OCTOPUS 4000

Aquatic monitor, control & alarm system

PROGRAMMING THE H_2O/S SOFTWARE

Version 1.0

AQUADYNE

First Edition
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Programming the Software

Your Octopus 4000 includes the latest version of the H_2O/S software which was pre-loaded into FLASH memory at the factory prior to shipment.
For additional information pertaining to the latest software release, visit our WEB page: ***http://www.aquadyne.com***

For this part of the installation process, we recommend that you have your laminated Quick Reference Menu Map card at hand to follow along with the description. This will familiarize you with the Quick Reference card as well as introduce you to the use of the Octopus 4000 software menus. See detailed Octopus 4000 Menu Mapsat the end of this guide.

Menu Structure/Keypads

Directional arrows on the membrane keypad are used to move horizontally across a given menu level. The “Enter” key is used to move down the menu map or to make a selection.

The user should return to the Current Status Display after entering any sub-menus.

Structure of OCTOPUS Menus

Top Level Display

All software menus and data entries are viewed through the LCD Screen Window on the face of the Octopus 4000. The screen typically shown in the window is the Current Status Screen. Current temperature, pH, ORP and conductivity values scroll across the top line of this screen. Activated control system(s) and/or alarm(s) are displayed on the lower status line of this screen providing up to date system status. Up to 16 events are saved and displayed in sequence.

The Current Status Screen is only one of several screens that comprise the Top Level Display. Side One of the Quick Reference Menu Map shows all available Top Level Displays.

To scroll through the Top Level Display, simply push the right or left arrow on the keypad. The screens will be shown in the order indicated on the Menu Map.

Figure 2.1 shows the current status window.

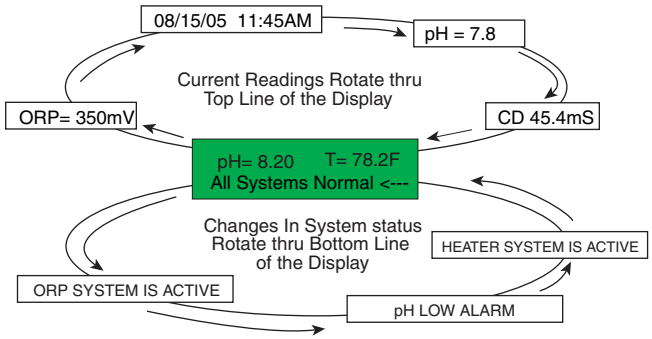


Figure 2.1 Current Status Window

Main Menu

The Main Menu is comprised of three primary sub-menus.

- Setpoints Menu (Submenus - setpoint, control, dose & dwell programming)
- Operation Menu (Submenus - control enabling, probe calibrate, password lock, IR printer, clear clean probe message)
- Setup Menu (Submenus - test, set module ID, new password, temp scale, timers, alarm, datalogger, wave-maker, pager, conductivity and digital input)

These menus are the first level down from the Current Status Window (with system hold disabled). To enter the Main Menu, simply push the Enter key from any position on the Current Status Window. The Setpoint Menu will always be the first main menu display from the Current Status Window. From here, using the right or left arrows on the keypad membrane, you can scroll left or right through the Main Menu.

Follow the required programming steps listed in Table 2.1 for your application.

Initial Software Setup	Menu	Monitor	Monitoring & Control	Monitor, Control & Alarm
9. Set system clock	Setup	✓	✓	✓
10. Enter protective password	Setup	Optional	Optional	Optional
11. Select conductivity temp comp setting	Setup	Optional	Optional	Optional
12. Select conductivity range(uS/mS)	Setup	✓	✓	✓
13. Select temperature scale(F/C)	Setup	✓	✓	✓
14. Enter setpoint & control ranges & pH & cond dose & dwell times	Setpoint	✓	✓	✓
15. Enter alarm range values & hold-off timer & enable water parameter alarms	Setup	✓	✓	✓
16. Set up digital input alarm	Setup	NA	NA	✓
17. Setup lighting/timer system	Setup	NA	✓	NA
18. Setup wave maker system	Setup	NA	✓	NA
19. Setup system hold	Setup	NA	✓	
20. Assign system control addresses	Setup	NA	✓	✓
21. Setup pager alarm system	Setup	NA	NA	✓
22. Enable system control	Operations	NA	✓	✓
23. Test system control/timer configuration	Setup	NA	✓	✓

Table 2.1 • Initial Software Setup

Step 9—Set the System Clock

Setup →Timer→Set Date/Time

The Octopus 4000 is equipped with an internal clock that includes its own battery source. As a result, you won't need to set the clock in the event of power failure. See *Operation And Maintenance guide* regarding recommended battery replacement.

Data is loaded in the following order: First, the month (01=January, 02=February. . ., 12=December), then the day of the month, and finally the last two digits of the year i.e. "05/16/07" for May 16, 2007. The controller will prompt you to verify the date before continuing to enter the time. If you answer NO to the question "Correct?," then you have an opportunity to re-enter the date.

Next, enter the time in a 12-hour format. After the time is entered you are again given the opportunity to verify that what you entered is correct. If you answer NO, then you will be given another opportunity to enter the time.

Step 10—Enter & Enable Protective Password

Setup →New Password
Operation→Lock-Unlock

The use of a password will protect your controller from unauthorized use. Anyone attempting to use the controller will not be able to enter the Main Menu without entering the correct password. Your password may consist of up to five characters, letters and/or numbers. You may choose not to utilize the password protection by not entering any password and move to the next setup procedure.

If activated, when pressing Enter at the Current Display Window, you will be prompted to enter your password. To do so, push the arrow until the first character you desire appears, then push enter. Follow this process for the remaining characters of your password. If your password has less than five characters, push enter a second time to signal that your password is complete. You will be prompted to enter the same password a second time to ensure that the password has been entered correctly. When your password has been entered and verified the LCD Screen returns to the "Exit Password" Screen.

In order to activate your password selection go to the Operations Menu, press Enter, then scroll using the arrows to the "Lock-Unlock" menu. Push Enter and the display will show "Lock Now." Push Enter and you have activated the password.

If you have forgotten your password, email support@aquadyne.com. Please provide the serial number of your controller.

Entering "AQDYN" at the new password prompt will display the system serial number and the version of H_2O/S software installed in the Octopus. This information will be required should you need to contact technical support for any reason.

Step 11—Select Conductivity Temperature Compensation

Setup →Cond. → Temp. Comp.

Programmable: 0.00% to 5.0% °C.

Temperature affects conductivity readings. Therefore a temperature compensation adjustment is provided. This adjustment allows you to artificially adjust the conductance reading in percent per degree Celsius from 0 to 5% per °C. As a general rule, an adjustment of 2-3% is common for the water environment.

NOTE: You can test the required percent adjustment setting by using water temperatures of known conductivity value and observing the conductivity readings. The readings should stay constant as the water changes temperature.

Step 12 - Select a Conductivity Range

Setup →Cond. → Set Range

Programmable : low range (0-1000 μS microsiemens) or high range (0-100 mS millisiemens)

The conductivity range menu allows you to set the appropriate conductivity scale. This is important since the conductivity range of water varies greatly depending on the application. Saltwater, for example, ranges from about 45,000 to 55,000 μS (45mS- 55mS), whereas freshwater conductivity is typically between 800 and 1,500 uS, depending on the water source. Other applications vary across a broad range as well, depending on the crop and the stage of growth.

You will need to select the conductivity scale that is appropriate for your system. The conductivity scale choices are 0-1000 μS (low range), or 0-100 mS (high range). The first scale is a much more sensitive scale since it reflects changes in conductivity of only one microSiemen (1μS). The second scale is less sensitive and reflects conductivity changes in increments of 100 μS.

Step 13—Select a Temperature Scale

Setup →Temp. Scale

Programmable : Celsius or Fahrenheit

The Octopus 4000 controller is set to Fahrenheit at the factory.

Changing the temperature scale automatically recomputes your setpoints. Iif your setpoints were entered in Fahrenheit and you change the temperature scale to Celsius, all of your setpoints will automatically be converted to their Celsius equivalents.

Step 14—Enter Setpoint and Range Values

Setpoints, control and alarm ranges must be programmed for each water parameter system you wish to control and/or alarm.

Programming these three values are covered in Steps 14 & 15:

- The optimal setpoint value (Step 14).
- The control range (Step 14).
- The alarm range (Step 15).

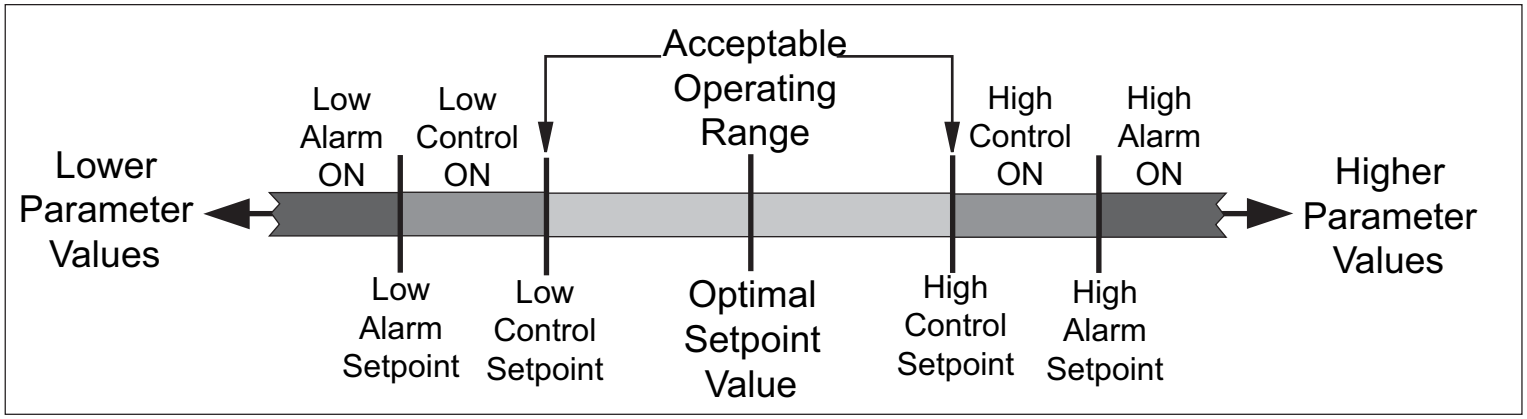
When these three values are entered, the system will operate as illustrated in Figure 2.2. As long as the water quality parameter remains within the acceptable operating range, no control or alarm will be activated. If, however, the parameter rises above or falls below the acceptable operating range, the Octopus 4000 will activate the appropriate control device. (Control system must be properly configured and programmed - steps 4, 5, 20 and 22). The control system remains activated until the parameter returns to the Setpoint value. (For ORP, the control device remains activated until the ORP value returns to the HIGH control point.) If alarm system(s) is enabled and parameter goes outside of the control range an audible alarm, pager alarm or email alarm will occur. Please note the high and low alarm trigger points are computed by adding the control value and the alarm value to the setpoint value. See ORP alarm section for exception. See Step 15 for complete instructions on programming alarm ranges.

Entering Data on the Setpoints Menu

Setpoints→Temp. Setpoint→Temp. Setpoint Range
→ORP Setpoint→ORP Setpoint Range
→pH Setpoint→pH Setpoint Range
→Cond. Setpoint→Cond. Setpoint Range

Conductivity and pH setpoint menus contain low & high control dose and dwell times. The dose and dwell times prevent overdosing a system, prevent raising or lowering a water parameter value too quickly and protects against “short cycling” of equipment.

Enter the setpoint menu from any position on the Top Level Display by pressing Enter. Scroll left or right using the arrows until you arrive at the desired parameter. Press Enter. Use the right or left arrow until the desired setpoint is displayed, push Enter once to register your selection. Table 2.1 shows which programming steps you should follow for desired monitor, control and alarm functionality.



Figures 2.2 Control Systems Setpoint, Control and Alarm Ranges

Pushing the right arrow will increase the setpoint value and pushing the left arrow will decrease the setpoint value. When the desired value is displayed, push the Enter key to select it.

As you choose a setpoint value, check the System Status light. The light should be solid green. If the light turns yellow as you are selecting your value, the setpoint is out of the normal value range for that parameter. Adjust the setpoint accordingly.

Enter a setpoint range (+/- value). The Octopus 4000 will add/subtract this value from the setpoint value. If the water parameter system detects a value outside of the optimal range (higher or lower than the setpoint value +/- the control value) the controller will activate any properly configured and programmed control device(s). See figure 2.2.

Parameter status lights on the Octopus 4000 indicate the control status of the water parameter systems. See Figure 1.2 *Installing the Components* for complete information regarding the parameter status lights.

Temperature Setpoints

Setpoint programmable .1° increments:
32°F to 90°F
0°C to 25°C

Setpoint range programmable .1° increments:
0.2°F to 5.0°F
0.1°C to 5.0°C

Set the temperature optimal setpoint value and setpoint range. Steps 4, 5, 20, and 22 must be completed for control functions.

Since most heaters and chillers have their own thermostat, these thermostats can be used as a backup temperature control system. The heater thermostat should be set several degrees above your desired temperature and the chiller several degrees below. If your desired temperature is 78°F then set your heater thermostat at 81°F and your chiller thermostat at 75°F.

The chiller system has a protective feature that prevents the chiller from turning on/off more often than every 10 minutes.

Temperature Example

Suppose you have a setpoint value of 78.2 °F, your target operating range is ±0.1 °F (78.1 to 78.3) and the alarm range is 0.1 °F (78.0 to 78.4). Figure 2.2 illustrates the relationship between the setpoint value, setpoint ranges and alarm ranges.

If the temperature stays within the target operating range (78.1 to 78.3 °F), the parameter status light will remain off and no control devices will be activated. If, however, the temperature enters the control range (below 78.1°F on the low side or above 78.3°F on the high side), the control system will activate.

At the beginning of the control range, the Octopus will turn on the chiller or heater, as needed. These peripheral devices will remain activated to drive the temperature value back to the optimal setpoint, and once achieved, the peripheral device will be turned off.

Conductivity Setpoints

Setpoint programmable: 0.00 to 99.9 mS
0 to 999 µS
(.1mS increments; 1uS increments)

Setpoint range programmable: 0.1 to 10.0 mS
1.0 to 100 µS
(.1mS increments; 1uS increments)

Low & high dose programmable: 0-99 seconds (1 second increments)
Low & high dwell programmable: 1-255 minutes (1 minute increments)

Set the conductivity optimal setpoint value and setpoint range. Steps 4, 5, 20, and 22 must be completed for control functions.

For control applications, dose and dwell times need to be programmed. The dose time is the amount of time a control device is activated to raise or lower the water parameter value. (If during dose time, the water parameter value reaches a value above or below the setpoint value, the dosing will cease.) The dwell time is the amount of time the Octopus is forced to wait to turn back on a control device after its programmed dose time. If after the dwell period, the water parameter value is still outside of the acceptable operating range, the control device will be energized.

Note that if the dose time is set to 0, the dwell time entered will be ignored by the Octopus and any control device will remain active until conductivity value returns to the Optimal Setpoint Value.

Conductivity Example

Suppose that you desire an optimal setpoint value of 45 mS, an operating range of ±5 mS and an alarm range of ±3mS. Figure 2.2 illustrates the relationship between the setpoint value, setpoint ranges and alarm ranges.

If the conductivity value remains within the target operating range (40 to 50 mS) the parameter status light will not be illuminated. If the conductivity value enters the control range (below 40mS on the low side or above 50 mS on the high side), the control system will activate. The control device will operate according to the programmed dose and dwell times.

pH Setpoints

Setpoint programmable in .05 increments:
4.00 to 10.00

Setpoint range programmable in .05 increments:
0.05 to 1.00

Low dose (buffer) programmable: 0-99 minutes
low dwell (buffer) 1-99 minutes
(low dose & dwell programmable in 1 minute increments)

High dose (CO2) programmable: 0-99 seconds
(programmable in 1 second increments)
high dwell (CO2) 1-255 minutes
(programmable in 1 minute increments)

Set the pH optimal setpoint value and setpoint range. Steps 4, 5, 20, and 22 must be completed for control functions.

For control applications, dose and dwell times need to be programmed. To control the pH system, the Octopus can control devices which dose a buffer and/or inject CO_2 gas. The dose time is the amount of time a control device is activated to raise or lower the water parameter value. (If during dose time, the water parameter value reaches a value above or below the setpoint value, the dosing will cease.) The dwell time is the amount of time the Octopus is forced to wait to turn back on a control device after its' programmed dose time. If after the dwell period, the water parameter value is still outside of the acceptable operating range, the control device will be energized.

Note that if the dose time is set to 0, the dwell time entered will be ignored by the Octopus and the unit will continue to dose buffer until the pH returns to the Optimal Setpoint Value.

ORP Setpoints

Setpoint programmable in 5mV increments
0 to 995 mV

Setpoint range FIXED: - 5 mV
(control for low ORP only)

Set the ORP optimal setpoint value. Steps 4, 5, 20, and 22 must be completed for control functions.

The ORP setpoint defines the acceptable level of oxidation reduction potential in your aquatic environment. The ORP level is an indicator of ozone. Acceptable levels are between 200 and 450 mV. The ORP setpoint can be maintained through the use of an ozonizer.

Ozonizer control devices (to raise ORP value) will remain activated until the ORP value returns to the HIGH control point.

Verify All Setpoint Settings

You can easily view the parameter setpoints. From the Top Level Display, simply push either the right or left arrow keys to scroll through the screens. Each successive push of an arrow will display another setpoint until it returns to the current status screen. Push Enter at any time to enter the submenus.

Configuration data such as setpoint , setpoint range values and alarm ranges are stored in permanent (nonvolatile) memory. Should primary or backup power to the Octopus be lost, these values are restored to their previous values when power is restored to the Octopus.

Step 15—Entering Alarm Range & Alarm Hold-Off Timer

General Alarm System

Setup→Alarm→pH Alarm→Disable/Enable
→ORP Alarm→Disable/Enable
→Temp. Alarm→Disable/Enable
→Cond. Alarm→Disable/Enable
→Set Holdoff→Disable/Enable

Temperature, pH, ORP and conductivity alarm ranges are entered in this menu. You must enable the alarm system before alarm ranges can be entered. Enter an alarm range as a +/- value. The high or low alarm trigger points are computed by adding the control value and the alarm value to the setpoint value. If a water parameter value goes below or above these values an audible alarm will occur after the alarm hold off time has expired. The local audible alarm will stop if the water parameter returns to non alarm values. Control devices, if enabled, will continue to function as programmed during alarm conditions. See figure 2.2. Systems with properly configured alarm paging or TCP/IP connections running AquaWeb II with autopoll running, will receive page or email of alarms.

Set the Alarm Hold-off Timer

Setup→Alarm→Set Holdoff

Programmable in 1 minute increments
0 to 99 minutes

The Hold-off Timer provides a delay before any audible alarm, pager alarm, or email alarm is triggered. This is useful to avoid “bounce” by allowing sufficient time for the trend to fully establish itself, thereby avoiding the premature processing of a false alarm. If you select 0 minutes then no delay will occur before an audible alarm is triggered. (Pager and email alarms have an additional optional delay programmed in the Pager Menu). If the Hold-off Timer value is greater than zero, the audible alarm will NOT SOUND until the alarm Hold-off Timer has expired. The lower portion of the Current Status Window will display which system is in alarm and whether its a high or low alarm condition regardless of the hold-off timer value.

To reset the audible alarm you must push the Enter key once on the face of the Octopus 4000. This will terminate further audible and pager alarms for that event. This action will silence the alarm and the alarm will not re-trigger unless the water parameter value returns to the target operating range and then reaches an alarm point again. The current status window, however, will continue to display any alarm condition(s) until the value returns to the acceptable operating range.

We recommend setting the alarm Hold-off period to at least 1 minute when using the pager option. This will avoid spurious pages due to small aberrations about the edge of the alarm range. See Step 21 for complete pager alarming instructions.

Temperature Alarm

Setup→Alarm→Temp. Alarm

Range programmable .1° increments:
0.1 to 3.0 °C/°F

Enable the alarm system and set the alarm range.

As an example, suppose you have a setpoint value of 78.0°F, control range of ±0.1°F, and alarm range ±0.1. If the temperature value drifts away from the target operating range and comes to the control range (lower than 77.9°F or higher than 78.1°F), then the peripheral device (heater or chiller for example), will be activated. If the temperature continues to drift away from the target operating range and comes to the end of the control range (i.e. <77.8°F or >78.2°F), then the heater or chiller will remain active but an audible alarm will be triggered after the expiration of the hold-off period. Also, the current status screen will display the alarm condition.

Conductivity Alarm

Setup→Alarm→Cond. Alarm

Range programmable: 1 to 50 μS
0.1 to 5.0 mS
(.1mS increments; 1μS increments)

Enable the alarm system and set the alarm range.

As long as the conductivity value of the water stays outside the alarm range, (i.e. within the acceptable operating range or control range), the alarm will not be triggered.

In addition to the general conductivity alarm there are two separate conductivity alarm outputs which can be configured from the Operation→Control→Cond. submenu. One for a low conductivity alarm and the other for a high conductivity alarm. When configured and programmed properly these outputs will go active in a low or high conductivity alarm condition.

pH Alarm

Setup→Alarm→pH Alarm

Range programmable in .05 increments:
0.05 to 1.00

Enable the alarm system and set the alarm range.

As an example, suppose your system has an optimum setpoint pH of 8.3 and a target operating range of ±0.10, then the pH has a target operating range from 8.2 to 8.4 pH units. If you set the pH alarm range to ±0.20 pH units, an alarm will be triggered if the pH falls below 8.0 or rises above 8.6 pH units. If the hold-off timer value is greater than zero, the audible alarm will not sound until the alarm hold-off timer has expired.

ORP Alarm

Setup→Alarm→ORP Alarm

Range programmable in 5 mV increments:
5 to 100 mV

Enable the alarm system and set the alarm range.

The alarm range for ORP operates about the ORP Setpoint, and NOT the limits of the optimal operating range since the operating range is fixed at ± 5 mV. For example setting the ORP alarm range to ± 10 mV with an ORP setpoint of 200 mV, an alarm will occur at 190 mV and 210 mV.

Step 16—Set Up Digital Input Alarm & Hold-off

Setup→Digital Input→Alarm if Closed→Holdoff
→Alarm if Open→Holdoff
→No Alarm

Hold off programmable in 1 second increments:
1 to 999 seconds

The Digital Input port allows the Octopus 4000 to issue an alarm based on whether a switch has opened or closed. Program the Digital Input Alarm accordingly. Program **alarm if closed** for properly connected digital input devices that will alarm when the two contacts are closed. For example using a float switch to alarm a low level condition would be programmed to alarm if closed. A power fail detection switch or a float switch to alarm a high level condition should be programmed to **alarm if open.**

The digital input alarm hold-off timer works like the water parameter alarm hold-off timer. The digital input hold-off timer provides a delay before any audible alarm, pager alarm, or email alarm is triggered. (The default digital input alarm hold-off time is 3 minutes.) The hold-off timer is useful to avoid "bounce" by allowing sufficient time for the trend to fully establish itself, thereby avoiding the premature processing of a false alarm. (Pager and email alarms have an additional optional delay programmed in the Pager Menu. Aquadyne recommends a digital timer hold-off of at least 1 minute with pager alarm enabled.) The audible alarm will NOT SOUND until the digital input alarm hold-off time has expired. The lower portion of the Current Status Window will display "Input Alarm 1" immediately following digital alarm condition.

To reset the audible alarm you must push the Enter key once on the face of the Octopus 4000. This will terminate further audible and pager alarms for that event. The alarm will not re-trigger unless the digital input returns to the non alarm condition, then goes into the alarm condition again. The current status window, however, will continue to display any alarm condition(s) until the digital input alarm condition does not exist.

Step 17—Set up the Lighting System

Setup→Timers→General Timers→Timer 1....Timer 16

Setting up the lighting system involves setting a start time and a stop time. The start time is the time the lighting system will come on and the stop time is the time it will go off. Only one start and one stop time per 24 hour period can be set for each channel.

See below for Lighting Scheme Example

Timer 1 is for the fluorescent lamps. These lamps are the first lights to come on in the morning and the last to go off late at night.
Timer 2 is for the metal halide lamps. To approximate the sun rising, these lamps come on in the late morning and go off in the late afternoon.
Timer 3 is for an additional halide lamp. This lamp will come on for about one to two hours at noon to simulate the midday sun.
Timer 4 is for a red bulb during the night to allow observation of nocturnal creatures that come out when the lights are out, and or moonlight simulation.

If you are not using all 16 channels, you can use the additional channels to control other devices

Step 18—Set up the WaveMaker Timers

Setup→Wave Maker Menu→Wave Maker 1A.....Wave Maker 2B

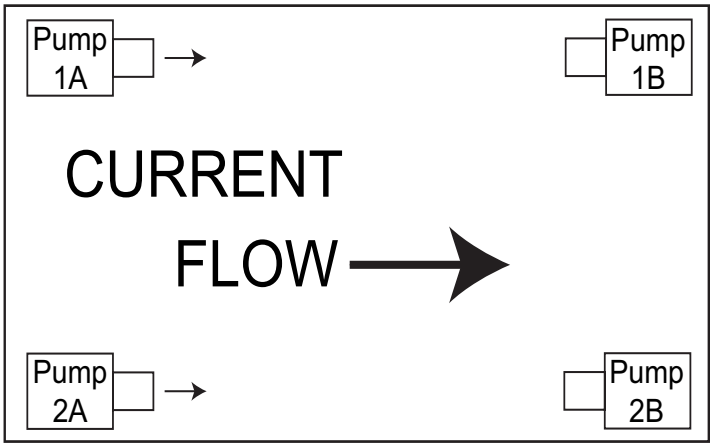
Each WaveMaker timer has a duration period. The duration specifies the length of time the specified timer (i.e. pump 1A) will operate before turning off and going to its counterpart timer (i.e. pump 1B).

The WaveMaker system is comprised of two completely independent systems. System 1 has two pumps (Pump 1A, Pump 1B), and System 2 has two pumps (Pump 2A, Pump 2B), as shown in Figure 2.3. Pumps 1A and 1B work as a pair (when one is on the other is off, and vice versa). And Pumps 2A and 2B also work as a pair. Figure 2.3 shows a WaveMaker example:

Since the pumps can have multiple ON/OFF times, and can operate independently, there is a great deal of flexibility in wave and surge generation.

For proper operation, it is necessary to program both pumps in a system even if you are using just 1 pump. The programmed time for the 2nd pump is the amount of time pump 1 will be shut off.

Cycle 1: (Top Diagram)
Pumps 1A and 2A are set to operate for 3 minutes (variable), with Pumps 1B and 2B off. This produces a flow pattern from left to right.



Cycle 2: (Bottom Diagram)
Pumps 1B and 2B are set to operate for 5 minutes (variable) with Pumps 1A and 2A off.
This produces the flow pattern from right to left.

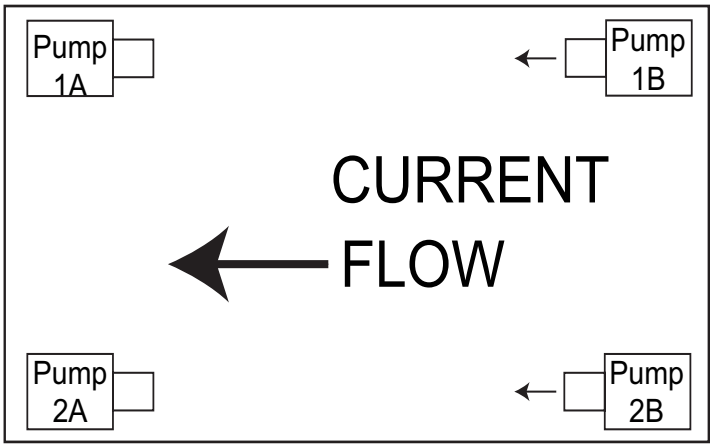


Figure 2.3 WaveMaker System

Step 19—Set up the System Hold

Setup→Timers→Set Hold Timer

User programmable 0-60 minutes

With System Hold enabled pressing Enter from any position on the Top Level Display will result in the System Hold prompt. Use the arrow key to scroll to YES, then press Enter. The Octopus controller will then shut down all equipment (except lighting, and the WaveMaker systems) and begin a System Hold Mode count down on the screen. When the timer reaches 0, all systems will return to their previous condition. The time required for control systems to return to an “on” condition, if they are supposed to be on, may take up to 3 minutes.

If you desire to cancel out of System Hold after it is enabled, simply push the Enter key and System Hold will be terminated.

The operation of the System Hold can be enabled even when the Octopus controller is locked with a password. To set the amount of time that the systems will be disabled for feeding, you select the System Hold Timer in the Timer Sub-Menu. If you select 0 minutes for the time, then System Hold is disabled and the System Hold prompt will not appear when selecting Enter from the Top Level Display. A value between 1 and 60 minutes will enable the System Hold Feature.

Step 20 - Assign Control Module Addresses

Setup→Set Module ID→Heater ID.....High Cond ID

Program the Octopus controller with the unique address(es) configured in Step 5 *Installing The Components*.

Other Control IDs

In addition to Control ID's for peripheral devices such as heaters and chillers, Control ID's may be required for other devices such as X-10-activated remote alarms configured in the system. Don't forget to assign Control ID's to the following, if applicable:

- Remote Alarm
- Lighting Timers
- WaveMaker

Step 22 is required to enable properly configured control/alarm/timer systems.

Step 21—Set up pager alarm

Setup→Pager Menu→Pager Enable.....Page Now

There could be problems in modem operation or pager functionality if the modem telephone line is shared. Be sure to use a dedicated line for the modem.

Step 6 is required for hardware configuration.

Alarm Pager Reference

Each parameter has an acceptable operating range. When the parameter enters the alarm range, the parameter that is in alarm will begin flashing on the unit. There is often a hold-off period (set by the user) that waits for the page feature to be activated. This hold-off period is to allow for a temporary out-of-bounds condition which can be caused by a power surge, etc. After the hold-off period has expired, it will activate the audible alarm (a standard feature) on the Octopus 4000 unit. If your Octopus 4000 has been configured and enabled for alarm pager support, an alarm page will be sent indicating the parameter is in alarm state (pH, ORP, Temperature, digital input) and the type of alarm it is (low alarm, high alarm, both high and low, power up or test). This digital information is then transmitted via a modem to your pager. The page consists of the last three digits of the serial number of the Octopus 4000 unit, followed by a five digit alarm code, as indicated in Table 2.2.

123	99999
Serial Number	Alarm Code

Table 2.2 Alarm Code on Pager

The five digit alarm code sent by the pager indicates which parameter is in alarm and what that alarm condition is (low alarm, high alarm, both high and low, power up or test). After the serial number of the unit, the first digit always refers to pH status, the second digit indicates ORP status, the third digit indicates temperature status, the fourth digit is conductivity status, and the last digit is the Digital Input.

Table 2.3 shows the possible alarm conditions and the codes that would be displayed. Note that a "0" in any digit location indicates that no alarm condition occurred for that system.

As an example, an alarm for an Octopus 4000 unit with serial number 003598, indicating a high pH and low ORP condition, the page would appear as follows:

"598 21000"

	pH	ORP	Temp	Cond	D1
Low Alarm*	1	1	1	1	1
High Alarm*	2	2	2	2	1
Both High and Low	3	3	3	3	NA
Power Up	0	0	0	0	0
Test	9	9	9	9	9

Table 2.3 Interpreting Alarm Code Numbers

If your system has the battery backup and a power fail detection switch, you will receive a page when power is lost at the outlet the power fail detection switch is plugged into. The Octopus and modem must be powered to send pages. If power fails on a unit that has no backup battery, once power comes back on, the unit will dial the phone pager and send a power up message. (All zeros means the unit is powered back up after a power outage.)

After any power outage or intentional power disconnect, the Octopus controller will display a "good page/bad page" message:

- Good page = X
  (This is how many times the page was completed.)

- Bad page = X
  (This is how many times the number was busy or the page didn't get through.)

After an alarm page has been acknowledged by pressing Enter on the face of the Octopus, if the alarm condition still exists (e.g., temperature or some other parameter is still outside the acceptable operating range) the alarm page will be triggered again and the Retransmit Alarm function will be activated.

Pager Enable/Disable

Setup→Pager Menu→Pager Enable

The pager enable/disable command allows you to enable or disable the paging system. If the system is disabled, no pages will be sent by the controller should an alarm condition occur.

Pager Phone Number

Setup→Pager Menu→PagerPh Number

Program the pager phone number into the Octopus 4000 .

Use the directional keys to select the desired number you wish to dial (16 characters can be entered). The number will be flashing until you press Enter to register your selection. (Note: If you enter a wrong digit, you must start the process over.) Depending on your specific situation you may need to use the dial modifiers (listed below). These are special parameters that are used to tell the modem what, when and how to dial the telephone number.

Dial Modifier	Description
0-9	Digits/characters for dialing.
,	Delay for approx. 1 sec.
W	Wait for dial tone.

The 'W' dial modifier is particularly important to make sure that there is a "dial tone" before initiating a page.

Pager Phone Number Example

The following is an example of the pager number requiring a bit more than the eleven-digit phone number:

To reach the pager, it is necessary to:

- Dial 9 for an outside line.
- Wait for the dial tone.
- Dial the paging company.
- Wait a couple of seconds for the paging company to answer the phone and accept a pager input.

The pager number to be used in this example would be:

9W6195551212

(Then set 5 seconds on the Pager Delay menu for the pager to delay before sending.)

Pager Delay

Setup→Pager Menu→Pager Delay

User programmable 0-60 seconds.

Every pager service company processes pager calls differently. It is therefore important that the Octopus 4000 does not start sending information before the pager company computer is ready to receive it. For this reason, the pager delay function is a critical setting for the pager software to work properly.

The pager delay time is the amount of time that the Octopus 4000 controller waits after it has dialed the phone number before sending the serial number and alarm values to the pager service company. You will have to experiment with the time value to select the correct time. For example, if your pager service has a message that precedes the transmission of a page you will need to count the number of seconds or use a watch to time the message period and program this time period into the Pager Delay. If the interval is set for too short a period, the serial number and alarm code will not be properly processed by the paging system. If the time period is set for too long a period, then the pager service company may terminate the call before the alarm code information is sent. A good starting value is 5-10 seconds.

Pager Retry (Redial)

Setup→Pager Menu→Pager Retry

User programmable 0-120 minutes.

The pager retry timer is activated if the Octopus 4000 controller is unable to send a page due to a busy phone line. The controller will wait the number of minutes specified by this command and attempt to send another page. The default value for this command register is 5 minutes. (Note: If you have your retry option set to “0”, and the modem gets a busy signal, the alarm page would not be transmitted.)

Pager Retransmit (Until Reset)

Setup→Pager Menu→Pager Retransmit

User programmable 0-120 minutes.

When an alarm condition is detected, (and after the hold-off period has expired), the paging system will send a pager alarm. The Octopus 4000 is programmed to continue the paging process until someone physically pushes the Enter key on the front of the Octopus 4000 controller to acknowledge the page.

The pager retransmit value controls the length of time that the controller waits after the first page before it initiates another page (every 30 minutes is the default setting) —assuming that the alarm has not been acknowledged.

Pager Tone/Pulse

Setup→Pager Menu→Pager Tone/Pulse

The pager tone/pulse command register controls whether the modem uses DTMF tones or pulses to dial the telephone. If you have a rotary phone, you will want to set the register to pulse; otherwise, leave the register at the default setting which is tone.

Baud Rate

Setup→Pager Menu→Baud Rate

The pager baud rate is the actual speed in which the Octopus 4000 can transmit data to the modem. The Octopus 4000 baud rate can vary at rates from 300 baud to 19,200 baud. The default value is 19,200 baud, which is ideal and recommended. This value will work with 90% of the modems in use today including the Aquadyne modem that comes with the pager option. If you also have the AquaWeb option you must set the baud rate of the pager to 19,200 to match the fixed baud rate of AquaWeb.

Data Format

Setup→Pager Menu→Data Format

The pager data format register controls how information is sent to the modem. The controller defaults 8 data bits, 1 stop bit, and no parity (81N). Additional information on serial data formats is outside the scope of this manual.

If using both a pager and AquaWeb, you must use the same data format for both.

Page Now (Test Page)

Setup→Pager Menu→Page Now

The Octopus 4000 allows you to test the paging system at any time to insure proper operation. At the Page Now prompt in the Pager menu press Enter. When you initialize the test page, the controller will show on the LCD display that it is in the process of communicating with the modem. The page now command generates a code which consists of a "999" following the unit's serial number. Allow at least five minutes after the controller has initiated a page, for it to be received by your pager.

Step 22—Enable Octopus 4000 System Control

Operations Menu→Control Menu

With the installation of the hardware components complete (Steps 1-8) and the configuration of the software complete (Steps 9-21), each system that the Octopus controller will manage now needs to be Enabled - Step 22. Parameter control systems should not be enabled until probes have had time to stabilize. See step 2 (Stabilization Period for Probes *Installing the Components)*.

The “Control" menu (under the Operations Menu) allows you to set each system to either the "OFF" or "AUTO" position. In the "Off" position, the system will remain off all the time. If the system is set to the "AUTO" mode, then that system will be controlled by the Octopus 4000.

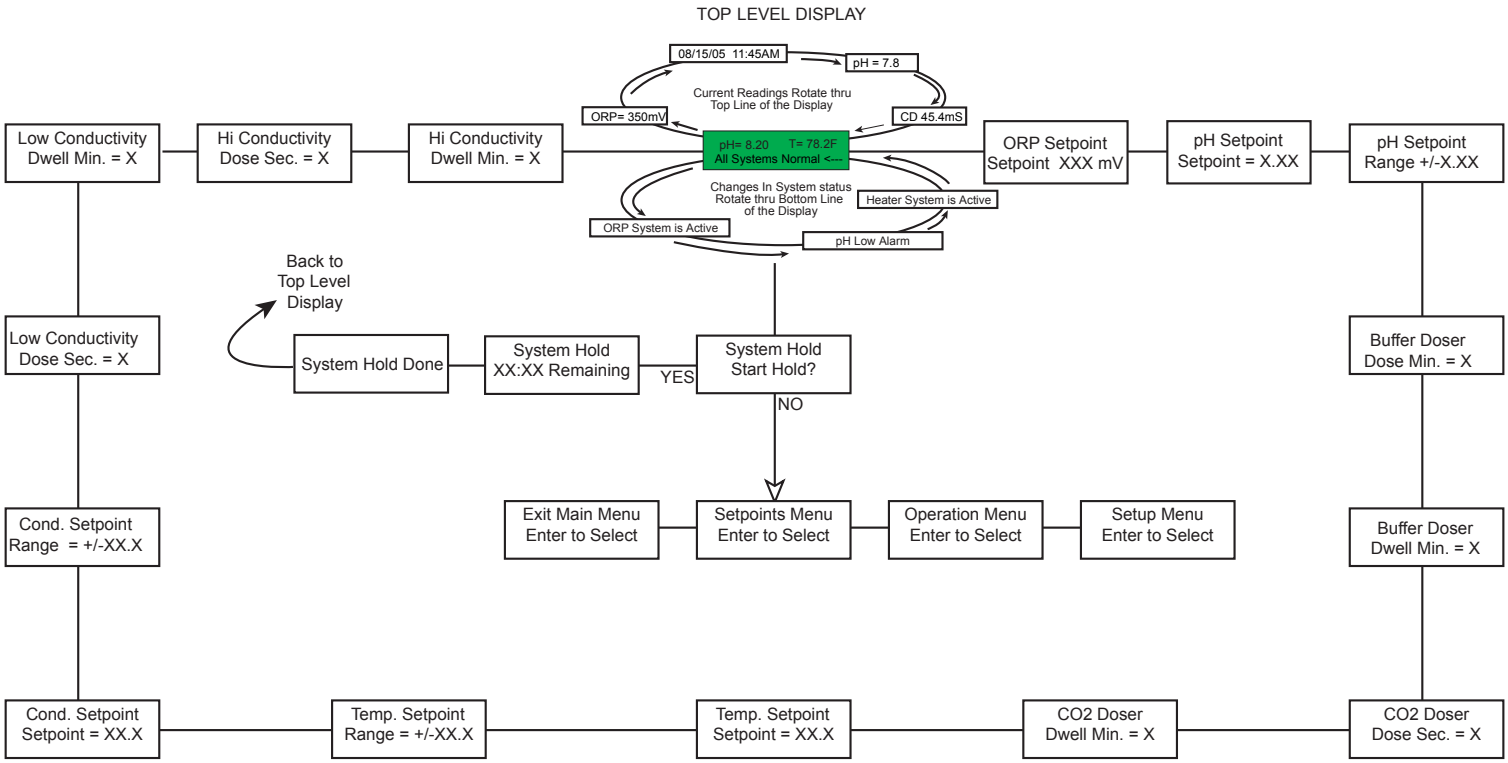
Step 23—Test the System Configuration

Setup Menu→System Test→Heater Test.....High Cond Test

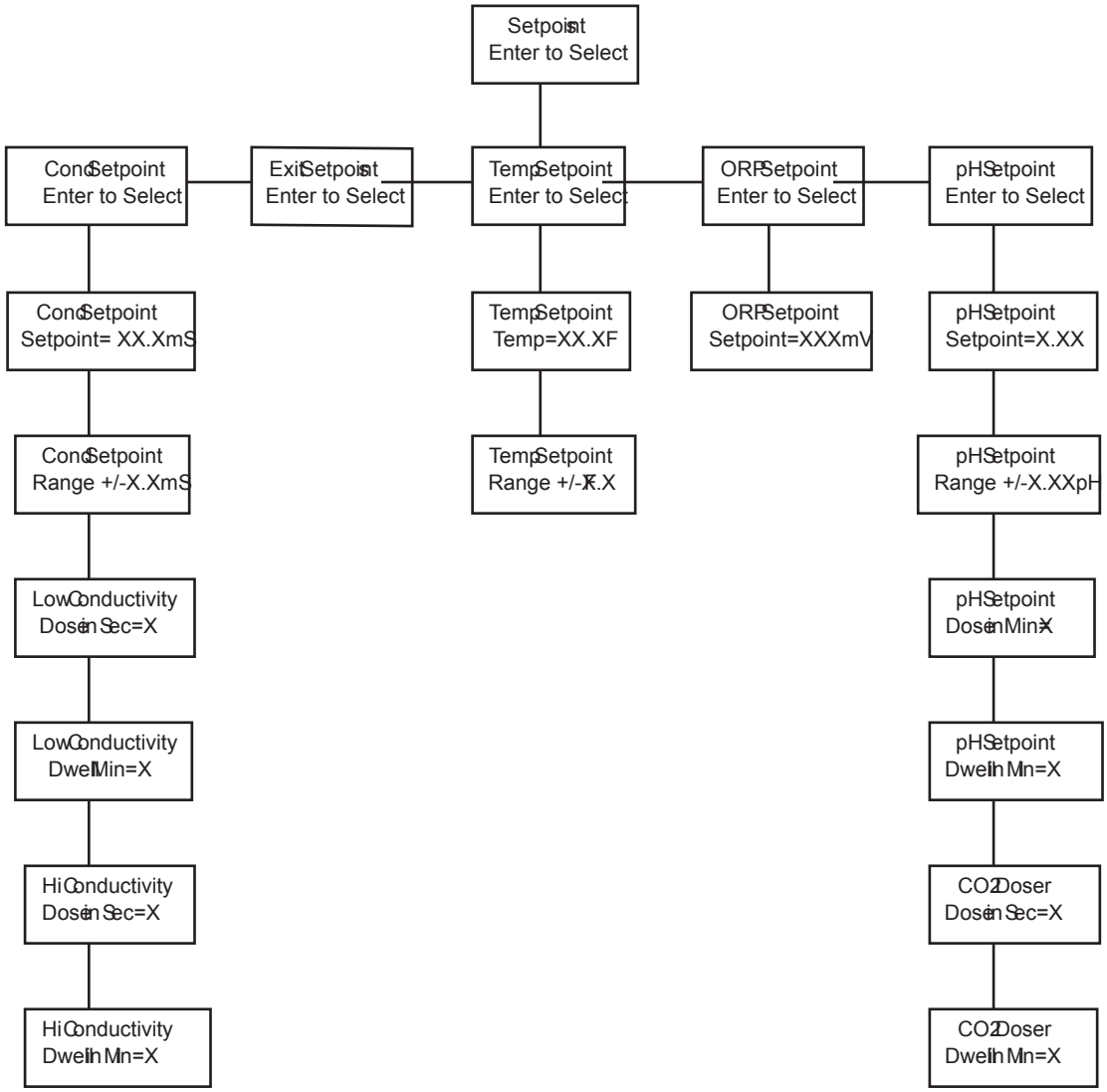
Steps 4, 5 and 20 must be completed prior to performing any system test. Its purpose is to allow you to exercise the individual systems independent of parameter setpoints to insure that the equipment is operating properly. Upon entering the Test Menu all systems that the Octopus is configurated to control will be shut down. The Octopus system status light will toggle between Green and Orange indicating communication with the power line interface. Do not perform any test until the system status light returns to the solid green state. This could take up to 30 seconds. By selecting the desired parameter control device (i.e. heater, chiller, or chemical dosing system, etc.), to be tested, each system can be turned on or off. Upon exiting the Test Menu all systems will be returned to their prior state.

All necessary steps must be completed properly in order for the Octopus to properly control systems.

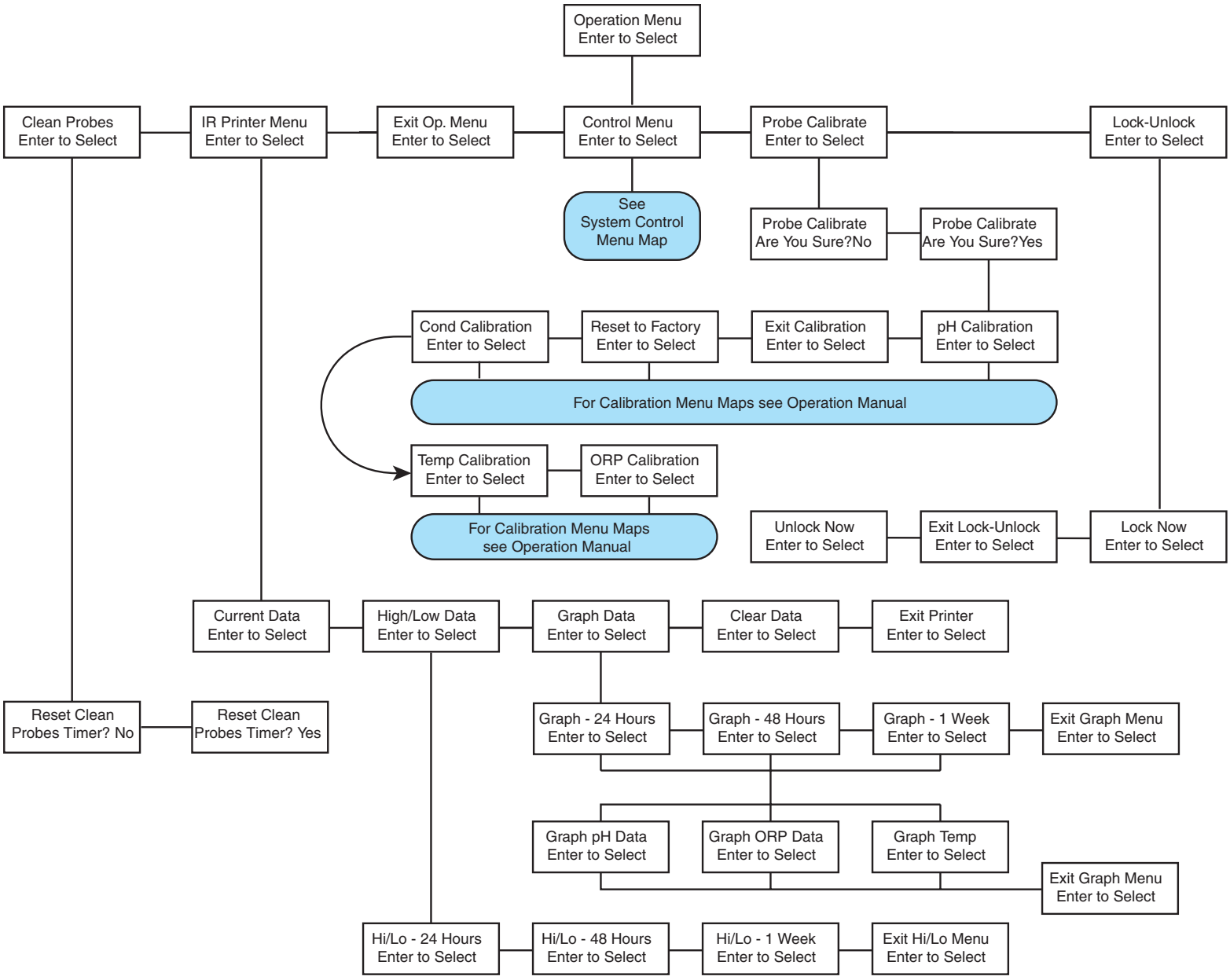
Main Menu Map



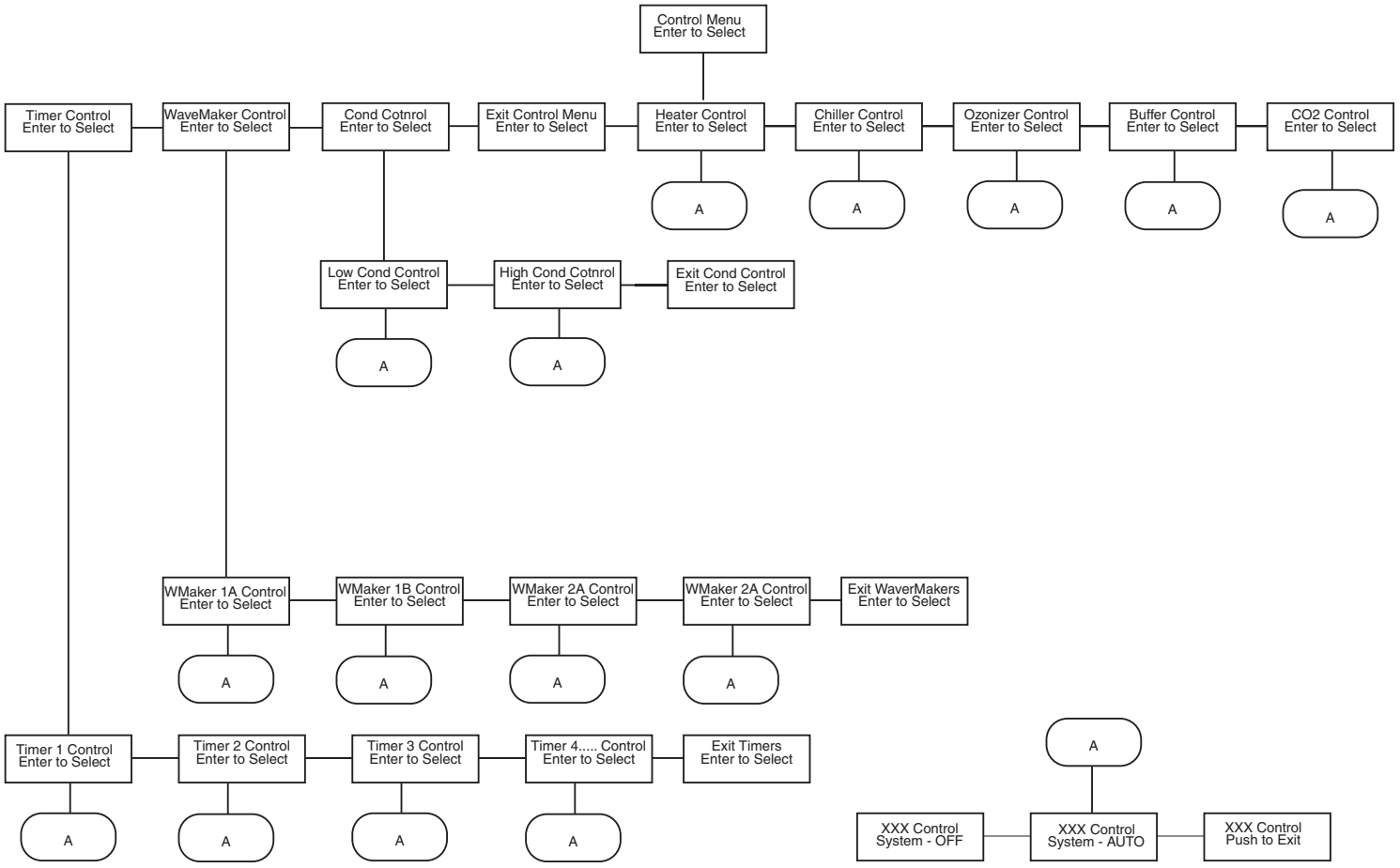
Setpoints Menu Map



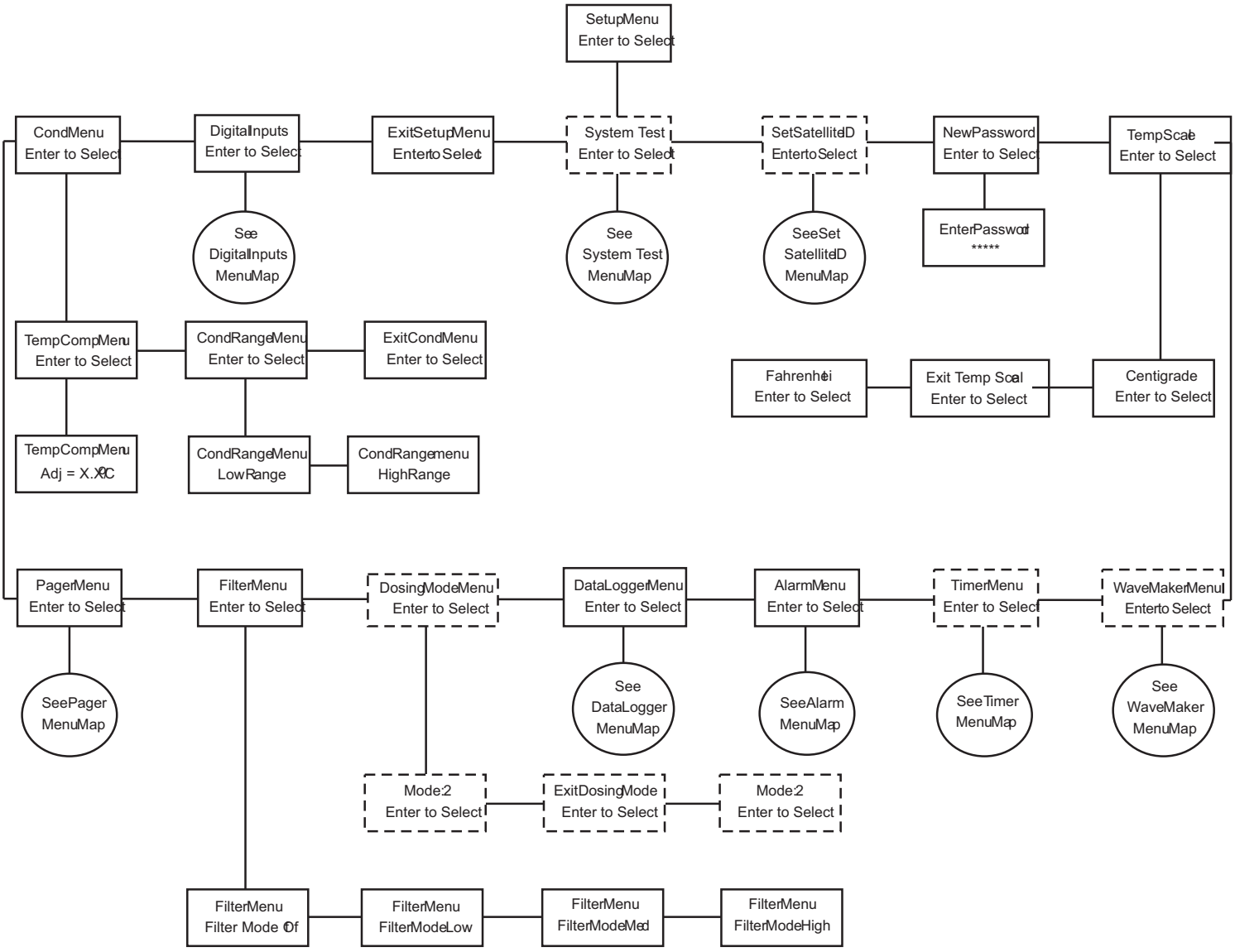
Operation Menu Map



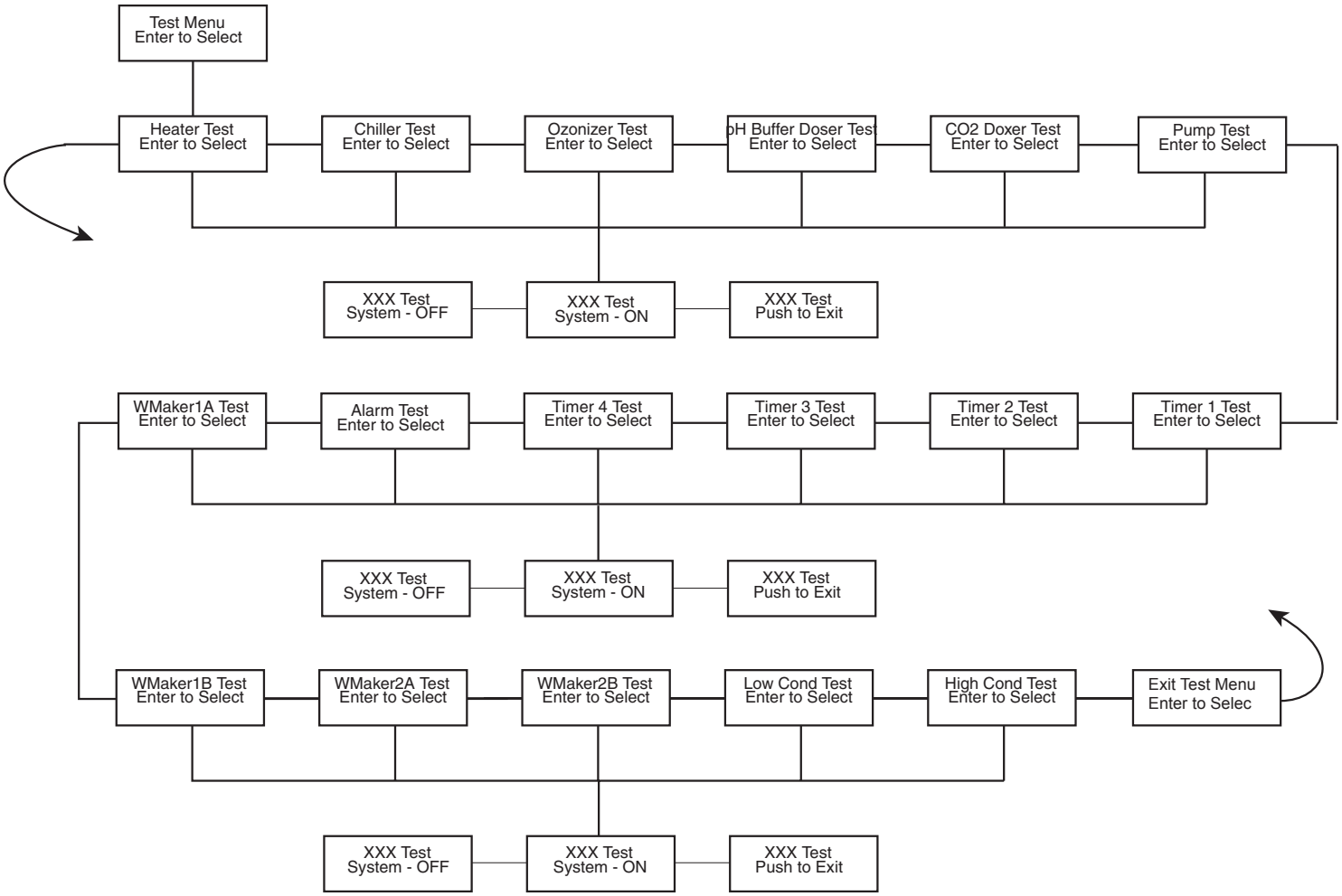
Control Menu Map



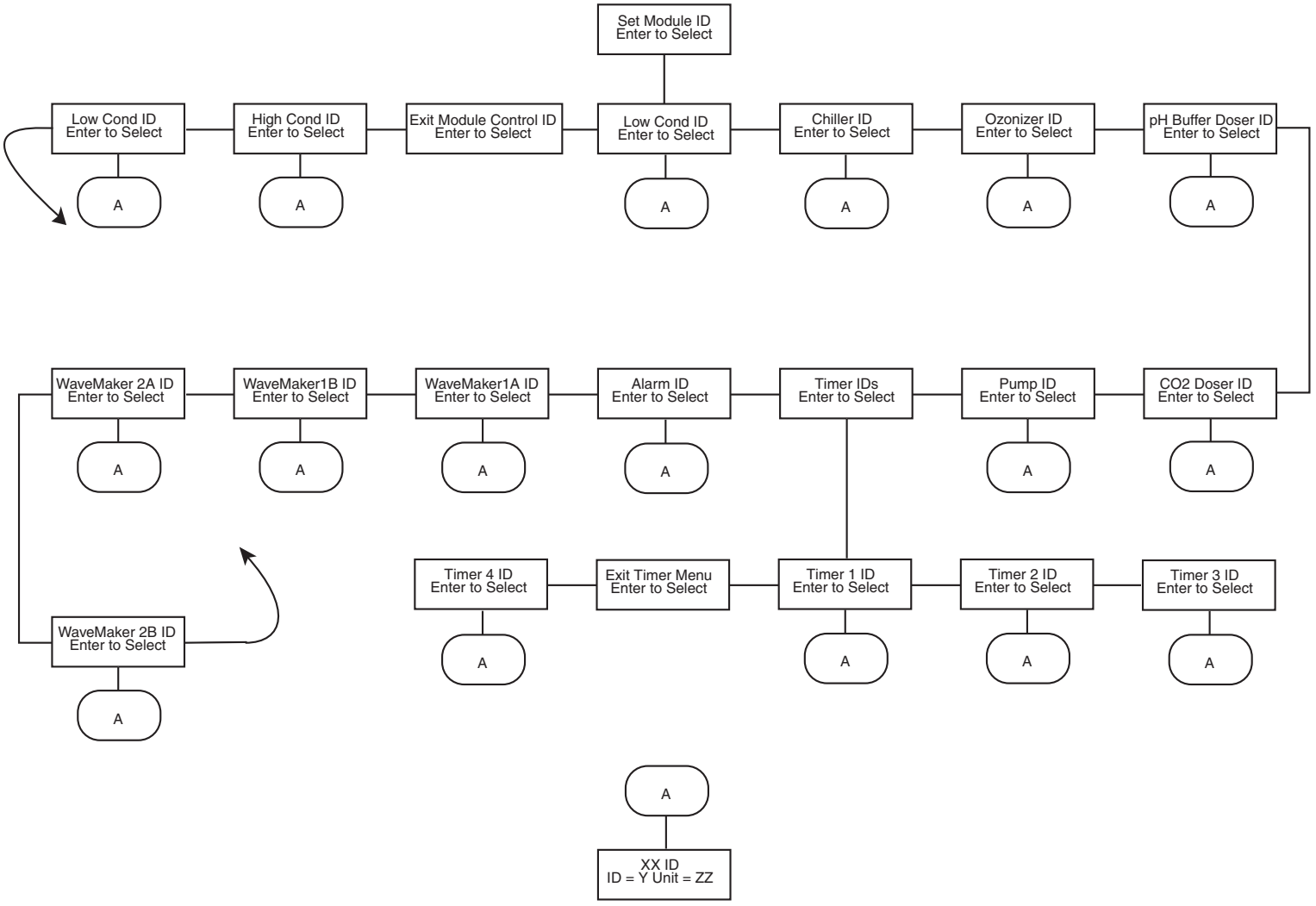
Setup Menu Map



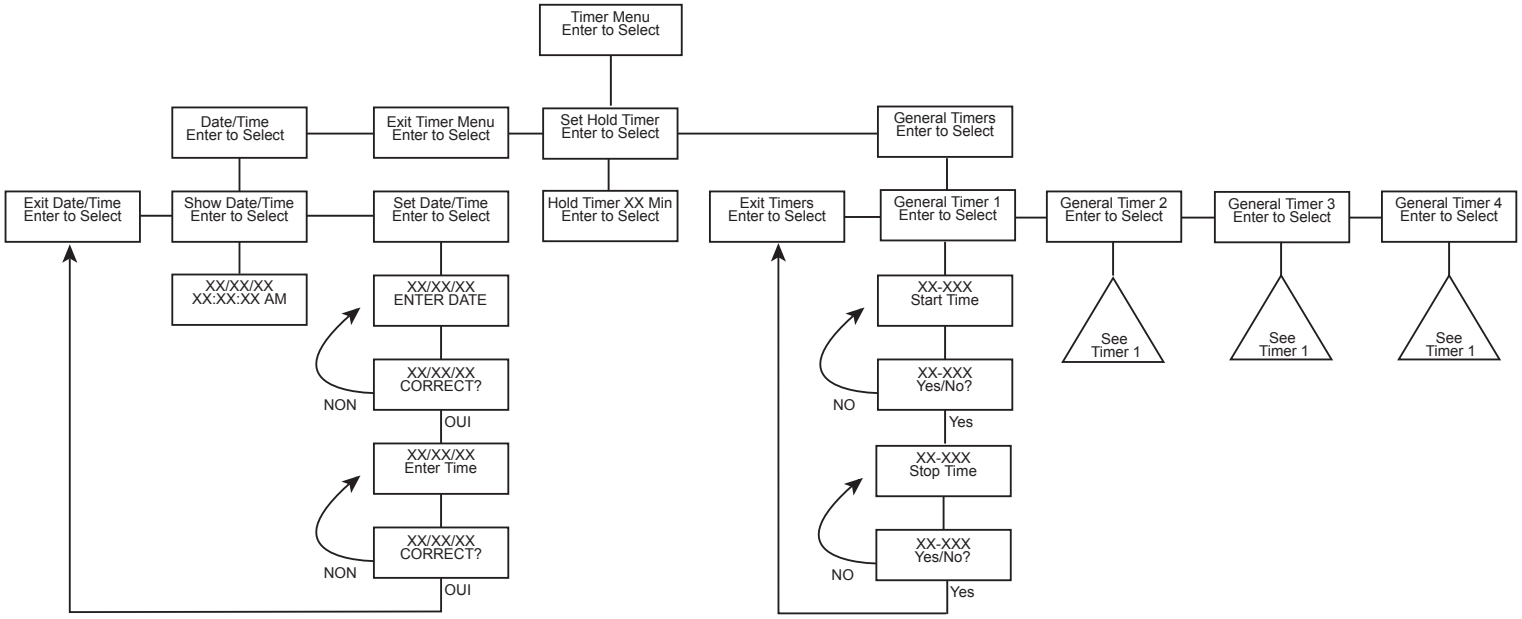
System Test Menu Map



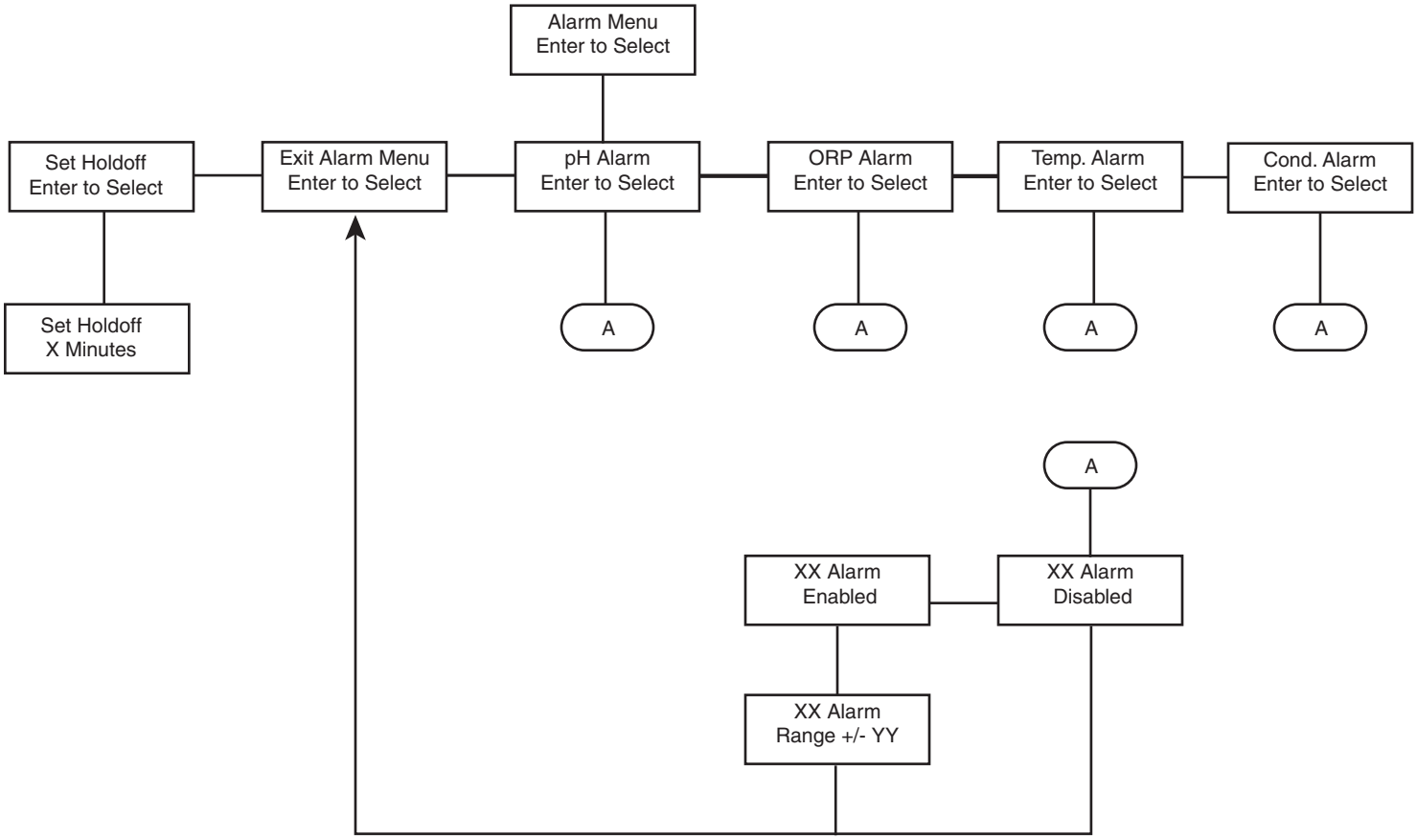
Set Module ID Menu Map



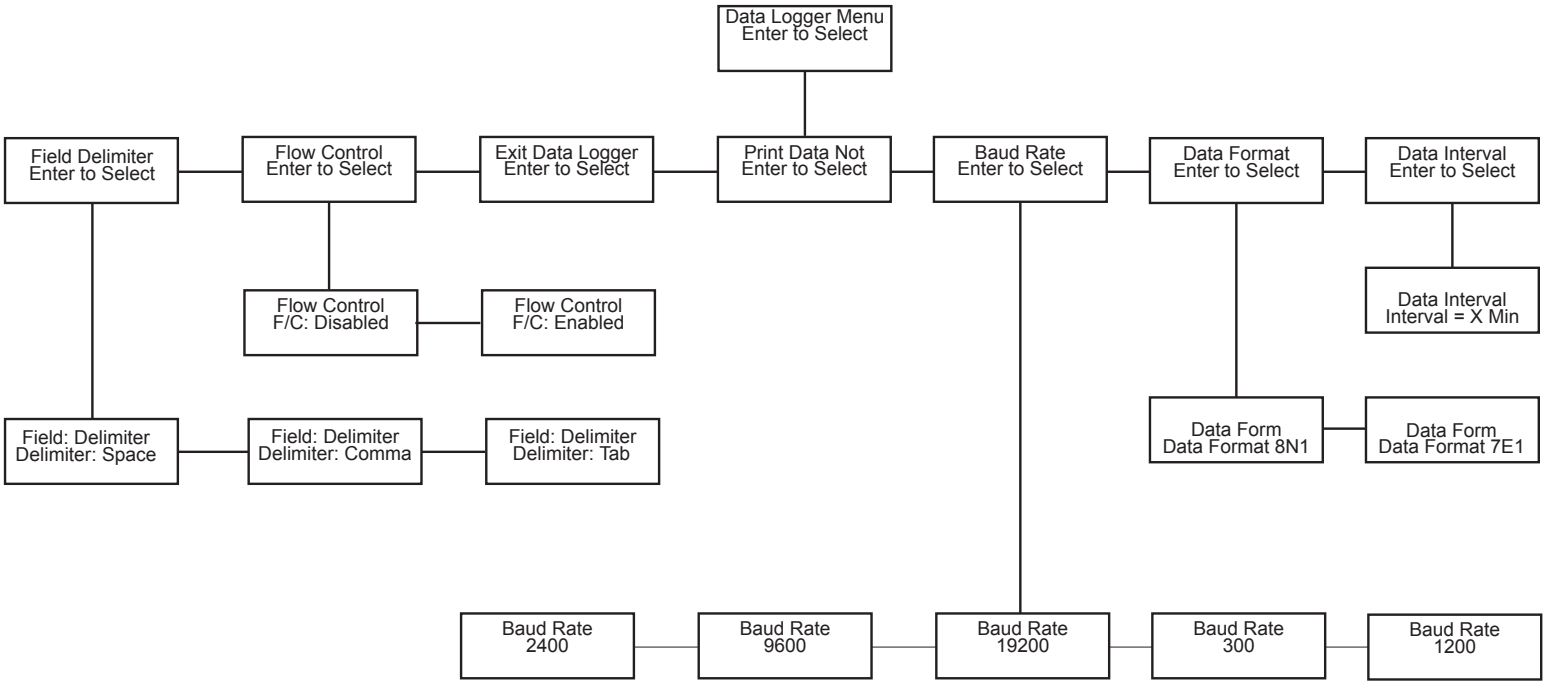
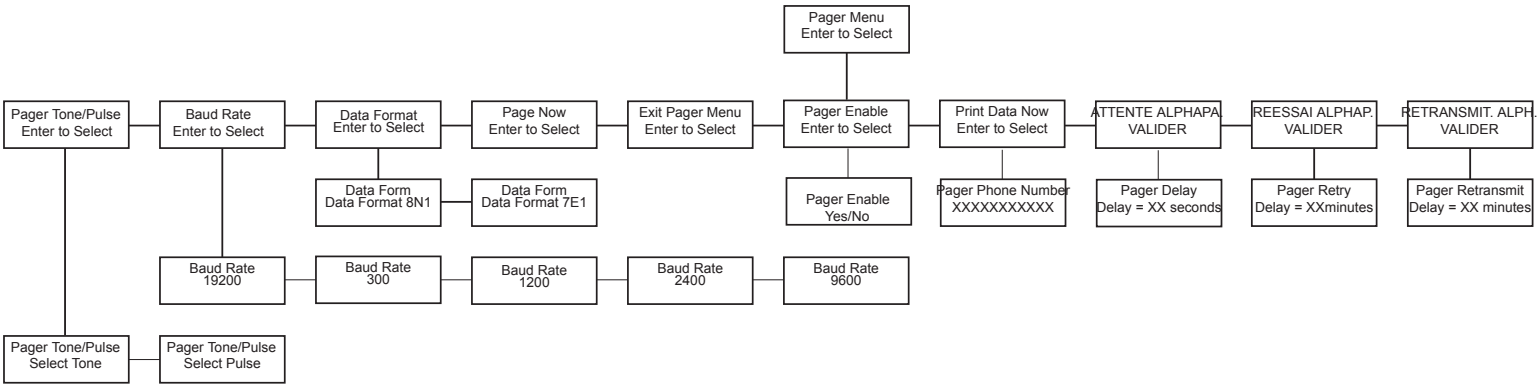
Timer Menu Map



Alarm Menu Map



DataLogger Menu Map



Pager Menu Map