

# AquaCal<sup>®</sup>

# Expansion Board Upgrade

(Upgrade Kit #STK0247)

Installation Quick Start Guide

*This document describes how to install an HP9 expansion board upgrade*

For more installation advice, see the online installation and operation manual.

[http://www.aquacal.com/wp-content/uploads/manuals/landingpage/exp/Expansion\\_Board\\_Upgrade\\_Manual.htm](http://www.aquacal.com/wp-content/uploads/manuals/landingpage/exp/Expansion_Board_Upgrade_Manual.htm)



### Important

Read this document before operating this product

For additional product manuals and operation / installation procedures, please visit [www.AquaCal.com](http://www.AquaCal.com)

MODEL / SERIAL NUMBER



# Table of Contents

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- 1 - Connections** ..... **1**
- 2 - Presets** ..... **3**
- 3 - Configuration** ..... **12**
  - 3.1 Create a Group ..... 12
  - 3.2 Create a Schedule ..... 14

## 1 - Connections

This section describes how to connect actuators, circulation pumps, and relay-controlled devices to the heat pump.

### DANGER

Failure to heed the following will result in injury or death.

- Deactivate power while routing wiring to control board.
- RISK OF ELECTRICAL SHOCK FROM ENERGY STORED IN CAPACITORS - MODELS EQUIPPED WITH VARIABLE FREQUENCY COMPRESSOR DRIVES STORE ELECTRICITY EVEN AFTER THE POWER HAS BEEN DEACTIVATED AT THE POWER BREAKER. ***Wait for 2 minutes after the shut down of equipment before servicing.***
- Follow all National Electric Codes (NEC) and/or State and Local guidelines.

### WARNING

Failure to heed the following may result in injury or death.

- Installation of this equipment by anyone other than a qualified installer can result in a safety hazard.
- The information contained throughout the "Installation" section is intended for use by qualified installation technicians familiar with the swimming Pool/Spa safety standards.

### NOTICE

Failure to heed the following may result in damage to equipment.

- Failure to protect equipment against corrosive conditions will adversely affect the life of the equipment and will void equipment warranty.

#### ***PLEASE NOTE:***

It is not necessary to connect an expansion board if the user only wishes to control an RS-485 equipped variable speed circulation pump. Controlling actuators, relays or a single speed circulation pump will require an expansion board.

#### ***ALSO NOTE:***

Combining different brands of variable speed circulation pumps is not supported. These brands can have different protocols that may be incompatible with each other. However, using one brand of RS-485 equipped variable speed circulation pump with a different brand single speed circulation pump is supported. A single speed circulation pump will require an expansion board as it uses a relay.

1. Turn off power at heat pump's power disconnect.
2. ***Wait two minutes for capacitors to discharge before proceeding.***
3. Remove heat pump electrical access panel.
4. Disconnect and label each wire leading to the control board with masking tape and a pen or another suitable labeling method.

Inserting Expansion Board into Control Board

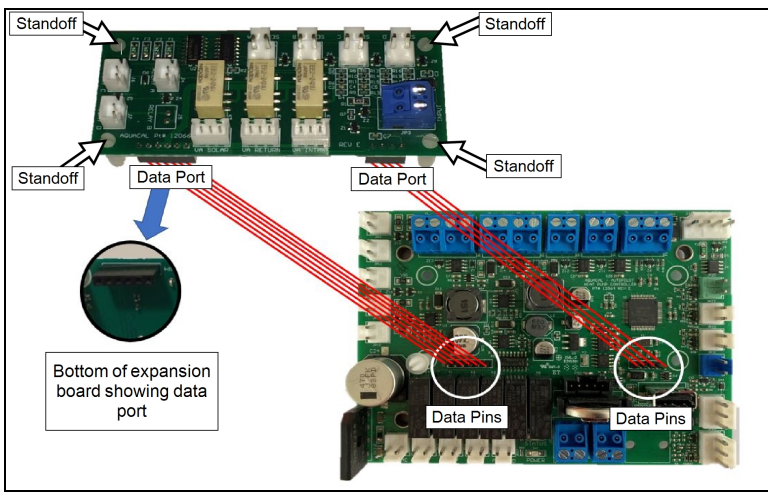


Figure 1 - Port Connections

5. Remove power control board from the heat pump.
6. Connect plastic standoffs into the expansion board.
7. Press the expansion board onto the control board making sure that data pins are aligned with data ports as indicated in Figure 1. There should be an audible "snap" as each of the four standoffs are pressed into place.
8. Reattach control board into the heat pump.
9. Route device wiring from relays and / or valve actuators to the low voltage side of the electrical enclosure and label wires. Follow all National Electric Codes (NEC) unless State or Local guidelines supersede.
10. Reconnect wires leading to power control board.
11. Attach device wires to the expansion board. Figure 2.

**Available Ports:**

- Circulation Pump:
  - "Port B" (RS-485 Connector) - Normally used for Variable Speed Circulation Pumps
- Actuators:
  - Port "VA Return"
  - Port "VA Intake"
  - Port "VA Solar" (Optional)
- Relays:
  - Relay "A" - The default for Single Speed Circulation Pumps
  - Relay "C"
  - Relay "D"

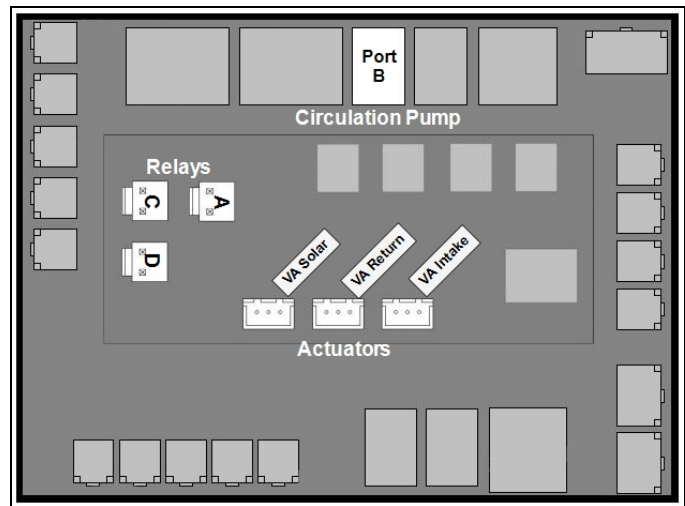


Figure 2 - Device Connections

12. Reattach heat pump access panel.
13. Apply power to heat pump.
14. An installation wizard will start automatically. The connected equipment can now be configured using the installation wizard's preset options. See "*Presets*" on the facing page.

## 2 - Presets

When the heat pump is first activated, an installation wizard will be displayed. If used, a list of site configurations (presets) will be offered. If the installation wizard was skipped, the system can be set to factory default and the wizard will reappear. See "Factory Reset".

**INSTALLER WIZARD?**  
**SKIP** **START**

Press the button under "START" to use the wizard and view the available heat pump presets.

### **NOTICE**

Failure to heed the following may result in damage to equipment.

- Any existing programs or settings will be cleared and replaced with the chosen preset option. If this is undesired, then press the button under "SKIP" to exit the wizard and set up equipment manually.
- After using a preset, values such as system RPMs should be checked to confirm they do not exceed system requirements. Damage to equipment due to excessive water flow, from setting RPMs too high, is not covered under factory warranties.

#### **PLEASE NOTE -**

- If the PoolSync<sup>®</sup> external controller was used prior to upgrading the system, all applicable heat pump presets will be shown.
- If a third-party external controller was used prior to upgrading the system, a factory reset will be required to see all presets. See "Factory Reset"

#### **ALSO NOTE -**

*After using a preset, any setting can be manually customized (or fine tuned) by the installer. Values, such as circulation pump RPMs, should be checked to confirm they do not exceed system requirements.*

### **Pool / Spa, No Valves, No Pump**

**POOL / SPA, NO VALVES**  
**SINGLE SPEED** **SELECT**

This preset configures the heat pump as follows:

- No valve actuator is configured.
- No circulation pump is configured.
- No schedules are configured.

When pressed, the "Pool/Spa" button will display with three choices:

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules - Without an active schedule, the heat pump mode is initially set to "OFF".

**Pool / Spa, No Valves, Pentair VS**

**POOL / SPA, NO VALVES  
PENTAIR VS                      SELECT**

This preset configures the heat pump as follows:

- No valve actuator is configured.
- A Pentair (or Sta-Rite) variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with three choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules

**Pool / Spa, No Valves, Hayward VS**

**POOL / SPA, NO VALVES  
HAYWARD VS                      SELECT**

This preset configures the heat pump as follows:

- No valve actuator is configured.
- A Hayward variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with three choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules

**Pool / Spa, No Valves, Jandy VS**

**POOL / SPA, NO VALVES  
JANDY VS                              SELECT**

This preset configures the heat pump as follows:

- No valve actuator is configured.
- A Jandy variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with three choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules

## Pool / Spa, No Valves, Single Speed

**POOL / SPA, NO VALVES  
SINGLE SPEED      SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- A single speed circulation pump is configured to use the relay "A" connection point on the expansion board.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with three choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules

## Pool / Spa, Valves, Pentair VS

**POOL / SPA, VALVES  
PENTAIR VS      SELECT**

This preset configures the heat pump as follows:

- Two actuator valves are configured named intake (on "VA INTAKE") and return (on "VA RETURN").
- A Pentair (or Sta-Rite) variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with three choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules



## Pool / Spa, Valves, Hayward VS

**POOL / SPA, VALVES  
HAYWARD VS**      **SELECT**

This preset configures the heat pump as follows:

- Two actuator valves are configured named intake (on "VA INTAKE") and return (on "VA RETURN").
- A Hayward variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with three choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules

## Pool / Spa, Valves, Jandy VS

**POOL / SPA, VALVES  
JANDY VS**      **SELECT**

This preset configures the heat pump as follows:

- Two actuator valves are configured named intake (on "VA INTAKE") and return (on "VA RETURN").
- A Jandy variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with three choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules

## Pool / Spa, Valves, Single Speed

**POOL / SPA, VALVES  
SINGLE SPEED**      **SELECT**

This preset configures the heat pump as follows:

- Two actuator valves are configured named intake (on "VA INTAKE") and return (on "VA RETURN").
- A single speed circulation pump is configured to use the relay "A" connection point on the expansion board.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with three choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Spa - With an initial timer of 2 hours at 104° F.
3. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
4. Schedules

## Pool Only, No Valves, No Pump

**POOL ONLY, NO VALVES  
NO PUMP**      **SELECT**

This preset configures the heat pump as follows:

- No valves actuators are configured.
- No circulation pump is configured.
- No schedules are configured.

When pressed, the "Pool/Spa" button will display with two choices:

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Schedules - Without an active schedule, the heat pump mode is initially set to "OFF".

## Pool Only, No Valves, Pentair VS

**POOL ONLY, NO VALVES  
PENTAIR VS**      **SELECT**

This preset configures the heat pump as follows:

- No valves actuators are configured.
- A Pentair (or Sta-Rite) variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with two choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Schedules

### Pool Only, No Valves, Hayward VSS

**POOL ONLY, NO VALVES  
HAYWARD VS SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- A Hayward variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with two choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Schedules

### Pool Only, No Valves, Jandy VS

**POOL ONLY, NO VALVES  
JANDY VS SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- A Jandy variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with two choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Schedules

### Pool Only, No Valves, Single Speed

**POOL ONLY, NO VALVES  
SINGLE SPEED SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- A single speed circulation pump is configured to use the relay "A" connection point on the expansion board.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with two choices.

1. Pool - With an initial timer set for 48 hours at 85° F.
2. Schedules

### Spa Only, No Valves, No Pump

**SPA ONLY, NO VALVES  
NO EQUIPMENT SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- No circulation pump is configured.
- No schedules are configured.

When pressed, the "Pool/Spa" button will display with two choices:

1. Spa - With an initial timer of 2 hours at 104° F.
2. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
3. Schedules

### Spa Only, No Valves, Pentair VS

**SPA ONLY, NO VALVES  
PENTAIR VS SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- A Pentair (or Sta-Rite) variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with two choices.

1. Spa - With an initial timer of 2 hours at 104° F.
2. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
3. Schedules

### Spa Only, No Valves, Hayward VS

**SPA ONLY, NO VALVES  
HAYWARD VS SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- A Hayward variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with two choices.

1. Spa - With an initial timer of 2 hours at 104° F.
2. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
3. Schedules

## Spa Only, No Valves, Jandy VS

**SPA ONLY, NO VALVES  
JANDY VS**      **SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- A Jandy variable speed circulation pump is configured.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with two choices.

1. Spa - With an initial timer of 2 hours at 104° F.
2. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
3. Schedules

## Spa Only, No Valves, Single Speed Circulation Pump

**SPA ONLY, NO VALVES  
SINGLE SPEED**      **SELECT**

This preset configures the heat pump as follows:

- No valve actuators are configured.
- A single speed circulation pump is configured to use the relay "A" connection point on the expansion board.
- A pool schedule is configured (Everyday from 8:00 am to 6:00 pm)

When pressed, the "Pool/Spa" button will display with two choices.

1. Spa - With an initial timer of 2 hours at 104° F.
2. Spa - With an initial timer of 2 hours at 96° F (*104° F with an installed OTA kit*).
3. Schedules

USE PRESET FROM USB  
SELECT

A file, previously saved onto a USB thumb drive, can be used to configure the heat pump.

**PLEASE NOTE:**

*This file will take advantage of any custom configurations entered by the installer on prior installations. The file will contain the equipment, group, and schedule settings. Other settings such as multi-unit installations, external control mode, etc. will still need to be configured.*

**DANGER**

Failure to heed the following will result in injury or death.

- Deactivate power while routing wiring to control board.
- RISK OF ELECTRICAL SHOCK FROM ENERGY STORED IN CAPACITORS - MODELS EQUIPPED WITH VARIABLE FREQUENCY COMPRESSOR DRIVES STORE ELECTRICITY EVEN AFTER THE POWER HAS BEEN DEACTIVATED AT THE POWER BREAKER. Wait for 2 minutes after the shut down of equipment before servicing.
- Follow all National Electric Codes (NEC) and/or State and Local guidelines.

1. Turn off power at heat pump's power disconnect.
2. Wait two minutes for capacitors to discharge before proceeding.
3. Remove heat pump electrical access panel.
4. Insert thumb drive into the heat pump's USB thumb drive port on the control board.
5. Activate power to heat pump. Do not touch thumb drive or electrical components inside heat pump. Risk of electrical shock can result in injury or death.
6. When installation wizard appears, select start.
7. Navigate to and select "USE SETUP FROM USB".
8. After heat pump has successfully loaded file and restarted, deactivate heat pump at power breaker.
9. Wait two minutes for capacitors to discharge before proceeding.
10. Remove thumb drive.
11. Reinstall heat pump's access panel.

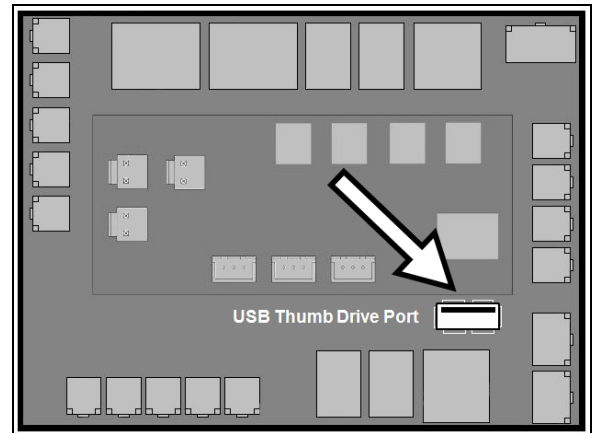


Figure 3 - USB Thumb Drive Port

## 3 - Configuration

### 3.1 Create a Group

#### EXAMPLES OF GROUPS THAT CAN BE CREATED:

- Backyard Lights Group
  - A pool light and a spa light that have been connected and configured by the heat pump installer can be activated upon demand.
- Cold Plunge Group -
  - A spa can be set to "COOL" to a desired temperature upon demand.
- Custom Group -
  - A custom group can be created that heats the water to a desired temperature without effecting another user's settings.







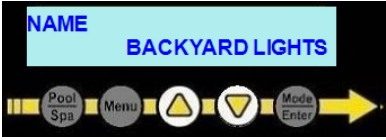


The example below shows a "BACKYARD LIGHTS" group being created manually. Two devices will be set to an operating state of "ON" when the group is active.

- A pool light relay
- A spa light relay

#### PLEASE NOTE

*This section only describes the configuration of an already connected relay device. To physically wire these types of devices to the heat pump, see the heat pump's installation manual.*

Enter "Groups" menus, then proceed

<p><b>IF UNIT IS ASLEEP, SWIPE TO WAKE UP</b></p>  <p>KEYPAD LOCKED</p>	<p><b>A PRESS "MENU" BUTTON</b></p>  <p>WATER TEMP ##°F HEAT SETPOINT ##°F</p>	<p><b>B USE ARROWS TO "GROUPS"</b></p>  <p>GROUPS ENTER</p>
<p><b>C PRESS "ENTER"</b></p>  <p>GROUPS ENTER</p>	<p><b>1 USE ARROWS TO "NEW GROUP SETUP"</b></p>  <p>NEW GROUP SETUP</p>	<p><b>2 ENTER TO CREATE</b></p>  <p>NEW GROUP SETUP</p>
<p><b>3 USE ARROWS TO NAME "BACKYARD LIGHTS"</b></p>  <p>NAME BACKYARD LIGHTS</p>	<p><b>4 ENTER TO SAVE</b></p>  <p>NAME BACKYARD LIGHTS</p>	<p><b>5 USE ARROWS TO SET MAXIMUM ACTIVE TIME</b></p>  <p>MAXIMUM ACTIVE TIME 12HR</p>

**6 ENTER TO SAVE**

MAXIMUM ACTIVE TIME 8HR

Pool Spa Menu Up Down Mode/Enter

**7 USE ARROWS TO SET FREEZE PROTECT OPTION**

FREEZE PROTECT ENABLED OFF

Pool Spa Menu Up Down Mode/Enter

**8 ENTER TO SAVE**

FREEZE PROTECT ENABLED OFF

Pool Spa Menu Up Down Mode/Enter

**9 PRESS BUTTON UNDER "YES" TO SAVE**

SAVE GROUP SETUP? YES NO

Pool Spa Menu Up Down Mode/Enter

**10 PRESS "ENTER" TO ADD EQUIPMENT**

ADD EQUIPMENT SELECT

Pool Spa Menu Up Down Mode/Enter

**11 USE ARROWS TO SELECT EQUIPMENT**

ADD EQUIPMENT POOL LIGHT RELAY

Pool Spa Menu Up Down Mode/Enter

**12 ENTER TO SAVE**

ADD EQUIPMENT POOL LIGHT RELAY

Pool Spa Menu Up Down Mode/Enter

**13 USE ARROWS TO DEVICE OPERATING STATE**

POOL LIGHT RELAY ON

Pool Spa Menu Up Down Mode/Enter

**14 ENTER TO SAVE**

POOL LIGHT RELAY ON

Pool Spa Menu Up Down Mode/Enter

**15 USE ARROWS TO "ADD EQUIPMENT"**

ADD EQUIPMENT SELECT

Pool Spa Menu Up Down Mode/Enter

**16 PRESS "ENTER" TO ADD MORE EQUIPMENT**

ADD EQUIPMENT SELECT

Pool Spa Menu Up Down Mode/Enter

**17 USE ARROWS TO SELECT EQUIPMENT**

ADD EQUIPMENT SPALIGHT RELAY

Pool Spa Menu Up Down Mode/Enter

**18 ENTER TO SAVE**

ADD EQUIPMENT SPALIGHT RELAY

Pool Spa Menu Up Down Mode/Enter

**19 USE ARROWS TO DEVICE OPERATING STATE**

SPALIGHT RELAY ON

Pool Spa Menu Up Down Mode/Enter

**20 ENTER TO SAVE**

SPALIGHT RELAY ON

Pool Spa Menu Up Down Mode/Enter

**MENU TO EXIT, PRESS & HOLD TO STATUS**

WATER TEMP ##°F  
HEAT SETPOINT ##°F

Pool Spa Menu Up Down Mode/Enter





## 3.2 Create a Schedule

A maximum of four (4) schedule programs can be configured for each group.

In this example a schedule is created to activate the backyards lights on the weekends from 9:00 pm to 10:00 pm.

Enter "Schedules" menus, then proceed

<p><b>IF UNIT IS ASLEEP, SWIPE TO WAKE UP</b></p> 	<p><b>A PRESS MENU BUTTON</b></p> 	<p><b>B USE ARROWS TO "SCHEDULES"</b></p> 
<p><b>C PRESS "ENTER"</b></p> 	<p><b>1 ARROWS TO GROUP TO SCHEDULE</b></p> 	<p><b>2 ENTER TO EDIT</b></p> 
<p><b>3 USE ARROWS TO THE PROGRAM TO SCHEDULE (1-4)</b></p> 	<p><b>4 ENTER TO EDIT</b></p> 	<p><b>5 USE ARROWS TO EDIT DAYS</b></p> 
<p><b>6 ENTER TO SAVE</b></p> 	<p><b>7 USE ARROWS TO "START" TIME</b></p> 	<p><b>8 ENTER TO EDIT</b></p> 
<p><b>9 USE ARROWS TO CHANGE</b></p> 	<p><b>10 ENTER TO SAVE</b></p> 	<p><b>11 USE ARROWS TO "END" TIME</b></p> 
<p><b>12 ENTER TO EDIT</b></p> 	<p><b>13 USE ARROWS TO CHANGE</b></p> 	<p><b>14 ENTER TO SAVE</b></p> 

**MENU TO EXIT, PRESS  
& HOLD TO STATUS**



