, change the number to a decimal to indicate where you want zone to be moved.

   Example: If you add a new device in address line 9 that you want to move to a new position between zones 3 and 4, click in the Zone Reorder field for zone 9, and then type 3.5 in place of the 9. If you want to move multiple zones between two addresses, you can use a series of decimals such as 3.4 and 3.6. You can use up to two decimal places when reordering zones.

   c. Click the **Reorder** (4) button.

4. A message warns you that permanent changes will be made to the system configuration. Click **OK** to continue.

Setting Up Programs (Establishing Water Windows)

The first step in setting up programs on the BaseStation 6000 system is to establish your water windows. Water windows designate when the system can water each day and over the course of a week. Typically, all days and times would be available for watering unless there are watering restrictions or you need to set aside a time for mowing.

After you establish the water windows, you can configure the system to start watering at specific times or you can use defined day intervals to set how many days the system will wait between watering cycles.

To establish water windows

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to set up programs and establish water windows.

2. Click the **Programs** button on the Main Page. The Set Watering Program Schedule window opens.

3. Click the arrow at the end of the **Program** (1) field, and then click the program that you want to set the water windows for.

4. Click the **Click to Edit Program Name** (2) button. The program Name dialog box opens.

5. In the field, type a descriptive name for the program that you are setting up.

6. Click **OK**.

7. On the Set Watering Program Schedule window, make sure that the **Water Window** (3) tab is visible.

8. Select the **Enable Program** (4) check box.

   A default water window scenario is displayed in the Watering Time grid (5).

   - Blue allows watering during that hour.

   - White does not allow watering.

   Note: Typically, all cells would be blue unless there are watering restrictions or you need to set aside a time for mowing.

9. Perform any of the following actions:

   - Click a white cell to turn it blue.

   - Click a blue cell to turn it white.

   - Click one side of the blue and white icon [▐▌] at the top of each column to set the entire column blue or white.

10. Determine how you want the program to start:

    - To have the program start at a specific time, follow the instructions under "Using Timed Watering Starts."

    - To have the program use defined day intervals, follow the instructions under "Using Day Intervals."

IMPORTANT NOTE: The program is not active until you configure the start option and select the Enable Program check box.

Using Timed Watering Starts

1. After you have established the water windows for your program, click the **Programs** button on the Main Page. The Set Watering Program Schedule window opens.

2. Click the arrow at the end of the **Program** (1) field, and then click the program that you want to set the start times for.

3. Make sure that the **Water Window** tab is visible.

4. Make sure that your water windows are set up accurately.

5. In the **Watering Time** grid, choose the watering start time for each day by clicking the appropriate box for each day and time until that box shows green.

   Tip: When an entire column is blue, you can click the green icon at the bottom of each column to set the entire column green.

6. Select the **Enable Clock Mode with Timed Watering Starts** (2) check box.

7. If the **Enable Program** (3) check box is not selected, click it to select it.

8. Click **Return/Save** (4).

Using Day Intervals

1. After you have established the water windows for your program, click the **Programs** button on the Main Page. The Set Watering Program Schedule window opens.

2. Click the arrow at the end of the **Program** (1) field, and then click the program that you want to set the day intervals for.

3. Make sure that the **Water Window** tab is visible.

4. Make sure that your water windows are set up accurately.

5. Make sure that the **Enable Clock Mode with Timed Watering Starts** (2) check box is **NOT** checked.

6. If the Watering Time grid shows green boxes that indicate start times, a message warns you that these boxes will be changed to blue. Click **OK** to continue.

7. If the **Enable Program** (3) check box is not selected, click it to select it.

8. Click **Return/Save** (4), and then configure the day intervals.

9. Click the **Adjust Zone** (5) tab on the Main Page.

10. In the **Day Interval** (6) field, type a number to indicate how many days the system will wait between watering cycles.

Verifying Your Water Window Configuration

Verify that your water window allows enough time for the assigned zones to run.

Note: If the Device Status field on the Adjust Zone tab or the Information tab has a **Gray** background, it means that the system cannot water because the water window is closed.

1. Click the **Programs** button on the Main Page. The Set Watering Program Schedule window opens.

2. Click the arrow at the end of the **Program** (1) field, and then click the program that you want to verify.

3. Make sure that the **Water Window** tab is visible.

4. From the **Base Unit** (3) drop-down list, click the Remote Base Unit that the program is used by.

5. Compare the information in the **Time Available** field to the information in the **Projected Run Time** for that Remote Base Unit.

6. If there is a discrepancy:

   - Adjust the watering time on the **Water Window** tab.

   - Change the **Total Minutes On** for the zones in the program on the **Adjust Zone** tab.

     Tip: You can make changes to all zones for a program with the Program/Value Editor. To open the editor, click the Information tab on the Main Page to activate the Main Menu. Click the Seasonal Adjust menu, and then click Adjust. The Set System Parameters window opens. Click the Program/Value Editor tab. In the Program Selector field, click the

arrow to choose the program that controls the zones that you want to change. Make changes in the remaining fields and then click Apply. When finished, click Return to close the Set System Parameters window.

- Review the settings for **Concurrent Zones** in the pane on the right side of the Water Window tab. Change the Concurrent Zone settings for the RBU that this program is running on and for the entire system. Refer to Controlling Total Active Zones (Concurrent Zones) on page 34.

Enabling Watering Days

The Watering Days feature is recommended only for those customers who have strict municipal requirements that force specific scheduled watering.

Normally, you would use the blue and white squares on the Water Window tab to configure watering restrictions by days of the week. If a fixed schedule of watering is required (such as only on odd days), the individual zones should be set up to water more frequently to assure that they water each available day.

WARNING! The watering days feature should be only used when absolutely necessary. If not used properly, this feature can limit watering days and cause many conflicts in the schedule.

To enable watering days

1. On the Main Page of the BaseStation 6000 software, click the **Programs** button. The Set Watering Program Schedule window opens.

2. Click the arrow at the end of the **Program** (1) field, and then click the program that you want to enable watering days for.

3. Click the **Watering Days** (2) tab.

4. Click the arrow in the **Select Desired Irrigation Cycle** (3) field, and then click the option for the days when you are allowed to water.

   Note: When you choose the options to water every 2nd, 3rd, or 4th day, additional information displays on the tab. You need to indicate whether you want the watering cycle to restart at the beginning of each month or to continue with the day intervals regardless of the month.

5. Click **Return/Save** (4).
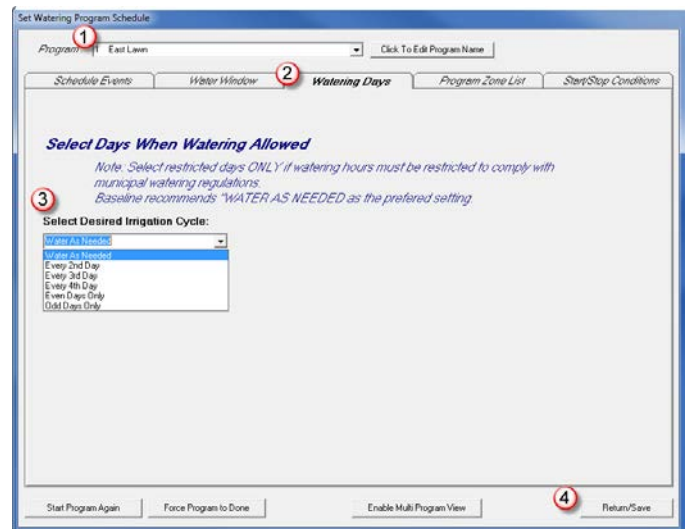
Viewing Multiple Programs

Displaying Multi Program View

1. Click the **Programs** button on the Main Page. The Set Watering Program Schedule window opens.

2. Click the **Enable Multi Program View** button. The Program View window opens.

3. By default, the system displays programs 1 - 6 in the window. The top pane displays the program values in a running grid by day and hour. The lower part of the window displays individual panes for up to 6 programs.
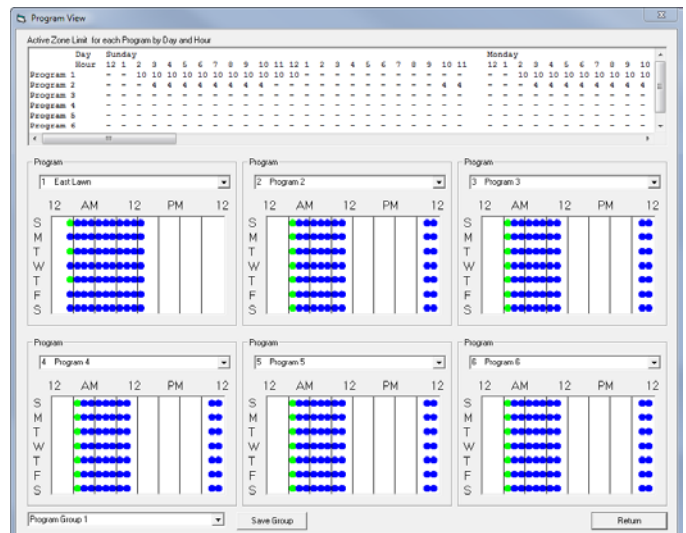
- To change the programs that are displayed in the individual panes, click the arrow in the program number field above the pane, and then click a different program number from the list.

- To create a group of six programs, make sure that the programs that you want to group are displayed in the individual panes in the lower part of the window. In the program group field at the bottom of the window, click the number of the program group that you want to use, and then click **Save Group**. To create another group, change the individual panes to display the programs that you want in a separate group. In the Program Group field, click an unused group number, and then click **Save Group**.

  Note: Groups are only used for viewing. They do not affect the system in any way.

- To change watering times in the individual pane for a program:

  - Increase watering time by clicking in a blank space to add a blue dot.

  - Decrease watering time by clicking on a blue dot to remove it.

  - If timed watering starts are enabled for your program, you can add a start time by clicking in a blank space to add a blue dot.Then click the dot again to change it to green, which represents start time.

- To save your changes and close the Program View window, click **Return** at the bottom of the window.

Controlling Total Active Zones (Concurrent Zones)

The BaseStation 6000 system is capable of activating multiple zones at one time. The number of concurrently operating zones depends on the available electricity to operate valves as well as the available water supply and the flow rate. A flow device is required for this setup.

If your site requires that more than one zone waters at once, and you know the gallons per minute available from your source and the gallons per minute output of each zone, you can set each of those limits appropriately. For example, if you know that your water source provides 100 gallons per minute, and each zone waters at a maximum of 25 gallons per minute, then you can operate 4 zones concurrently. When the system runs the concurrent zones, it ignores any master valves, which could result in an overcurrent alert.

Note: To understand how the settings for total active zones correspond with the flow management features of the BaseStation 6000, refer to the Managing and Optimizing Flow section beginning on page 68.

You can configure the following methods for controlling how many zones can be activated at any time:

- By the **total zones the entire system** can have activated

- By the number of **zones each Remote Base Unit** can have activated

- By the **total zones each program** can have activated

Example: You can run one zone at a time on the program that operates the football field, and four zones on the drip program.

To configure the total active zones for the entire system

1. On the Main Page of the BaseStation 6000 software, click the **Base Unit** (1) tab.

2. In the **Total Active Zones** (2) field at the bottom of the **Base Unit** tab, type a number to represent the maximum number of zones that the entire system can run at any one time.

   Note: During the initial configuration of your BaseStation 6000, we recommend that you **set the Total Active Zones to 1,** which limits the number of zones that can run at one time to only one**.**

To configure the active zones for a Remote Base Unit

1. On the Main Page of the BaseStation 6000 software, click the **Base Unit** (1) tab.

2. Click the Remote Base Unit (2) that you want to configure active zones for.

3. Find the line that corresponds to the Remote Base Unit that you want to configure active zones for.

4. In the **Base** (3) field under the **Active Zones** column, type a number between 1 and 20 to represent the number of zones that can be running concurrently on this Remote Base Unit.

   Note: During the initial configuration of your BaseStation 6000, we recommend that you **set the Active Zones to 1,** which limits the number of zones that can run at one time to only one**.**

5. In the **Device** (4) field under the **Active Zones** column, type a number between 1 and 4 to represent the maximum number of active zones per biCoder on this RBU.

6. Repeat these steps to configure the active zones for each RBU on your system.

To configure the total active zones per program

1. On the Main Page of the BaseStation 6000 software, click the **Programs** button. The Set Watering Program Schedule window opens.

2. Click the arrow at the end of the **Program** (1) field, and then click the program that you want to set the total active zones for.

3. In the **Total Active Zones** (2) field type a number between 1 and 20 to represent the number of zones that can be running concurrently for this program.

   Note: During the initial configuration of your BaseStation 6000, we recommend that you **set the Total Active Zones to 1,** which limits the number of zones that can run at one time to only one**.**

4. Click **Return/Save**.

After You Finish Initial Programming

After you complete the initial programming tasks in the BaseStation 6000 system, you should run the system to ensure that it is operating as expected.

If you want to manually operate individual zones, refer to Manually Running Zones on page 72.

If you need to make adjustments to your system, refer to the topics in the Programming Adjustments section of this document.

When your configuration is acceptable, and you want to leave the system in the Active status, click the Information tab on the Main Page. Verify that the System Activity status says "System Active" and that the Run button is highlighted in green. Refer to Understanding System Status and Color Coding on page 37.

IMPORTANT REMINDER! Leave both the software and the computer running at all times. If you shut down the BaseStation 6000 Site Controller software and/or the computer, your irrigation system will stop watering.

4 - PROGRAMMING ADJUSTMENTS

Understanding System Status and Color Coding

While you are configuring the BaseStation 6000 software and adjusting your programs, you will notice that the system displays various status messages and color coding that also indicates status.

The example on the right illustrates some of the status messages and color coding.

(1) **System activity status** – This flashing status tells what the system is doing. In this example, the system is Active, which means that watering is occurring. If you click the Config Zone or Config Sensor tab, notice that this status changes to BaseUnit Paused Configuration Active. The Pause (6) button is also highlighted with a yellow border. The system will return to Active status when you click on a tab, such as the Information tab or when you click the Run button.

(2) **Red background** – In the Device Status field, red indicates that a zone will not water. In this example, there is a flow fault on Zone 1, which means that the zone will not water until the fault is cleared.

In the Zone Description field, red indicates that the program associated with the zone is disabled. The red highlighting is removed when you enable the program.

(3) **Light blue (cyan) background** – Indicates that zone is soaking. In this example, zones 2 and 3 are soaking.
Pale yellow background (not illustrated) – Indicates that the zone is waiting to water.
Bright yellow background (not illustrated) – Indicates that too many errors are occurring. Click on the Zone Description to find out what the errors are.

(4) **Dark blue background** – Indicates that the zone is watering.

(5) **Green background** – Indicates that the programmed activity is done.

Gray background (not illustrated) – Indicates that the system cannot water because the water window is closed.

Magenta background (not illustrated) – When the Zone Description field for an auto zone displays a magenta background, it indicates that someone clicked the Too Dry button on the Automatic Zone and Sensor Management window, and the system is watering the zone. To stop watering and clear the magenta background, go to the Adjust Zone tab and click Force Zone to Done on the Actions menu.

(6) **System activity buttons** – When the Run button is highlighted in green as shown in this example, it means that the system is currently running. You can click Pause to temporarily halt watering, but if you leave the system paused with this button, it will restart at midnight. Click the Run button to turn off the temporary pause.
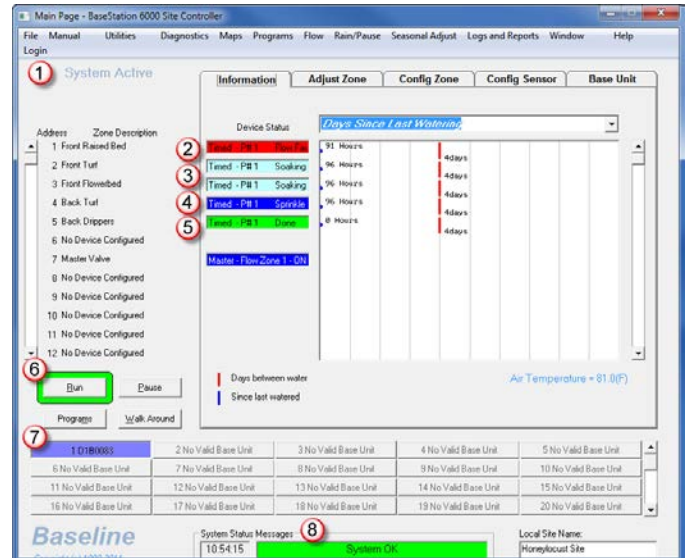
(7)   **Remote Base Unit buttons** – Each of the Remote Base Units that you have configured on your BaseStation 6000 system are represented by buttons in this grid. The background of these buttons displays the same color coding as described above. In this example, the background color is dark blue, which indicates that one or more zones associated with this RBU are currently watering. When all zones are done, the background color of the RBU button changes to green.

(8)   **System Status Messages** – The status of the BaseStation 6000 software displays in this field.

Viewing System Information

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to view system information.

2. Click the **Information** (1) tab. The system shows the Days Since Last Watering information in the pane.

3. To display other system information, click the arrow (2) at the end of the field at the top of the tab.

4. Click one of the following options in the list (3) that displays:

- **Time Watered this Watering Cycle** – Shows the Current On Time in minutes and the On Time Limit in minutes.

- **Soil Temperature** – If you have a soil moisture sensor installed, the current soil temperature displays.

- **Total Minutes On** – The total minutes that each zone has watered since the installed date displays in a histogram-type chart.

- **Error Count** – If errors occurred on the various valves or sensors, you can view the total number on this report.

- **Soak Cycle Timers** – You can review the Water Time and Wait Time for your zones.

- **Zone Map** – If you have loaded pictures or drawings of your zones into the BaseStation 6000, the system will display the image of each zone in sequence. Refer to Adding a Picture of a Zone on page 76.
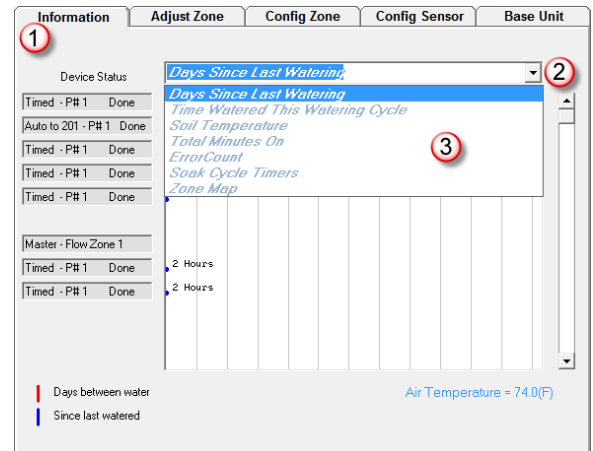
Checking the Status of Individual Zones

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to check the status of a zone.

2. Click the **Adjust Zone** tab.

3. Use the scroll box on the left side of the tab to find the zone that you want to check.

4. Click the button in the **Zone Actions** column. A menu displays.

5. Click **Quick Zone Status**. The message box displays the status of the zone.

6. Click **OK**.

Adjusting Individual Zones

The BaseStation 6000 provides a variety of methods for adjusting watering time, but the most direct way to adjust individual zones is to make changes on the Adjust Zone tab.

To adjust sprinkler settings and soak cycle settings for an individual zone

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to adjust a zone.

2. Click the **Adjust Zone** (1) tab.

3. Use the scroll boxes (2) on the right or left side of the tab to find the zone that you want to adjust.

   Note: If your configuration includes linked zones, you can adjust the tracking ratio of those zones. Refer to Adjusting the Tracking Ratio of Linked Zones on page 41. Otherwise, you adjust the individual settings for linked zones by adjusting the primary zone.

4. Under the **Sprinkler Settings** column, change the number in the **Total Min On** (3) field to increase or decrease the total number of minutes that this zone will run.

   Note: You can temporarily adjust the run time for a zone that is configured for ET, but the program will restore the ET settings.

5. Under the **Sprinkler Settings** column, change the number in the **Day Interval** (4) field to increase or decrease the number of days between waterings.

   Note: If you selected Enable Clock Mode with Timed Watering Starts on the Set watering Program Schedule window, the Day Interval field does not display on the Adjust Zone tab.

   Note: The interface indicates that you can double-click in the Total Min On and/or Day Interval field to enable changes; however, you must first enable this functionality on the Seasonal Adjustments tab. Refer to Making Seasonal Adjustments on page 47.

   Regardless of whether you have a seasonal adjustment currently enabled, information about any previous seasonal adjustment displays in the field (5) at the bottom of the Sprinkler Settings column. The field might display something like Sys = 3 D or 77%, which means that the watering days for this time period are set to 3, and the adjustment percentage for this time period is set to 77 percent of normal. If you have enabled a seasonal adjustment, the displayed settings will affect your run times. The settings display even if seasonal adjustment is disabled, but they do not affect your run times. Refer to Making Seasonal Adjustments on page 47.

6. Under the **Soak Cycle Adjust** column, change the number in the **Minutes On** and **Minutes Soak** (6) fields to increase or decrease the run time or soak time of the soak cycle.

7. Select the **Enable** (7) check box to enable the soak cycle settings for the zone.
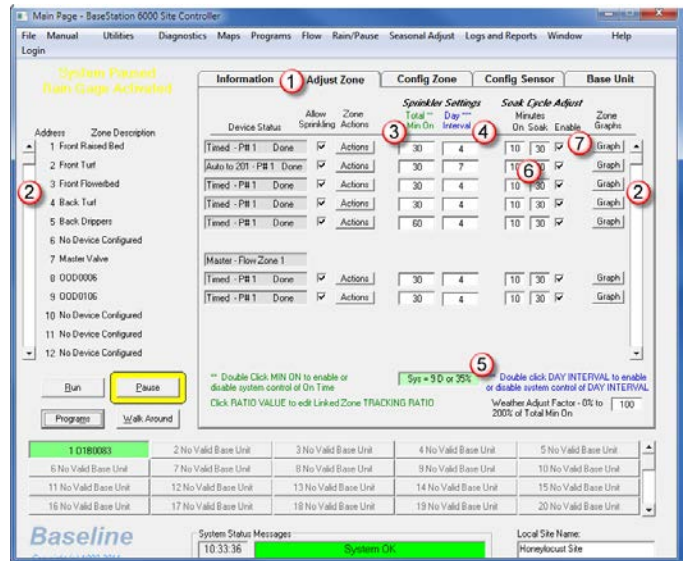
Note: Refer to the following topics for information about the additional functionality available from the Adjust Zone tab.

Zone Graphs Button

Adjusting Programming with biSensors on page 41

Weather Adjust Factor

Compensating for Unusually Wet or Dry Weather on page 41

Seasonal Adjustments

Making Seasonal Adjustments on page 47

Zone Actions Menu

Manually Running Zones on page 72

Setting Zones to Done on page 73

Checking the Status of Individual Zones on page 38

Adding Zone Notes on page 77

Adding a Picture of a Zone on page 76

Disabling Zones

Imagine that you are changing the landscaping in an area of your site and you do not want the zones in that area to water until the work is complete. Rather than removing those zones from the system and losing all the configuration data, you can disable them for as long as necessary. When you want the zones to water again, you can turn them back on and their settings will still be available.

To disable a zone

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to disable individual zones.

2. Click the **Adjust Zone** (1) tab.

3. Use the scroll boxes (2) on the right or left side of the tab to find the zone that you want to disable.

4. Click the check box in the **Allow Sprinkling** (3) column to remove the check mark. The background color in the Zone Description (4) field changes to red.

   Note: If you disable a primary zone, all the zones that are linked to it will also be disabled. If you disable a linked zone, only that zone will be disabled.

To enable a zone after it was disabled

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to enable a disabled zone.

2. Click the **Adjust Zone** tab.

3. Use the scroll box on the left side to find the zone that you want to enable.

4. Click the check box in the **Allow Sprinkling** column to replace the check mark. The red background color in the Zone Description field disappears.

   Note: If you disable and then re-enable a zone, the zone status will be set to done.

Adjusting the Tracking Ratio of Linked Zones

By adjusting the tracking ratio, you can account for different head types or variations in microclimate or soil type. A linked zone will "track" the run time of the primary zone that it is linked to. If you want a linked zone to run less than the primary zone, adjust the tracking ratio percentage down. If you want it to run longer than the primary zone, adjust the percentage up. The BaseStation 6000 tracking ratios range from 33 percent to 400 percent.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to adjust linked zones.

2. Click the **Adjust Zone** tab.

3. Find the line for the linked zone that you want to adjust, and then double-click in the field under the **Total Min On** column. The Select Primary Zone – Auto or Timed dialog box opens.

4. Click the arrow in the **Tracking Ratio** field, and then choose an option that will water more or less than the primary zone.

5. Click **OK**.

Compensating for Unusually Wet or Dry Weather

If your area is experiencing unusual weather and you want to adjust your entire system either up or down, you can adjust the watering by a percentage of normal.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to adjust the zones to compensate for unusually wet or dry weather.

2. Click the **Adjust Zone** tab.

3. In the **Weather Adjust Factor** (1) field, type a number that represents your adjustment percentage. Keep in mind that 100 % causes the system to water as scheduled. If you enter 50 %, the system decreases watering by half. If you enter 200 %, the system doubles watering. If you enter 0 %, the system does not water at all.

   Note: When you set a Weather Adjust Factor, it remains active until you change the number in this field to 100 to indicate that the system should water as scheduled. If you experience an unexpected watering schedule, check this field to determine whether you still have a weather adjustment factor set.

Adjusting Programming with biSensors

A biSensor soil moisture sensor measures the loss of water from the root zone and enables you to adjust the watering schedule accordingly. Depending on your conditions, you can use one of several water strategies with the sensor to control how a zone will run. The water strategies use the following moisture limits that are monitored by the soil moisture sensor:

Upper Moisture Level (Upper Threshold): This setting represents the upper moisture limit (wettest) that soil is allowed to reach. This setting typically equals the field capacity level of soil moisture.

Lower Moisture Level (Lower Threshold): This setting represents the lower moisture limit (driest) the soil is allowed to reach and can be used to control when a zone's watering cycle will start. This setting typically equals the maximum allowed depletion (MAD) level of soil moisture.

In order to use soil moisture sensors to monitor your watering, you must have at least one auto zone configured. Refer to Creating Scheduling Groups on page 29 for more information.

The following sections explain how each strategy affects the "Start Time" and "Day Interval" programs and also explains how to set up your system to use the strategies.

Turn On Based on Day Interval and Turn Off Based on Upper Moisture Level (Water Strategy 1)

When you enable Water Strategy 1, the system will start based on the way you have the program for the zone configured – either in clock mode with timed watering starts, or on day intervals (as configured on the Adjust Zone tab).

Regardless of which start method is used, the system will turn off based on the run time configured on the Adjust Zone tab. If the run time for the zone is sufficient to reach the upper moisture level (upper threshold) as read by the biSensor, the system will apply additional water to compensate for the sensor depth. You can adjust the compensation amount by changing the number in the Sensor Depth Compensation field in the Automatic Zone and Sensor Management window.

If the run time for the zone is not sufficient to reach the upper moisture level, the system will stop watering based on the run time setting. The system does not adjust the zone's defined run time based on the upper moisture level that is set for the biSensor.

If the soil moisture is over the upper moisture level when a start time or day interval occurs, the system will water for one minute and then shut off and wait for the next start time or day interval.

Review the graph for the auto zone to ensure that your run time settings allow the system to water to the upper moisture level. Refer to the Graphs section on page 92 for information about reading and interpreting the soil moisture graphs.

To configure the system to turn off based on upper moisture level

1. On the Main Page of the BaseStation 6000 software, click the **Adjust Zone** tab.

2. Find the line for the auto zone that you want to configure.

3. Click the **Graph** (1) button at the end of the line. The Automatic Zone and Sensor Management window opens.

   Note: If you have scheduling groups set up, adjusting the primary zone will affect all zones that are linked to it.

4. In the **Water Strategy** group box, select Water Strategy 1 (2).

5. Use the slider on the right of the graph to adjust the Upper Moisture Limit (3) represented by the green line. For help setting this line correctly, refer to the topic To calibrate a biSensor on page 23.

6. Click the **Return** button to close the Automatic Zone and Sensor Management window.

   Note: Refer to the Graphs section on page 92 for information about reading and interpreting the soil moisture graphs.
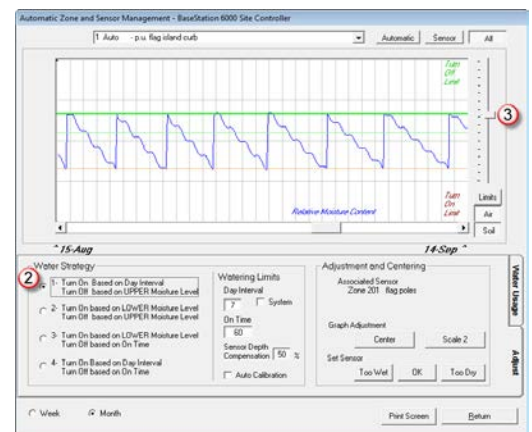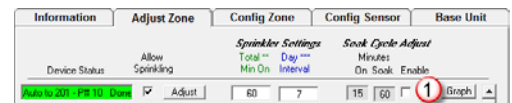
Turn On Based on Lower Moisture Levels and Turn Off Based on Upper Moisture Levels (Water Strategy 2)

When you enable Water Strategy 2, the system will start based on the way you have the program for the zone configured – either in clock mode with timed watering starts, or on day intervals (as configured on the Adjust Zone tab).

- **Clock mode with timed watering starts**: The system will only start when a start time is reached and the moisture level is below the lower moisture level (lower threshold).

- **Day intervals**: The biSensor will monitor the soil moisture content and start the zone's watering cycle when the lower moisture level is reached and watering is allowed as set by its water window. In order for Water Strategy 2 to be effective with the day interval setting, make sure that all days and times are set up to allow watering (unless there are watering restrictions).

Regardless of which start method is used, the system will turn off based on the run time configured on the Adjust Zone tab. If the run time for the zone is sufficient to reach the upper moisture level (upper threshold) as read by the biSensor, the system will apply additional water to compensate for the sensor depth. You can adjust the compensation amount by changing the number in the Sensor Depth Compensation field in the Automatic Zone and Sensor Management window.

If the run time for the zone is not sufficient to reach the upper moisture level, the system will stop watering based on the run time setting. The system does not adjust the zone's defined run time based on the upper moisture level that is set for the biSensor.

If the soil moisture is over the upper moisture level when a start time or day interval occurs, the system will water for one minute and then shut off and wait for the next start time or day interval.

Review the graph for the auto zone to ensure that your run time settings allow the system to water to the upper moisture level. Refer to the Graphs section on page 92 for information about reading and interpreting the soil moisture graphs.

To configure the system for upper and lower moisture levels

1. On the Main Page of the BaseStation 6000 software, click the **Adjust Zone** tab.

2. Find the line for the auto zone that you want to configure.

3. Click the **Graph** (1) button at the end of the line. The Automatic Zone and Sensor Management window opens.

   Note: If you have scheduling groups set up, adjusting the primary zone will affect all zones that are linked to it.

4. In the **Water Strategy** group box, select Water Strategy 2 (2).

5. Use the slider on the right of the graph to adjust the Upper Moisture Level (3) represented by the green line. For help setting this line correctly, refer to the topic To calibrate a biSensor on page 23.

6. Use the slider on the left of the graph to set the Lower Moisture Level (4) represented by the red line. For help setting this line correctly, refer to the topic To calibrate a biSensor on page 23.

7. Click the **Return** button to close the Automatic Zone and Sensor Management window.

   Note: Refer to the Graphs section on page 92 for information about reading and interpreting the soil moisture graphs.
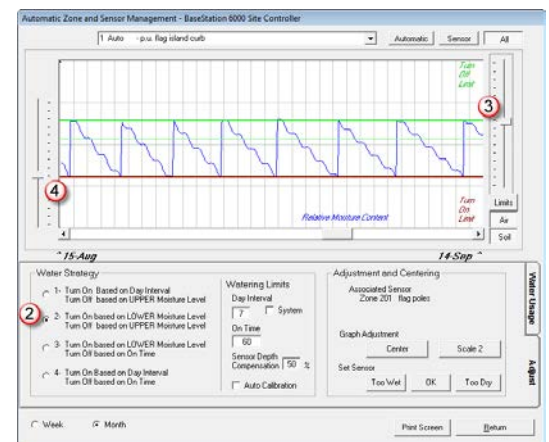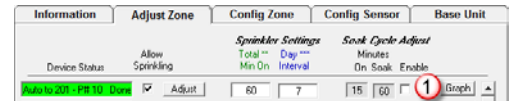
Turn On Based on Lower Moisture Levels (Water Strategy 3)

When you enable Water Strategy 3, the system will start based on the way you have the program for the zone configured – either in clock mode with timed watering starts, or on day intervals (as configured on the Adjust Zone tab).

- **Clock mode with timed watering starts**: The system will only start when a start time is reached and the moisture level is below the lower moisture level (lower threshold). The zone will then run for its total defined run time.

- **Day intervals**: The biSensor will monitor the soil moisture content and start the zone's watering cycle when the lower moisture level is reached and watering is allowed as set by its water window. The zone will then run for its total defined run time. If a zone reaches its day interval and has not reached the lower moisture level, it will then run for its defined run time.

To configure the system for lower moisture levels only

1. On the Main Page of the BaseStation 6000 software, click the **Adjust Zone** tab.

2. Find the line for the auto zone that you want to configure.

3. Click the **Graph** (1) button at the end of the line. The Automatic Zone and Sensor Management window opens.

   Note: If you have scheduling groups set up, adjusting the primary zone will affect all zones that are linked to it.

4. In the **Water Strategy** group box, select Water Strategy 3 (2).

5. Use the slider on the left of the graph to set the Lower Moisture Level (3) represented by the red line. For help setting this line correctly, refer to the topic To calibrate a biSensor on page 23.

6. Click the **Return** button to close the Automatic Zone and Sensor Management window.

   Note: Refer to the Graphs section on page 92 for information about reading and interpreting the soil moisture graphs.
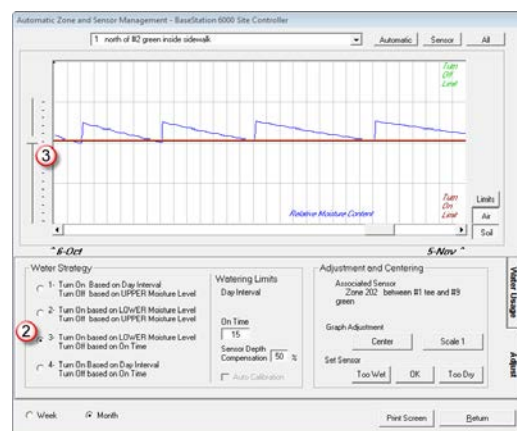
Turn On Based on Day Interval and Turn Off Based on Time (Water Strategy 4)

Effects on Start Time Programming and on Day Interval Programming

When you use Water Strategy 4, the sensor will not affect the programming of the zone, but it will monitor the moisture levels for that zone. This option can be useful when you are configuring the system.

To configure the system to turn on based on day interval and turn off based on time

1. On the Main Page of the BaseStation 6000 software, click the **Adjust Zone** tab.

2. Find the line for the auto zone that you want to configure.

3. Click the **Graph** (1) button at the end of the line. The Automatic Zone and Sensor Management window opens.

   Note: If you have scheduling groups set up, adjusting the primary zone will affect all zones that are linked to it.

4. In the **Water Strategy** group box, select Water Strategy 4 (2).

5. Click the **Return** button to close the Automatic Zone and Sensor Management window.

   Note: Refer to the Graphs section on page 92 for information about reading and interpreting the soil moisture graphs.
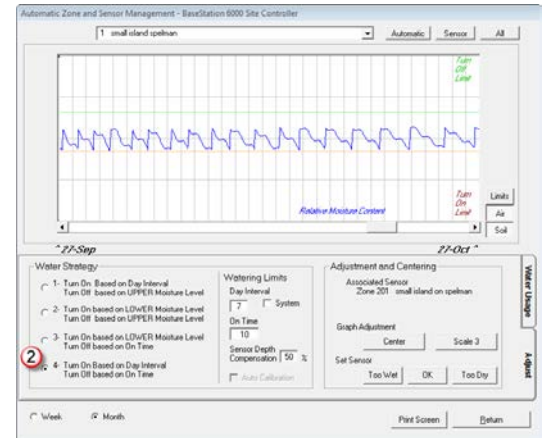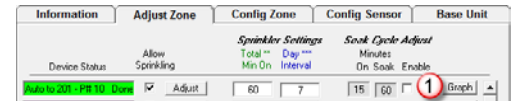
Adding and Managing Events

During the course of a watering season there will be times when you need to prevent watering on all or part of your system. You can add scheduled events in order to prevent watering for a designated period of time. When the event date and time have passed, the system will resume watering as scheduled.

To add an event

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that controls the zones affected by the event.

2. Click the **Programs** button. The Set Watering Program Schedule window opens.

3. Click the **Schedule Events** tab.

4. Click the arrow in the field at the top of the page, and then click the program (1) that you want to add the event to.

   Note: If you want to add an event to all programs, select the Check to Apply to All Programs (2) check box under the calendar.

5. Click the **Add Event** (3) button.

6. Type a descriptive name for the event in the **Type Event Description Here** (4) field.
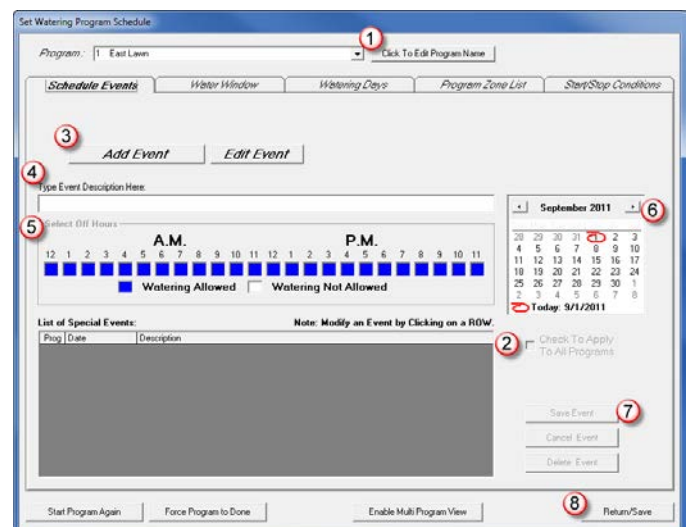
7. In the **Select Off Hours** (5) group box, find the hours when you want the system to be turned off, and then click any blue boxes to make them white. The white boxes indicate that watering is not allowed.

8. On the calendar (6), click the date when you want the event to occur.

    Note: If you have added event details that you do not want to save, click Cancel Event Edits to undo those changes.

9. Click **Save Event** (7).

10. Click **Return/Save** (8).

To edit an event

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that controls the zones affected by the event.

2. Click the **Programs** button. The Set Watering Program Schedule window opens.

3. Click the **Schedule Events** tab.

4. Click the arrow in the field at the top of the page, and then click the program that the event is associated with.

5. Click the **Edit Event** button.

6. In the **List of Special Events**, click on the event that you want to edit.

7. Make any necessary changes to the description, off hours, or date.

    Note: If you have changed any event details that you do not want to save, click Cancel Event Edits to undo those changes.

8. Click **Save Event**.

9. Click **Return/Save**.

To permanently delete an event

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that controls the zones affected by the event.

2. Click the **Programs** button. The Set Watering Program Schedule window opens.

3. Click the **Schedule Events** tab.

4. Click the arrow in the field at the top of the page, and then click the program that the event is associated with.

5. Click the **Edit Event** button.

6. In the **List of Special Events**, click on the event that you want to permanently delete.

7. Click **Delete Event**.

8. Click **Yes** in the Event Manager confirmation message.

9. Click **Return/Save**.

Making Seasonal Adjustments

The BaseStation 6000 has tools for making adjustments to your programs to match seasonal watering needs. You can adjust both the watering frequency and watering amounts without making permanent changes to your programs.

Note: We recommend that you do not use this tab to make adjustments for new landscapes, such as new sod or seed.

If your area is experiencing a period of unusual weather, and you want to temporarily adjust your entire system either up or down, consider using the Weather Adjust Factor field on the Adjust Zone tab, rather than configuring the seasonal adjustments described in this topic. Refer to Compensating for Unusually Wet or Dry Weather on page 41.

The system provides the following strategies for making seasonal adjustments:

Straight Time Only – This strategy removes any seasonal adjustments and returns the system to the normal watering schedule.

Monthly Adjust-Days – This strategy enables the user to specify the maximum number of days the system can go before it waters again. For example, during the first two weeks of April the system will go a maximum of four days before it waters again. These values can be adjusted for seasonal watering differences.

Monthly Adjust-Time – This strategy enables you to adjust the watering time in each two-week period based on a percentage of the maximum watering time. Typically, this strategy is not used, but it is available if percentages are easier to manage.

Monthly Adjust-Time and Days – This strategy combines the previously discussed strategies and enables some zones to be adjusted based on days and other zones adjusted based upon times.

Note: We recommend that you set the values for all monthly strategies to represent historic water usage in the given area.

Setting Up Seasonal Adjustments

1. On the Main Page, click the **Information** tab to activate the Main Menu.

2. Click the **Seasonal Adjust** menu, and then click **Adjust**. The Set System Parameters window opens.

3. Make sure the **Seasonal Adjustments** tab is visible.

4. In the **Seasonal Adjustment Method** group box, select the option for handling the adjustments:

    - If you want your programs to water on a consistent cycle throughout the year (or whenever your system is turned on), select **Straight Time Only**, and then click the **Return** button at the bottom of the window.

    - If you want to specify the maximum number of days the system can go before it waters again, select **Monthly Adjust-Days**. In the **Seasonal Adjustment Factors for Watering Time and Watering Days** group box, select **Edit Watering Days**, and then in the fields for the days of the month, type the number of days that you want the system to wait before it waters again.

    - If you want to adjust the watering time in each two-week period based on a percentage of the maximum watering time, select **Monthly Adjust-Time.** In the **Seasonal Adjustment Factors for Watering Time and Watering Days** group box, select **Edit Watering Time Adjustment Percent,** and then in the fields for the days of the month, type a number that represents the percentage of the maximum watering time that you want to be used during those days.

- If you want to set up your seasonal adjustments based on a combination of days and percentages, select **Monthly Adjust-Time and Days.** In the **Seasonal Adjustment Factors for Watering Time and Watering Days** group box, first select **Edit Watering Days**, and then in the fields for the months when you want to adjust by days, type the number of days that you want the system to wait before it waters again. Then select **Edit Watering Time Adjustment Percent,** and in the fields for the months when you want to adjust by percentages, type a number that represents the percentage of the maximum watering time that you want to be used.

    Note: If you want to restore these fields to the default values provided by the system, click the Load Default Values button.

5. Click the **Return** button to save your changes and close the Set System Parameters window.

6. If you selected an option other than Straight Time Only, go to the **Adjust Zone** tab and enable the automatic seasonal adjustment in the Total Min On and the Day Interval fields as needed.

    a. Depending on the seasonal adjustment option that you selected, double-click in the **Total Min On** and/or the **Day Interval** fields to enable the automatic adjustment.

    b. Click **Yes** in the confirmation message box.

7. To view the seasonal adjustment that is currently being applied, go to the **Adjust Zone** tab and review the field at the bottom of the **Sprinkler Settings** column. The field might display something like Sys = 3 D or 77%, which means that the watering days for this time period are set to 3, and the adjustment percentage for this time period is set to 77 percent of normal.

    Note: Regardless of whether you have a seasonal adjustment currently enabled, information about any previous seasonal adjustment displays in the field at the bottom of the Sprinkler Settings column. If you have enabled a seasonal adjustment, the background color in the **Total Min On** and/or the **Day Interval** fields changes to light blue (cyan) to match the background color of the field at the bottom of the Sprinkler Settings column.

Shutting Down the System at the End of the Watering Season

Depending on your location and watering needs, sometimes you will need to shut off watering for a period of time. Instead of making adjustments to many different zones and programs, you can simply halt the system indefinitely until you decide to restart operation. This option is called Seasonal Shutdown.

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Utilities**, and then click **Seasonal Shutdown**. A confirmation message displays.

3. Click **Yes** to stop all watering. Another confirmation message displays.

4. Click **Yes** again. A check mark displays next to the Seasonal Shutdown option on the Utilities menu. "Seasonal Shutdown" displays in the upper-left corner of the main page, and the Pause button is highlighted in yellow.

To resume watering after a seasonal shutdown

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Utilities**, and then click **Seasonal Shutdown**. A confirmation message displays.

3. Click **Yes** to resume all watering. The check mark next to the Seasonal Shutdown option on the Utilities menu is removed. "System Active" displays in the upper-left corner of the main page, and the Run button is highlighted in green.

Shutting Down the System when Rain is Forecast

The BaseStation 6000 software provides sensor-based options for controlling your irrigation system when it rains. However, if rain is forecast and you do not have sensor devices installed or configured, you can use the Rain Shutdown option to pause all watering for a specified number of days.

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Utilities**, and then click **Rain Shutdown**. The Rain Shutdown dialog box opens.

3. In the field, type a number between 1 and 7 to indicate the number of days that you want watering to be paused.

4. Click **OK**. A check mark displays next to the Rain Shutdown option on the Utilities menu. "Rain Pause" displays in the upper-left corner of the main page, and the Pause button is highlighted in yellow.

To resume watering after a rain shutdown

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Utilities**, and then click **Rain Shutdown**. A confirmation message displays.

3. Click **OK** to resume all watering. The check mark next to the Rain Shutdown option on the Utilities menu is removed. "System Active" displays in the upper-left corner of the main page, and the Run button is highlighted in green.

Starting/Stopping Irrigation Based on Tiered Soil Moisture Readings

The BaseStation 6000 system can be configured to start or stop irrigation based on readings from soil moisture sensors.

You might have a situation where you are watering a landscape installed over contaminated land, and there is potential for contaminates to leach into groundwater if the irrigation water applied at the surface penetrates the soil too deeply. In a brownfield situation like this, you can identify up to three tiers of water penetration and then install a soil moisture sensor in each of these tiers. Using the advanced functionality of the BaseStation 6000 system, you can automatically control the irrigation based on the readings from each soil moisture sensor.

Requirements

- Soil moisture sensors installed in the locations that you need to monitor

- Soil moisture sensors configured in the BaseStation 6000 system

- System notification configured in BaseStation 6000 Report & Alert Mailer

To configure the settings for tiered soil moisture readings

1. Before you go to the Start/Stop Conditions tab to begin the configuration, find the serial numbers of the soil moisture sensors that you added to the system for this purpose. (If you have not added the sensors yet, refer to the topic about configuring a biSensor on page 23.)

    a. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that the sensors are connected to.

    b. Click the **Config Sensor** tab.

    c. Use the scroll box on the left to find the sensors that you configured for the tiered moisture readings.

    d. Write down the Remote Base Unit number and the serial numbers of the sensors. Be careful to maintain the order of the sensors from top to bottom.

2. Click the **Information** tab to activate the Main Menu.

3. On the Main Menu, click **Programs**, and then click **Start/Stop Conditions**. The Set Watering Program Schedule window opens.

4. Make sure that the **Start/Stop Conditions** tab is visible.

5. Click the arrow in the **Program** field and click the program that you want to configure moisture sensors for.

6. In the **Moisture Sensor** group box, refer to the list of sensors that you recorded in Step 1 above, and then type the information in the **Base** and **Address** fields. After the system reads the sensor, the current data will display in the Description field and in the Curr=C (Current) field under the Moisture column.
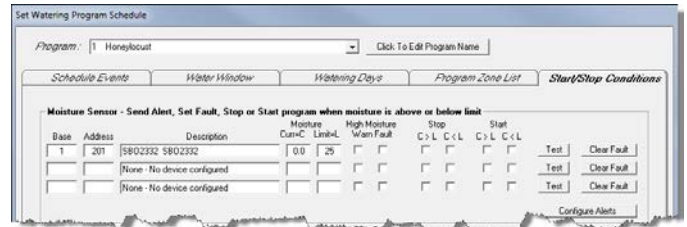
   Note: If you are setting up a series of stacked sensors, we advise that you enter them into the software in order from top to bottom to simplify the management of the system.

7. In the **Limit=L** field under the **Moisture** column, type the limit for the soil moisture on this sensor. The limit is a percentage based on the graph of the soil moisture sensor readings. To view the graph, close the Set Watering Program Schedule window. On the Main Page, click the Config Sensor tab. Find the line for sensor that you are using for these readings, and then click the Graph button on the right end of the line. After viewing the graph, return to the Set Watering Program Schedule window to continue this procedure.

   Note: If you want to set the limit to 25%, type 25 in the field. Do not use a decimal point to designate a percentage.

8. Under the **High Moisture** column, select one of the check boxes:

   - **Warn:** The system sends a warning when this limit is reached.

   - **Fault:** The system creates a fault condition when this limit is reached. The fault condition will persist until you clear it by clicking the **Clear Fault** button at the far right of the line for the sensor.

9. If you want irrigation to **stop** when…

   - The current moisture is greater than the limit, select the **C > L** check box under **Stop.**

   - The current moisture is less than the limit, select the **C < L** check box under **Stop.**

10. If you want irrigation to **start** when…

    - The current moisture is greater than the limit, select the C > L check box under Start.

    - The current moisture is less than the limit, select the C < L check box under Start.

11. If you selected the Warn check box, click the **Configure Alerts** to indicate how and when you want the warning messages to be sent. If you need to configure the message recipients, refer to System Notification on page 82.

12. Click **Return/Save**.

Starting/Stopping/Pausing Irrigation Based on Temperature Sensor Readings

The BaseStation 6000 system can be configured to start, stop, or pause irrigation based on readings from temperature sensors.

This option would be useful in the following example:
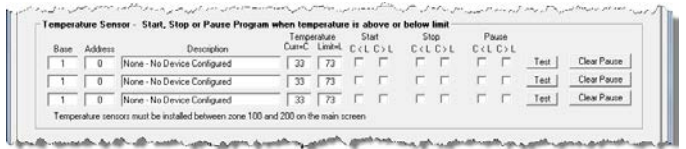
While it might seem unusual to water an artificial turf playing field, water is frequently used to reduce the temperature of the playing surface. Applying water will rapidly cool the surface, but the cooling effect does not last very long.

If you were in charge of managing a situation like this, you could install a temperature sensor near the playing surface. Then in the BaseStation 6000 software, you would configure the sensors to start, stop, or pause irrigation based on the readings from the sensor. The system will keep the playing surface at a constant temperature by applying water when needed.

Requirements

- Air temperature sensors are installed in the locations that you need to monitor.

- Air temperature sensors are configured in the BaseStation 6000 system. (Refer to Adding Devices to Manage Start/Stop Conditions on page 20.)

To configure the settings for temperature sensor readings

1. Before you go to the Start/Stop Conditions tab to begin the configuration, find the serial number of the air temperature sensor that you added to the system for this purpose. (If you have not added the sensor yet, refer to Adding Devices to Manage Start/Stop Conditions on page 20.)

    a. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that the sensor is connected to.

    b. Click the **Config Zone** tab.

    c. Use the scroll box on the left to move to the Address range between 180 and 199, and then find the sensor that you configured to manage the start/stop conditions.

    d. Write down the Remote Base Unit number and the serial number of the sensor.

2. Click the **Information** tab to activate the Main Menu.

3. On the Main Menu, click **Programs**, and then click **Start/Stop Conditions**. The Set Watering Program Schedule window opens.

4. Make sure that the **Start/Stop Conditions** tab is visible.

5. Click the arrow in the **Program** field, and then click the program that you want to configure air temperature sensors for.

6. In **Temperature Sensor** group box, refer to the information that you recorded in Step 1 above, and then type that information in the **Base** and **Address** fields for the air temperature sensors that you are using the monitor this location. After the system reads the sensor, the current data will display in the Description field and in the Curr=C (Current) field under the Temperature column.

7. In the **Limit=L** field under the **Temperature** column, type the limit for the air temperature on this sensor.

8. If you want irrigation to **start** when…

    - The current temperature is less than the limit, select the **C < L** check box under **Start.**

    - The current temperature is greater than the limit, select the **C > L** check box under **Start.**

9. If you want irrigation to **stop** when…

    - The current temperature is less than the limit, select the **C < L** check box under **Stop.**

    - The current temperature is greater than the limit, select the **C > L** check box under **Stop.**

10. If you want irrigation to **pause** when…

    - The current temperature is less than the limit, select the **C < L** check box under **Pause.**

    - The current temperature is greater than the limit, select the **C > L** check box under **Pause.**

11. Click **Return/Save**.

Starting/Stopping/Pausing Irrigation Based on Switch State

The BaseStation 6000 system can be configured to start, stop, or pause irrigation based on the state of a switch.

This option would be useful in the following example:

Suppose that your irrigation water comes from a cistern. When the water level in the cistern drops below a certain depth, you want your irrigation system to shut off or pause so you do not pump the cistern dry. In a situation like this, you would install a float switch in the cistern to detect the low level, and then configure the BaseStation 6000 system to operate based on the state of that switch.

Requirements

- Switch devices are installed in the field.

    Note: You cannot use a pause button as a start/stop device.

- Switch devices are configured in the BaseStation 6000 system (Refer to Adding Devices to Manage Start/Stop Conditions on page 20.)

To configure the settings for switch states

1. Before you go to the Start/Stop Conditions tab to begin the configuration, find the serial number of the switch device that you added to the system for this purpose. (If you have not added the switch device yet, refer to Adding Devices to Manage Start/Stop Conditions on page 20.)

    a. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that the switch device is connected to.

    b. Click the **Config Zone** tab.

    c. Use the scroll box on the left to move to the Address range between 180 and 199, and then find the switch device that you configured to manage the start/stop conditions.

    d. Write down the Remote Base Unit number and the serial number of the switch device.

2. Click the **Information** tab to activate the Main Menu.

3. On the Main Menu, click **Programs**, and then click **Start/Stop Conditions**. The Set Watering Program Schedule window opens.

4. Make sure that the **Start/Stop Conditions** tab is visible.

5. Click the arrow in the **Program** field, and then click the program that you want to configure a switch device for.

6. In the **Switch Device** group box, refer to the information that you recorded in Step 1 above, and then type that information in the **Base** and **Address** fields for the switch device that you are using. After the system reads the device, the updates the Description field and the Switch State field.

7. If you want irrigation to **start** when…

    - The switch is open, select the **Open** check box under **Start.**

    - The switch is closed, select the **Closed** check box under **Start.**

8. If you want irrigation to **stop** when…

    - The switch is open, select the **Open** check box under **Start.**

    - The switch is closed, select the **Closed** check box under **Start.**

9. If you want irrigation to **pause** when…

- The switch is open, select the **Open** check box under **Start.**

- The switch is closed, select the **Closed** check box under **Start.**

10. Click **Return/Save**.

Changing all Zones in a Program

The Program/Value Editor enables you to change all zones within a program to have the same the watering and soak cycle values. If you are managing a large site where the zones have similar watering requirements, this option will come in handy.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that controls the zones that you want to change.

2. Click the **Information** tab to activate the Main Menu.

3. On the Main Menu, click **Window**, and then click **System Parameters**. The Set System Parameters window opens.

4. Click the **Program/Value Editor** (1) tab.

5. Click the arrow in the **Program Selector** (2) field, and then click the program that controls the zones that you want to change.

6. In the **Watering** (3) column, change the settings for all zones in the selected program:

- **On Time** – Type the maximum on time in minutes. Water will stop when this time is up in both timed and sensor modes.

- **Days Between** – Type the maximum days between watering for both timed and auto zones.

- **Flow Rate GPM** – Type the predicted flow rate for the zones in gallons per minute. This parameter is optional.

7. In the **Soak Cycle** (4) column, change the settings for all zones in the selected program:

- **On Time** – Type the water on time in minutes for each cycle of the soak cycle.

- **Wait Time** – Type the minimum amount of time in minutes that the system will wait between each cycle of the soak cycle.

- **Soak Cycle Enable** – Select the check box to enable soak cycles for these zones.

8. Click **Apply Setting to ALL Zones in the Program on Selected Base** (5). A confirmation message warns you that this option will overwrite all existing configuration information.

9. Click **OK**.

10. Click **Return** (6).
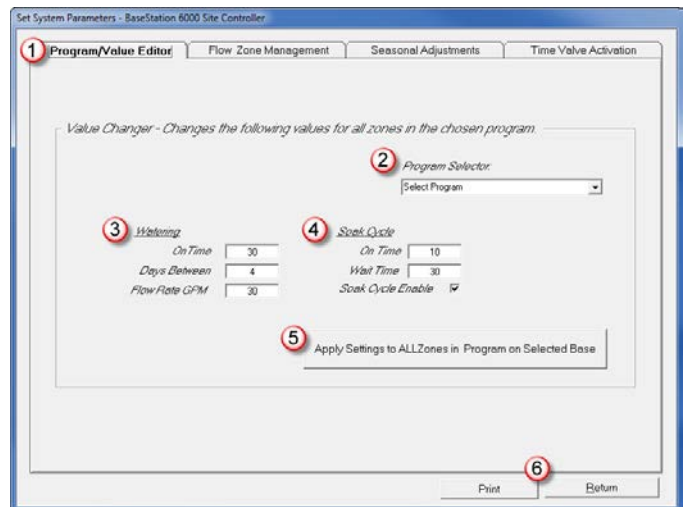
5 – ET-BASED WATERING

Evapotranspiration (ET) refers to the loss of moisture from the soil by evaporation and by the transpiration of plants. Factors such as air temperature, humidity, solar radiation, and wind speed affect the rate at which ET occurs. The BaseStation 6000 system includes advanced ET-based watering technology, which enables ET-based zones to be watered when needed rather than on a pre-set schedule.

ET-based irrigation systems attempt to calculate the loss of water from the root zone and adjust the watering schedule accordingly. The first step in this process is to obtain an accurate estimate of reference ET (ET_0). Data for the standardized reference ET equation is gathered from air temperature sensors, weather stations, or rain gauges. Then the BaseStation 6000 software estimates ET_0 by plugging the on-site data into mathematical equations (Hargreaves or Penman Monteith).

In addition, the system uses data that you supply about the zone:

- A specific plant type's water needs

- The plant's microclimate (ranging from full sun to total shade)

- Irrigation method used (spray, rotor, drip, or bubbler)

- Type of soil at the site (clay, sand, or loam)

- Slope of landscape (ranging from slight to extreme)

- The latitude of the site

The BaseStation 6000 system provides several methods for implementing ET-based watering:

- Based on readings from an air temperature sensor

- Based on readings from a weather station such as the Campbell Scientific Evapotranspiration Monitoring Station

- Based on readings from a rain gauge such as a tipping rain bucket

IMPORTANT NOTE: ET-based watering does not take the place of programs on your BaseStation 6000 controller. You still need to follow the instructions in the Initial Programming and Programming Adjustments sections of this manual to set up your programs, and then apply the ET settings to the specific zones.

Configuring an ET Primary Zone

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that controls the zone that you want to configure as an ET zone.

2. Click the **Config Zone** (1) tab.

3. On the line for the zone that you want to configure, click the arrow in the field under **Device Mode**, and then click **ET-Time** (2). The ET Parameter Input window opens.

4. Click the **Primary Zone Management** (3) tab.

5. Verify that the correct zone is displayed in the **Select Zone** (4) field.

6. Click the arrow in the **Plant Type** (5) field, and then click the option that represents the type of vegetation that will be watered by this zone. The number in the field to the right of Plant Type is the percentage of ET_0 that will be used for the plant type.

   Note: If none of the plant types in the list match the vegetation in the zone that you are configuring, click **Other**, and then type a number in the field on the right to represent the percentage of ET_0 that is required for watering the plant type.

7. Click the arrow in the **Shade Index** (6) field, and then click the option that represents the zone's microclimate.

8. Click the arrow in the **Sprinkler Type and Application Rate** (7) field, and then click the type of output device. In the field on the right, type the application rate for that device in inches per hour.

   Note: Most spray heads and rotors are labeled with their application rate in inches per hour. If you are configuring ET for a dripper or bubbler zone, you will have to convert the stated application rate from gallons per hour to inches per hour. Refer to Calculating the Application Rate for Dripper or Bubbler Zones on page 118 in the Resources section of this manual.

9. Click the arrow in the **Soil Type** (8) field, and then click the type of soil found in this zone.

10. Click the arrow in the **Slope** (9) field, and then click the degree of slope in this zone. Based on your entries in these fields, the system recommends settings for the zone.

11. To enter the recommended settings for your ET-based zone, click **Apply Settings** (10) in the Water Application Parameters group box.

    Note: If you want to verify that the settings were applied, go to the Adjust Zone tab and review the fields for your ET-based zone.

12. In the **Latitude** (11) field, type a number that represents the degrees of latitude for the location of your site. You can find the latitude on a detailed map or on various web sites (for example, www.findlatitudeandlongitude.com).

    Note: The fields under Primary Zone Adjustments and Overrides are not used during the initial configuration of the ET primary zone. Refer to the instructions below for adjusting an ET-based zone.

13. Click **Record** (12).

14. Click **Return** (13) to close the ET Parameter Input window and return to the Config Zone tab.

15. Click the **Information** tab to exit the configuration mode.
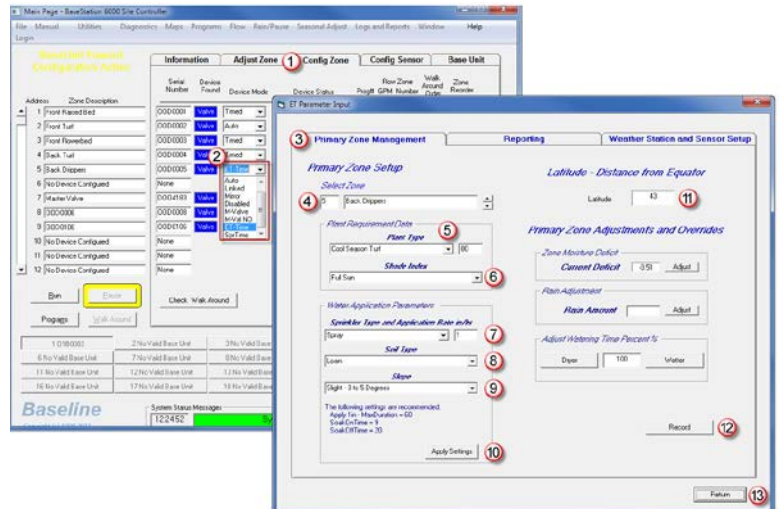
Adjusting an ET-Based Zone

On the Adjust Zone tab, you can temporarily adjust the run time for a zone that is configured for ET, but the program will restore the ET settings. Follow the steps below to permanently adjust the settings for an ET-based zone.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that controls the ET-based zone that you want to adjust.

2. Click the **Config Zone** tab.

3. On the line for the ET-based zone that you want to adjust, click the arrow in the field under **Device Mode**, and then click **ET-Time**. The ET Parameter Input window opens.

4. Click the **Primary Zone Management** tab.

5. Verify that the correct zone is displayed in the **Select Zone** field.

6. Change the **Setup** fields as needed. If the recommended settings change as a result, be sure to click **Apply Settings** to have those changes applied to the zone.

7. In the fields under **Primary Zone Adjustments and Overrides**, enter any adjustments that are necessary for the zone.

   - The **Current Deficit** field in the Zone Moisture Deficit group box shows the accumulated deficit since the last watering cycle. If the watering cycle is not long enough to reduce the deficit to 0, the deficit will increase over time. If you see an increasing deficit, it could mean that the ET parameters are not adjusted correctly, the temperature sensor is not in a representative place, or there is an irrigation equipment or deliver problem. These issues should be investigated.

   - If a significant amount of rain falls on your site, you can use the **Rain Amount** field in the Rain Adjustment group box to record the amount in inches. The amount will be figured into the ET deficit calculations.

   - If you need to increase or decrease watering time based on watering performance, click **Dryer** or **Wetter** within the Adjust Watering Time Percent group box. You can also type a number in the field to increase or decrease the run time by a percentage.

8. Click **Record**.

16. Click **Return** to close the ET Parameter Input window and return to the Config Zone tab.

17. Click the **Information** tab to exit the configuration mode.

Configuring a Precision Rain Shutdown

You can install a tipping rain bucket rain gauge and then configure that gauge to shut down irrigation precisely based on the configuration. The rain gauge is read every 10 minutes. When the total amount of rain reaches the specified limit for that day, the system shuts down irrigation for the specified amount of time.

For the physical installation of the rain gauge, please refer to the "Installation Guide" that was included in the package.

1. If you have not added the rain gauge to the BaseStation 6000 system, do that first by following the instructions in Adding a Tipping Bucket Style Rain Gauge on page 26.

2. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where the rain gauge is installed.

3. Click the **Config Zone** tab and note the zone number of the rain gauge.

4. Click the **Information** tab to activate the Main Menu.

5. On the Main Menu, click **Rain/Pause**, and then click **ET Rain Gauge Mgr**. The ET Parameter Input window opens.

6. Ensure that the **Weather Station and Sensor Setup** tab is visible.

7. In the **Rain Shutdown** group box, ensure that the correct Remote Base Unit is displayed in the **Select Base Unit to Be Controlled** field.

   Note: If you have multiple RBUs connected to your BaseStation 6000 system, you can configure the rain gauge to control any or all of those RBUs. Perform the following steps for the RBU displayed in the Select Base Unit to Be Controlled field, and then choose a different RBU in that field and repeat the steps.

8. In the **Rain Gauge Base Unit** field, type the number of the Remote Base Unit that the rain gauge is connected to.

9. In the **Rain Gauge Address** field, type the zone number of the rain gauge.

10. If you want the system to shut down irrigation based on the rain gauge data, select the **Enable Rain Shutdown** check box.

    Note: When you select the Enable Rain Shutdown check box, the system will read the status of the rain gauge and display the information in the Current Status field.

11. If there are any programs on the associated RBU that you do not want to be shut down, type those program numbers in the **Excluded Programs** field. Type a comma between each number. Example: 1,2,13

12. In the **Rain Gauge Parameters** group box, configure the settings for the rain gauge:

    - **Inches Per Pulse** – Type the increment at which the rain gauge tips (found in the specifications for the rain gauge).

    - **Minimum Inches** – Type the minimum amount of rain (in inches) that will cause the system to shut down.

    - **Hours Off Per Inch** – Type the number of hours that you want the system to stay off per inch of rain received. If the value in the Minimum Inches field is less than an inch, the actual hours off will be a percentage (equal to the percentage of an inch in the previous field) of the number in this field.

      Example: If you enter 0.25 inches in the Minimum Inches field, and then enter 24 hours in the Hours Off Per Inch field, the system will shut down for 6 hours when the rain gauge measures 0.25 inches of rain. If the rain gauge measures 0.5 inches of rain, the system will shut down for 12 hours. When a full inch of rain is received, the system will shut down for 24 hours.

    - **Maximum Absorption Rate in Inches/Hour** – Type a number that represents the rate at which the soil in the affected zones will accept water.

    - **Test** – Click to test the system's communication with the rain gauge.

    - **Set Fault** – Click to set an artificial rain event. The settings for the rain shutdown display in the Current Status field.

    - **Clear Fault** – After an actual or artificial rain event, click Clear Fault to remove the pause condition.

13. Click **Return**.

Configuring an ET Weather Station

A typical weather station includes the following meteorological sensors:

- Solar Radiation Sensor (pyranometer)

- Air Temperature Sensor

- Relative Humidity Probe

- Tipping Bucket Rain Gage

- Wind Sensor (anemometer)

The BaseStation 6000 software can read and display the data from the weather station and then use the data from that station to obtain an accurate estimate of reference ET (ET_o).

This functionality is coming soon…

Configuring Hargreaves Equation and a Rain Gauge for Weather Station Data

The Hargreaves equation typically requires only measured temperature data to calculate reference ET_o. However, the BaseStation 6000 enables you to combine rainfall data with the Hargreaves equation to factor a rain adjustment into the system's ET parameters.

This functionality is coming soon…

ET Reporting

This functionality is coming soon…

6 – FLOW

The BaseStation 6000 Site Controller has powerful flow features, which enable you to:

- **Detect and manage flow faults** – With a flow device, the system can monitor the readings to protect your irrigation system from excessive flow. In an "overflow event" the controller closes all master valves associated with the flow meter and halts all irrigation to protect the landscape from flooding, within five minutes of overflow detection.

- **Control water usage** – The BaseStation 6000 Site Controller gives you very precise control over the flow in your system, which enables you to carefully monitor and use water while staying within allowed limits. The controller will monitor the system flows in order to shorten water windows and maximize the number of valves running without exceeding system flow capacity.

- **Manage and optimize flow** – You can configure a model of your irrigation system in the BaseStation 6000 software. The system will use that information to distribute and control watering based on flow settings.

Before you attempt to use the flow features in the BaseStation 6000 software, make sure you understand the following terms and concepts:

- **Flow** – The amount of water that moves through your irrigation system at any given time.

- **Flow zone** – The group of zones in your irrigation system that is monitored by a flow device. If you install multiple flow devices on your system, you will have multiple corresponding flow zones.

- **Flow node** – A section of your irrigation system that is differentiated from other sections by its piping structure. An irrigation system for a residential property might have only one flow node, but a system for a sports complex or a business park might have multiple nested flow nodes based on how the pipe sizes in the water delivery system change as the system branches out to the various irrigation sites. In the BaseStation 6000 software, you can configure flow nodes in parent-child relationships to match complex integrated piping structures.

Detecting and Managing Flow Faults

When you set up your system to monitor for flow-based faults, you can prevent water loss due to a broken pipe.

You can configure the BaseStation 6000 system to detect and manage flow faults across your entire irrigation system (you must have a flow device on the point of connection for the site) or on individual flow zones. For either option, you must have a Flow biCoder configured in the system.

If you know the flow for all the zones in your irrigation system, you can configure the base flows manually (refer to Manually Entering the Flow on page 62). You can also use the Learn Flow option to have the system operate all the valves and automatically update the base flow fields (refer to Enabling the BaseStation 6000 to Learn the Flow for Each Valve on page 62).

Viewing and Understanding Flow Device Readings

1. Make sure that you have already added a Flow biCoder to the BaseStation 6000 system. Refer to Adding a Flow biCoder on page 21.

2. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

3. Click the **Flow** menu, and then click the **Configure Flow Sensors** option. The Flow BiCoder and Pause Device Management and Configuration window opens.

4. Click the **Flow Bicoder – All Bases** tab.

5. In the **Current Combined Flow and Usage** group box, review the data in the following fields:

   - **Combined Flow** – This field shows the current sum of all the flow through all the flow devices on the system in gallons per minute.

   - **Combined Usage** – This field shows the total water usage by the irrigation system in gallons per minute since the system was installed or since the Flow biCoders were reset.

   - **Flow Limit** – This field shows the gallons per minute limit entered by the user. When this limit is enabled, the entire system will shut down if the flow exceeds this limit. Refer to Setting Up Flow Monitoring for the Entire System on page 60.

6. In the **Flow Zones – Address Flow Decoders and Set Limits** group box, review the data in the following fields:

   - **Flow** – This field shows the current flow reading of the Flow biCoder.

   - **Usage** – This field shows the total water usage that has been read by this Flow biCoder since the system was installed or since the Flow biCoder was reset.

7. When you finish viewing the flow device readings, click **Return** to close the Flow BiCoder and Pause Device Management and Configuration window.

Setting Up Flow Monitoring for the Entire System

1. Make sure that you have a master valve and a flow device installed at the point where the irrigation system connects to the water supply. Determine whether the master valve is normally open or normally closed.

2. Make sure that you have already added the Flow biCoder associated with the master valve to the BaseStation 6000 system. Refer to Adding a Flow biCoder on page 21.

3. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

4. Click the **Flow** menu, and then click the **Configure Flow Sensors** option. The Flow BiCoder and Pause Device Management and Configuration window opens.

5. Click the **Flow Bicoder – All Bases** tab.

6. In the **Flow Limit** field within the **Current Combined Flow and Usage** group box, type the maximum flow allowed on the entire system.

7. Select the **Enable Limit** check box.

8. Click **Return**.

   If the total flow of the system exceeds the amount listed in the Flow Limit field for more than 5 minutes, watering will be shut down for the entire system. The errors display in the Alarms and Alerts pane and the background color of the Device Status field on the Information tab changes to red.
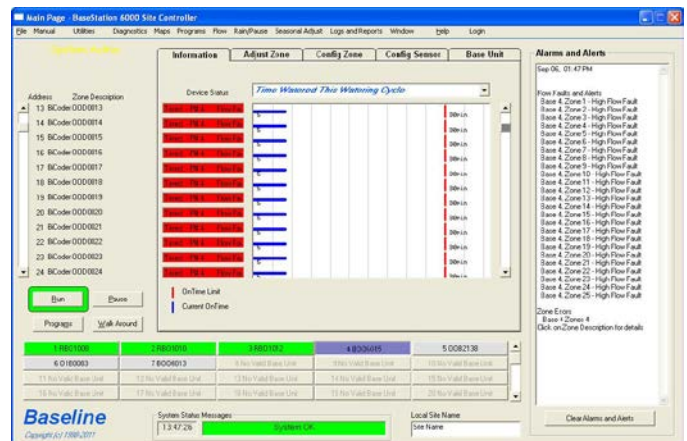
Setting Up Flow Monitoring for Flow Zones

Use this procedure to set up individual components of your system to be monitored and handled separately. If there is a problem, only that component is shut down and the rest of the system continues to water as needed.

1. Make sure that you have already added all of the Flow biCoders that are associated with the flow devices to the BaseStation 6000 system. Refer to Adding a Flow biCoder on page 21.

2. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

3. Click the **Flow** menu, and then click the **Configure Flow Sensors** option. The Flow BiCoder and Pause Device Management and Configuration window opens.

4. Click the **Flow Bicoder – All Bases** (1) tab.

   Note: The behavior of the fields on the Flow Bicoder – All Bases tab changes depending on what type of master valve is configured in the system and associated with a certain flow device.

5. Verify that the **Enable Sensor** (2) check box is marked for each Flow biCoder. In some cases, the check mark in this check box is automatically removed while values are being updated in the system. Be sure to verify that the check boxes are marked after you finish updating the fields on this tab.

6. In the **Flow Zone** (3) column, type the number of the flow zone that each Flow biCoder is associated with.

   Important! Number your flow zones from 1 through 24 to correspond with the Flow biCoder numbers.

7. Use the fields in the **Upper Limit** (4) column to set a high flow limit that will shut off the valves associated with this flow zone.

   - The **OFF** value represents the upper flow limit in gallons when the system is not watering. If, for example, there is a hose bib on this zone that would allow water to flow when the zone is not watering, you can set this value to allow a certain level of flow. If this value is set incorrectly, a flow fault will occur on this zone when the hose bib is turned on.

   - The **ON** value represents the upper flow limit in gallons when the system is watering.

     Note: If you have a normally open Flow biCoder configured without an upper limit set, an error will warn you that it is not set up properly.

8. Click the **Enable** (5) check box to indicate that these limits are activated.

   Note: Type the limits in the fields and then quickly select the associated Enable check box. An error will display if the system tries to write the values to the Flow biCoder before the Enable check box is selected.

9. Use the fields in the **Flow Variance Limits** (6) column to set limits on the amount of variance as a percentage over or under the expected flow. If flow variance is triggered, it will shut off the valves associated with this flow zone.

   - The **High** value represents the percentage over the expected flow at which you want the system to shut off the valves associated with this flow zone.

   - The **Low** value represents the percentage under the expected flow at which you want the system to shut off the valves associated with this flow zone.

10. Select the **Enable** (7) check boxes to the right of the High or Low value fields to indicate which Flow Variance Limits are activated.

11. Click the **Test** (8) button to find out whether the Flow biCoder is working correctly and to get a reading of the current flow. The test results display in the pane below the table.

12. Under the **Set/Reset** (9) column, click the **S** button to simulate a high flow event and find out whether the Flow biCoder is set up correctly. Click the **R** button to reset a high flow fault.

13. Click **Return** (10). The Flow BiCoder and Pause Device Management and Configuration window closes.

14. On the Main Page of the BaseStation 6000 software, click the **Config Zone** tab.

15. In the **Number** field under the **Flow Zone** column, assign each zone to the flow zone that it will be monitored by.

    Note: You also need to assign your master valves to the flow zones that they will control. After you configure these settings, the system can shut down the water for a flow zone when a fault occurs.

    If a flow fault is triggered, watering will only stop for the flow zone where the fault was detected. An error message also displays on the Main Page.

16. Click the **Information** tab to exit the configuration mode.

Manually Entering the Flow

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that you want to enter base flows for.

2. Click the **Config Zone** tab.

3. In the **GPM** field under the **Flow Zone** column, type the gallons per minute (GPM) flow for each valve.

4. Click the **Information** tab to exit the configuration mode.

Enabling the BaseStation 6000 to Learn the Flow for Each Valve

The BaseStation 6000 learns flow by program. It activates each valve individually and measures the flow while the valve is activated. The Pipe Fill Time and Turn Off Time values are used to calibrate the test.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that you want to learn flows for.

2. Click the **Information** tab to activate the Main Menu.

3. Click the **Flow** menu, and then click the **Learn Flow** option. The Flow BiCoder and Pause Device Management and Configuration window opens.

4. Click the **Learn Flow** tab.

5. Click the arrow in the field under **Learn Flow By Program**, and then click the program that you want to use to learn flow (1).

6. Select either **Learn Flow Now** or **Learn Flow at Time** (2). If you want to use Learn Flow at Time, set the time when you want the system to start learning the flow.

    Note: Depending on the number of valves that are associated with the program that you are performing the Learn Flow process on, it might take an hour or more to complete. Also, keep in mind that during this process, the system turns on the zone, fills the pipe, runs the sprinkler or emitter for one minute, takes the reading, and then shuts down that zone and moves to the next one. You should only perform the Learn Flow process when it is acceptable to water.

7. In the **Pipe Fill Time** (3) field, type the number of seconds that it takes to fill the empty line, activate the valve, and reach a steady state operating pressure.

    Note: The easiest way to determine the pipe fill time is to turn on the zone, and then time how long it takes for you to see water flowing at a steady pressure.

8. In the **Turn Off Time** field, type the number of seconds required for the longest valve on the program to completely close after power is no longer applied to the solenoid.

    Note: The Turn Off time allows your system to turn off the previous zone and stabilize after the last zone so that the flow from the previous zone is not included in the current zone's learn-flow cycle.

9. To start the Learn Flow process, click **Test** (4). If you selected the Learn Flow Now option, the test starts immediately. If you selected Learn Flow at Time, the process will begin at the specified time. The status of the Learn Flow process displays in the field (5) at the bottom of the Learn Flow By Program group box and a colored rectangle shows the actual stage of the process. A cyan colored rectangle means that the process is starting or transitioning to a different zone. A dark-blue rectangle means that flow learning is occurring.

10. You can also learn flow for one zone by using the fields in the **Learn One Zone** group box (6). Type the Remote Base Unit and the Zone Address Number that you want to learn, and then press **Test** (7). The system uses the program number, pipe fill time, and turn off time, that you entered in the Learn Flow By Program group box.

Note: The results of the Learn Flow process are displayed in the pane (8) on the right of the Learn Flow tab. The results also display in the Report Viewer. The report is saved in a file in the Learn Flow folder under the folder structure for the BaseStation 6000 software on your computer's hard drive. When the Learn Flow process has completed, the results are automatically recorded in the appropriate fields on the Config Zone tab on the Main Page.

Clearing a Flow-Based Fault

When you notice a flow fault on your system, watering will not start again until you fix what is causing the fault, and then clear the fault.

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to view the flow faults as illustrated below.
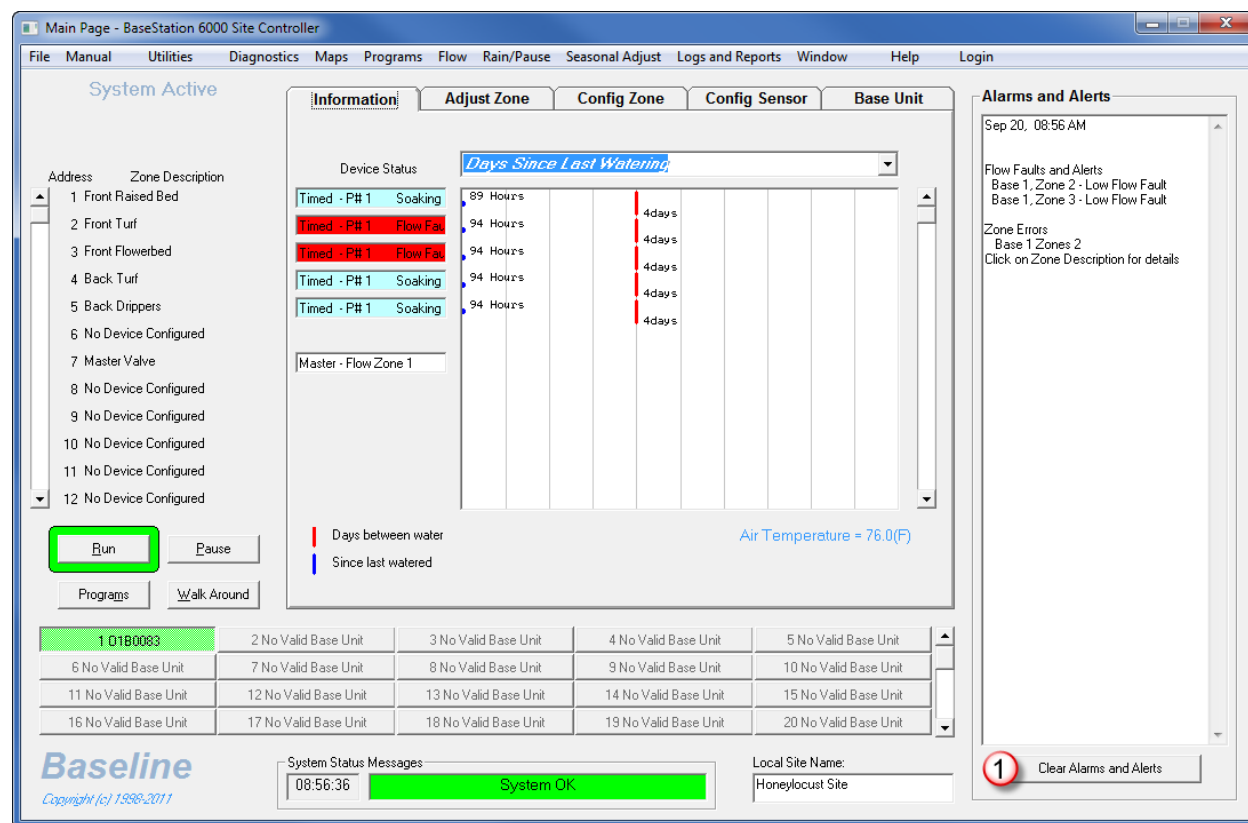
2. Click **Clear Alarms and Alerts** (1).

3. Click one of the buttons in the **Clear Error Warnings** box.

    - **Yes** clears all errors on all Remote Base Units.

    - **No** clears the errors on the currently displayed Remote Base Unit.

    - **Cancel** ignores the errors and returns to the Main Page.

4. Click the **Diagnostics** menu, and then click **Flow Diagnostics**. The Flow BiCoder and Pause Device Management and Configuration window opens and displays the Flow Bicoder – All Bases tab.

5. Review the settings on the tab.

6. If any flow faults display in the pane at the bottom, click **Reset** to clear those faults. Watering will resume.

7. Click **Return** to close the Flow BiCoder and Pause Device Management and Configuration window.

Controlling Water Usage

The usage control features in the BaseStation 6000 enable you to proactively monitor usage and adjust watering to stay within certain allowed limits. When you configure the software to monitor usage, you can prevent costly overages from your water supplier.

Setting Up a Water Budget By Month

Setting up a Water Budget By Month enables you to define and track the total flow for each flow biCoder per month. You enter a target usage amount for a given month, and then define how the system will react when this amount is reached.

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Flow**, and then click **Monthly Usage Control**. The Flow BiCoder and Pause Device Management and Configuration window opens.

3. Click the **Water Budget By Month** tab.

4. Click the arrow in the field under **Monthly Usage Manager**, and then click the Flow biCoder that you want to use to monitor your water budget (1).

5. In the **Usage** table, type a number in the **Target** (2) field for each month to represent the maximum amount of water (in GPM) that you expect to use during that month.

   Note: You will notice that either NA or a percentage displays to the right of the Actual fields. NA means that the system cannot calculate a percentage based on the relationship between the target and the actual because the flow meter has not yet read the actual flow for the month.

6. Define how you want the system to respond to the flow targets (3):

   - **Warn if monthly usage to date meets or exceeds planned usage to date** – Allows the system to exceed the target number but presents a warning so that you can see what is taking too much water.

   - **Warn if monthly usage total has been reached or exceeded** – Warns you if your irrigation system reaches the overall total target flow for the month.

   - **Constrain watering by program to meet water usage target** – Keeps you from going over your usage targets and can be handled in the following ways:

     - **Stop when target usage is reached** – Waters the system as it is set up. When the target is reached for that month, they system stops watering and does not resume until the next month.

     - **Adjust continuously –** Uses the system's setup to determine the total monthly water that will be used and adjusts your programming as needed.

7. Select one of the options in the **Control Method** (4) group box:

   - **Predicted** – The system calculates the flow based on each zone's GPM and how it will water and then compares that against your monthly target.

   - **Flow Meter** – The system compares the actual flow of the system to the monthly target for each flow meter.

8. In the fields under **Programs NOT Controlled** (5), type the numbers of any programs that you do not want the system to control with the flow usage settings. The system will water these programs as scheduled and adjust all other programs in order to meet the usage goals.

   Note: If you have programs that are not controlled, it is possible that all other programs will stop watering completely during a month in order to meet the water budget while continuing to water the exempt programs.

9. Click **Return**.

Flow Usage – Graphs

When you have Flow biCoders connected to your irrigation system and configured in your BaseStation 6000 system, you can create Water Usage graphs. These graphs enable you to monitor for faults and control water distribution, and they also enable you to verify that your system is watering correctly.

Generating a Flow Usage Graph

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Flow**, and then click **Usage Graphs**. The Flow BiCoder and Pause Device Management and Configuration window opens.

3. Click the **Water Usage** tab.

4. Click the arrow at the end of the field (1) to the right of the key, and then click the type of graph that you want to generate.

   Note: The graphs are described and illustrated below.

5. By default, the graph displays the Total Usage of all flow zones, but you can choose a different flow zone. Click the up arrow or down arrow (2) so that the flow zone that you want graph is visible in the field.

6. By default, the graph shows the current month, but you can scroll to a previous or future month by dragging the scroll box at the bottom of the window.

Understanding the Flow Usage Graphs

Actual vs. Planned – This graph shows the actual usage recorded by the flow meter compared to the planned usage.

- Actual usage is represented on the graph by the red line.

- Planned usage is the sum of the GPM flows for the zones found on the Config Zone tab multiplied by the amount of time the zones are scheduled to run on a specific day. Planned usage is represented on the graph by the green line.

- Manual usage captures any flow that results from using the manual run features in the BaseStation 6000 software. Manual usage is represented on the graph by the dark blue line.

- Unplanned usage captures any flow that comes from a hose bib or from a leak or broken pipe. Unplanned usage is represented on the graph by the yellow line.
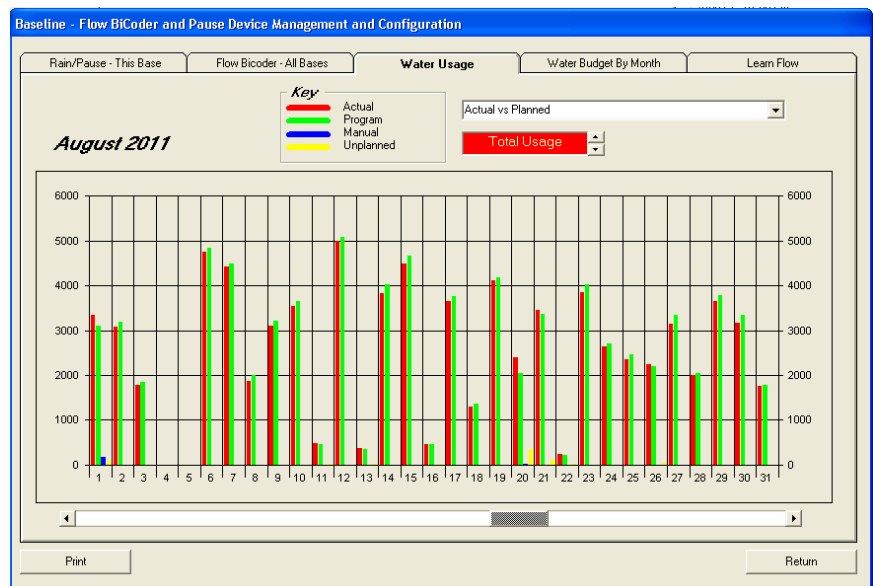
If the actual usage is greater than the planned usage on a specific day, the difference should be represented by any manual and/or unplanned usage.

On the Actual vs. Planned graph, you can drill into more detail for a particular day by clicking one of the graphed bars for that day. The graph expands to show the data on an hourly scale. Click one of the bars again to see the data for that hour. To return to the previous view of the data, click **Back to Previous Screen**.

Actual vs. Planned – Cumulative – This graph shows the sum total of water usage per day.

On the Actual vs. Planned – Cumulative graph, you can drill into more detail for a particular day by clicking one of the graphed bars for that day. The graph expands to show the data on an hourly scale. Click one of the bars again to see the data for that hour. To return to the previous view of the data, click **Back to Previous Screen**.
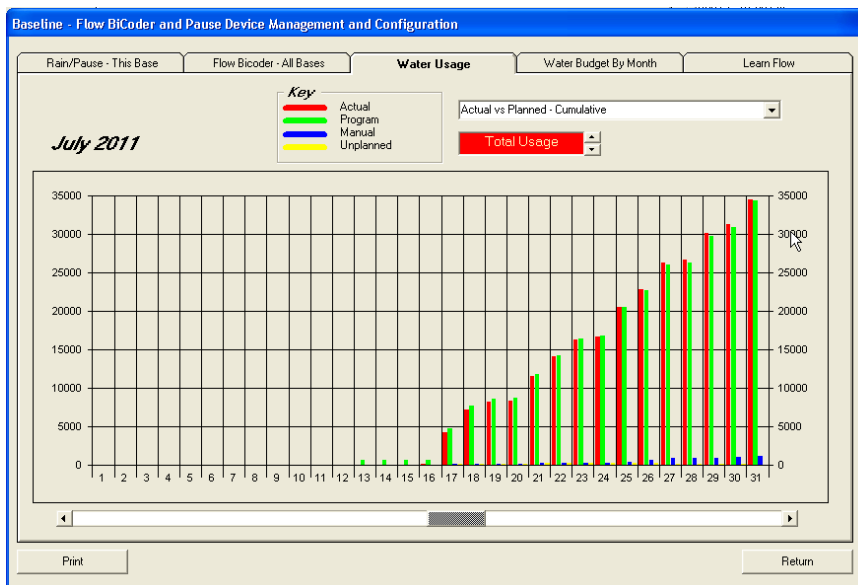
Projected Usage Against Limit – This graph shows the planned usage represented by the green bars compared with the actual usage recorded by the flow meter represented by the red bars.
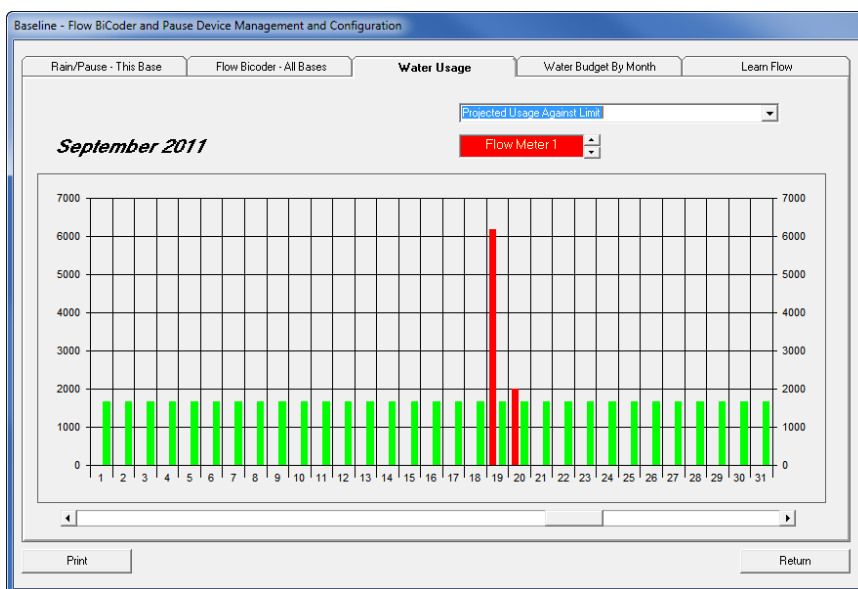
Projected Usage Against Limit – Cumulative
– This graph shows the target usage from
the Water Budget By Month tab
represented by the green line compared
with the total planned usage represented by
the red line.
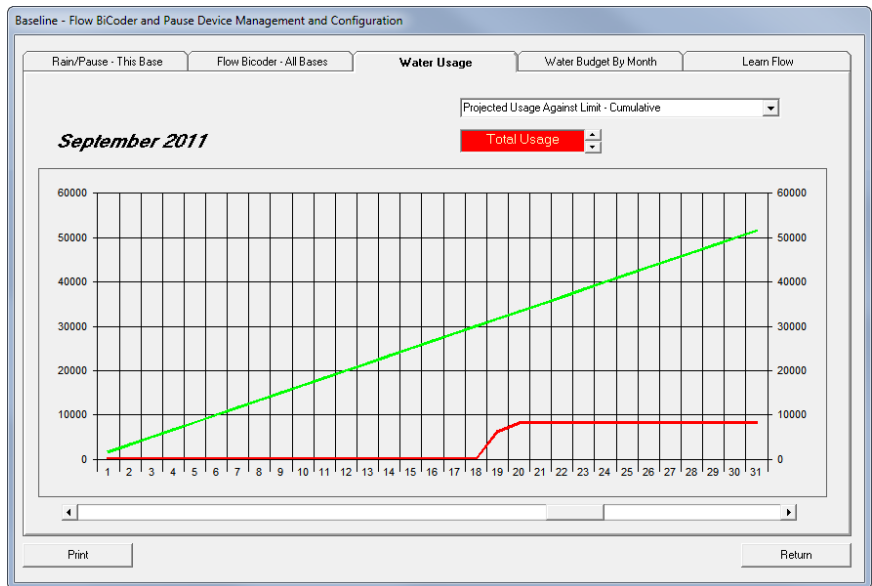
Managing and Optimizing Flow

The BaseStation 6000 software has powerful features that enable you to control how much water flows through the piping structure of your irrigation system.

There are three levels of flow management, each providing a higher level of control than the previous:

- Flow management by Remote Base Unit zones

- Flow management by program zones

- Flow management by flow nodes

Note: Other system parameters controlling zone activation such as total number of active zones for the system, the Remote Base Unit, or the program might limit the flow before the total target flow for a zone is achieved.

Enabling Flow Management

In order to take advantage of flow management, you must enable it in the BaseStation 6000 software.

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Flow**, and then click **Config Flow Control**. The Set System Parameters window opens.

3. Click the **Flow Node Management** tab.

4. Select the **Enable System Flow Management** check box at the top of the window.

Setting Up Flow Management by Remote Base Unit Zones

When you set up flow management by Remote Base Unit zones, you define how many zones can be run on the overall system and then by each Remote Base Unit. Using this flow management option, you can control how much flow will be drawn from each portion of your system. While this option does not require you to have a flow device installed in your system, you still need to know the capacity of your irrigation system in order to accurately configure the number of zones that can be active at the same time.

1. On the Main Page of the BaseStation 6000 software, click the **Base Unit** tab.

2. In the **Total Active Zones** (1) field, type the total number of zones that can run on the entire system at one time.

3. In the **Base** (2) field under the **Active Zones** column, type the total number of zones that can run on each RBU.

4. In the **Device** (2) field under the **Active Zones** column, type the total number of zones that can run on each device that is connected to this RBU.

5. Select the check box next to **Flow Ramp Up Control** (3), and in the next field, type a number to indicate how many zones can be turned on per minute. These settings minimize impact on available flow when new zones start on the system.

Setting Up Flow Management by Program Zones

When you set up flow management by program zones, you define how many zones can be run during each program, which, in turn, controls how much flow will be drawn from each program on your system. While this option does not require you to have a flow device installed in your system, you still need to know the capacity of your irrigation system in order to accurately configure the number of zones that can be active at the same time.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit where you want to set up flow management by program zones.

2. Click the **Programs** button. The Set Watering Program Schedule window opens.

3. Click the arrow in the **Program** field, and then click the program that you want to configure flow management for.

4. In the **Total Active Zones** field, type the total number of zones that can be active for the selected program.

5. Click **Return/Save**.

Setting Up Flow Management by Flow Nodes

To have very fine control of how water is managed on your system, you can set up flow management by flow nodes. In order to use this feature, you must configure your irrigation system's flow structure in the BaseStation 6000 software. You use the software to build a model that represents your piping structure with the associated flows. Before you begin these configuration tasks, we recommend that you create a detailed schematic of your system that shows:

- The total source GPM

- The layout of the piping structure

- The flow meters that you have installed

- The flow nodes and flow zones that you have identified

- The pipe size and feet/sec for each of the flow nodes

Configuring the Source Flow Node

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Flow**, and then click **Config Flow Control**. The Set System Parameters window opens.

3. Click the **Flow Node Management** tab. The source flow node is listed in the left pane.

4. Click on the source flow node to highlight it.

5. Click the **Edit Node** button on the right side of the window. The fields in the **Flow Node Control** group box at the bottom of the window become available for updating.

6. In the **Pipe Size** field, type the diameter of the main supply pipe in inches.

7. In the **Feet/Sec** field, type the maximum velocity of the flow in the pipe in feet. The program calculates the gallons per minute and updates the **GPM** field automatically.

8. Select the **Loop** check box if the pipe is looped or has two inputs.

9. Click **Save**.

Creating Additional Flow Nodes

While you can configure a total of 800 flow nodes in your model, we recommend that you reserve 24 nodes at the first level to represent up to 24 flow meters that you can install on your system. These first-level nodes are thought of as the "parents," and the nodes that branch off from them are thought of as the "children."

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Flow**, and then click **Config Flow Control**. The Set System Parameters window opens.

3. Click the **Flow Node Management** tab. The source flow node is listed in the left pane.

4. Click on the source flow node to highlight it.

5. Click the **Add Node** button on the right side of the window. A new node displays in the list in the left pane and the fields in the **Flow Node Control** group box at the bottom of the window become available for editing.

6. In the **Parent** field, type the number of an existing flow node if the new flow node is a child of the existing flow node (in other words, the new flow node branches off the existing flow node).

7. In the **Pipe Size** field, type the diameter of this flow node pipe in inches.

8. In the **Feet/Sec** field, type the maximum velocity of the flow in the pipe in feet. The program calculates the gallons per minute and updates the **GPM** field automatically.

9. Select the **Loop** check box if the pipe is looped or has two inputs.

10. Click **Save**.

Associating Valves with the Flow Nodes

When you create your flow node structure, all the valves are associated with Flow Node 1 by default. Follow the steps in this procedure to change how the valves are associated.

1. Create and configure all of your flow nodes.

2. On the **Flow Node Management** tab, click Flow Node 1 in the left pane. All of the valves display in the pane on the right.

3. Click the valve that you want to move to a different flow node.

4. Click **Edit Node**. The fields in the Flow Node Control group box at the bottom of the window become available for editing.

5. Change the number in the **Flow Node** field to the new flow node that you want this valve to be associated with.

   Note: You can also change the gallons per minute for the valve on the Flow Node Management tab by typing a number in the GPM field.

6. Click **Save**.

7. Continue until you have associated all valves with their appropriate flow nodes.

   Note: After making changes, you can click Refresh Valves to display the current valve list in the right pane.

7 –MANUAL OPERATIONS

Manually Running Zones

The BaseStation 6000 provides the following options for manually running zones.

To water all zones again

This option waters all zones on the selected Remote Base Unit according to the active program.

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Manual**, and then click **Water All Zones Again**. The Adjust Zone tab shows the watering progress.

To water a single zone again

This option waters a selected zone according to the time specified in its active program.

1. On the Main Page of the BaseStation 6000 software, click the **Adjust Zone** tab.

2. Find the zone that you want to water again, and then click the **Actions** button on the line for that zone.

3. Click **WaterZoneAgain** on the Actions menu.

To manually test one zone

This option enables you to test a zone for the number of minutes that you specify.

Note: Only use this option to test a zone for one or two minutes. If you want to manually run a zone for a longer time, use the Manual Run Zones option (To manually run a list of zones).

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Manual**, and then click **Test One Zone**. The Manually Operate ONE Zone dialog box opens.

3. In the **Starting Zone** (1) field, click the up arrow or down arrow so that the zone that you want to run is visible in the field.

    Note: If Zone 1 is displayed in the Starting Zone field, click the up arrow ▲ at the end of the field to scroll through the list of zones.

4. In the **On Time In Minutes** (2) field, type the number of minutes that you want the zone to run.

5. When you are ready to begin the manual run, click **Start** (6). If necessary, you can click Pause or Cancel to stop the manual run. The Manually Operate ONE Zone dialog box stays open and shows the time for the zone test counting down. When the test is done, the Manually Operate ONE Zone dialog box closes.
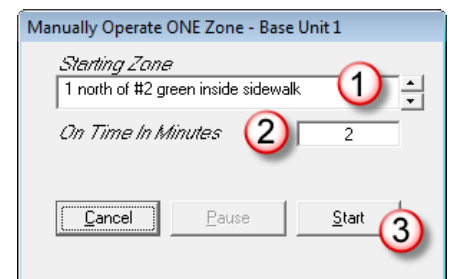
To manually run a list of zones

The BaseStation 6000 provides flexible control of non-scheduled irrigation cycles. One method is to define a list of zones and run them for a defined amount of time. You can initiate manual runs on as many as four Remote Base Units at any one time.

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Manual**, and then click **Manual Run Zones**. The Activate Run List dialog box opens.

3. In the **Base Unit Number** field, type the number of the Remote Base Unit that controls the zones that you want to run manually.

   Note: If you want to initiate manual runs on zones associated with other RBUs, complete this procedure for one RBU and its associated zones, and then return to Step 2 and complete the procedure for the next RBU.

4. Click **OK**. The Water Zone list opens.

5. In the **Zone** column, click the arrow (1) at the end of the fields to choose the zone addresses that you want to run.

6. In the **On Time** (2) column, type the number of minutes that you want each zone to run. You can add up to 15 zones to the manual run list.

7. In the **# of Active Valves** (3) field, type a number to indicate how many zones can run at one time.

   Note: You must not exceed the number of concurrent zones that you have set elsewhere in the system.

8. Click **Activate Watering** to start watering (4).

9. If you want to stop the manual watering process before all zones have run, click **Return** to close the Water Zone list. A message asks if you want to cancel this watering operation. Click **Yes**.

Setting Zones to Done

Use one of the following options if you want to set all zones (or a single zone) to done, when the irrigation system is watering.

To set all zones to done

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Manual**, and then click **Set All Zones to Done**. A message displays to warn that this action will cancel or reset all watering cycles and set the Days Since Last Watering to 0. Click **OK**. On the Adjust Zone tab, all zones will show as Done.

To set a single zone to done

1. On the Main Page of the BaseStation 6000 software, click the **Adjust Zone** tab.

2. Find the zone that you want to water again, and then click the **Actions** button on the line for that zone.

3. Click **Force Zone to Done** on the Actions menu.

Pausing the System Temporarily

On the Main Page of the BaseStation 6000 software, click the **Pause** button. The System Activity status changes to BaseUnit Paused Configuration Active. The Pause button is highlighted with a yellow border. If you leave the system paused with this button, it will restart at midnight. Click the **Run** button to return the system to Active status.

Other pauses and shutdowns are available in the system:

- You can add events that will cause the system to stop running during designated time periods, and then restart when the time for the event has passed. Refer to Adding and Managing Events on page 45.

- You can shut the system down for an indefinite period of time when the watering season is over. Refer to Shutting Down the System at the End of the Watering Season on page 48.

- You can shut the system down for a designated period of time when rain is forecast. Refer to Shutting Down the System when Rain is Forecast on page 49.

- You can control the system based on soil moisture readings. Refer to Starting/Stopping Irrigation Based on Tiered Soil Moisture Readings on page 49.

- You can control the system based on temperature. Refer to Starting/Stopping/Pausing Irrigation Based on Temperature Sensor Readings on page 50.

- You can control the system based on the state of a switch. Refer to Starting/Stopping/Pausing Irrigation Based on Switch State on page 52.

Configuring the Walk Around Order and Starting a Walk Around Test

When you add zones (valves) to your BaseStation 6000 system, those zones are listed sequentially in the Walk Around Order column on the Config Zone tab. It is likely that the order in the software does not match the order in which you would visit those zones while doing a walk around audit of your irrigation system. To enable effective system auditing and to get better information about how your system is watering, you can change the numbers in the Walk Around Order column to match the actual layout of your system.

Configuring the Walk Around Order

1. Click the **Config Zone** tab on the Main Page. The Walk Around Order column displays the default order that was configured when you added your zones.

2. Type a new number in the **Walk Around Order** (1) field for the zones that you want to change. Keep in mind that each zone must have its own number.

3. Click **Check Walk Around** (2) to verify that you do not have any duplicates. If you find any duplicates, you must fix them before you start the walk around test.

Starting a Walk Around Test

1. Click the **Information** tab on the Main Page.

2. From the list at the bottom of the page, click the **Remote Base Unit** that controls the zones that you want to test.

3. Click the **Walk Around** (3) button. The Walk Around Test window for the selected RBU opens.

4. In the **Ending Zone** field, click the up arrow or down arrow (4) so that the zone where you want the test to end is visible in the field.

5. In the **Starting Zone** field, click the up arrow or down arrow (4) so that the zone where you want the test to start is visible in the field.

6. Type a number in the **On Time In Seconds** (5) field to indicate how long each zone will run during the walk around test.

7. Type a number in the **Seconds before Starting** field to indicate how long the system will wait before starting the first zone. This delay gives you time to go to the zone location so you can observe the test.

8. When you are ready to begin the walk around test, click **Start** (6). If necessary, you can click Pause or Cancel to stop the walk around test.

8 – SYSTEM MANAGEMENT

Adding a Picture of a Zone

You can associate photographs or drawings with your zones to help visualize the zone location.

Note: The image must be in the JPG format. For example, the image file must have the .jpg file extension.

The ideal photograph or drawing is a rectangular shape in the "landscape" orientation, which means that the width is greater than the height. You can also use a photograph or drawing that is in the "portrait" orientation (the height is greater than the width); however, in this case, the software will compress and/or stretch the image to fit the predefined size.

To add a picture of a zone

1. Load the image into the proper directory:

    a. On the BaseStation 6000 computer, start **Windows Explorer**:

        - Click the **Start** button on the Microsoft Windows taskbar.

        - Point to **All Programs**, and then point to **Accessories**.

        - Click **Windows Explorer**.

    b. Copy the image file into the following directory:

        C:\xTrol\Irrigation\Programs\SiteMap

2. In the BaseStation 6000 software, click the **Adjust Zone** tab.

3. On the line for the zone that you want to add a picture to, click the **Actions** button.

4. Click **Picture**. The No Picture Found dialog box opens.

5. Click **Yes**. The Zone Map dialog box opens.

6. Click the **Browse for Picture** button.

7. Use the **Open** dialog box to find the image that you want to associate with the zone.

8. Click once on the image to select it, and then click **Open**. The Zone Map dialog box opens again.

9. Verify that the **Base Unit** number and **Zone** number are for the zone in the selected image.

10. Click **Return**. The Zone Map dialog box closes.

To view the picture of the zone

1. Click the **Adjust Zone** tab.

2. On the line for the zone image that you want to view, click the **Actions** button.

3. Click **Picture**. The Zone Map dialog box opens and displays the image.

To change the zone picture

1. Click the **Adjust Zone** tab.

2. On the line for the zone image that you want to change, click the **Actions** button.

3. Click **Picture**. The Zone Map dialog box opens and displays the image.

4. Click the **Browse for Picture** button.

5. Use the **Open** dialog box to find the new image that you want to associate with the zone.

6. Click once on the image to select it, and then click **Open**. The Zone Map dialog box opens again.

7. Verify that the **Base Unit** number and **Zone** number are for the zone in the selected image.

8. Click **Return**. The Zone Map dialog box closes.

Adding Zone Notes

If you have information that you want to associate with a zone, you can add it to the Zone Notes.

1. Click the **Adjust Zone** tab.

2. On the line for the zone that you want to add notes to, click the **Actions** button.

3. Click **Notes**. The Notepad window opens and displays the date and time for the note.

4. Type the note under the date and time.

5. Click the **File** menu, and then click **Exit**. A Notepad message prompts you to save the changes to the note.

6. Click **Save**.

    Note: The BaseStation 6000 system automatically assigns a filename to the Notepad file.

Adding Base Notes

If you have information that you want to associate with a Remote Base Unit, you can add it to the Base Notes. Base Notes can serve as reminders because you can configure them to automatically display a number of days in the future.

To add a base note

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that you want to add notes to.

2. Click the **Information** tab to activate the Main Menu.

3. On the Main Menu, click **Window**.

4. Click **Notes and Pictures**, and then click **Base Notes**.

5. On the Base Notes menu, click **Add Base Note**. The Activate Reminder dialog box displays.

6. In the **Setup Reminder** field, type the number of days until the reminder displays, and then click **OK**. The Notepad window opens.

7. In the **Notepad** window, under the current date and time heading, type your note.

8. When you finish adding your note, click the **X** in the upper-right corner of the **Notepad** window.

9. When you are prompted to save your changes, click **Save**. Notice that the filename matches the Remote Base Unit serial number and the file will be saved in the correct directory on your computer's hard drive.

Viewing Base Notes

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that you want to view notes for.

2. Click the **Information** tab to activate the Main Menu.

3. On the Main Menu, click **Window**.

4. Click **Notes and Pictures**, and then click **Base Notes**.

5. On the Base Notes menu, click **View Base Note**. The Notepad window opens.

6. When you finish viewing the notes, click the **X** in the upper-right corner of the **Notepad** window.

Deleting the Base Notes File

If you want to delete your Base Notes file so you can start fresh with new Base notes, use the Clear Notes option.

1. On the Main Page of the BaseStation 6000 software, click the Remote Base Unit that you want to delete the notes file for.

2. Click the **Information** tab to activate the Main Menu.

3. On the Main Menu, click **Window**.

4. Click **Notes and Pictures**, and then click **Base Notes**.

5. On the Base Notes menu, click **Clear Base Note**. A warning message displays.

6. Click **Yes** to delete the Base Notes file.

Loading and Configuring a Site Map

The Site Map option in the BaseStation 6000 software provides a graphical interface for managing your irrigation system. You can create JPEG images that represent the sites controlled by your Remote Base Units. After you load those images into the BaseStation 6000 software, you can position markers that represent your zones on the map image. When your map is configured, you can use many of the BaseStation 6000 software features to control your irrigation system from the map view.

You can create site map images by exporting a JPEG file from your landscape design software. You can also capture an image of your site by displaying an online satellite image (for example, from Google Maps or Google Earth) on your computer. When the image is available and scaled properly, simultaneously press the Alt and the Print Screen buttons on your keyboard. Open the Microsoft Paint program, and then paste the image into Paint. You can use the tools in Paint to crop the image and then save it as a JPEG file.

Note: The image must be in the JPG format. For example, the image file must have the .jpg file extension.

The ideal image is a rectangular shape in the "landscape" orientation, which means that the width is greater than the height. You can also use an image that is in the "portrait" orientation (the height is greater than the width); however, in this case, the software will compress and/or stretch the image to fit the predefined size.

Loading the Image into the Proper Directory

Note: Perform this task at a time when it is acceptable to close the BaseStation 6000 software for several minutes. Remember that watering will be stopped when the software is closed.

1. In the BaseStation 6000 software, click the x in the upper-right corner of the window to exit the program. When the confirmation message displays, click OK. The BaseStation 6000 software closes.

2. On the BaseStation 6000 computer, start **Windows Explorer**:

a. Click the **Start** button on the Microsoft Windows taskbar.

b. Point to **All Programs**, and then point to **Accessories**.

c. Click **Windows Explorer**.

3. Copy the image file into the following directory:

C:\xTrol\Irrigation\Programs\SiteMap

4. If the default **SiteMap1.jpg** file is in the directory, you can either delete that file or give it a different file name.

5. Rename the your map file to **SiteMap#.jpg** where the # is a number between 1 and 20 that indicates which Remote Base Unit the map is for.

Example: The map file for Remote Base Unit 1 would be *SiteMap1.jpg* and the map file for Remote Base Unit 2 would be *SiteMap2.jpg*

Note: The file must be named exactly as specified including capitalization. To rename a file, right-click on the name of the file, and then click Rename from the available options.

Loading the Site Map into the BaseStation 6000 Software

1. After you have loaded the map image into the proper directory on your computer, and you have named the image file appropriately, close the BaseStation 6000 software.

2. Restart the BaseStation 6000 software (refer to Manually Starting the BaseStation 6000 Software on page 10). Your new map file is automatically loaded into the software.

3. To verify that your map file is available, click the **Information** tab on the Main Page of the BaseStation 6000 software to activate the Main Menu.

4. On the Main Menu, click **Maps**, and then click **Site Map**. The Site Map window opens.

Configuring the Site Map

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Maps**, and then click **Site Map**. The Site Map window opens. Small colored squares that represent your zones are arranged in a grid at the top of the map.

3. At the bottom of the pane on the right side of the map, click the **Uncheck to move zones** (1) check box to remove the check mark. Now, you can move the zone markers (small colored squares) around on the map.

4. Position the mouse pointer on the zone marker that you want to move. The zone description displays in the pane on the right side of the map.

5. Hold down the left mouse button and drag the zone marker to where that zone is located on the map.

6. When you have placed all your zone markers on the site map, click **Uncheck to Move Zones** to lock markers in place and to prevent the markers from being accidentally moved.

7. Click **Main View**.
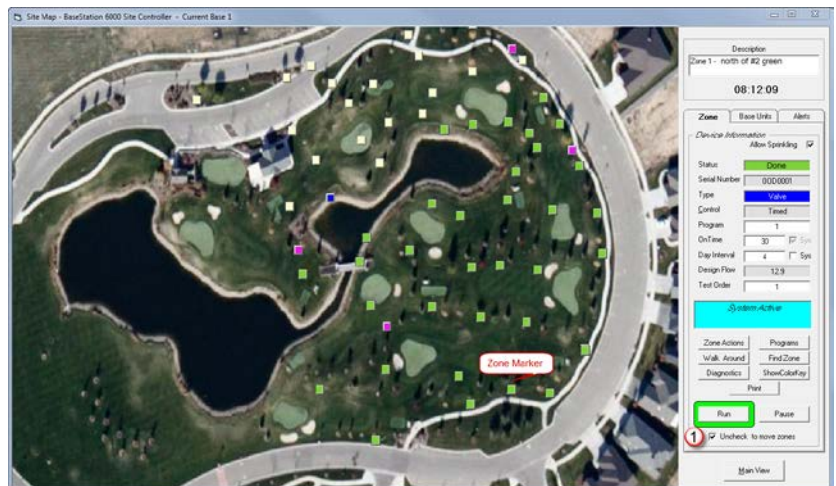
Managing the System from the Site Map

After you have configured the site map, you can manage the system directly from the map view. The features available from the site map are the same as those in the rest of the software, but the map enables you to visualize where your zones are located.
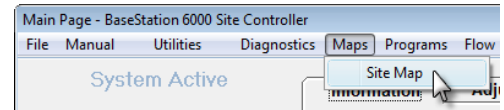
1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Maps**, and then click **Site Map**. The Site Map window opens.

3. Click the **Base Units** tab in the pane on the right side of the map.

4. Click the Remote Base Unit (1) that you want to work with.

   Note: If you do not see a map on the screen or you have not configured your Site Map, refer to the instructions for Loading the Site Map into the BaseStation 6000 Software on page 79 and the instructions for Configuring the Site Map on page 79.
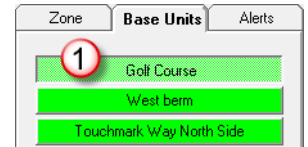
5. Click the **Zone** tab in the pane on the right side of the map.

6. On the site map, click the box (2) that represents the zone that you want to work with. The information for that zone displays in the pane on the right side of the map. Other zones that are in the same scheduling group are highlighted on the site map. The primary zone is highlighted in red.

   - Use any of the following features:

     - **Allow Sprinkling** (3) – Selecting this box allows the selected zone to water, removing the check mark prevents the zone from watering until you select the box again. If you have the primary zone selected and there are zones linked to it, they will also be affected.

     - **Zone Actions** (4) – Displays a list of actions that you can perform on the zone.

     - **Right-click a zone marker on the map** – Displays the same list of actions as the Zone Actions button.

     - **Walk Around** – Displays the Walk Around Test window, so you can start this feature. Refer to Starting a Walk Around Test on page 74.

     - **Diagnostics** – Displays the System Diagnostics window that enables you to troubleshoot and maintain your system.

     - **Programs** (5) – Displays the Set Watering Program Schedule window and loads the program that the zone you have selected is assigned to.
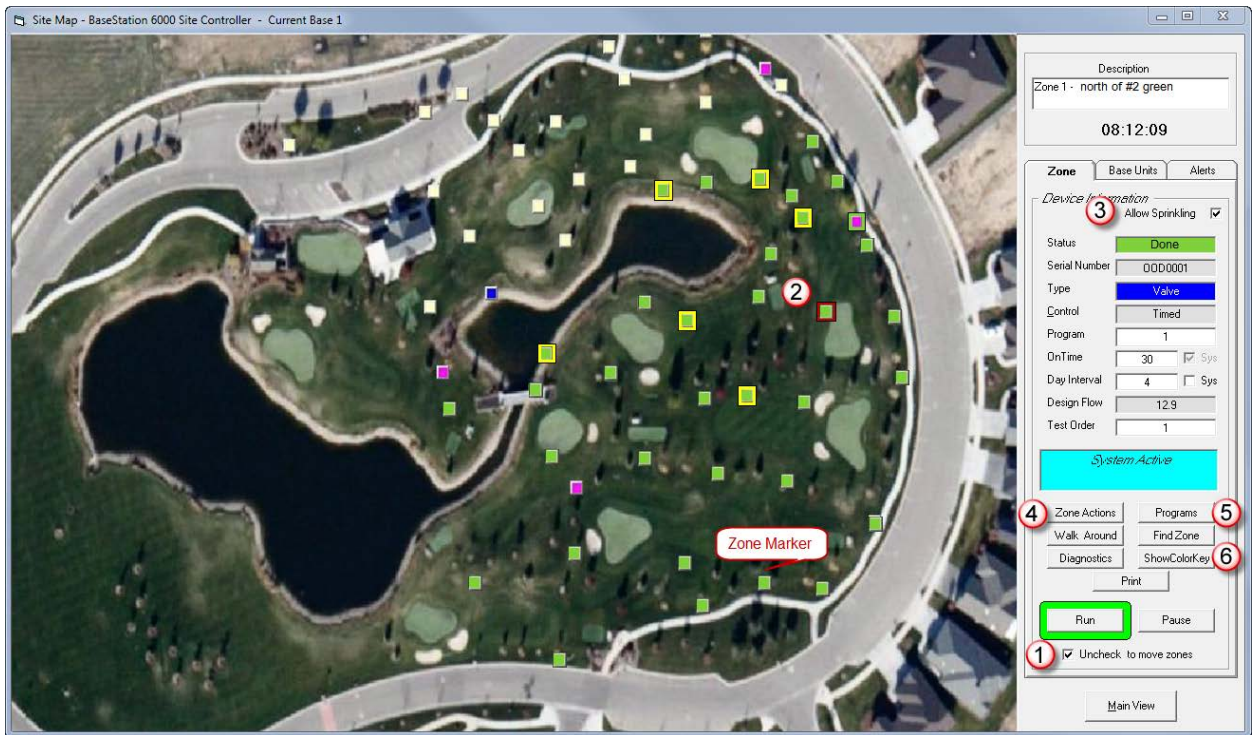
- **Find Zone** – Brings up the search function of the system and enables you to search for zones and devices based on serial number or zone number.

- **ShowColorKey** (6) – Displays the color key in the pane on the right. To return to the tab view, click **HideColorKey**.

- **Print** – This option prints the site map to the printer that is attached to the BaseStation 6000 computer.

  Note: This print option does not allow you to choose a specific printer and does not notify you when the document finishes printing.

- **Run and Pause** – These buttons enable you to run and pause your system. If you click the Pause button here, the system will restart at midnight.

System Notification

The BaseStation 6000 Site controller has advanced monitoring features. You can set up the system to automatically notify a person or group of people with a variety of site information. You can send general system information through email. You can set up system alerts to be sent over email or text message. Setting up System Notifications can greatly improve a user's awareness to how the system is running.

Adding Contacts

Before you can start to use the Alerts and Notifications portions of the BaseStation 6000, you need to set the contacts for the system to communicate to. You configure these settings in the BaseStation 6000 Report and Alert Mailer program. You will find an icon for this program in the Windows taskbar on your BaseStation 6000 computer.

1. In the Windows Taskbar, click the BaseStation 6000 Report and Alert Mailer icon to open the software.

2. Verify that the Status Notification in the top left corner is **Enabled** (1). If it is not enabled, click the **Click to Enable** button.

3. Click **Manage Contacts** (2). The Manage Contact List window opens.

4. Click **Add New Contact** (3). The Add New Contact window opens.

5. For all contacts you need to provide at least a first name (4).

6. If you want this contact to receive email notifications, type his or her email address in the **E-mail** (5) field.

7. If you want this contact to receive text messages, type his or her cell phone number in the **Cell Phone** (6) field.

   a. From the list in the **Cell Provider** (7) field, click the contact's cell phone provider.

   b. In the **Text Address** (8) field, type the address that is used to send text messages to the contact's phone. For example, if a contact's Verizon cell phone number is (123) 456-7890, the text address would be 1234567890@vtext.com

8. Click **OK** (9) to save the contact information. The Manage Contact List window opens again and shows the new contact in the top pane.

9. Repeat steps 4 through 8 for each additional contact.

10. Click **Close** on the Manage Contact List window.

11. Minimize the BaseStation 6000 Report and Alert Mailer software window, but do not close it.

WARNING! Closing the BaseStation 6000 Report and Alert Mailer software prevents all messages from being sent. If you accidently close the software, restart it by double-clicking its icon on the desktop.

Editing Contact Information

1. In the Windows Taskbar, click the BaseStation 6000 Report and Alert Mailer icon to open the software.

2. Verify that the Status Notification in the top left corner is **Enabled**. If it is not enabled, click the **Click to Enable** button.
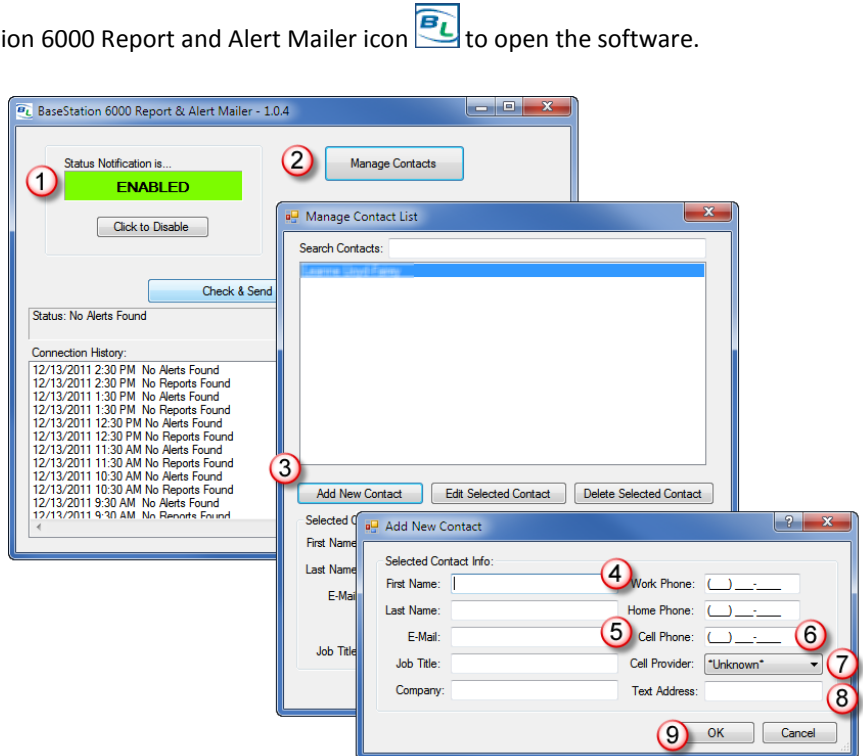
3. Click **Manage Contacts**. The Manage Contact List window opens.

4. Click the contact in the top pane, and then click **Edit Selected Contact**. The Edit Contact window opens.

5. Make any necessary changes in the fields, and then click **OK**.

6. Click **Close** on the Manage Contact List window.

7. Minimize the BaseStation 6000 Report and Alert Mailer software window, but do not close it.

WARNING! Closing the BaseStation 6000 Report and Alert Mailer software prevents all messages from being sent. If you accidently close the software, restart it by double-clicking its icon on the desktop.

Deleting a Contact

1. In the Windows Taskbar, click the BaseStation 6000 Report and Alert Mailer icon [BL] to open the software.

2. Verify that the Status Notification in the top left corner is **Enabled**. If it is not enabled, click the **Click to Enable** button.

3. Click **Manage Contacts**. The Manage Contact List window opens.

4. Click the contact in the top pane, and then click **Delete Selected Contact**.

5. Click **OK**.

6. Click **Close** on the Manage Contact List window.

7. Minimize the BaseStation 6000 Report and Alert Mailer software window, but do not close it.

WARNING! Closing the BaseStation 6000 Report and Alert Mailer software prevents all messages from being sent. If you accidently close the software, restart it by double-clicking its icon on the desktop.

Testing the Notifications

After you have set up your contacts it is useful to test them to verify that everything is working correctly. Perform these steps in the Change E-mail Settings window of the BaseStation 6000 Report and Alert Mailer software.

1. In the Windows Taskbar, click the BaseStation 6000 Report and Alert Mailer icon [BL] to open the software.

2. Verify that the Status Notification in the top left corner is **Enabled** (1). If it is not enabled, click the **Click to Enable** button.

3. Click **Change E-mail Settings** (2). The E-mail Settings window opens.

4. Click **Test Settings** (3). The E-mail Settings window expands to show the test fields.

5. In the **Contacts** (4) list, click the contact who you want to send a test message to.

6. Click the **Test Message Type** (5) that you want to send.

7. Click **Send Test Message** (6). The results of the test display in the pane in the lower right corner of the E-mail Settings window.

8. Verify with the contact that he or she received the test message. If the contact reports that the message did not come through, ask the person to check the Junk Mail folder. If the test message was routed to Junk Mail, ask the contact to change his or her email settings, so the notification emails show up in the email inbox.

9. Click **OK** (7) to close the E-mail Settings window.
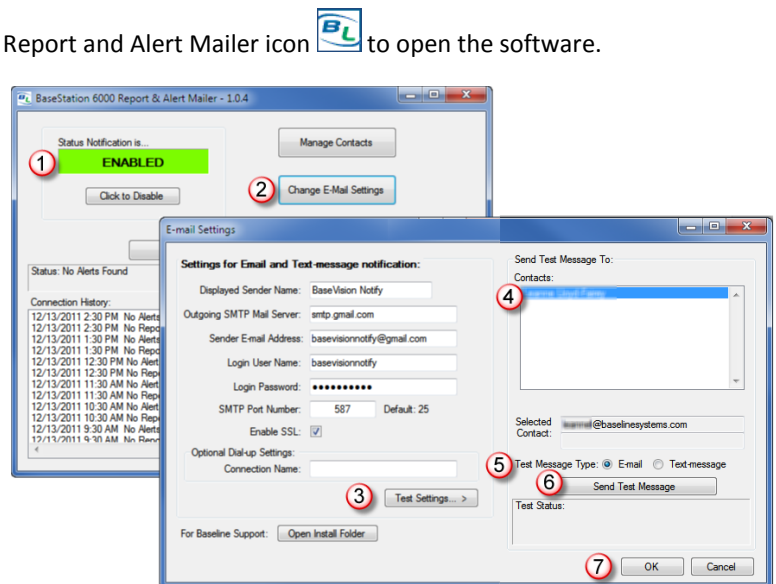
10. Minimize the BaseStation 6000 Report and Alert Mailer software window, but do not close it.

WARNING! Closing the BaseStation 6000 Report and Alert Mailer software prevents all messages from being sent. If you accidently close the software, restart it by double-clicking its icon on the desktop.

Turning On the Notifications

Now that you have your contacts set up, you can turn on the notifications that you want to send out and when.

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Window**, and then click **Alerts – Configure**. The Select E-Mail and Text Messages window opens.

3. In the **Mail Daily Reports** group box, click in the check boxes to select the daily reports that you want the system to send out. The selected reports will be sent to all email address contacts at approximately 8:30 am daily.

    Note: Depending on your watering schedule, the system might not send every selected report every day. Some of the reports are not generated until specific system activity occurs.

4. In the **Enable Notification Alerts** group box, click in the check boxes to select the alerts that you want the system to send out and whether you want those alerts to be sent by Text Message, E-mail, or both.

5. In the **Alert Delivery Times** group box, click in the check boxes to indicate when you want the alerts to be sent. By default these check boxes are blank. Unless you place a check mark in a box, no alerts will be sent.

6. Click **Return**.

Turning Off the Notifications

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Window**, and then click **Alerts – Configure**. The Select E-Mail and Text Messages window opens.

3. In the **Mail Daily Reports** group box, click the selected check boxes for the daily reports that you **do not want** the system to send out. The checkmarks are removed from the check boxes.

4. In the **Enable Notification Alerts** group box, click the selected check boxes for the alerts that you **do not want** the system to send out. Remove the check marks in the Text Message and E-mail check boxes for the alerts that you do not want to send.

5. In the **Alert Delivery Times** group box, click in the boxes to indicate when you want the alerts to be sent. By default these check boxes are blank. Unless you place a check mark in a box, no alerts will be sent.

6. Click **Return**.

Receiving Reports and Alerts by Email

When you set up the BaseStation 6000 software to send reports and alerts by email, the selected reports will be sent at approximately 8:30 am daily. If you do not receive an expected email, make sure that it was not automatically routed to your "Junk" email folder. If you find the reports email in your "Junk" email folder, use the tools in your email software to mark the message as "not junk." You can also add basevisionnotify@gmail.com to your Safe Senders list in your email software.

The email that you receive will be similar to the illustration below:

The reports are linked to the email as attachments. To open a report attachment, double-click on the attachment. The report displays in a Notepad window.

If you find that the columns in the report are not aligned properly, which makes the data hard to read, click the **Maximize** (□) button on the top window border. If the data is still not aligned properly, click the Format menu, and then click Word Wrap.

To close a log or report file, click the **Close** (X) button on the top window border.

To print a log or report file, if your computer is connected to a printer, open the file that you want to print. Click the **File** menu, and then click **Print**. Configure your print options in the Printer dialog box, and then click **Print**. The file is printed on your selected printer.

User Management

You can set up accounts for the users of your BaseStation 6000 system. After you set up the user's account and password, you can grant access or restrict access to various functions in the BaseStation 6000 software. In addition to giving different people different levels of access to the system, you can also track what each user is doing and what changes he or she made in the system. Refer to the Configuration Log described in Available Logs and Reports on page 90.

Typically one user assumes the role of administrator and has access to all program functions including adding new users and assigning/maintaining passwords. The administrator might want to grant full access to another user so that person can serve as a backup administrator, but most other users will be have restricted access to the program functions.

After you set up user accounts and enable the passwords, you will be prompted to type your password when you try to navigate to various program functions. If you have access, you will be allowed to proceed, but if not, a message warns that you do not have permission to enter the area (software function).

Assigning an Administrator Password

1. On the BaseStation 6000 Main Page, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Login**, and then click **Manage Passwords**. The Input Password dialog box opens.

3. Press **Enter** on the keyboard to bypass the Input Password dialog box. The Password Security and Logging window opens.

4. Click in the blank **Password** (1) field of the **Administrator** line. The Enter Password dialog box opens.

5. Type a password of at least 5 characters in the **Password** (2) field.

6. Retype the password in the **Re-enter Password** (3) field.
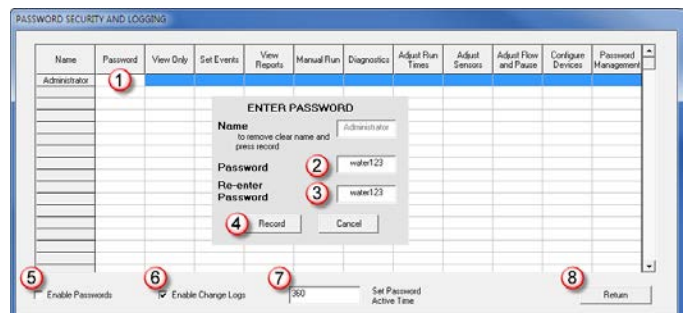
7. Click **Record** (4). The Enter Password dialog box closes.

    IMPORTANT NOTE: By default, the administrator has access to all system functions indicated by blue shading in the table cells. Do not change the administrator's access level.

8. In the Password Security and Logging window, select the **Enable Passwords** (5) check box.

9. If you want the system to keep a log of the changes made in this window, select the **Enable Change Logs** (6) check box.

10. In the **Set Password Active Time** (7), type a number between 1 and 360 to indicate how many minutes of inactivity are allowed before the system automatically logs the user off.

11. Click **Return** (8) to close the Password Security and Logging window.

Adding Users and Passwords

1. On the BaseStation 6000 Main Page, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Login**, and then click **Manage Passwords**. The Input Password dialog box opens.

3. Type the administrator password in the field, and then click **Enter**. The Password Security and Logging window opens.

    Note: If you have not set up an administrator password, do that before you add users. Refer to the procedure above.

4. Click in a blank line in the **Name** column. The Enter Password dialog box opens.

5. In the **Name** field, type the user's name.

    Note: The system allows you to add more than one user with the same name. For ease of maintenance, we recommend that you add an initial or other character to distinguish multiple users with the same name.

6. Type a password of at least 5 characters in the **Password** field.

7. Retype the password in the **Re-enter Password** field.

8. Click **Record**. The Enter Password dialog box closes.

9. Perform the steps to grant access to system functions.

Changing a User's Name or Password

1. On the BaseStation 6000 Main Page, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Login**, and then click **Manage Passwords**. The Input Password dialog box opens.

3. Type the administrator password in the field, and then click **Enter**. The Password Security and Logging window opens.

4. In the table, find the user whose name and/or password need to be changed.

5. Click in either the **Name** or the **Password** column on the line for that user. The Enter Password dialog box opens.

6. Make the necessary changes. If you change the password in the first field, ensure that you also change it in the Re-enter Password field.

7. Click **Record**.

Removing a User

1. On the BaseStation 6000 Main Page, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Login**, and then click **Manage Passwords**. The Input Password dialog box opens.

3. Type the administrator password in the field, and then click **Enter**. The Password Security and Logging window opens.

4. In the table, find the user who you want to remove.

5. Click in either the **Name** or the **Password** column on the line for that user. The Enter Password dialog box opens.

6. Click in the **Name** field, and then press **Delete** on the keyboard to remove the name from the field.

7. Click **Record**.

8. Click **Cancel** to close the Enter Password dialog box. The line for the user is removed from the table on Password Security and Logging window.

Granting or Change Access to System Functions

This procedure assumes that you have already set up an administrator password and you have already added users and their associated passwords. If you have not done so, follow the steps in Assigning an Administrator Password and Adding Users and Passwords before you perform the steps in this procedure.

1. On the BaseStation 6000 Main Page, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Login**, and then click **Manage Passwords**. The Input Password dialog box opens.

3. Type the administrator password in the field, and then click **Enter**. The Password Security and Logging window opens.

4. In the table, find the user whose access needs to be changed.

5. Click the cells to indicate the functions that the user has access to. When the cell is white, the user has no access to that system function. When the cell is blue, the user has access.

   You can grant access to the following system functions:

   - **View Only** –Gives the user the ability to look at the basics of the system, but not make any changes

   - **Set Events** – Allows the user to add Scheduled Events to the system

   - **View Reports** – Allows the user to view the different reports generated by the BaseStation 6000 system

   - **Manual Run** – Gives the user the ability to manually operate the system

   - **Diagnostics** –Allows the user to access the diagnostic features for troubleshooting and monitoring

   - **Adjust Run Times** – Allows the user to adjust run times for zones

   - **Adjust Sensors** – Allows the user to adjust properties for biSensors

   - **Adjust Flow and Pause** – Gives the user the ability to adjust and control Flow and Pause in the system

   - **Configure Devices** – Allows the user to add, remove, and configure different devices in the system

   - **Password Management** – Allows the user to manage users and user rights

6. Click **Return**.

Logging Off

When a user with limited access has logged onto the BaseStation 6000 system, other users with greater access will not be able to use their allowed functions without logging on repeatedly. In this situation, it is best to have the first user log off and allow the second user to log on.

The reverse situation might also be an issue in a multi-user environment. A user with full access has logged onto the system and is then called away. If a different user with restricted access uses the system while the first user is logged on, the second user will have full access to the system.

For these reasons, when operating the BaseStation 6000 system in a multi-user environment, it is best to get into the habit of logging off when you need to step away for any length of time.

Note: Depending on the length of time in the Set Password Active Time field, the system might automatically log users off promptly. However, it is still a good idea to log off.

To log off

1. On the BaseStation 6000 Main Page, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Login**, and then click **Log Off**. A message informs you that logging off was successful.

3. Click **OK** to close the message box.

Logging On as a Different User

1. On the BaseStation 6000 Main Page, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Login**, and then click **Log On as different user**. The Input Password dialog box opens.

3. Type the appropriate password for the user, and then click **Enter**.

Removing Password Protection from the BaseStation 6000 System

If you set up user accounts and passwords for your BaseStation 6000 system, and then you find that you no longer need to control user access, the administrator can remove the password protection from the system.

To remove password protection

1. On the BaseStation 6000 Main Page, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Login**, and then click **Manage Passwords**. The Input Password dialog box opens.

3. Type the administrator password in the field, and then click **Enter**. The Password Security and Logging window opens.

4. Click the **Enable Passwords** check box to remove the check mark.

5. Click **Return**.

Using Time Valve Activation

Time Valve Activation is an advanced feature that enables you to run specific zones at exact times using a configuration that you write into a Microsoft Excel spreadsheet. This configuration overrides the normal watering schedule.

This feature is available as a tab on the Set System Parameters window. You can access it using either of the following methods:

- Click Seasonal Adjust, click Adjust, and then click the Time Valve Activation tab.

- Click Window, click System Parameters, and then click the Time Valve Activation tab.

If you want to implement this feature, contact Baseline Support for instructions.

9 – LOGS, REPORTS, ALERTS, and GRAPHS

The BaseStation 6000 has a wealth of logs, reports, alerts, and graphs to help support your irrigation efforts.

Logs and Reports

The logs and reports capture the BaseStation 6000 software configuration, the changes made by users, and the daily activity of the system. The logs and reports are stored on the hard drive of the BaseStation 6000 computer in the path C:\xTrol\Irrigation\Programs\. You can access some of the logs and reports from the BaseStation 6000 software, but for others, you must navigate to the folder where the logs are stored and open the file directly. You can review and print the logs and reports as needed and even send them as email attachments to your colleagues.

Note: If you want to set up the system to automatically send logs and alerts to users, refer to System Notification on page 82.

- **To access logs and reports from the BaseStation 6000 software**, click the Information tab to activate the Main Menu. Click the Logs and Reports menu, and then click the file that you want to view (refer to the descriptions below). The Open dialog box shows the available files for the specific log or report. Click the filename, and then click Open. Depending on the size of the file, it displays in either the Report Viewer window or the Notepad application.

- **To navigate to the folders** where the logs and reports are stored, right click on the Windows Start button, and then click Open Windows Explorer. In the list of drives, click on the C: drive (typically labeled as "Local Disk"). The folders on that drive are listed in a separate pane within Windows Explorer. Scroll to the bottom of the folder list. Double-click on the folder named xTrol. When the files and subfolders display, double-click on the folder named Irrigation. In the next list, double-click on the folder named Programs. Within this folder, you will see the folders that contain the logs and reports (see below for descriptions).

- **To open a log or report file from a folder**, navigate to the folder where the file is stored, and then double-click on the filename. The file opens in the Notepad application. If you find that the columns in the report are not aligned properly, which makes the data hard to read, click the Maximize (□) button on the top window border. If the data is still not aligned properly, click the Format menu, and then click Word Wrap.

- **Working with logs and reports in Report Viewer**

  - To print a log or report file, if your computer is connected to a printer, click the Print button at the bottom of the window.

  - To display the most current data for a log or report that is updated frequently, click the Refresh button at the bottom of the window.

  - To open another log or report in Report Viewer, click View Logs and Reports at the top of the window. Click the log or report that you want to view. The Open dialog box shows the available files for the specific log or report. Click the filename, and then click Open.

  - To close the Report Viewer window, click Return at the bottom of the window.

- **Working with logs and reports in Notepad**

  - To close a log or report file, click the Close (X) button on the top window border.

  - To print a log or report file, if your computer is connected to a printer, open the file that you want to print. Click the File menu, and then click Print. Configure your print options in the Printer dialog box, and then click Print. The file is printed on your selected printer.

- ▪ To save a log or report file to a flash drive (also called a USB drive or a thumb drive), plug the flash drive device into a USB port on the computer. Windows will detect the drive. Open a folder to view files on the drive. Windows Explorer opens and shows the contents of the flash drive. Open another Windows Explorer window by clicking on the Windows Start button, and then clicking Open Windows Explorer. Navigate to the path C:\xTrol\Irrigation\Programs\ and then open the folder where the file that you want to save to the flash drive is located. Find the file in the list, position the cursor on it, and then click the right mouse button. In the list of options, click Copy. Go to the Windows Explorer window for your flash drive. Position the cursor in the right pane, and then click the right mouse button. In the list of options, click Paste. The file is copied to your flash drive. You can now remove the flash drive from the BaseStation 6000 computer and transport the file to another computer in order to share it, print it, or email it.

- ▪ To email a log or report file, if you have access to email on the BaseStation 6000 computer, go to your email and start a new email message. Click the option within the message to attach a file. In the file dialog box, navigate to the folder where the file is stored, click on the filename, and then click Open. The log or report file is attached to the email and will be sent to the email recipient. If you do not have email on the BaseStation 6000 computer, follow the instructions above to save a log or report file to a flash drive, and then take the flash drive to a computer where email is available.

  Note: The BaseStation 6000 system can be configured to email some logs and reports to specific users on a daily basis. Refer to System Notification on page 82 for information about setting up this feature.

Available Logs and Reports

The logs are described based on the folder where they are stored on the computer's hard drive.

Note: When you look at the list on the hard drive of the BaseStation 6000 computer in the path C:\xTrol\Irrigation\Programs\ you will notice folders and files that are not described in the table below. The folders and files that are not documented are used by Baseline Support or are machine readable only. Baseline recommends that you open only the files that are described below and avoid touching those that are not described.

Folder Name	Logs and Reports Menu	Description
ConfigSheet	Configuration Sheet	Once per day, your system configuration is written to file that is saved in this folder. The file shows your zones, their modes, the decoder serial numbers and a summary of the program settings. If you change your settings and find that your system is no longer working properly, you can compare the Configuration file from the last day when the system worked properly with the current Configuration file to find out what changes might have caused problems.
ErrorLog	Error Logs	Periodically throughout the month, the system writes an error log file to this folder. At the end of the month, the final log showing all errors that occurred during the month is saved. Review this log file to see all errors that occurred in your system during a month. Primarily used by Baseline Support.
FlowData	Daily Flow Log	Whenever there is flow in the irrigation system, a **Flow Data** log is saved in this folder. Whenever a flow fault occurs, a **Flow Fault** log is saved in this folder. These reports are typically used by Baseline Support to help troubleshoot your system – the data is not easily interpreted by end users.
FlowData Gallons	NA	This file records the flow usage for each flow meter at the end of each day. The system creates a new file at the beginning of each year.
GeneralLog	Daily Activity Log	Updated continuously throughout the day, the commands that you issued (including pause events) in the BaseStation 6000 software are saved to a file.

Folder Name	Logs and Reports Menu	Description
IOLog	NA	If you set up IO logs to be mailed to Baseline Support, the system sends the reports from this folder. These reports are used by Baseline Support to help troubleshoot your system – the data is not easily interpreted by end users. For instructions on mailing reports, refer to System Notification on page 82.
IrrigationLog	Station Run Time Log	Reports the zone run times for each zone for each day of the month.
Learn Flow	NA	If you run the Learn Flow process on your system, the results are written to a file that is saved in this folder.
MoistureData	NA	Once per day, the readings from your soil moisture sensors are captured in a file in this folder. These reports are typically used by Baseline Support to help troubleshoot your system – the data is not easily interpreted by end users.
Self Test	NA	When you run the Detailed Test on All Zones from the System Self Test tab in the System Diagnostics window, the results are written to a file in this folder.
Status Report	NA	Shows a current summary of all operations performed by your irrigation system. Shows any current warnings, sensor readings, and the status of each zone.
SysMgrLog	Configuration Log	Shows the user actions that were performed (including pause events) and what time they were performed on the BaseStation 6000 system during the course of a day. Shows every change made to the current configuration.
ValveTime	Active Valve IO Log	This data in this file shows the valves that are on and whether they are being communicated with on a minute-by-minute basis. This report is typically used by Baseline Support to help troubleshoot your system – the data is not easily interpreted by end users.
WaterUsage	NA	The files in this folder show number of gallons used and minutes watered broken out by various time frames and devices.
Yearly Usage Report	NA	This file records the system usage by flow meter on a daily basis. When the file opens in the Notepad application, align the report columns by clicking the Maximize (□) button on the top window border, click the Format menu, and then click Word Wrap. You can import this report into Microsoft Excel for further analysis of the usage data.

Alarms, Alerts, and Warnings

The BaseStation 6000 constantly monitors the irrigation system to detect conditions that will affect the performance of your system. These alerts will help you stay on top of issues. As a matter of fact, one BaseStation 6000 user found and repaired 10 failed solenoids with the help of these alerts. He estimated that the time from alert to repair was 15 minutes, which prevented damage to the landscaping.

The alarms, alerts, and warnings are displayed in a pane on the right side of the Main Page of the BaseStation 6000 software. If you do not see the Alarms and Alerts pane, you need to enable it. Click the Information tab to activate the Main Menu. Click the Window menu, and then click View Alarm Alerts.

When an alarm is displayed in the Alarms and Alerts pane, you can click the Zone Description to open the Error Display window. Additional details about the error are shown in that window.

You can configure the BaseStation 6000 system to send the following alerts to specific users by text message and/or email on a regular schedule. Refer to System Notification on page 82 for information about setting up this feature.

- High flow shutdown

- Excessive current (such as a two-wire short or too many valves operating concurrently)

- High moisture warnings

- High moisture fault (where watering has been stopped on a specified program)

Refer to the Troubleshooting section to diagnose the messages.
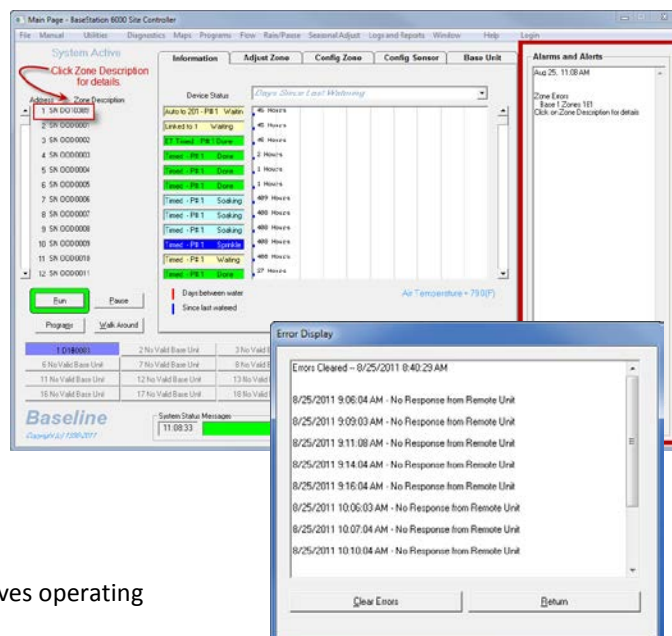
Graphs

The BaseStation 6000 system provides soil moisture graphs and flow graphs. The soil moisture graphs are described below. Refer to Adjusting Programming with biSensors on page 41 for information about the adjustment features associated with the soil moisture graphs. The flow graphs are explained within the Flow Usage – Graphs section on page 66 of this manual.

Reading a Soil Moisture Graph

The basic features of a soil moisture graph are shown in the illustration below. The vertical gray lines represent time. In this example, each gray line represents one day. The system is watering about every 2½ days. This interval varies based on weather or plant use.
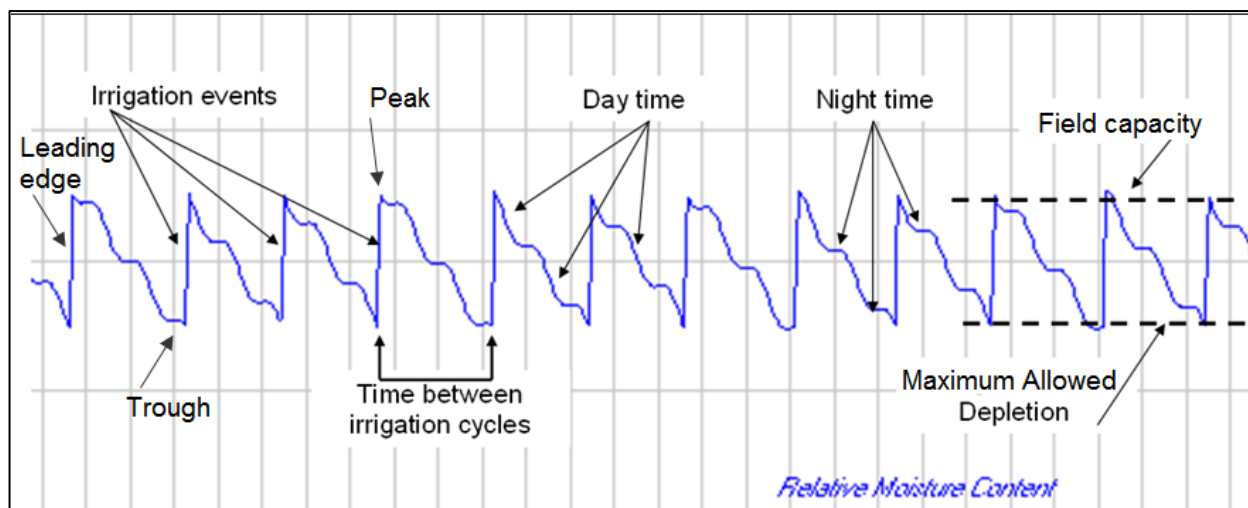
Moisture levels drop more sharply during day time than during night time due to higher temperatures.

When a soil moisture sensor detects a steady increase in moisture levels during an irrigation event, the leading edge of the graph is sharp and clean. If the leading edge is jagged, it means that moisture levels increased erratically during (or after) the irrigation event. This situation might occur if the sensor is buried too deeply or if the irrigation event applies water too quickly.

A sharp peak on graph means that the moisture level rose to a certain level and then the soil started to dry out normally. A rounded peak means that moisture is being held in the soil after the cycle is complete and some time passes before the moisture starts to decrease.

The trough represents the initial drying out. If you have a lower threshold set, the trough represents the maximum allowed depletion of moisture in the soil and the point where another irrigation event is initiated.

Adjusting the Data View on a Graph

When you display a soil moisture graph, you can adjust the view of the data on the graph.

(1) **Selected sensor** – This field shows the sensor for which data is being displayed on the graph.

(2) **Data view** – Click these buttons to switch between the view that shows just the sensor data (Sensor), the view that shows the graph and tools for managing the auto zone (Automatic) and the view that shows all your zones (All).

(3) **Data that is graphed** – Click these buttons to display or hide the lines representing the data on the graph.

Color key for graph lines –The words Air Temperature, Turn Off Limit, Turn On Limit, Relative Moisture Content, and Soil Temperature are displayed around the edges of the graph. These words refer to the graph lines and the color of the word matches the color of the corresponding graph line.
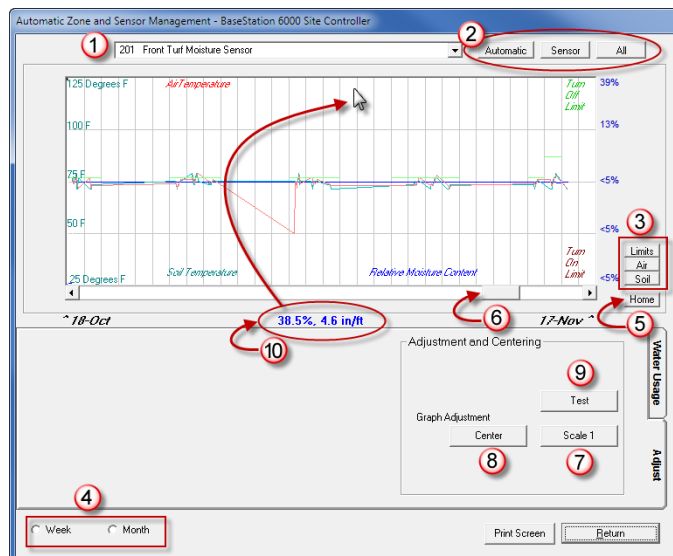
(4) **Data range** – Click these buttons to change the range of data. You can also toggle between the data ranges by clicking in the graph. Notice that the actual dates for the date range are displayed at the lower-left and lower-right corners of the graph.

(5)   **Home** – Click the Home button to display the data for a month where today's date is centered. The default view shows a month where today's date is on the right edge of the graph.

(6)   **Scroll to different date** – Click and drag the scroll box at the bottom of the graph display a different date range on the graph.

(7)   **Scale** – Click the Scale button to control the level of detail by zooming in or out.

(8)   **Center** – Click the Center button to center the graph lines horizontally.

(9)   **Test** – Click Test to display a current reading from the sensor.

(10)   **Moisture percentage** – When the graph is in Scale 1 or 2, this reading displays for the location of your cursor. In the illustration, notice that the cursor is positioned near the top of the graph and the moisture percentage reading corresponds to that location.

Possible Graphs

If you have a biSensor soil moisture sensor installed and you are using one of the watering strategies based on moisture sensor readings, your soil moisture graphs might look like one of those illustrated below. Use the following information to interpret the graph and to determine whether you need to make changes to your settings.

Good Graph

This example of a good graph shows the following desirable characteristics:

- The leading edges for the moisture graph are sharp and clean indicating that the moisture is reaching the sensor while the zone is being watered.

- The upper and lower thresholds are separated sufficiently to allow multiple days between watering.

- The watering days are spread out allowing the surface of lawn to dry somewhat thereby helping to prevent disease.

- The days between watering vary somewhat to account for changes in the moisture requirements of the grass.

- The curves have good vertical movement indicating that ground is not saturated.
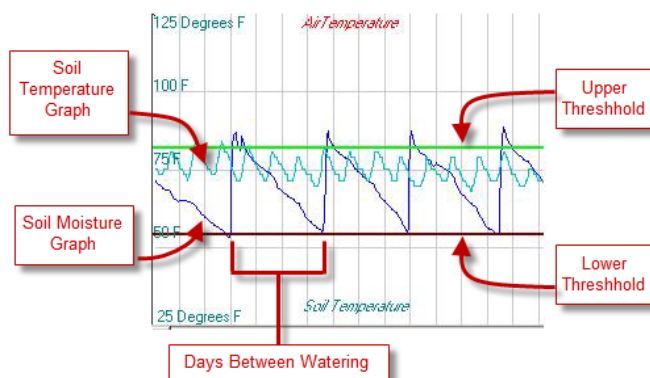
Good Graph with Initial Peaking (High Peaks after Watering)

This example of a good graph shows the following characteristics:

- An initial high peak that falls off rapidly and then decreases normally.

- The moisture content is greater than the field capacity of the soil. The moisture is moving below the sensor and wetting the lower portions of the root zone.
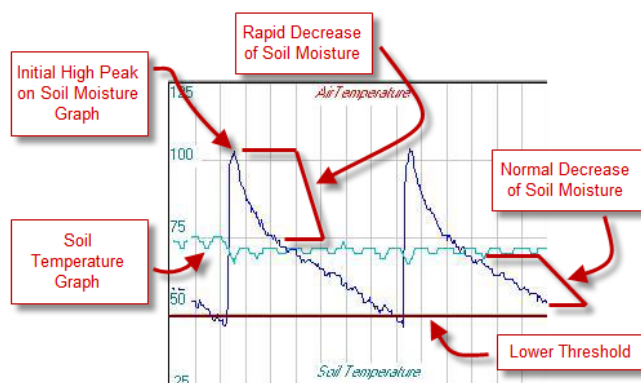
Recommendations

- This graph represents a normal occurrence caused by water traveling through the soil to the sensor more slowly than it is applied. If the peaking is not excessive, no changes are required.

- If the peaking is excessive, the soak time should be increased so that water is applied more slowly.

Moisture Continues to Rise after Cycle Is Complete

Characteristics

- The moisture continues to rise well after the cycle is complete, indicating that there was not enough time for the water to percolate through the soil to the location where the sensor is buried during the programmed cycle time.

  - The leading edges are not sharp and clean
  - The tops are rounded

- The watering cycle stops because it reaches the maximum allowed time, not because the desired moisture level is reached.

- It might also mean that water is being applied too fast and the soil cannot absorb the moisture quickly enough to allow the sensor to read the moisture.

Recommendations

- If the water is being applied too fast, increase the soak time to allow the moisture to reach the sensor.

- If the sensor is buried deeper than 4 inches, we recommend that it be relocated. Typically, 2 – 3 inches is an adequate depth for most sensors.

  - Mark or record the location of the sensor so it does not get damaged during aeration.
  - Locate the sensor in a dryer portion of the zone.
  - Do not locate sensors in shady areas unless the whole zone is shady.
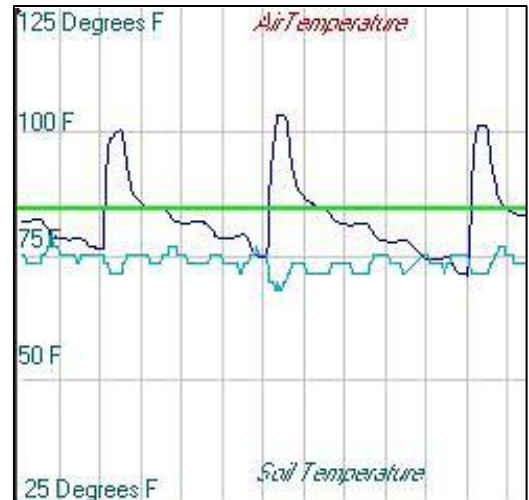
Erratic Graph

The movement on this graph is not distinctly tied to watering cycles.

Causes and Recommendations

- The watering cycle may not be long enough for the moisture to reach the sensor - increase the watering time.

- The sensor may be too deep and moisture is not reaching the sensor - CAREFULLY move the sensor.

- The sensor is not in the zone being watered. Locate the sensor and test the zone coverage. Find the sensor and confirm that the correct zone is watering it.

- The sensor is too wet and is hyper saturated. Locate the sensor and probe the ground to test for water content.

- Check for broken/leaking pipes and valves, marshy areas, or extreme over watering.
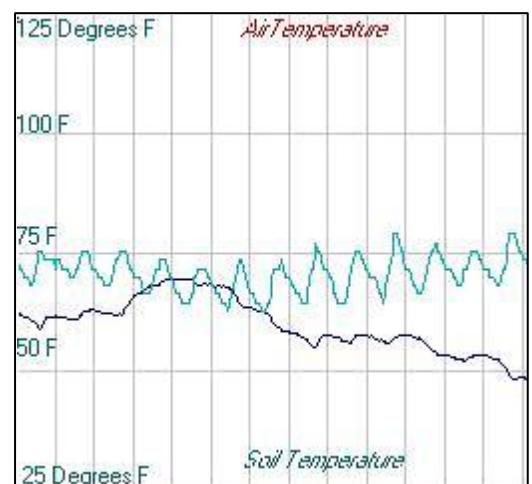
Saturated – Not Drying Out (Watering Too Often)

Characteristics

- The lower threshold (the moisture level where the water turns on) is set just above the field capacity of the soil.

- The soil does not have time to dry between watering cycles.

- The excess moisture applied during each watering cycle percolates through the soil and is lost to the plant.

Recommendations

- Move the upper threshold down to the level of the trough that represents the initial drying out. For example, set the upper threshold at the point where the lower threshold is currently.

- Move the lower threshold down to enable the zone to dry before watering. For most lawns, we recommend a level that allows at least three days between watering for most lawns in hot weather. Water less often when it is cooler.

- Never set a zone to water every day (Max Days = 1) or have the upper threshold and the lower threshold so close that the system waters every day.
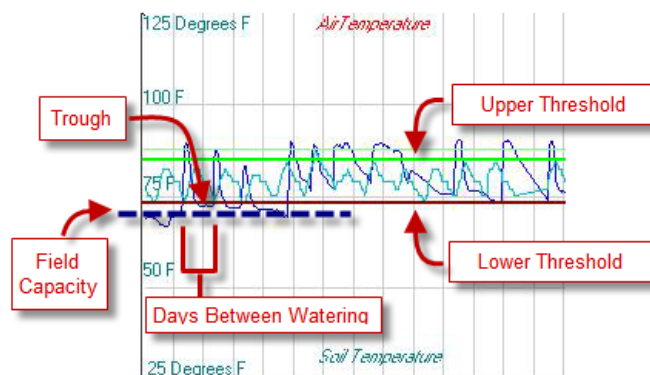
Two Watering Peaks (Overlapped Zones)

Characteristics

- The graph shows two watering peaks. Typically one peak represents one zone watering, and the other represents another zone watering.

- This situation may also happen if a substantial watering interruption occurred; however, this event is less likely and typically would not happen with the regularity shown on the graph.

Recommendations

- Find the zone that overlaps the sensor and configure it to water immediately after the zone with the sensor. The two zones must be in the same hydrozone.

- Set the soak cycle so that the watering of the two zones overlap. The sensor will be watered proportionately by each zone and produce reasonable results.
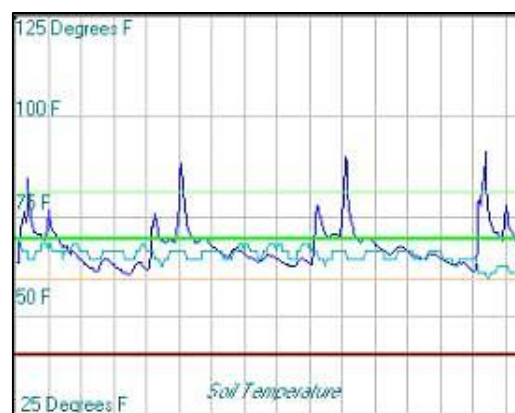
  Note: If you cannot make either of these recommended changes, the zone may not be a candidate for automatic watering and will not be a candidate for automatic sensor threshold adjustment.

Graph Not Moving

Characteristics

- The graph shows only a little movement and the ground where the sensor is located is saturated.

- The overall trend of the graph may be flat but there are sharp peaks that correspond to the watering cycles. The peaks fall off rapidly.

Recommendation

- The ground is near, at, or above field capacity and does not dry out between watering days.

- Check the watering frequency. If the system is watering daily or every two days, increase the days between watering.

- Click the **Too Wet** button in the Set Sensor section of the Adjustment and Centering group box below the graph.

- If the problem persists, the sensor may be too deep. It should not be buried any deeper than 4 inches and typically, 2 – 3 inches is an adequate depth for most sensors.
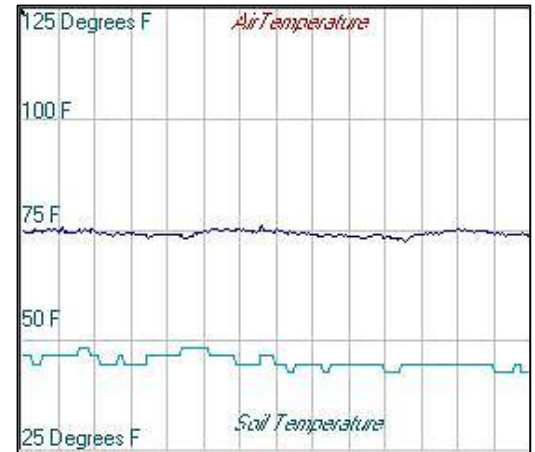
10 – SYSTEM DIAGNOSTICS

The BaseStation 6000 provides robust tools for analyzing the system and diagnosing issues. Refer to the Troubleshooting section on page 104 for information about using System Diagnostics to find issues.

Accessing the System Diagnostics Interface

1. On the Main Page of the BaseStation 6000 software, click the **Information** tab to activate the Main Menu.

2. On the Main Menu, click **Diagnostics**, and then click **System Diagnostics**. The System Diagnostics interface opens.

3. On the left side of the interface, use the tabs to access the various types of diagnostic tests.

4. View the test results in the pane on the right side of the interface.

5. If you want to see additional test data, select the **Enable More Detailed Data OutPut** check box.

   Note: If a test is taking too long to complete, start Task Manager on your computer. In the Applications list, click System Diagnostics, and then click End Task.

6. When you are finished using the System Diagnostics, click **Return** to go back to the Main Page.
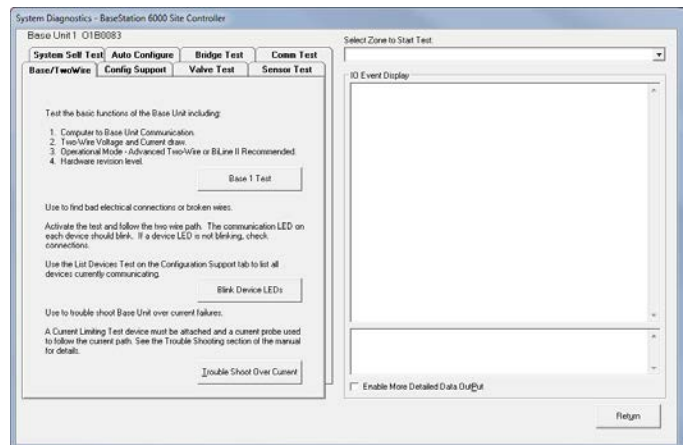
   Note: Refer to the following sections for information about the various types of diagnostic tests. Refer to the Troubleshooting section on page 104 for information based on the error messages that might display when you are running the various diagnostic tests.

Testing the Basic Functions of theRemote Base Unit

Use the Base Unit test to determine:

- Whether the Remote Base Unit and the computer are communicating with each other

- What current and voltage the two-wire is drawing

- The recommended biLine protocol for your system

- What hardware revision you have

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Base/TwoWire** tab.

3. Click the **Base # Test** button (where the # represents the number of the Remote Base Unit that you want to test).

Testing Electrical Connections with Devices

Use the Blink Device LEDs test to find bad electrical connections or broken wires. Clicking this test button activates the two-wire path and should cause the communication LED on each device to blink. If an LED is not blinking, check the electrical connections.

Note: Perform this test when one person is working at the computer and another person is verifying the blinking LEDs in the field.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Base/TwoWire** tab.

3. Click the **Blink Device LEDs** button. Depending on the complexity of your system, this test might take several minutes to complete.

Testing for Excess Current

Use this test to find and troubleshoot excess current (also known as over current) in your system. You must attach a current limiting test device and a current probe on the path that you want to test. Refer to the Remote Base Unit Troubleshooting on page 104 for more details about excess current.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Base/TwoWire** tab.

3. Click the **Trouble Shoot Over Current** button.

Listing Devices

Use this option to list all devices that are attached to the system and indicate how many of the available ports are used.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Config Support** tab.

3. Click the **List Devices** button.

Verifying Configuration

Use this option after installing any new biCoders or adding any new hardware. The test removes any address conflicts and ensures that the hardware configuration matches the program configuration.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Config Support** tab.

3. Click the **Verify and Repair Configuration** button.

Testing Communication with Devices

Use these tests to determine whether a specific device is communicating with the RBU. You can test either by Serial Number or by Zone ID. Note that multivalve decoders may only return the serial number of the first zone on a multiple zone device.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Config Support** tab.

3. In the **Device Communication Test** group box, perform one of the following:

   - Type the serial number of the device that you want to test in the **Serial Number** field, and then click **Ping Serial Number**.

   - Type the zone number of the device that you want to test in the **Zone ID** field, and then click **Ping Zone Number**. The test results display in the lower pane on the right side of the System Diagnostics interface.

Testing Valves

This test activates a valve continuously to verify its operation. At the biCoder, the valve LED should be on.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Valve Test** tab.

3. Click the arrow in the **Select Zone to Start Test** field located in the upper right of the System Diagnostics interface.

4. Click the zone that you want to test. The system updates the IO Event Display pane with data about the zone.

5. Click the **Turn On Valve** button. The voltage and current readings for the zone display in the IO Event Display pane.

6. Perform one of the following:

   - If you want to turn on the next valve, click **Next**.

   - If you want to turn off the valve and stop the test, click **Turn Off Valve**.

   - If you want to see and hear the valve actuate, click **Toggle Valve**.

Testing the Current Supplied to a Valve

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Valve Test** tab.

3. Click the arrow in the **Select Zone to Start Test** field located in the upper right of the System Diagnostics interface.

4. Click the zone that you want to test. The system updates the IO Event Display pane with data about the zone.

5. Click the **Test Valve Current** tab in the lower left of the System Diagnostics interface. The valve and system current display in the fields on the Test Valve Current tab in the lower left of the System Diagnostics interface.

6. If you want the system to read the current again, click **Read Valve**.

7. If you want to record the readings in order to determine whether the device degrades in the future, select the **Record Reference Values** check box, and then click **Record**. The values display in the reference fields and will remain for future comparison.

Testing the Current Power Setting of the Decoder

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Valve Test** tab.

3. Click the arrow in the **Select Zone to Start Test** field located in the upper right of the System Diagnostics interface.

4. Click the zone that you want to test. The system updates the IO Event Display pane with data about the zone.

5. Click the **Program Valve Drive Power** tab in the lower left of the System Diagnostics interface.

6. Click **Read Valve Power**. The results display in the pane on the right side of the System Diagnostics interface.

   Note: The other options on the Program Valve Drive Power tab are reserved for use with guidance from Baseline Technical Support.

Testing Sensors

Use this option to test all sensor functions.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Sensor Test** tab.

3. Click the arrow in the **Select Zone to Start Test** field located in the upper right of the System Diagnostics interface.

4. Click the sensor that you want to test. The system updates the IO Event Display pane with data about the sensor. The sensor readings display in the Test Configured Sensor Parameters and Operation group box on the left side of the System Diagnostics interface.

5. Click **Read Sensor** to have the system refresh the fields with the most current readings.

Performing a Quick Test on All Zones

This test operates all biCoders for a half a second to verify that the solenoid is neither open nor shorted. The test also verifies communication with all sensors in the system.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **System Self Test** tab.

3. Click the **Quick Test All Zones** button. A progress bar displays above the button. When finished, the test results display in the pane on the right of the System Diagnostics interface.

Performing a Detailed Test on All Zones

For both biCoders and sensors, this test verifies:

- Moisture and temperature reading for each moisture sensor

- Current and voltage delivered to each valve

- Quality of the communication signal both sending and receiving

- Device type and revision number

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **System Self Test** tab.

3. Click the **Detailed Test All Zones** button. The test results display by device in the pane on the right of the System Diagnostics interface. The test results are written to a log file that is saved on your computer in the following path:

   C:\xTrol\Irrigation\Programs\Self Test\

4. If you want to stop the test, click **Stop After Test**. The detailed test will stop after the test finishes on the current device.

   Note: Use the Enable IO Logs check box only as directed by Baseline Technical Support.

Clearing the Current Configuration

This option removes all currently configured biCoders and sensors from the system. Use this option only when you are sure that you want to delete your configuration.

WARNING! You cannot undo this operation.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Auto Configure** tab.

3. Click the **Clear Current Configure** button.

Using the Auto Configuration Option

You can use the Auto Configuration option to accelerate initial configuration of the system by having the program automatically detect all biCoders that are attached to the selected Remote Base Unit. Then Auto Configuration assigns zone numbers to the biCoders that the system detected.

WARNING! If not used properly, Auto Configuration may have unintended consequences on existing systems.

Auto Configuration does not configure devices that already have a zone number assigned. Additionally, you specify the number (or address) for the first automatically configured zone. After Auto Configuration is complete, you can reassign zone numbers as desired and group them any way you want.

Auto Configuration only detects biCoders; you still need to manually configure other devices such as sensors and optional hardware. Auto Configuration only detects biCoders that have valves attached. If you run the Auto Configuration option and find that some biCoders are missing, check their connections.

Note: This feature can make the configuration process confusing if too many devices are auto configured at once. Baseline suggests attaching a few devices at a time and auto configuring these small sets, rather than auto configuring the entire system at once.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Auto Configure** tab.

3. Click the **Auto Configure** button. A message warns that "the current configuration will be permanently modified." Only proceed if you want to set up a new configuration. The Report Viewer window displays the configuration progress.

   Note: Any device that has been previously configured will be unaffected by the Auto Configuration option.

4. After the system detects all the connected devices, the Input First Zone dialog box opens. Type the zone number that you want the Auto Configuration option to begin with.

   Note: All numbers lower than the entered number will be unaffected by the Auto Configuration option.

5. After the Auto Configuration process is complete, click **Return** to close the Report Viewer.

Note: Because Auto Configuration sets zone numbers automatically, you may wish to reorder the zones at this point. Refer to Grouping and Reordering Zones on page 30 for more information.

Learning the Zone Addresses of biCoders

Use this option to learn the zone addresses of all biCoders between zone address 1 and zone address 200. Other biCoders and sensors must be configured manually. When you perform this operation, the Baseline system will be configured to operate the learned hardware.

WARNING! If you already have devices configured in the system, they will be removed by this operation.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Auto Configure** tab.

3. Click the **Learn Physical Configuration** button. A warning message displays.

4. Click **OK** to proceed.

Testing a Bridge Unit

If you have a bridge unit configured on your system, you can test it to ensure that it is connected and communicating properly.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Bridge Test** tab.

3. Perform one of the following:

   - Test the Bridge Unit only – select the appropriate biLine protocol, and then click **Test Bridge Only**.

   - Test the configuration of the Bridge Unit and Remote Base Units – click **Test Bridge, Base, and Remote Units**.

   - Read data for one RBU – click **Read Base/Remote Base Serial Number**. Type the number of the RBU that you want to read, and then click **OK**. The test results display in the pane on the right side of the System Diagnostics interface.

Testing Radio or Backbone Communication between Computer and RBUs

Use this option to test the input/output error rate between the computer and the Remote Base Units.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Comm Test** tab.

3. Click the **Test Base Communication** button.

4. If you want the test to run continuously, select the **Enable Looping** check box. Do not, however, select the **Enable Logs** check box unless you are instructed to do so by Baseline support. When you enable the logs, the system generates large files that are meaningful only to Baseline support technicians.

   Note: If you want to stop the test before it is complete, click the Stop Test button.

   The test results display in the pane on the right side of the System Diagnostics interface and in the bars on the Comm Test tab:

   - Errors/Total – total number of commands attempted

   - Success – total number of commands completed successfully

   - Errors – total number of commands not completed successfully

   - Success % – percent of commands completed successfully

Testing Communication between Computer and the biCoders

You can verify the Local Area Network connection between your computer and the Remote Base Unit or Bridge Unit.

1. Go to the **System Diagnostics** interface. Follow the steps in the Accessing the System Diagnostics Interface section.

2. Click the **Comm Test** tab.

3. In the **Address** field, type the address of the biCoder that you want to test.

4. Click the **Test Bicoder Communication** button.

5. If you want the test to run continuously, select the **Enable Looping** check box. Do not, however, select the **Enable Logs** check box unless you are instructed to do so by Baseline support. When you enable the logs, the system generates large files that are meaningful only to Baseline support technicians.

   Note: If you want to stop the test before it is complete, click the Stop Test button.

   The test results display in the pane on the right side of the System Diagnostics interface and in the bars on the Comm Test tab:

   - Errors/Total – total number of commands attempted

   - Success – total number of commands completed successfully

   - Errors – total number of commands not completed successfully

   - Success % – percent of commands completed successfully

11 – TROUBLESHOOTING

Access the System Diagnostics window by clicking the **Diagnostics** menu and then clicking **System Diagnostics**.

Remote Base Unit Troubleshooting

General	
Test Process	In the System Diagnostics interface, click the **Base/TwoWire** tab, and then click the **Base # Test** button (where the # represents the number of the Remote Base Unit that you want to test).
Message	No Valid Base Unit No Response from Base Unit
Possible Causes	The Remote Base Unit is not properly configured. Check the connections between the Remote Base Unit and the computer. Power supply or power supply connection failure. Failure on the two-wire. Remote Base Unit fails to initialize due to faulty hardware.
Troubleshooting	Verify success at each step before proceeding. Verify all Remote Base Unit connections, and then run the Base # Test again. If the "No Valid Base Unit" message displays, the Remote Base Unit may not be properly configured. Navigate to the **Base Unit** tab on the Main Page and click the **Comm** button. Verify that the communication setup options are correct. Return to the System Diagnostics window and run the Base # Test again. Disconnect the two-wire system from the Remote Base Unit, and then run the Base # Test again. Unplug and reconnect the Remote Base Unit power supply. Does it pass the self-test where the communication LED briefly blinks and then stops? If the LED continues to blink, or blink with an unusual pattern, the test has failed. The Remote Base Unit needs to be repaired. After the repair is complete, repeat the Base # Test. Visually verify the computer to Remote Base Unit connection. Repair and run the run the Base # Test again. Shut down and restart the computer. Run the Base # Test again. Exchange components in order to isolate the failing part. Test the computer cable, power supplies, Remote Base Unit, and finally the computer. Run the Base # Test after each change. **Note**: Navigate to the Remote Base Unit tab of the Main Page and click the

	Initialize Serial Ports button to configure a new Remote Base Unit.
	Reconnect the two-wire system. Run the Base # Test again.

Advanced Two-Wire is Not Operational

Test Process	In the System Diagnostics interface, click the **Base/TwoWire** tab, and then click the **Base # Test** button (where the # represents the number of the Remote Base Unit that you want to test).
Message	The system is capable of operating in Advanced Two-Wire Mode but is currently operating in standard two-wire mode.
Possible Causes	A newer Remote Base Unit has been added to an older system. This is not an operational error and the system will continue to operate normally. No action is necessary. There are older components configured into the system. In some cases, an adapter can be added to make these older units compliant with the Advanced Two-Wire Standard. A defective device is causing excess current in one power phase. The device is also likely to fail with over current errors. Troubleshoot this situation using the techniques specified in the Over Current section below.
Troubleshooting	Disconnect each device one at a time and run the Base # Test until the system operates in advanced two-wire mode. Correct the device, connect it to the two-wire system and run the Base # Test again. Continue to add devices one device at a time, running the Base # Test after each device, until the entire system is connected and operating in advanced two-wire mode.

Over Current

Test Process	In the System Diagnostics interface, click the **Base/TwoWire** tab, and then click the **Base # Test** button (where the # represents the number of the Remote Base Unit that you want to test).
Message	Over Current on the Two-Wire Over Current on Base Unit
Possible Causes	A remote device is connected improperly with reversed wires. The two-wire red and white are shorted together. Remote Base Unit failure.
Troubleshooting	Visually verify all Remote Base Unit connections. Run the Base # Test again. Verify the Remote Base Unit by disconnecting the two-wire system from the Remote Base Unit. Run the Base # Test again. Reconnect the two-wire system to the Remote Base Unit.

	Run the Base # Test again. Break the two-wire communication and isolate parts of the system. Run the Base #Test again. Keep isolating and testing smaller and smaller sections of the system until the physical location of the fault is found. Isolate the problem to a wiring problem or a device failure and correct the failure.

Note: The Base Unit Test can be used to detect over current conditions by simply plugging in the 30 volt power supply and noting the LED blinking status. However, running this test more than ONE TIME during a 60-second interval may cause the Remote Base Unit to OVERHEAT and FAIL.

Two-Wire Troubleshooting – No Response

Initial Test Preparation	Use these test steps to determine the location of failing devices: 1. In the System Diagnostics interface, click the Base/TwoWire tab, and then click the Base # Test button (where the # represents the number of the Remote Base Unit that you want to test). This test must pass before proceeding. 2. In the System Diagnostics interface, click the Config Support tab, and then click the List Devices button. Note which devices are present and which are not. 3. If devices are currently configured into the system, click the System Self Test tab and then click the Quick Test All Zones button. Note which devices fail the message "No response from Remote Unit."
	Use the tests below to isolate and localize the broken or shorted wire or device.
Test Method 1 – Measure the electrical continuity of the wire with a voltmeter	1. Remove the two-wire from the Remote Base Unit. 2. Remove a biCoder or biSensor from the two-wire. 3. Connect the red and white wires together at the location of the removed device. 4. At the Remote Base Unit, measure the resistance of the wire loop with a digital voltmeter (DVM). It should be less than 13 ohms.
Test Method 2 – Add a load to the wire to test current carrying capability	1. Remove the biCoder from the questionable location. 2. In the upper-right of the System Diagnostics interface, click the arrow in the **Select Zone to Start Test** field, and then click the device that you want to test. The results display in the IO Event Display pane. The message will say "No response from remote unit." 3. Click the **Valve Test** tab, and then click the **Toggle Valve** button to power up the two-wire system. 4. Briefly connect a valve across the two-wire circuit. If the wires are good, the valve will actuate. If the valve does not actuate, one of the wires has failed.
Test Method 3 – Substitute known good parts	1. Remove the biCoder from the questionable location. 2. Find a device that you know is good and write down the device's serial number. 3. Wire that substitute device into your system. 4. In the System Diagnostics interface, click the **Config Support** tab. 5. In the **Device Communication Test** group box, type the serial number of the substitute device in the **Serial Number** field and then click **Ping Serial Number**. If the device fails to respond, the wires are bad.

Test Method 4 – Use a substitute two-wire path	1. Remove the biCoder from the questionable location. 2. Run another wire or set of wires across the top of the ground to the questionable device and reconnect it. 3. In the upper right of the System Diagnostics interface, click the arrow in the **Select Zone to Start Test** field, and then click the device that you want to test. The results display in the IO Event Display pane. If the results are successful, it indicates that the original wire was faulty. If the "No response from remote unit" message displays, it may indicate that the substitute wire is faulty, or the device has failed. 4. If you suspect that the device has failed, follow the instructions in Test Method 3 to substitute and test a known good device.
Repair	If possible locate a spare wire and verify that the replacement wire has adequate insulation to properly function as a two-wire conductor using the Baseline Wire Insulation Tester. If new wire is added, use double-jacketed wire as recommended by Baseline. If necessary use a wire tracer or a fault finder to locate the break in the wire. Replace the wire and verify that the replacement wire has adequate insulation to properly function as a two-wire conductor using the Baseline Wire Insulation Tester. Use the following tests in the System Diagnostics interface to verify functionality: • Base # Test on the Base/TwoWire tab • Quick Test All Zones on the System Self Test tab • Detailed Test All Zones on the System Self Test tab

biCoder™ Troubleshooting

Test Steps	In the System Diagnostics interface, click the **Base/TwoWire** tab, and then click the **Base # Test** button (where the # represents the number of the Remote Base Unit that you want to test). If test fails, refer to Remote Base Unit Troubleshooting. Run the **Quick Test All Zones** from the **System Self Test** tab of the System Diagnostics interface. Note any failing zones. In the upper right of the System Diagnostics interface, click the arrow in the **Select Zone to Start Test** field, and then click the biCoder that you want to test. The results display in the IO Event Display pane. The following messages are possible: • **No response from remote unit** - failure may indicate that a wire has failed. Refer to Wire Troubleshooting. • **Open Circuit Valve** – Indicates a bad solenoid or bad wire to the valve (the wire that connects the biCoder to the valve). • **Short Circuit Valve** – Indicates a failed solenoid or valve wires. • **Over Current Valve** – Indicates a failing solenoid or multiple valves connected to a device that exceed the maximum current draw. • **Check Sum Error** – Remote – Indicates an address conflict. Grounded wires caused by failing insulation or nicks or cuts in the insulation may also cause

	this fault. Run the Detailed Test All Zones from the System Self Test tab of the System Diagnostics interface.
	• **High Communication Voltage failure** – A poor quality or high resistance two-wire system caused by poor connections or excessively long wiring runs between the Remote Base Unit and the biCoder.
	• No 24 Volt AC on a 12- or 24-valve biCoder – Indicates that the power plug is not connected or the inline fuse (on the circuit board) is blown.

biSensor™ Troubleshooting

Test Steps	In the System Diagnostics interface, click the **Base/TwoWire** tab, and then click the **Base # Test** button (where the # represents the number of the Remote Base Unit that you want to test). If test fails, refer to Remote Base Unit Troubleshooting.
	Run the **Quick Test All Zones** from the **System Self Test** tab of the System Diagnostics interface. Note any failing zones.
	In the upper right of the System Diagnostics interface, click the arrow in the **Select Zone to Start Test** field, and then click the biSensor that you want to test. The results display in the IO Event Display pane. The following messages are possible:
	• **No Response from Remote Unit** - failure may indicate that a wire may have failed. Refer to Wire Troubleshooting.
	• **Zero Moisture Reading** – Indicates a cut or damaged sensing unit requiring replacement.
	• **Check Sum Error** – Remote – Indicates an address conflict. Grounded wires caused by failing insulation or nicks or cuts in the insulation may also cause this fault. Run the Detailed Test All Zones from the System Self Test tab of the System Diagnostics interface.
	• **High Communication Voltage failure** – A poor quality or high resistance two-wire system caused by poor connections or long wiring runs between the Remote Base Unit and biCoder.

General Troubleshooting

Problem	Symptoms /Cause	Possible Fixes
System activates valve and shows that it is watering but no water comes on.	Water may be turned off or the valve is faulty or clogged.	• Make sure water is turned on to Master valve. • If the solenoid for the problem zone is buzzing or clicking, check valve diaphragm and solenoid.
Errors are reported on zones and watering is intermittent.	Bad or marginal wiring or connections is usually the cause of this problem.	• Check wiring using the Baseline Wire Tester (Model #BI-WIT). • Check connections. If in doubt, cut out the connection and reconnect. • Test the common ground wire to the earth ground. Resistance should be greater than 1M ohms. • Check the common wire. Apply voltage to a valve (turn on valve). Attach a voltmeter negative (-) lead to the common and the positive (+) lead to the power or hot wire. If there is no voltage, take the voltmeter negative (-) lead and put in ground. If there is voltage, then the common is bad.
Valve is turned on when it should not be.	Valve has been turned manually in the field. Valve is accidentally wired to the two-wire path.	• Check valve and wiring in the field.

Wire Troubleshooting – The Ultimate Frustration

Wiring problems can be very frustrating. A good process is critical in making continual progress and in isolating the problem. The root of many problems on existing installations is poor wiring, including broken insulation, inadequate connections, and patches on top of patches.

WARNING! Corrosion is caused by electricity leaking from the wire into the earth. Broken insulation, nicked insulation, non-waterproof connections contributes to this leakage, which will corrode wires and inevitably cause a wire failure. Some failures will occur sooner than later. The two-wire is on all of the time and therefore has electricity constantly running through the entire wire length. In the state, it is critical to prevent leakage because corrosion happens quickly. When wire is grounded, the system will lose voltage and the signal quality will degrade.

Testing Wire with Baseline's Wire Integrity Tester

Using Baseline's wire integrity tester, you can test the integrity of existing wire that is being considered for use in a Baseline system. Wires that are part of the biLine communications system must have low resistance and must not have any electrical leakage to earth ground. Wires that do not have an electrical path to earth ground will not corrode.

1. Disconnect the wire to be tested from all other connections at both ends of the wire; otherwise, you will be testing both the wire and other connected devices.

2. Connect the black wire from the tester to the wire to be tested.

3. Connect the green wire to earth ground.

   Note: A twelve-inch screwdriver stuck into moist ground works well.

4. Press TEST and observe the results:

   - LED ON = good wire that is suitable for use in biLine communications.

   - LED OFF = wire has excessive leakage to earth ground and cannot be used in biLine communications.

   Note: You can test the batteries in the wire integrity tester by pressing the TEST with the test leads open or unconnected.

12 – REFERENCE

Backing Up Your Data

The BaseStation 6000 system gives you an amazing amount of control over your watering system. If you have a large system, you will spend many hours of valuable time setting up the BaseStation 6000 system and fine tuning it to precisely meet your watering needs. Even though we do not anticipate software or hardware failure, and we do all that is possible to minimize the potential, failures do sometimes happen. Replacing the computer or a part of the computer is a very simple task. If you have made a habit of backing up your system, then recreating your programming, watering history, and other system configurations can also be a very simple process. On the other hand, if you have not backed up your system on an external device, you will experience significant downtime.

PLEASE BACK UP YOUR SYSTEM REGULARLY

To back up your system

1. On the Main Page of the BaseStation 6000, click the **Information** tab to activate the Main Menu.

2. Click the **File** menu.

3. Choose one of the following options from the **File** menu:

   - **System Backup** – This option makes a backup copy of your configuration and stores the files on the computer that is running the BaseStation 6000 software.

     Note: While the System Backup option is useful, these backup files might not be available if the computer's hard drive were to fail. For that reason, it is recommended that you periodically back up your configuration using the Removable System Backup option.

   - **Removable System Backup** – This option displays a dialog box that enables you to designate a location for your backup. If you insert a flash drive (also called a USB drive or a thumb drive) into one of the USB ports on the computer, you can back up directly to it. This option enables you to keep your backup in a secure location.

To restore the system from a backup

1. When the computer is connected and the BaseStation 6000 software is running, verify that the backup files are in the following directory:

   C:\xTrol\Irrigation\Programs\SystemBackups

2. If the files are not there, copy and paste them from the removable system backup.

3. On the Main Page of the BaseStation 6000, click the **Information** tab to activate the Main Menu.

4. Click the **File** menu, and then click **System Restore**. The Open dialog box displays the list of files in the SystemBackups folder.

5. Use the scroll box on the right side of the window to move through the list of files until you find the file named System Backup.Cfg

6. Click that file once to select it, and then click the **Open** button. Your configuration is restored from the backup file and the system is ready to use again.

System Adjustments – Reference Guide

The Baseline 6000 system is capable of many different watering strategies. This section describes in detail the different options available. It is highly recommended that operators read through this section before setting up any watering strategies. An understanding of the different ways the system can be set up will be beneficial when deciding on setting site parameters.

There are many features built in to aid in management of the system, from automatic to user defined adjustments. The following list can be used as a quick reference to determine the best method to accomplish different tasks.

Tip: "Utilities," "Manual," "File," "Maps" and "Window" refer to the options on the Main Menu on the Main Page. "Programs" button is located in the lower left corner of the Main Page.

Adjustments that Affect the Entire System

Adjustment	How to Access in the Software	More Information
Set the number of valves the system can activate	Base Unit tab > Total Active Zones check box	page 11
Enable system adjustment of watering based upon day intervals or percentages	Seasonal Adjust menu > Adjust	page 47
Set flow limits that will shut down system if exceeded	Flow menu > Configure Flow Sensors	page 20
Shut down the system for a set amount of time if the rain switch is activated	Rain/Pause menu > Configure > Pause/Rain – This Base tab	page 18
Shut the system down for a set amount of time	Utilities menu > Rain shutdown	page 49
Shut the system down for an indefinite amount of time	Utilities menu > Seasonal Shutdown	page 48
Enter a weather adjustment factor	Adjust Zone tab > Weather Adjust Factor field	page 41
Add a Remote Base Unit	Base Unit tab	page 11
Backup and System Restore	File menu > System Backup / System Restore	Page 111

Adjustments Made Per Remote Base Unit

Adjustment	How to Access in the Software	More Information
Configuring biCoders	Config Zone tab	page 15
Configuring biSensors	Config Sensor tab	page 21
Number of Active Zones	Base Unit tab > Base & Device fields	page 11
Site Map	Maps menu > Site Map	page 78

Adjustments Made Per Program

Adjustment	How to Access in the Software	More Information
Set a day when program will not water	Programs menu > Schedule Events > Schedule Events tab	page 45
Set restricted watering day cycles	Programs menu > Water Window > Watering Days tab	page 33
Set how many zones can be active per program	Programs menu > Water Window > Water Window tab	page 30
Create start/stop conditions	Programs menu > Start/Stop Conditions > Start/Stop Conditions tab	page 49
Change all zones in a program	Window menu > System Parameters > Program/Valve Editor tab	page 53

Adjustments Made Per Zone

Adjustment	How to Access in the Software	More Information
Set the ratio the linked zones will water. The ratio is based upon the primary zone it is linked to.	Config Zone tab > Device Mode > Linked option Adjust Zone tab > Total Min On field	page 29
Reorder zones	Config Zone tab > Zone Reorder	page 30
Assign zones numbers to create an order to which the zones will be tested	Config Zone tab > Walk Around Order	page 74
Set projected GPM per zone	Config Zone tab > FlowZone column > GPM field	page 62
Configure new devices and assign descriptions	Config Zone tab Config Sensor tab	page 15 page 21
Manual zone watering	Manual > Manual Run Zones	page 73

Adjustments Made Per Hydrozone (Adjustments Made to Sensors and Auto Zones)

Adjustment	How to Access in the Software	More Information
Assign maximum number of days between watering	Adjust Zone tab > Day Interval field	page 32
Set soak cycle for Hydrozone	Adjust Zone tab > Soak Cycle Adjust fields	page 39
Set watering strategies	Adjust Zone tab > Zone Graph buttons	page 41
Assign zones to programs	Config Zone tab > Prog# field	page 15
Set the mode of the zone	Config Zone tab > Device Mode drop-down list	page 15
ET Parameters	Adjust Zone tab > Adjust button View ET Parameters	page 55

Address Usage in the BaseStation 6000

In the BaseStation 6000 Site Controller there are different address blocks associated with the different types of two-wire devices (biCoders) that can be connected to the system. Below is a basic list of the different address blocks and what can be assigned in each. Each individual Remote Base Unit will have its own list.

Address Range	Two-wire devices that can be assigned
1 – 199	Valve activating, two-wire devices (biCoders). This address range includes any device that is assigned on the Config Zone tab.
180 – 199	Start/Stop devices that are assigned on the Config Zone tab
200	Tipping Rain Bucket
201 – 225	biSensors
230 – 237	Pause and Rain sensors
238 – 250	Flow devices
254	Air Temperature Sensor. This sensor can only be configured on Remote Base Unit 1.

Water Auditing

The purpose of a water audit is to determine how much water is being applied to a zone in a certain amount of time. This information is useful for setting the watering times (duration) and days between watering cycles (interval) while the biSensors are being "watered" in. Below is an explanation of how to perform an audit and how to set the initial times.

A water audit, to be very accurate, should include all zones. However, for this application, an audit of just a few zones with different heads (spray and rotor) can give you a general idea of how much water is being put down by the different sprinkler head types.

To audit a zone and set initial watering times

1. Set 3 or more flat bottom cans or mugs at various places in the zone. Place them at least 4 feet from the sprinkler heads.

2. Turn on the sprinklers for 15 minutes.

3. Measure the depth of water in each can and find the average depth in all cans.

4. Using the table below, first look up the water depth in the top row. Select the present season and find the number of minutes suggested to water. This value (along with the suggested day interval) will be used to set initial watering times for each Automatic zone.

Note: The time for rotor zones will be very different than popup zones.

Water Depth in cans (inches)	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
Spring (water every 4 days)	52	34	26	20	17	13	10	9	6
Summer (water every 3 days)	104	69	52	41	35	26	21	17	13
Fall (water every 3 days)	69	51	39	31	26	19	15	13	10

Source: State of Utah Division of Natural Resources.

Note: These values are guidelines only. They are representative of Kentucky Blue type grasses in moderate climates. Southern climates with Bermuda type grasses may not fall into these watering categories and may require different times. During the "watering in" time for the biSensors, it is best to err on the wet side. After the biSensors take over, it is much easier to maintain a desired moisture level.

Zone Group Organizer Worksheet

Example

			Project Name		
Zone	**Sprinkler Type**	**Zone Type**	**Zone Description**	**Serial #**	**Notes**
1	na	Sensor	North Lawn Middle		
2	P	Automatic	Same		Old zone #4
3	P	Slave	NE Lawn Popups		Old zone #12
4	P	Slave 2	N Lawn Perimeter Popups		Old zone #7
5	P	Slave 2	NE Lawn middle popups		Old zone #5
6	P	Slave 2	NE Lawn perimeter popups		Old zone #3
7	P	Slave 2	Front entrance popups		Old zone #8
8	P	Etc.			
9			Blank zone		
10	na	Sensor	South lawn		
11	R	Automatic	Same as sensor above		Old zone #6
12	R	Slave	South lawn middle		Old zone #13
13	R	Slave	SE lawn		Old zone #9
14	R	Etc.			
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Sprinkler Type Key: P = popup, R = rotor, B = bubbler

Project Name					
Zone	Sprinkler Type	Zone Type	Zone Description	Serial #	Notes
1		Sensor			
2		Master			
3		Slave			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Sprinkler Type Key: P = popup, R = rotor, B = bubbler

# Calculating the Application Rate for Dripper or Bubbler Zones

In zones watered by spray heads or rotors, the application rate is typically given in inches of water applied per hour. However, in drip systems, application amounts are given in gallons per hour (GPH) or gallons per minute (GPM) rather than inches.

In order to configure a dripper or bubbler zone for ET in the BaseStation 6000 system, you need to convert the application rate in that zone from GPH into inches per hour. Follow the steps below to complete the conversion.

1. Measure the area that the dripper zone covers, and then convert that measurement to square feet. In the example below the zone measures 5 ft by 10 ft.

    Use the following formula to calculate **square feet**:

    $$5\,ft \times 10\,ft = 50\,ft^2$$
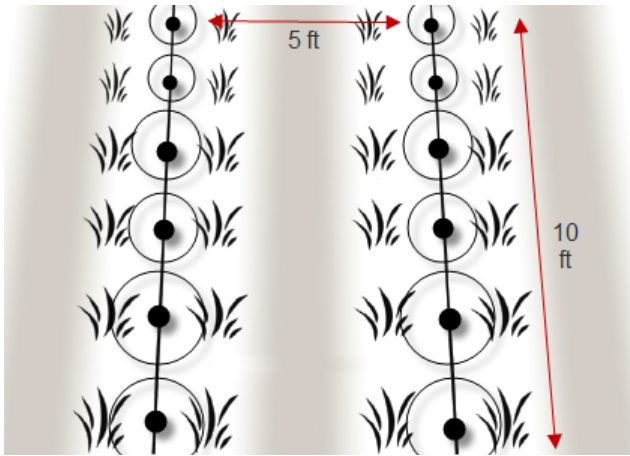
8. Count the number of emitters within that area, and then calculate the number of emitters per square feet. In the example there are 12 emitters.

    Use the following formula to **calculate the number of emitters per square feet** in the zone (in other words, one emitter covers this much area within the zone):

    $$\frac{12\,emitters}{50\,ft^2} = 0.24\,\frac{emitters}{ft^2}$$

9. Find the **application rate of the emitters**. In this example, it is 0.9 GPH.

10. Convert the application rate to **cubic feet per hour** using the following formula:

    $$0.9\,GPH \times \frac{1\,ft^3}{7.48\,gal} = 0.12\,\frac{ft^3}{hr}$$

11. Take the cubic feet per hour (0.12) and divide by the emitters per square foot (0.24) to get **feet per hour** applied.

    $$\frac{0.12}{0.24} = 0.5\,\frac{ft}{hr}$$

12. Convert the feet to inches.

    $$0.5\,\frac{ft}{hr} \times \frac{12\,inches}{ft} = 6\,\frac{inches}{hr}$$

    In this example, the system delivers 6 inches of water per hour.

Glossary of Terms

address: When a device is attached to a Remote Base Unit and added to the BaseStation 6000 software, the device is given an address. In the BaseStation 6000 Site Controller, there are different address blocks associated with the different types of two-wire devices (biCoders) that can be connected to the system. Refer to Address Usage in the BaseStation 6000 on page 114.

air temperature sensor: A sensor that functions like thermometer to measure the temperature of the air and report this measurement to the controller by way of a decoder

application rate: The rate at which water is applied to an area within the landscape by an irrigation system. In order to determine proper duration of watering, it is essential that you know the application rate for each watering zone.

auto-calibration: The controller is able to determine the water holding capacity (field capacity) of soil when using biSensor based watering strategies.

auto zone: A zone in your irrigation system that is connected to a sensor and uses the sensor readings to control how it waters. The auto zone is configured in the BaseStation 6000 software.

backbone: The backbone is a unique wiring system, independent of any other wiring configurations. Backbone refers to the wiring topology and not to a specific type of wire.

Baseline Mobile Access™: An upgrade the BaseStation 6000 system that turns any web-enabled cell phone or other mobile device into a remote control and gives you full access to your BaseStation 6000 system

biCoder™: A Baseline two-wire decoder connected to the two-wire path activates valves by decoding signals sent from the Remote Base Unit.

bi-directional communication: See two-way communication

biLine™ protocol: Baseline's proprietary two-way communication standard that operates over two-wire irrigation wiring

biSensor™ Soil Moisture Sensor: A sensor that is buried in the soil. It provides soil moisture and temperature data to the Baseline BaseStation Controller.

Bridge Unit: When your system includes more than one Remote Base Unit, the Bridge Unit is located between the BaseStation 6000 computer and the Remote Base Units.

central control system: An irrigation system that has a master controller (often a running on a computer) that tells the valves at remote locations to open and close. The BaseStation 6000 is a master controller that relays commands to the Remote Base Units, which, in turn, relay commands to the valves.

conventional irrigation wiring: A wiring system that requires each individual valve to be wired to the controller and requires one "common" or "ground" wire from the controller to each group of valves. Conventional wiring transmits only power.

cycle time: The amount of time needed for the system to complete a watering cycle and a soaking cycle.

decoder: A device that interprets the signals that it receives from the controller and tells the valve to turn on or off.

distribution uniformity: A measure of how uniformly water is being applied by an irrigation system

effective root depth: The length of the section of dense plant roots below which there is limited root activity. The plant draws most of its water and nutrients from the effective root zone. Different plants have different effective root depths, and their root structures vary from time to time during their growth.

ET-based watering: A watering methodology that uses the principles of evapotranspiration to water when needed rather than on an established schedule.

Ethernet: A computer networking technology that connects devices with a cable and then allows those devices to send information to and receive information from each other.

ETo: See reference ET

evaporation: Loss of water as vapor from the soil surface or from moisture on the surface of a leaf. Differs from transpiration in that the water does not pass through the plant parts.

evapotranspiration (ET): The process of transferring moisture from the earth to the atmosphere by evaporation of water and transpiration from plants.

field capacity: When soil moisture content is at this level, it means that all excess moisture has drained freely from that soil. The amount of remaining moisture is the field capacity.

field controller: An irrigation controller that is located in the field close to the valves as opposed to a master controller that is located away from the valves.

firmware: Computer programming code that is permanently stored in the read-only memory of a device

Flow biCoder: A specialized decoder that is built into Baseline's flow devices such as flow meters or flow sensors

flow device: A device such as a flow meter or flow sensor that is used to monitor the flow of water in an irrigation system

flow node: Part of your irrigation system that is differentiated from other parts by its piping structure.

flow zone: The group of zones in your irrigation system that is monitored by a flow meter. If you install multiple flow meters on your system, you will have multiple corresponding flow zones.

GPH: The abbreviation for gallons per hour

GPM: The abbreviation for gallons per minute

Hargreaves Evapotranspiration Equation: A mathematical formula that requires only measured temperature data to predict net evapotranspiration. This equation was developed by George H. Hargreaves (Research Professor Emeritus, International Irrigation Center, Dept. of Biological and Irrigation Engineering, Utah State University, Logan, Utah).

hydrozone: A grouping of plants that have similar water requirements and can be watered the same.

IP address (Internet Protocol address): A number assigned to each device that is participating in a computer network that uses the Internet Protocol for communication.

inches per hour: The application rate for zones that are watered by spray heads or rotors

infiltration: The process by which water passes through soil – the liquid permeates the soil by passing through the pores in the soil

Intelligent Soak Cycle™: When a zone waters using an Intelligent Soak Cycle, the total watering run time includes periods of watering interspersed with periods of soak times, or non-watering times. Baseline's Intelligent Soak Cycles™ prioritize cycles for zones that have already started to water over zones that have not started in order to maximize watering efficiency and minimize total irrigation time.

K value (also known as **K-Factor**): A calibration factor for a flow device expressed in pulses per unit volume. The K value is used to calibrate the volumetric throughput of a flow device. Manufacturers give the K value (or K-Factor) of their flow device in the device specification.

linked zone: A zone that runs at the same interval as a primary zone

lower threshold: If you are using soil moisture sensors to control watering, the lower threshold is the point at which the soil water content is low enough to start watering.

master valve: An automatic or manual valve installed at the supply point which controls the water flow into the system's mainline piping

maximum allowed depletion (MAD): When the soil moisture content reaches this level, irrigation needs to start. In most cases, the maximum allowed depletion level is just before the plants begin to show visible signs of stress.

mesh radio: A wireless communication network made up of radio nodes in which there are at least two pathways of communication to each node.

microclimate: The climate of a specific location within a landscape. Variations in climate are influenced by subtle differences in temperature, humidity, and wind exposure. Microclimates can have a significant impact on plant water needs.

offset value: A calibration factor for a flow device that compensates for limitations in the device's ability to measure small signals adequately. Manufacturers give the maximum amount of offset associated with their flow device in the device specification.

over current (also known as excess current): A situation where a greater-than-intended electric current is supplied due to short circuits, excessive load, and/or incorrect design.

pause device: An electronic device that can be configured to suspend watering based on specific conditions. The BaseStation 6000 accommodates a variety of pause devices including those that monitor wind, rain, air temperature, flow, or pressure. You can also configure an outside operation button that will pause the system from a remote location.

Penman-Monteith Evapotranspiration Equation: A mathematical formula that requires daily mean temperature, wind speed, relative humidity, and solar radiation to predict net evapotranspiration. This equation was developed by Howard Penman and John Monteith.

permanent wilting point: When soil moisture content reaches this level, plants can no longer get water from the soil, and they will wilt and die.

pore: In soil, a space between mineral particles that allows water to infiltrate into the soil.

powered decoder: A decoder device that interprets the signals that it receives from the controller and tells the valve to turn on or off. A powered decoder is designed to retrofit into existing systems and requires 120 VAC service at installation location.

precipitation rate: See application rate

primary zone: a zone in your BaseStation 6000 system configuration that is at an address with a lower number than the other linked zones within the same hydrozone. For example, if zones 1 – 50 are in one hydrozone, zone 1 would be the primary zone. The zone is configured as either Auto or Timed.

rain gauge: A type of rain sensor that collects and measures rain water. This sensor can be configured to halt watering based on a specific amount of rain received.

rain sensor: A device that detects rain and can be configured to halt watering. A rain gauge and a rain switch are two types of rain sensors that can be configured in the BaseStation 6000 system.

rain switch: A type of rain sensor that uses hydroscopic discs to detect rain and halt watering. When the discs dry out, the irrigation system is ready to water again.

reference ET (ETo): A factor used to adjust ET-based watering for a specific site. Reference ET is typically calculated based on inputs from weather sensors and data for a reference crop such as Kentucky bluegrass.

Remote Base Unit™: A component of the BaseStation 6000 system that manages an electrically isolated irrigation sub-system and is able to support 200 valves

run time: The total time that a zone is watering. In an Intelligent Soak Cycle, the total watering run time is calculated by multiplying the minutes for each watering cycle by the number of cycles.

runoff: When the soil moisture content is at the saturation level, any excess water from rain, snow melt, or irrigation drains to a low point in the landscape.

saturation: When the soil moisture content is at this level, nearly all of the spaces between soil particles are filled with water. After a soil has reached saturation, it does not become more saturated; although, in some situations where water is trapped, it can become flooded.

scheduling group: The primary zone and the other linked zones within a hydrozone. This group of zones can be watered on the same interval.

serial port: A type of external connection on a computer. The external connector for a serial port can be either 9 pins or 25 pins. Devices are connected with a serial cable.

soak time: In an Intelligent Soak Cycle, soak time is interspersed with watering time in order to prevent runoff.

software: Computer programs and related data that instruct a computer what to do and how to do it.

soil-moisture content: The ratio of the volume of contained water in a soil compared with the entire soil volume.

soil-moisture deficit: When soil dries (for example, by evaporation), the measurable shortage of water in the soil is known as the soil-moisture deficit. It also refers to the amount of water needed to return to field-capacity moisture content**.**

soil moisture sensor: See biSensor™ Soil Moisture Sensor

smart controller: Irrigation controller that uses ET information to water when needed and to make seasonal adjustments of run times

time domain transmission (TDT): A measurement of how much the electrical signals in the soil are slowed down by the presence of water

timed zone: A mode in the controller software that configures a zone to be watered on a timed schedule rather than on a smart irrigation schedule

transpiration: The loss of water vapor from parts of plants. Water is lost primarily from the pores on the leaves but also from stems, flowers, and roots.

two-way communication: In a Baseline irrigation system, the controller sends a command over the two-wire to a biCoder. The biCoder then lets the controller know that the command was received and understood. If the biCoder does not respond, the controller knows that there is a problem, and it will alert you. Most competing two-wire systems do not implement two-way communication.

two-wire irrigation wiring: Wiring that replaces the typical bundle of conventional irrigation wires with just two wires. In a two-wire irrigation system, only one valve needs to be connected directly to the controller, as opposed to every valve in a conventional system. In addition to transmitting power, a two-wire system can also transmit data.

upper threshold: If you are using soil moisture sensors to control watering, the upper threshold is the point at which the soil water content is high enough to halt watering.

valve: A device that opens to allow water to flow to the sprinkler heads or emitters in a zone. It closes to halt watering for that zone.

water budget: In the BaseStation 6000 system, the water budget functionality enables you to define and track the total flow for each Flow biCoder per month. You can configure the target flow value in GPM for the Flow biCoder and how the system will react when this number is reached.

water window: The time available for watering through an irrigation system. Typically, all days and times would be available for watering unless there are watering restrictions or you need to set aside a time for mowing.

weather station: Meteorological sensors that monitor weather conditions and send data to a computer.

Wi-Fi: A method for wirelessly connecting electronic devices

zone: A designated area of landscaping that is watered by a specific valve

Warranty Information

Baseline's warranty obligations are limited to the terms set forth below:

Baseline warrants to the original consumer purchaser that new Baseline System and components will be free from defects in material and workmanship for the Standard One Year Warranty Period. The Baseline biSensor™ as well as 1, 2 and 4 valve biCoders will be free of defects in material and workmanship for a Five Year Warranty Period. The start of the warranty period is the date of installation of the system or component. For replacement irrigation components, the warranty on the replacement component is the remainder of the warranty on the original component, or 90 days, whichever is longer.

If the customer discovers a defect, contact your Baseline product installer, or Baseline Inc.

Baseline will, at its option, repair or replace the component at no charge to the customer, provided it is returned during the warranty period, with transportation charges prepaid, to Baseline Inc. in Boise, Idaho. Baseline will pay return shipping of its choice. Base Stations and displays must be properly packaged in the original packaging or Baseline approved packaging to obtain warranty service.

For warranty service, contact Baseline at 1-866-294-5847 to obtain a "Return Merchandise Authorization" (RMA) number. A copy of the receipt or a bill of sale bearing the appropriate Baseline serial number and model number may be required for warranty service.

Warranty Exclusions: normal wear and tear, abuse, unreasonable use, mistreatment, or neglect. Damage caused during installation or incorrect installation, damage caused by modification or repair not made or authorized by Baseline whose Manufacturer's Serial Number and/or Material Number label have been removed, torn or defaced, damage caused by use of non-Baseline packaging, damage caused by improper or improperly used packaging.

THIS WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, WHETHER ORAL OR WRITTEN, EXPRESSED OR IMPLIED. BASELINE SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND AGAINST INFRINGEMENT. No Baseline dealer, agent or employee is authorized to make any modification, extension or addition to this warranty.

BASELINE IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOSS OF DATA, LOSS OF PROFITS, DOWNTIME, GOODWILL, DAMAGE OR REPLACEMENT OF EQUIPMENT AND PROPERTY.

Some states do not allow the exclusion or limitation of incidental or consequential damages or exclusions of implied warranties, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may have other rights that vary from state to state.