BFE15 Tech Sheet

Bullfrog Spas
System PN 55515

Reviewed by 22 Sept 2008
R. Alex Eddington
Derrick Christman
ok.

System Model # E15-BFE15-YCAH
Software Version # 34 (upon production release)
EPN # 2918

Base PCBA – PN 55516
PCB EL1500 – PN 22075 Rev B
HEX File – TBD
Configuration Signature – 21C4ACB8

Base Panels
Setups 1, 3 & 5
ML700 – PN 52798-01
Setups 2, 4, 6 & 7
ML553 – PN 55381

Aux Panels
AX10A1 – PN 52803
AX10A2 – PN 52804

Template used: 40916_A.pdf 09/05/2008
55515_97_B.pdf 09/17/2008

BALBOA water group

System Revision History

System PN	EPN	Date	Requested By	Changes Made
55515	2918	07/24/08	Customer	Create new system Tech Sheet Based on BF05 - 53983-05 and incorporate BF03 features.
55515	2918	09/17/08	Balboa	Rework Tech Sheet using released EL1500 Template

Basic System Features and Functions

Power Requirements

- 120/240VAC, 60Hz, 16/48A, Class A GFCI-protected service (Circuit Breaker rating = 20/60A max.)
- 3 or 4 wires – hot, hot (opt), neutral, ground
- Setup 7 requires 120/240 VAC pump and heater conversion instructions

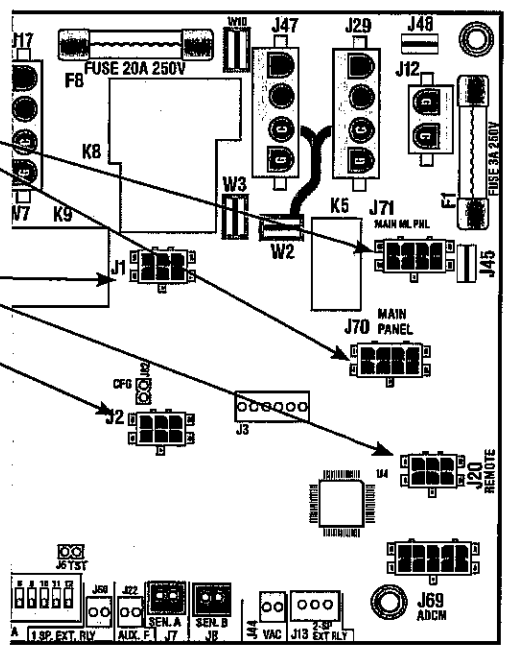
System Outputs

See Next Page for Configuration Setups

* Heater wattage is rated at 240V. When running 120V to heater, output is approximately 25%.

Additional Options

- Full Feature Dolphin Remote and Spa-only Dolphin Remote
- Spa Monitor
  Connects to Main Panel terminal J70 or J71
- IR or RF Dolphin Receiver Module
  Connects to Remote terminal J20
- Auxiliary Panel Connections J1 and J2
- Ozone Generator
  Connects to terminal J29
- MoodEFX Lighting
  Connects to Spa Light terminal J12
- Stereo System
  Connects to A.V. terminal J50



Basic System Features and Functions

Setup 1
- 240V Pump 1, 2-Speed
  (Timeouts: high-spd 30-minute, low-spd 1-hour)
- 120V Circ Pump
  (3-hour filter cycle)
- 120V Ozone (runs with Circ Pump)
- 12V Spa Light (1-hour timeout)
- 120V AV (Stereo)
- 240V 5.5kW Heater
- ML700 Main Panel

Setup 2
- 240V Pump 1, 2-Speed
  (Timeouts: high-spd 30-minute, low-spd 1-hour)
- 120V Circ Pump
  (3-hour filter cycle)
- 120V Ozone (runs with Circ Pump)
- 12V Spa Light (1-hour timeout)
- 120V AV (Stereo)
- 240V 5.5kW Heater
- ML553 Main Panel

Setup 3
- 240V Pump 1, 2-Speed
  (Timeouts: high-spd 30-minute, low-spd 1-hour)
- 240V Pump 2, 2-Speed
  (Timeouts: 30-minute, 10-minute for purge cycle)
- 120V Circ Pump
  (3-hour filter cycle)
- 120V Ozone (runs with Circ Pump)
- 12V Spa Light (1-hour timeout)
- 120V AV (Stereo)
- 240V 5.5kW Heater
- ML700 Main Panel

Setup 4
- 240V Pump 1, 2-Speed
  (Timeouts: high-spd 30-minute, low-spd 1-hour)
- 240V Pump 2, 2-Speed
  (Timeouts: 30-minute, 10-minute for purge cycle)
- 120V Circ Pump
  (3-hour filter cycle)
- 120V Ozone (runs with Circ Pump)
- 12V Spa Light (1-hour timeout)
- 120V AV (Stereo)
- 240V 5.5kW Heater
- ML553 Main Panel

Setup 5 (As Manufactured)
- 240V Pump 1, 2-Speed
  (Timeouts: high-spd 30-minute, low-spd 1-hour)
  (2-hour filter cycle)
- 240V Pump 2, 2-Speed
  (Timeouts: 30-minute, 10-minute for purge cycle)
- 120V Ozone (runs with filter)
- 12V Spa Light (1-hour timeout)
- 120V AV (Stereo)
- 240V 5.5kW Heater
- ML700 Main Panel

Setup 6
- 240V Pump 1, 2-Speed
  (Timeouts: high-spd 30-minute, low-spd 1-hour)
  (2-hour filter cycle)
- 240V Pump 2, 2-Speed
  (Timeouts: 30-minute, 10-minute for purge cycle)
- 120V Ozone (runs with filter)
- 12V Spa Light (1-hour timeout)
- 120V AV (Stereo)
- 240V 5.5kW Heater
- ML553 Main Panel

Setup 7
- 120V/240V Pump 1, 2-Speed
  (Timeouts: high-spd 30-minute, low-spd 1-hour)
  (2-hour filter cycle)
- 120V Ozone (runs with filter)
- 12V Spa Light (1-hour timeout)
- 120V AV (Stereo)
- 5.5kW @ 240VAC Heater
  (Effectively 1.5kW @ 120VAC)
- ML553 Main Panel

Persistent Memory and Powering Up

Any time you change DIP Switches or Software Configuration Settings that affect parameters the user can change (any filter settings, set temperature default, Celsius vs Fahrenheit, 12-hour vs 24-hour time, reminders suppression, etc), you must reset Persistent Memory for your DIP Switch or Software Configuration Settings changes to take effect. You should also reset Persistent Memory after loading a new file into a board (using the ESM, purchased seperately).

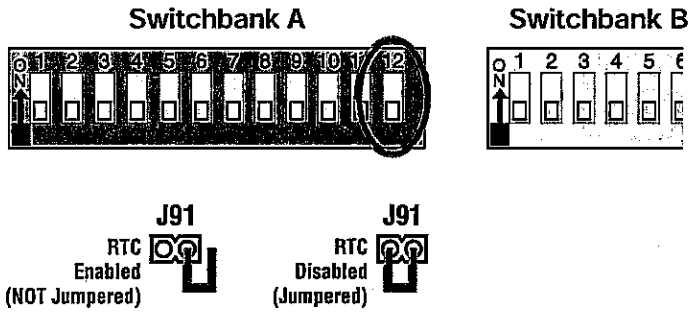
To reset Persistent Memory:

- Power down.
- Set A12 ON (See illustration below).
- Power up.
- Wait until "Pr" or "PRIMING MODE" is displayed on your panel. Note: If "CFE" appears see section below.
- Set A12 OFF (This can be done safely with power on if you use a nonconductive tool such as a pencil to push the switch back to the OFF position. Otherwise, power down before setting A12 OFF)
- Power up again (if you powered down in the previous step).
- For all other power ups, leave A12 OFF

About Persistent Memory and Time of Day Retention:

This system uses memory that doesn't require a battery to store a variety of settings. What we refer to as Persistent Memory stores all the User Preferences, as well as all the filter settings, the set temperature, and the heat mode.

Persistent Memory is not used for Time of Day. Time of Day needs to be "kept running" (not just stored) while the power is off, so a separate Real Time Clock feature (on all models except the EL1000, EL1500 v34 and GL1500 v34) keeps track of Time of Day while the unit is off. Time of Day Retention, and Time of Day Retention alone, is controlled by the J91 jumper. J91 must be set according to main system panel used.



CFE message on power up:

If "CFE" appears before (and instead of) "Pr" or "PRIMING MODE", you have not configured DIP Switches and/or Software Configuration Settings in a valid manner. This must be corrected before you can reset Persistent Memory.

The switch numbers, jumpers, or configuration settings displayed after "CFE" are ones with which the system has found a configuration problem. For example:

- "CFE A5 b2" would mean that the combination of how you've set A5 and how you've set B2 is not supported on this system.
- "CFE J99" would mean that there is a problem with jumper J99
- "CFE P3 1 bL. 1" would mean that the combination of how you've set pump 3 for 1-speed and blower for 1-speed is not supported on this system.
- "CFE P3_ bL_" would mean that the combination of how you've set DIP switches which have been assigned to pump 3 and blower is not supported on this system.

Power Up Display Sequence

Upon power up, you should see the following on the display:

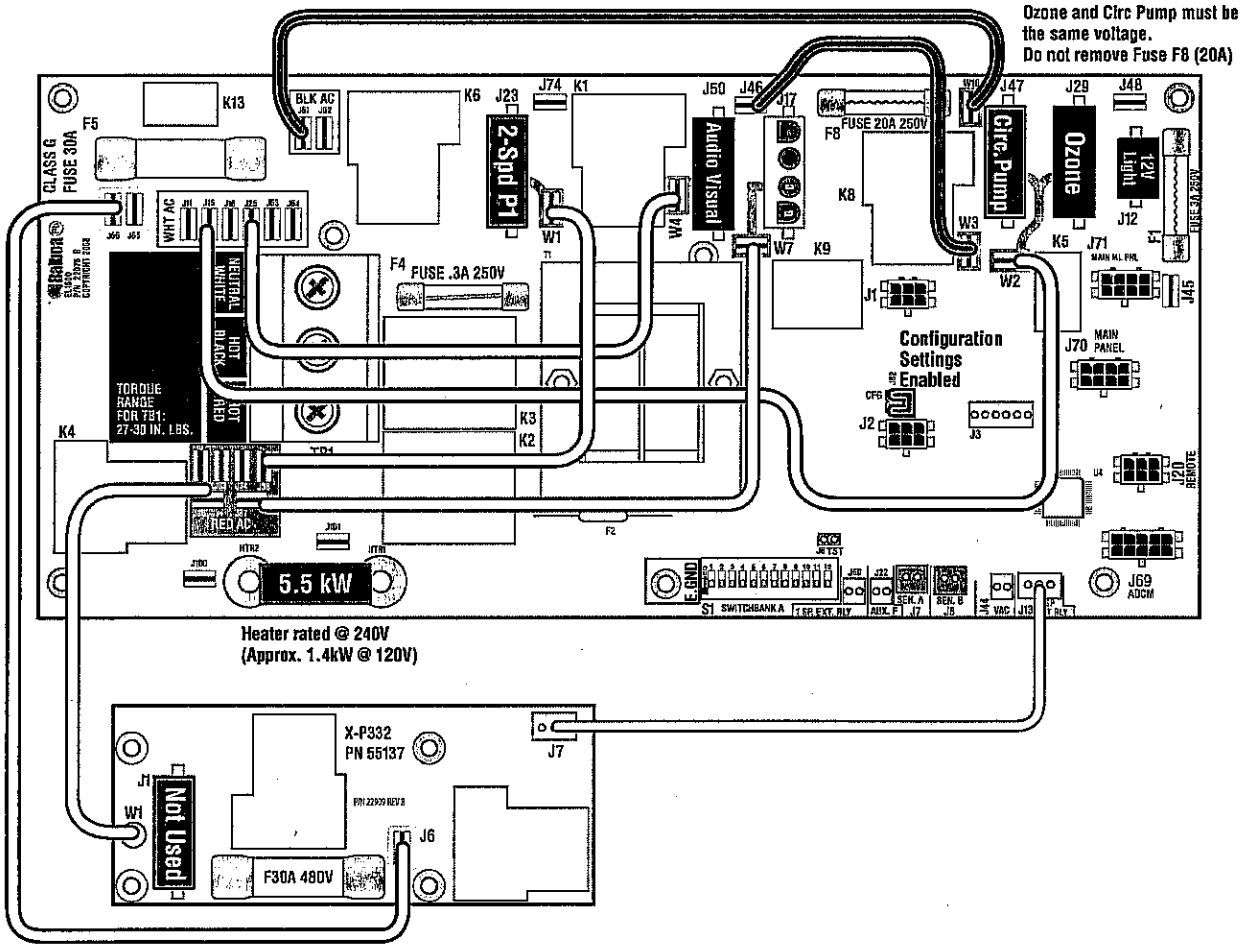
- Three numbers in a row, which are the SSID (the System Software ID). The third display of these numbers is the Software Version, which should match the version of your system. For example, if these three numbers are 100 134 26, that is a Mach 3 EL8000 at version 26.
- If there is a Configuration Error, the CFE message (see above) will appear at this point (and none of the messages below will display). Otherwise what comes next is:
- An indication of either the input voltage detected (EL1000, 1500, 2000), or the heater wattage range supported (EL8000/GL1500/GL2000/GL8000).
  Heater wattage display: "1-3" means the system supports a heater from 1 kW to 3 kW. "3-6" means the system supports a heater from 3 kW to 6 kW. "3-3" means the system supports a 3 kW heater only. (These ranges may be modified slightly in the case of special heaters, which the next bullet covers.)
  Input voltage display: A system showing "240" supports 3 kW to 6 kW heaters. A system showing "120" supports the very same heaters, although at 120V those heaters will function at only 1/4 of their 240V rated wattage. (The system shows only either "240" or "120" as a general indication of input voltage; it does not show the actual input voltage.)
- If your system is using a special type of heater, a display such as "H6" may appear next. If your system is using the generic Balboa heater, no heater type display will appear.
- "Pr" or "PRIMING MODE" will appear to signal the start of Priming Mode.

At this point, the power up sequence is complete. Refer to the User Guide for the ML Series panel on your system for information about how the spa operates from this point on.

Wiring Configuration and DIP Settings

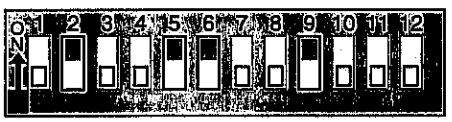
Setup 1

- 240V Pump 1, 2-Speed
- 120V Circ Pump
- 120V Ozone
- 12V Spa Light
- 120V Audio-Visual (Stereo)
- 240V 5.5kW Heater
- ML700 Main Panel



WARNING: Main Power to system should be turned OFF BEFORE adjusting DIP switches.
WARNING: Persistent Memory (A12) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

Switchbank A



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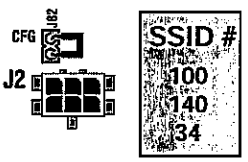
A4, Filters by Time
A5, A6, } See Table 2 Circ Behavior
A7, A8, } See Table 3 Pump 2
A9, Filter Duration 3 hr.
A10, No Edit
A11, Special Amp Rule OFF
A12, Memory ON

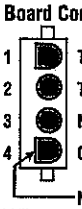


When the Logic Jumper is installed on J82 (CFG), Software Config. Settings are enabled. DIP Switches will operate as shown.

Wiring Color Key

- 120 Volt Connections
- 240 Volt Connections
- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

Board Connector Key



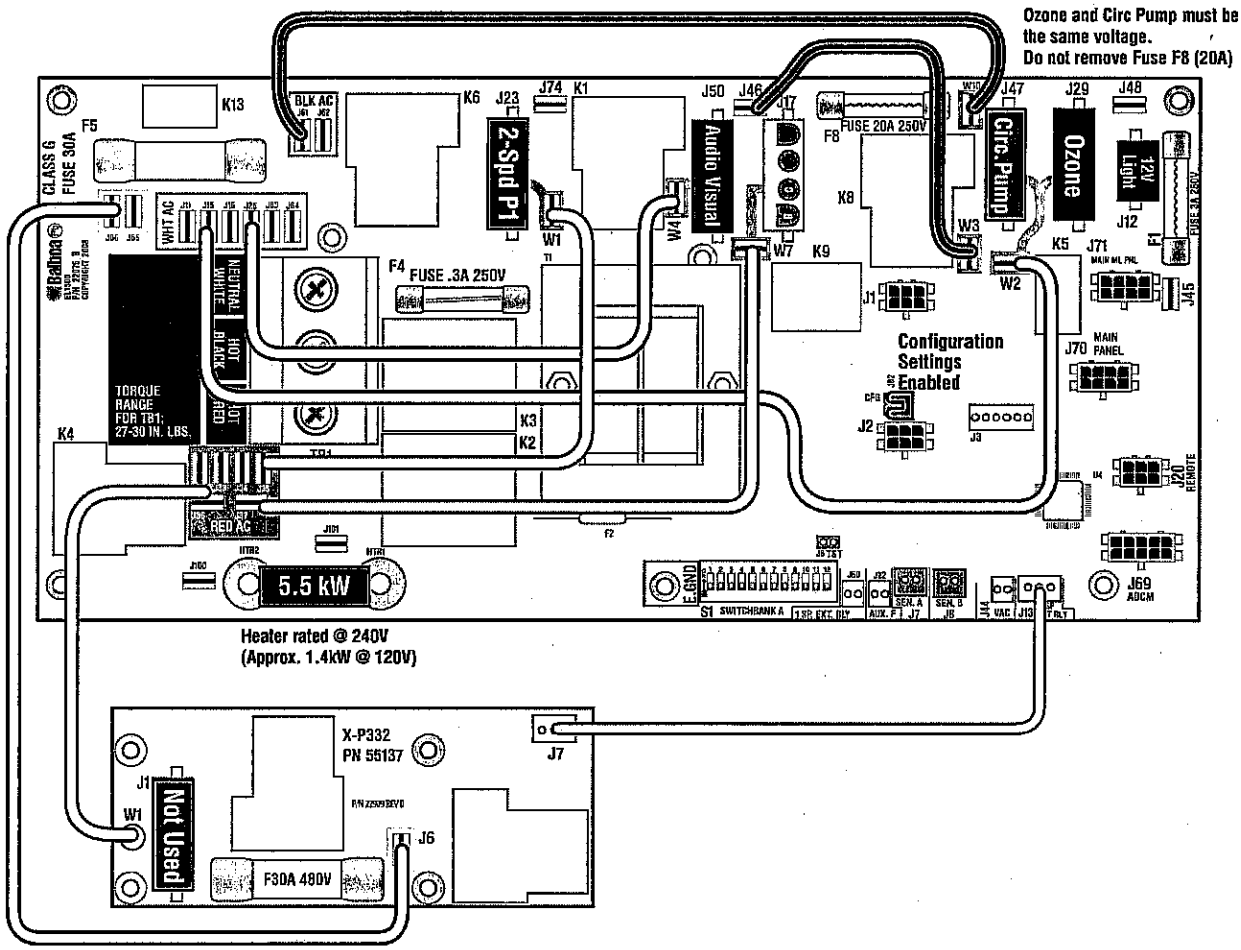
1 Typically Line voltage
2 Typically Line voltage for 2-speed pumps
3 Neutral (Common)
4 Ground

Note flat sides in connector

Wiring Configuration and DIP Settings

Setup 2

- 240V Pump 1, 2-Speed
- 120V Circ Pump
- 120V Ozone
- 12V Spa Light
- 120V Audio-Visual (Stereo)
- 240V 5.5kW Heater
- ML553 Main Panel



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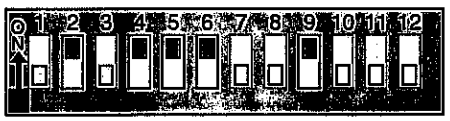

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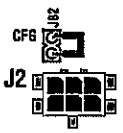

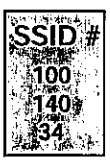

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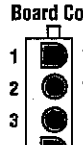
Wiring Color Key

- 120 Volt Connections
- 240 Volt Connections
- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

Board Connector Key



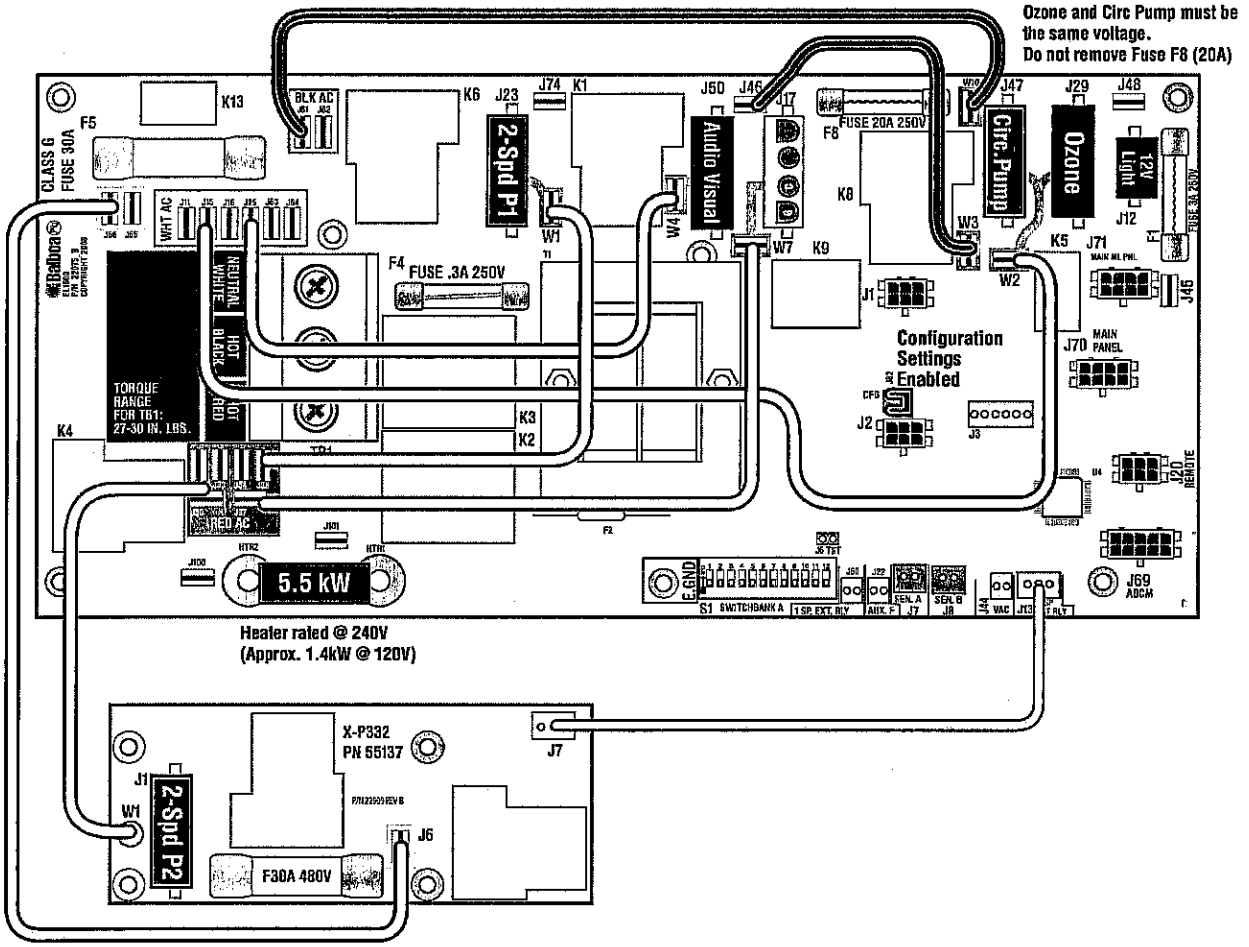
1. Typically Line voltage
2. Typically Line voltage for 2-speed pumps
3. Neutral (Common)
4. Ground

Note flat sides in connector

Wiring Configuration and DIP Settings

Setup 3

- 240V Pump 1, 2-Speed
- 240V Pump 2, 2-Speed
- 120V Circ Pump
- 120V Ozone
- 12V Spa Light
- 120V Audio-Visual (Stereo)
- 240V 5.5kW Heater
- ML700 Main Panel



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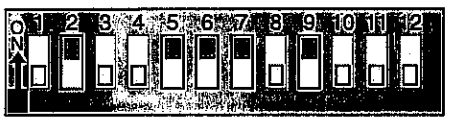
Switchbank A



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A5, } See Table 2
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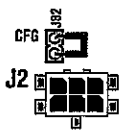
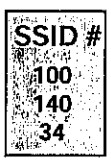
A9, Filter Duration 3 hr.
A10, No Edit
A11, Special Amp Rule OFF
A12, Memory ON



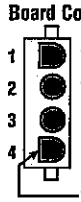


When the Logic Jumper is installed on J82 (CFG),
Software Config. Settings are enabled.
DIP Switches will operate as shown.

Wiring Color Key

- 120 Volt Connections
- 240 Volt Connections
- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

Board Connector Key

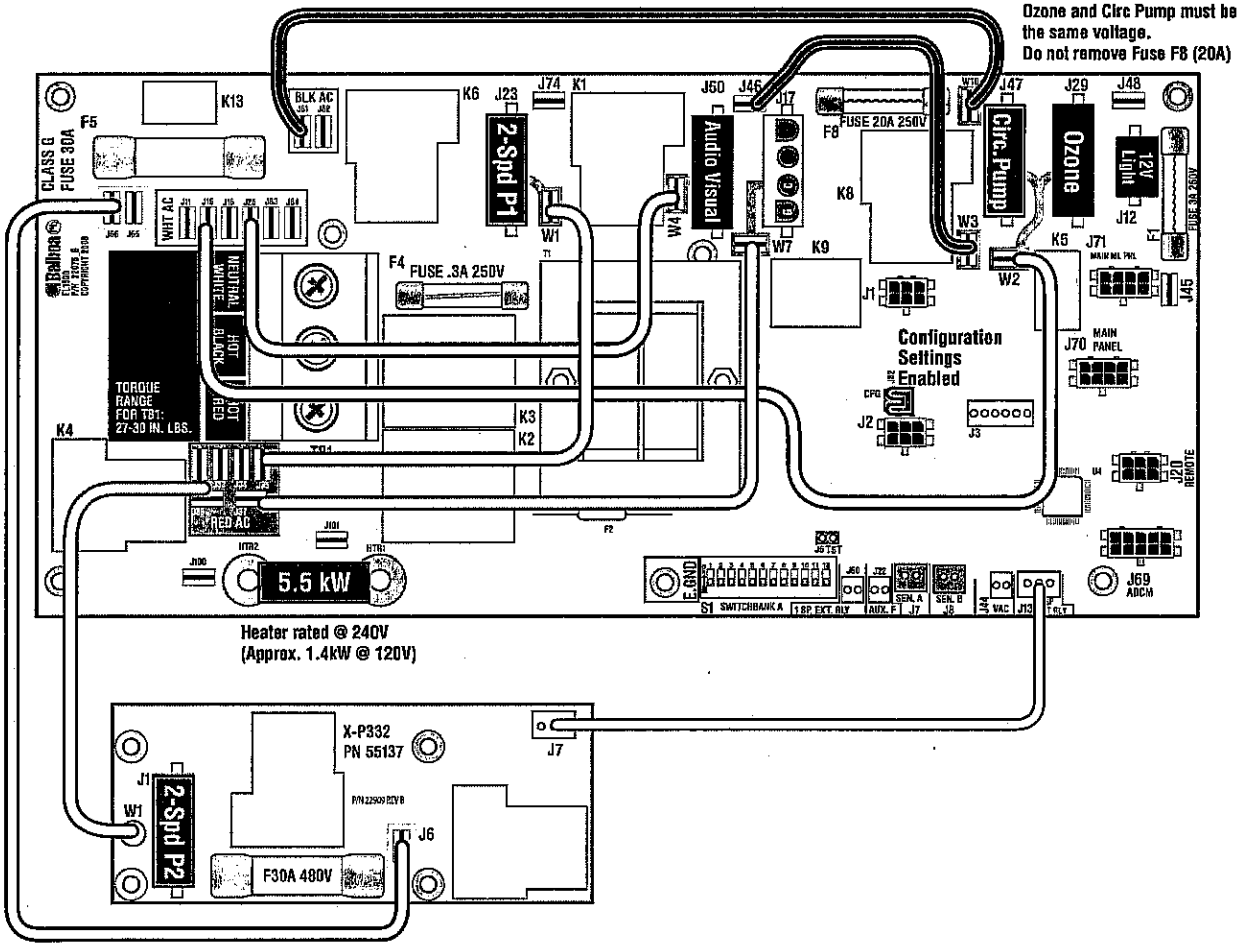


1. Typically Line voltage
2. Typically Line voltage for 2-speed pumps
3. Neutral (Common)
4. Ground

Note flat sides in connector

Setup 4

- 240V Pump 1, 2-Speed
- 240V Pump 2, 2-Speed
- 120V Circ Pump
- 120V Ozone
- 12V Spa Light
- 120V Audio-Visual (Stereo)
- 240V 5.5kW Heater
- ML553 Main Panel



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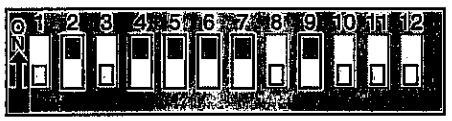
WARNING: Persistent Memory (A12) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

Switchbank A



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A3, } Pumps w/Heat
A4, Filters by Duration
A5, } See Table 2
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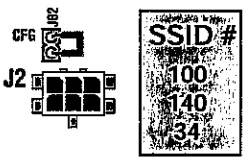
A7, } See Table 3
A8, } Pump 2
A9, Filter Duration 3 hr.
A10, No Edit
A11, Special Amp Rule OFF
A12, Memory ON



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Wiring Color Key

- 120 Volt Connections
- 240 Volt Connections
- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

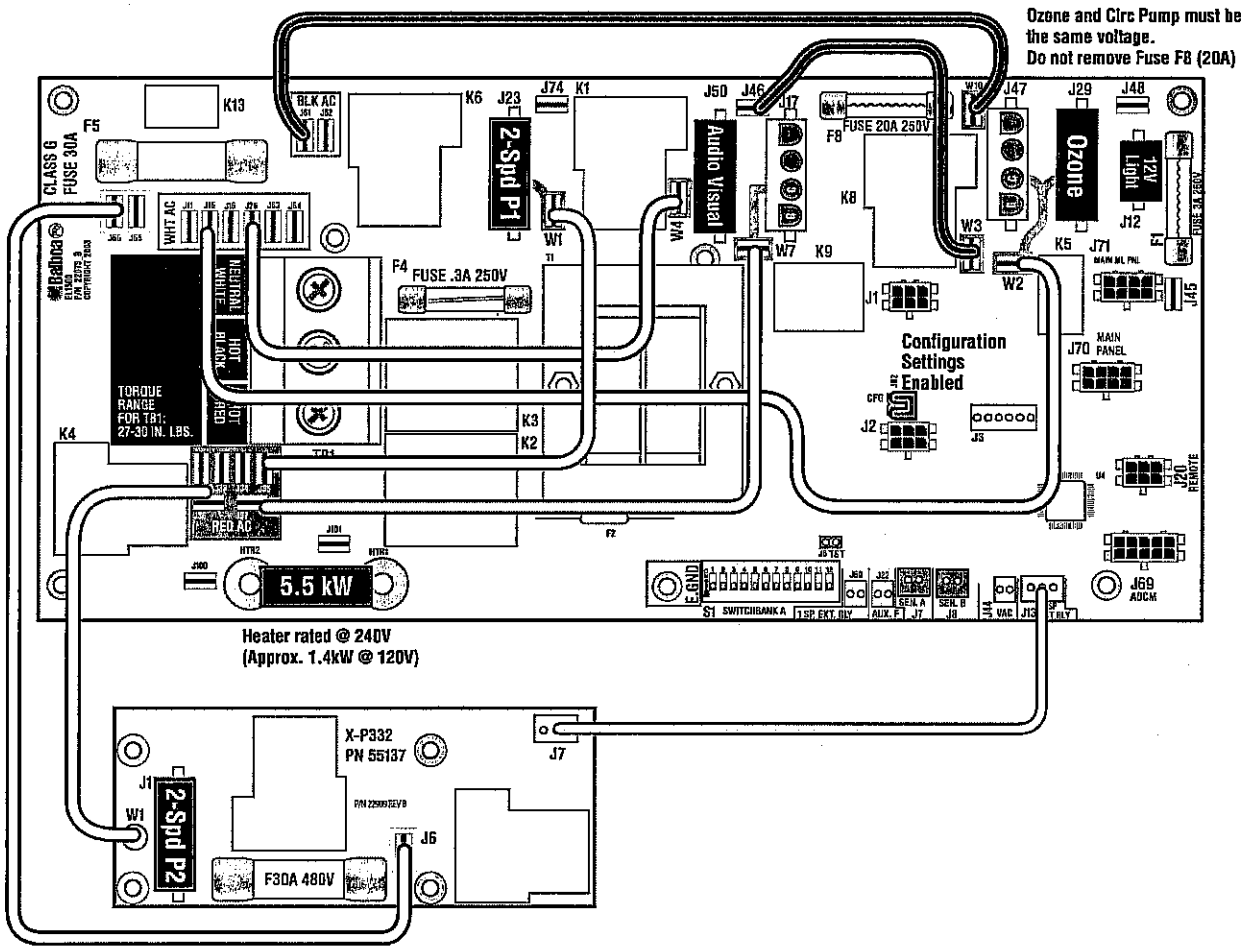
Board Connector Key

1. Typically Line voltage
2. Typically Line voltage for 2-speed pumps
3. Neutral (Common)
4. Ground

Note flat sides in connector

Setup 5 (As Manufactured)

- 240V Pump 1, 2-Speed
- 240V Pump 2, 2-Speed
- 120V Ozone
- 12V Spa Light
- 120V Audio-Visual (Stereo)
- 240V 5.5kW Heater
- ML700 Main Panel



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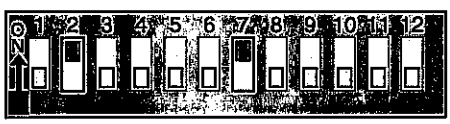

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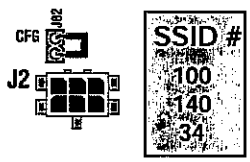

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Wiring Color Key

- 120 Volt Connections
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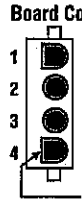
- 12 Volt Connections
- Relay Control Wires

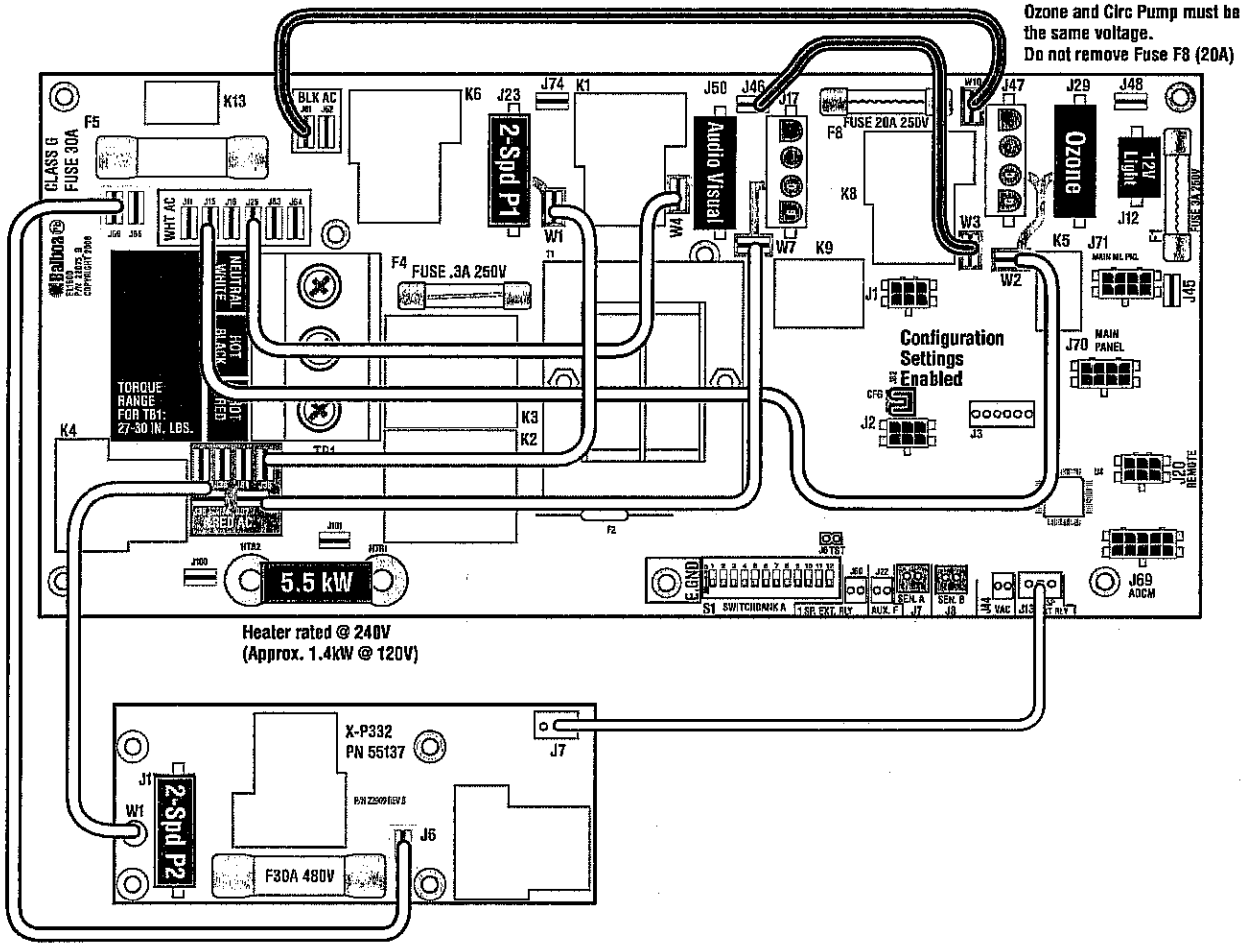
Board Connector Key



1 Typically Line voltage
2 Typically Line voltage for 2-speed pumps
3 Neutral (Common)
4 Ground
Note flat sides in connector

Setup 6

- 240V Pump 1, 2-Speed
- 240V Pump 2, 2-Speed
- 120V Ozone
- 12V Spa Light
- 120V Audio-Visual (Stereo)
- 240V 5.5kW Heater
- ML553 Main Panel



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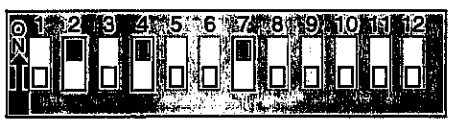

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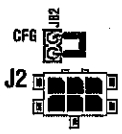

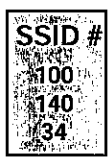

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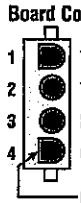
Wiring Color Key

- 120 Volt Connections
- 240 Volt Connections
- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

Board Connector Key



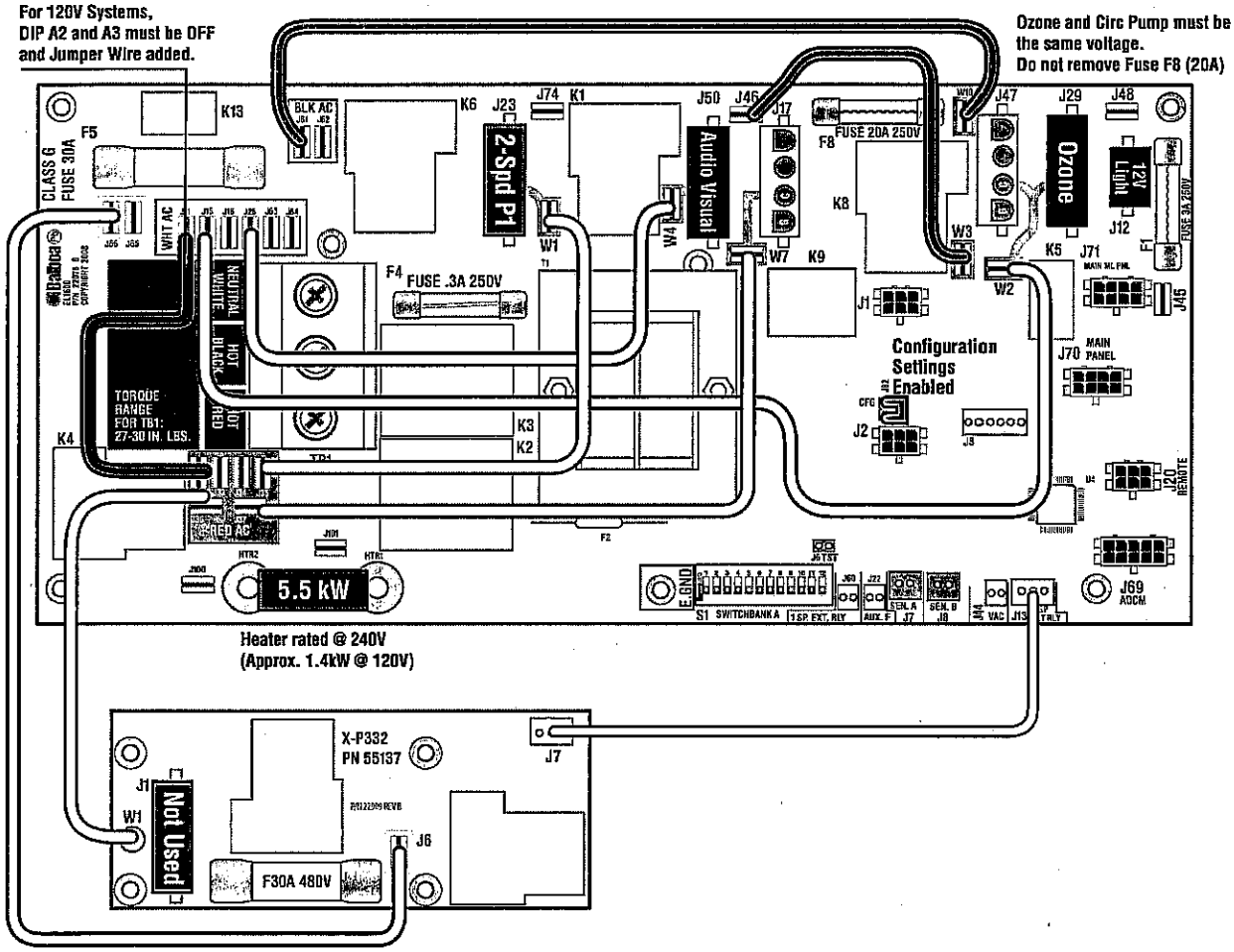
1 Typically Line voltage
2 Typically Line voltage for 2-speed pumps
3 Neutral (Common)
4 Ground

Note flat sides in connector

Wiring Configuration and DIP Settings

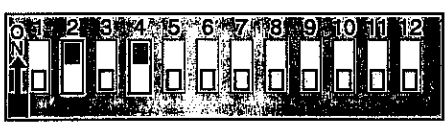
Setup 7

- 120/240V Pump 1, 2-Speed
- 120V Ozone
- 12V Spa Light
- 120V Audio-Visual (Stereo)
- 240V 5.5kW Heater (Effectively 1.5 kW @ 120V)
- ML553 Main Panel

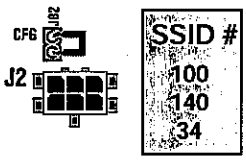


WARNING: Main Power to system should be turned OFF BEFORE adjusting DIP switches.
WARNING: Persistent Memory (A12) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

Switchbank A



A1, Test Mode OFF
A2, A3, } See Table 1 Pumps w/Heat
A4, Filters by Duration
A5, A6, } See Table 2 Circ Behavior
A7, A8, } See Table 3 Pump 2
A9, Filter Duration 2 hr.
A10, No Edit
A11, Special Amp Rule OFF
A12, Memory ON

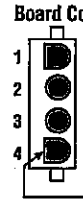


When the Logic Jumper is installed on J82 (CFG), Software Config. Settings are enabled. DIP Switches will operate as shown.

Wiring Color Key

- 120 Volt Connections
- 240 Volt Connections
- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

Board Connector Key



1 Typically Line voltage
2 Typically Line voltage for 2-speed pumps
3 Neutral (Common)
4 Ground
Note flat sides in connector

DIP Switches and Jumpers Definitions

WARNING:
- Setting DIP switches incorrectly may cause abnormal system behavior and/or damage to system components.
- Refer to Switchbank illustration on Wiring Configuration page for correct settings for this system.
- Contact Balboa if you require additional configuration pages added to this tech sheet.

DIP Switchbank A Key

A1 .....Test Mode (normally Off)
A2 .....See Table 1
A3 .....See Table 1
A10 .....When switched ON when spa is on, system will enter the Edit Menu for Configuration Settings. **Do not start spa with A10 turned on or CFE* error will occur**
A11 .....In "ON" position, enables Special Amperage Rule, see "SA" in Software Configuration section for functionality with your system
.....In "OFF" position, disables Special Amperage Rule
A12 .....Persistent memory reset (used when spa is powering up) See "Persistent Memory and Powering Up" page

*CFE errors are illegal configurations such as a pump and a blower set to run on the same output. The configuration must be corrected before the spa will operate.

Table 1

A2	A3	# of Hi-Speed Pumps/Blower Before Heat Disabled
OFF	OFF	0
ON	OFF	1
OFF	ON	2
ON	ON	Up to 4

Assignable DIP Switch Key

A4 .....In "ON" position, Filter cycles are programmed by duration
.....In "OFF" position, Filter cycles are programmed by time
A5 and A6.....See **Table 2** for Circ Pump Behavior settings
A7 and A8.....See **Table 3** for Pump 2 Behavior settings
A9 .....In "ON" position, Filter cycles duration is 3 hours
.....In "OFF" position, Filter cycles duration is 2 hours

Table 2

A5	A6	Circ Pump Behavior
OFF	OFF	Non-circ
OFF	ON	24-hour
ON	OFF	24-hour w/3°F
ON	ON	Like Pump 1 low

Table 3

A7	A8	Pump 2 Behavior
OFF	OFF	No Pump 2
OFF	ON	1-Spd Pump 2
ON	OFF	2-Spd Pump 2 on X-P332
ON	ON	1-Spd Pump 2 on X-P332

Software Configuration Settings

(n) = OEM Setting (Green circle)

Fd	Program Filter Cycles by Duration	n Y (_) **n** = Start and stop times; for time capable panels. **Y** = Duration; for non-time capable panels _ = 1 DIP Switch
F 1	Pump 1 in Filter (w/Circ Pump)	(n) Y (This feature is used in Circ Mode only.) Allows Pump 1 Low to operate in Filter Cycles to add extra filtration. **n** = Normal; **Y** = Pump 1 with Circ
24	24-Hour Time*	(n) Y _ **n** = 12-hour (am/pm); **Y** = 24-hour (military\European); _ = 1 DIP Switch *Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.
tc	Celsius**	(n) Y _ **n** = Fahrenheit; **Y** = Celsius; _ = 1 DIP Switch **Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up
to	Timeouts	1 F 2 (3) 4 5 6 **1-6** = 10, 20, 30, 40, 50, 60 minutes; **F** = 15 minutes
1 t	Pump 1 Low Timeout	d (1) 2 3 4 _ **d** = Use "Timeouts" value above; **1-4** = number of hours; _ = 3 DIP Switch
Lt	Light Timeout	d (1) 2 3 4 **d** = Use "Timeouts" value above; **1-4** = number of hours
Sc	Scrunch Panel	(n) Y _ **n** = Normal panel layout; **Y** = Alternate panel layout (ML900 scrunching enabled - ML550/700 Jets 3 replaces Blower; _ = 1 DIP Switch
ct	Circ Type (behavior)	n A 3 P (_) **n** = Non circ or circ pump not plumbed with heater; **A** = 24-hour; **3** = 24-hour with 3°F shutoff outside filter; **P** = Acts like Pump 1 Low (filter cycles, polls, etc.); _ = 2 DIP Switch

Software Configuration Settings Continued

Pump Speeds

P 1	Pump 1 Speeds	1 (2) _ **1** = 1 speed; **2** = 2 speed; _ = 1 DIP Switch
P2	Pump 2 Speeds	0 1 2 E (_) **0** = Disabled; **1** = On/Off on main board; **2** = 2 speed on X-P332 Board; **E** = On/Off on X-P or X-P231; _ = 2 DIP Switch
P3	Pump 3 Speeds	(0) E H Y _ **0** = Disabled; **E** = External X-P or X-P231 board; **H** = On/Off on pin 1 of X-P332 board; **Y** = On/Off on pin 2 of X-P332 board; _ = 3 DIP Switch
P4	Pump 4 Speeds	(0) Y _ **0** = Disabled; **Y** = On/Off on pin 2 of X-P332 board; _ = 3 DIP Switch
bL	Blower Speeds	(0) 1 2 3 _ **0** = Disabled; **1** = On/Off on main board; **2** = 2 speeds on X-TB board; **3** = 3 speeds on X-TB board; _ = 2 DIP Switch
15	Mister 1	(n) Y _ **n** = Disabled; **Y** = On/Off on X-P or X-P231 board; _ = 1 DIP Switch
12	Mister 2	(n) Y _ **n** = Mister Disabled; **Y** = Mister Enabled on pin 1 of X-P332 board; _ = 1 DIP Switch
13	Mister 3	(n) Y _ **n** = Mister Disabled; **Y** = Mister Enabled on pin 2 of X-P332 board; _ = 1 DIP Switch

Software Configuration Settings Continued

Options

oE	Option 1*	(n) Y P _ **n** = Disabled; **Y/P** = Enabled on J17; _ = 2 DIP Switch
03	Option 3*	(n) Y P _ **n** = Disabled; **Y/P** = Enabled on pin 1 of X-P332 board; _ = 2 DIP Switch
04	Option 4*	(n) Y P _ **n** = Disabled; **Y/P** = Enabled on pin 2 of X-P332 board; _ = 2 DIP Switch

*Note: Options 3-4: Y = On/Off w/ no timeout (toggle) mode; P = Pulse (momentary) mode

cc	Cleanup Cycles**	(0) 1 2 3 4 **0** = Disabled; **1-4** = Number of hours

**Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.

cU	Cleanup Cycles as User Preference	(n) Y **n** = Only in Configuration Settings; **Y** = Over-rideable by User via User Preferences

Ozone

o3	Ozone Operation	A (F) _ **A**= Operates with Heater Pump (Pump 1 Low or Circ Pump); **F** = Operates in Filter and Cleanup Cycles only; _ = 1 DIP Switch
o5	Ozone Suppression	n (Y) _ **n** = No Suppress; **Y** = 1-hour suppress on button press; _ = 1 DIP Switch
oI	Ozone Icon	n (Y) **n** = O_3 Icon on Panels Disabled; **Y** = O_3 Icon on Panels Enabled

Software Configuration Settings Continued

Auxiliary Buttons

A1	Aux Button 1 (Bank A)	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
A2	Aux Button 2 (Bank A)	1 (2) 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
A3	Aux Button 3 (Bank A)	1 2 3 4 5 6 (b) g F E o t d P n A U r O H 9 L 8 7
A4	Aux Button 4 (Bank A)	1 2 3 4 5 6 b g F (E) o t d P n A U r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled; **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir; **7** = Option 5

b1	Aux Button 1 (Bank B)	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
b2	Aux Button 2 (Bank B)	1 (2) 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
b3	Aux Button 3 (Bank B)	1 2 3 4 5 6 (b) g F E o t d P n A U r O H 9 L 8 7
b4	Aux Button 4 (Bank B)	1 2 3 4 5 6 b g F (E) o t d P n A U r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled; **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir; **7** = Option 5

AU	Aux Button Bank Select	(A) b _

A = Bank A; **b** = Bank B; **_** = 1 DIP Switch

Reminders

Sr	Suppress all Reminders	n (Y) _

n = Display Reminders; **Y** = Suppress all Reminders; **_** = 1 DIP Switch

rP	Check pH Reminder Period	0 (1) 2 3 4 5 6 7 8 9 t
rS	Check Sanitizer Reminder Period	0 (1) 2 3 4 5 6 7 8 9 t
rF	Clean Filter Reminder Period	0 1 2 (3) 4 5 6 7 8 9 t
r9	Test GFCI Reminder Period	0 1 2 (3) 4 5 6 7 8 9 t
rd	Drain Water Reminder Period	0 1 2 3 4 5 (6) 7 8 9 t
rA	Change Mineral Cartridge	(0) 1 2 3 4 5 6 7 8 9 t
rC	Clean Cover Reminder Period	0 1 2 3 4 5 6 7 (8) 9 t
ro	Treat Wood Reminder Period	0 1 2 3 4 5 6 7 (8) 9 t
rt	Change Filter Reminder Period	0 1 2 3 4 5 6 7 8 (9) t

0 = Off; **1** = 7 days; **2** = 14 days; **3** = 30 days; **4** = 45 days; **5** = 60 days; **6** = 90 days; **7** = 120 days; **8** = 180 days; **9** = 365 days; **t** = 21 days

Software Configuration Settings Continued

Temperature Settings

LS Lowest Set Temperature* (8) 7

8 = 80°F/26.0°C; **7** = 70°F/21.0°C

*Setting LS at 7 and Fr at 5 will cause a CFE error.

St Default Set Temperature** 5 6 7 8 9 (0) 1 2 3 4 E F n

5 = 95°F/35.0°C; **6** = 96°F/35.5°C; **7** = 97°F/36.0°C; **8** = 98°F/36.5°C; **9** = 99°F/37.0°C; **0** = 100°F/38.0°C; **1** = 101°F/38.5°C; **2** = 102°F/39.0°C; **3** = 103°F/39.5°C; **4** = 104°F/40.0°C; **E** = 80°F/26.5°C; **F** = 85°F/29.5°C **n** = 90°F/32.0°C

**Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.

UL Uppermost Set Temperature 5 6 7 8 9 0 1 2 3 (4) E F n

5 = 95°F/35.0°C; **6** = 96°F/35.5°C; **7** = 97°F/36.0°C; **8** = 98°F/36.5°C; **9** = 99°F/37.0°C; **0** = 100°F/38.0°C; **1** = 101°F/38.5°C; **2** = 102°F/39.0°C; **3** = 103°F/39.5°C; **4** = 104°F/40.0°C; **E** = 80°F/26.5°C; **F** = 85°F/29.5°C **n** = 90°F/32.0°C

Fr Freeze Temperature Threshold 3 (4) 9 5

3 = 39°F/3.9°C; **4** = 44°F/6.7°C; **9** = 49°F/9.4°C; **5** = 54°F/12.2°C;

tL Set Temperature Lock t (S)

t = Temp Lock Only; **S** = Temp + Settings Lock

Software Configuration Settings Continued

Filter Cycles

Lc	Light Cycle Programming	(n) Y **n** = Disabled; **Y** = Enabled
1r	Filter 1 Start Hour (Set 1)*	- 0 1 2 3 4 5 6 7 (8) 9 A b C d E F g H J L n o P r
1d	Filter 1 Duration (Set 1)*	- 0 1 (2) 3 4 5 6 7 8 9 A b C d E F g H J L n o P r
2r	Filter 2 Start Hour (Set 1)*	- 0 1 2 3 4 5 6 7 8 9 A b C d E F g H J L (n) o P r
2d	Filter 2 Duration (Set 1)*	- 0 1 (2) 3 4 5 6 7 8 9 A b C d E F g H J L n o P r

- = Standard Defaults; **0** = 0 (12 am, 24); **1-9** = 1-9; **A** = 10; **b** = 11; **C** = 12; **d** = 13 (1 pm); **E** = 14 (2 pm); **F** = 15 (3 pm); **g** = 16 (4 pm); **H** = 17 (5 pm); **J** = 18 (6 pm); **L** = 19 (7 pm); **n** = 20 (8 pm); **o** = 21 (9 pm); **P** = 22 (10 pm); **r** = 23 (11 pm)

These settings allow customization of the filter defaults. If any of these four settings is **"-"**, the standard filter defaults are used.

1d and **2d** cannot both be set to **0**.

When **Fd.n** is selected, **1d** and **2d** are Filter 1 and Filter 2 Duration specifically.

When **Fd.y** is selected:
If **1d** is set to **0**, **2d** is the duration; otherwise **1d** is the duration.
If **1d** is set to **0**, only the Night cycle runs.
If **2d** is set to **0**, only the Day cycle runs.
If neither **1d** nor **2d** is set to **0**, both the Day and Night cycles run.

*Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.

3r	Filter 1 Start Hour (Set 2)**	(-) 0 1 2 3 4 5 6 7 8 9 A b C d E F g H J L n o P r
3d	Filter 1 Duration (Set 2)**	- 0 1 2 (3) 4 5 6 7 8 9 A b C d E F g H J L n o P r
4r	Filter 2 Start Hour (Set 2)**	(-) 0 1 2 3 4 5 6 7 8 9 A b C d E F g H J L n o P r
4d	Filter 2 Duration (Set 2)**	- 0 1 2 (3) 4 5 6 7 8 9 A b C d E F g H J L n o P r

- = Standard Defaults; **0** = 0 (12 am, 24); **1-9** = 1-9; **A** = 10; **b** = 11; **C** = 12; **d** = 13 (1 pm); **E** = 14 (2 pm); **F** = 15 (3 pm); **g** = 16 (4 pm); **H** = 17 (5 pm); **J** = 18 (6 pm); **L** = 19 (7 pm); **n** = 20 (8 pm); **o** = 21 (9 pm); **P** = 22 (10 pm); **r** = 23 (11 pm)

These settings allow customization of the filter defaults. If any of these four settings is **"-"**, the standard filter defaults are used.

3d and **4d** cannot both be set to **0**.

When **Fd.n** is selected, **3d** and **4d** are Filter 1 and Filter 2 Duration specifically.

When **Fd.y** is selected:
If **3d** is set to **0**, **4d** is the duration; otherwise **3d** is the duration.
If **3d** is set to **0**, only the Night cycle runs.
If **4d** is set to **0**, only the Day cycle runs.
If neither **3d** nor **4d** is set to **0**, both the Day and Night cycles run.

**Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.

FS	Filter Default Start Time Set***	(1) 2 _ **1** = Set 1; **2** = Set 2; **_** = 1 DIP Switch

***Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.

FP	Filter Default Duration Set*	1 2 (_) **1** = Set 1; **2** = Set 2; **_** = 1 DIP Switch

*Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.

Software Configuration Settings Continued

Purge Duration

PP	Pump Purge Duration	3 1 2 5 (t) **3** = 30 seconds; **1 - 5** = 1 - 5 minutes; **t** = 10 minutes
bP	Blower Purge Duration	5 1 2 (3) 4 6 t F **5** = 5 seconds; **1** = 10 seconds; **2** = 20 seconds; **3** = 30 seconds; **4** = 45 seconds; **6** = 60 seconds (1 minute); **t** = 2 minutes; **F** = 5 minutes
EP	Mister Purge Duration	(5) 1 2 3 4 6 t F **5** = 5 seconds; **1** = 10 seconds; **2** = 20 seconds; **3** = 30 seconds; **4** = 45 seconds; **6** = 60 seconds (1 minute); **t** = 2 minutes; **F** = 5 minutes

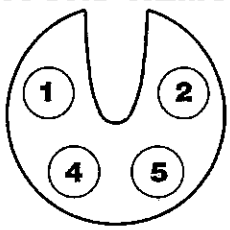
Software Configuration Settings Continued

Remote Buttons Set A

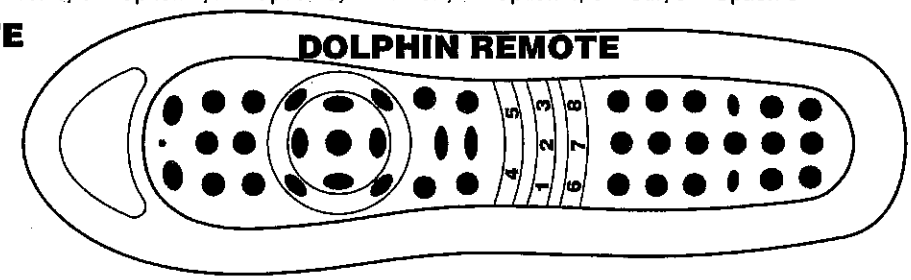
n1	Remote Button 1 (Set A)	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
n2	Remote Button 2 (Set A)	1 (2) 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
n3	Remote Button 3 (Set A)	1 2 (3) 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
n4	Remote Button 4 (Set A)	1 2 3 4 5 6 (b) g F E o t d P n A U r O H 9 L 8 7
n5	Remote Button 5 (Set A)	1 2 3 4 5 6 b (g) F E o t d P n A U r O H 9 L 8 7
n6	Remote Button 6 (Set A)	1 2 3 4 5 6 b g (F) E o t d P n A U r O H 9 L 8 7
n7	Remote Button 7 (Set A)	1 2 3 4 5 6 b g F E (o) t d P n A U r O H 9 L 8 7
n8	Remote Button 8 (Set A)	1 2 3 4 5 6 b g F E o (t) d P n A U r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled; **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir; **7** = Option 5

ROUND REMOTE



DOLPHIN REMOTE

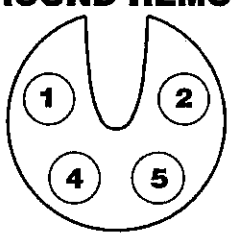


Remote Buttons Set B

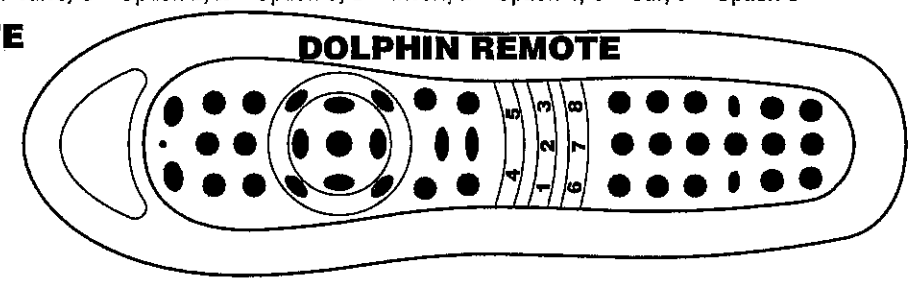
H1	Remote Button 1 (Set B)	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
H2	Remote Button 2 (Set B)	1 (2) 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
H3	Remote Button 3 (Set B)	1 2 (3) 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
H4	Remote Button 4 (Set B)	1 2 3 4 5 6 (b) g F E o t d P n A U r O H 9 L 8 7
H5	Remote Button 5 (Set B)	1 2 3 4 5 6 b (g) F E o t d P n A U r O H 9 L 8 7
H6	Remote Button 6 (Set B)	1 2 3 4 5 6 b g (F) E o t d P n A U r O H 9 L 8 7
H7	Remote Button 7 (Set B)	1 2 3 4 5 6 b g F E (o) t d P n A U r O H 9 L 8 7
H8	Remote Button 8 (Set B)	1 2 3 4 5 6 b g F E o (t) d P n A U r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled; **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir; **7** = Option 5

ROUND REMOTE



DOLPHIN REMOTE



d0	Remote Button Bank Select	(A) b _

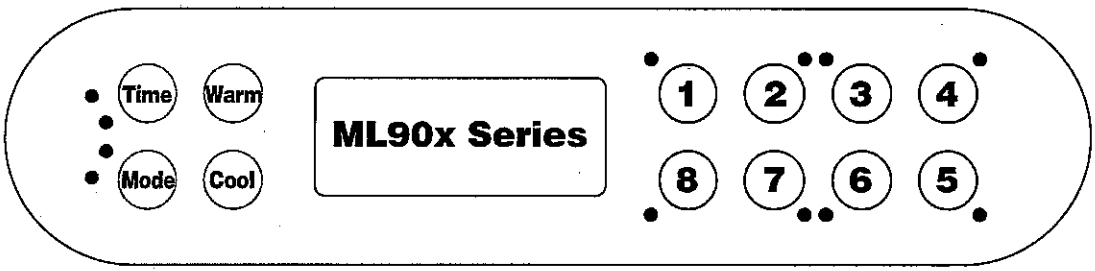
A = Bank A; **b** = Bank B; **_** = 1 DIP Switch

Software Configuration Settings Continued

ML90x Series Buttons

81	ML90x Custom Button 1	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
82	ML90x Custom Button 2	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
83	ML90x Custom Button 3	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
84	ML90x Custom Button 4	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
85	ML90x Custom Button 5	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
86	ML90x Custom Button 6	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
87	ML90x Custom Button 7	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
88	ML90x Custom Button 8	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled; **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir; **7** = Option 5



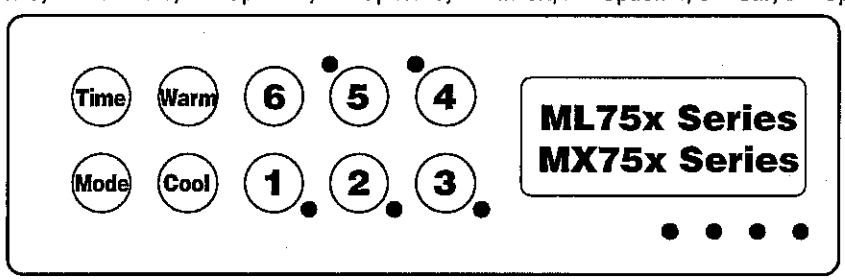
8C	ML90x Custom Buttons Enable	(n) Y _

n = Disabled; **Y** = Enabled; **_** = 1 DIP Switch

ML75x/MX75x Series Buttons

61	ML75x/MX75x Custom Button 1	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
62	ML75x/MX75x Custom Button 2	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
63	ML75x/MX75x Custom Button 3	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
64	ML75x/MX75x Custom Button 4	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
65	ML75x/MX75x Custom Button 5	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
66	ML75x/MX75x Custom Button 6	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled; **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir; **7** = Option 5



6C	ML750/MX750 Custom Buttons Enable	(n) Y _

n = Disabled; **Y** = Enabled; **_** = 1 DIP Switch

Software Configuration Settings Continued

ML70x Series Buttons

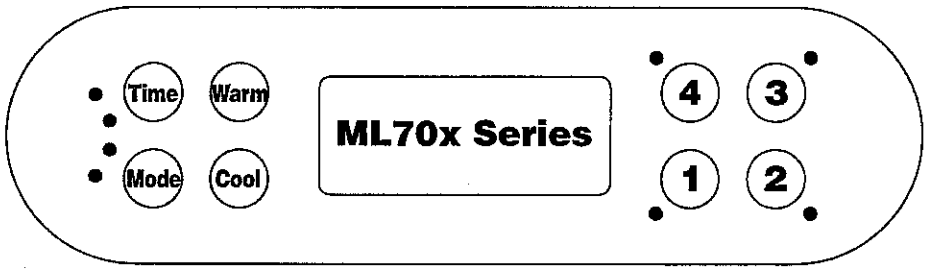
41 ML70x Custom Button 1 (1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

42 ML70x Custom Button 2 (1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

43 ML70x Custom Button 3 (1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

44 ML70x Custom Button 4 (1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled; **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir; **7** = Option 5



4C ML70x Custom Buttons Enable (n) Y _

n = Disabled; **Y** = Enabled; **_** = 1 DIP Switch

ML55x Series Buttons

51 ML55x Custom Button 1 (1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

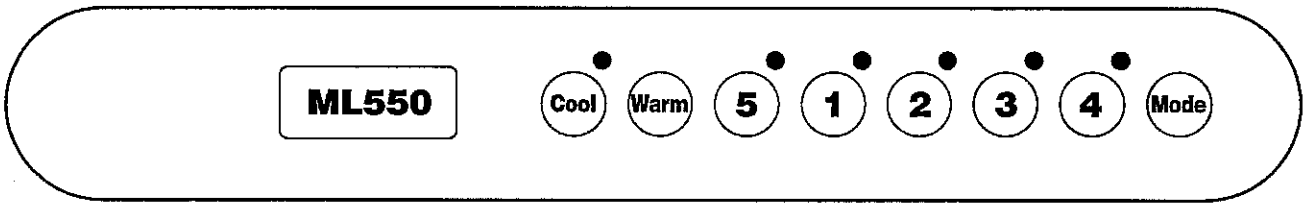
52 ML55x Custom Button 2 1 2 3 4 5 6 b g F E o t d P n A (U) r O H 9 L 8 7

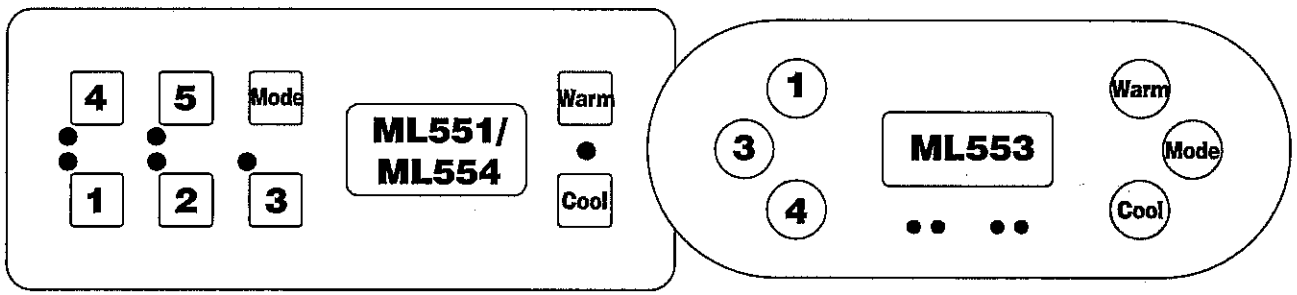
53 ML55x Custom Button 3 1 (2) 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

54 ML55x Custom Button 4 1 2 3 4 5 6 b (g) F E o t d P n A U r O H 9 L 8 7

55 ML55x Custom Button 5 1 2 3 4 5 6 b g F E o t d P n A (U) r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled; **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir; **7** = Option 5





5C ML55x Custom Buttons Enable n (Y) _

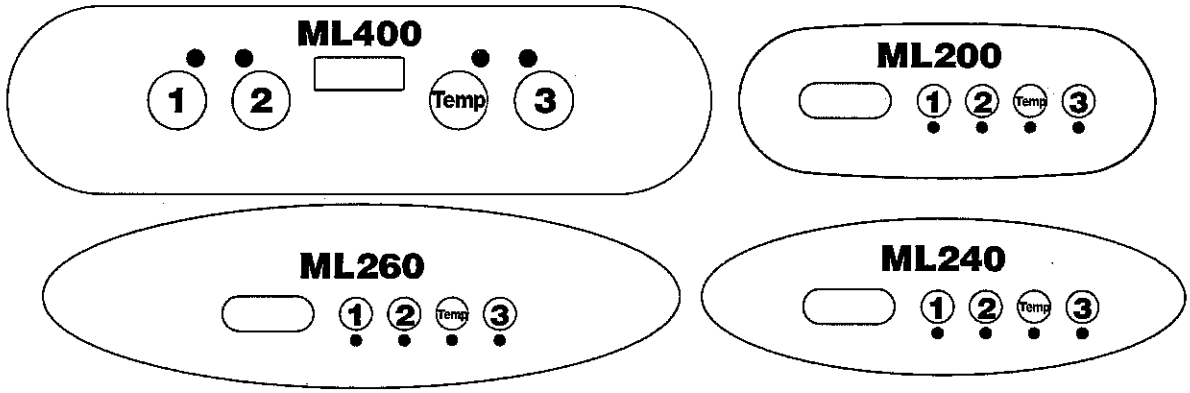
n = Disabled; **Y** = Enabled; **_** = 1 DIP Switch

Software Configuration Settings Continued

ML40x/ML2xx Series Buttons

31	ML40x/ML2xx Custom Button 1	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
32	ML40x/ML2xx Custom Button 2	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
33	ML40x/ML2xx Custom Button 3	(1) 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); **b** = Blower; **g** = Spa Light; **F** = Fiber-Optic wheel/light; **E** = EitherLight; **o** = Option 1; **t** = Mister 1; **d** = Mister 2/Cool; **P** = Mister 3/Elec Heat; **n** = Ext Heat; **A** = Sound Mode Select; **U** = Button Disabled (DO NOT USE); **r** = Air Valve; **O** = Option 2; **H** = Option 3; **9** = Invert; **L** = Option 4; **8** = Stir ; **7** = Option 5



3C	ML40x/ML2xx Custom Buttons Enable	(n) Y _ **n** = Disabled; **Y** = Enabled; _ = 1 DIP Switch
5A	Special Amperage Rule*	(1) 2 3 4 **1** = Blower off when 2nd high-speed pump on; **2** = Max 1 high-speed pump **3** = Max 2 high-speed pumps; **4** = Max 2 high-speed pumps + Blower off when 2nd high-speed pump on

*Note: DIP A11 must be ON to use Special Amperage Rule.

dr	DR Mode	(n) Y **n** = Disabled; **Y** = Enabled
dE	Demo Mode	(n) Y **n** = Disabled; **Y** = Enabled
9F	GFCI Test Enable	n (1) 2 3 4 5 6 7 **n** = Disabled; **1** = Auto after 1 day; **2** = Auto after 2 days; **3** = Auto after 3 days; **4** = Auto after 4 days; **5** = Auto after 5 days; **6** = Auto after 6 days; **7** = Auto after 7 days

Ozone Connections

Ozone Connector Voltage: The EL circuit board is factory configured to deliver a preset voltage (120V or 240V) to the on-board ozone connector (J29). See the ratings table on the wiring diagram attached to the cover of the enclosure for the configured voltage. For 240V output W2 connects to Red AC and for 120V output W2 connects to White AC.

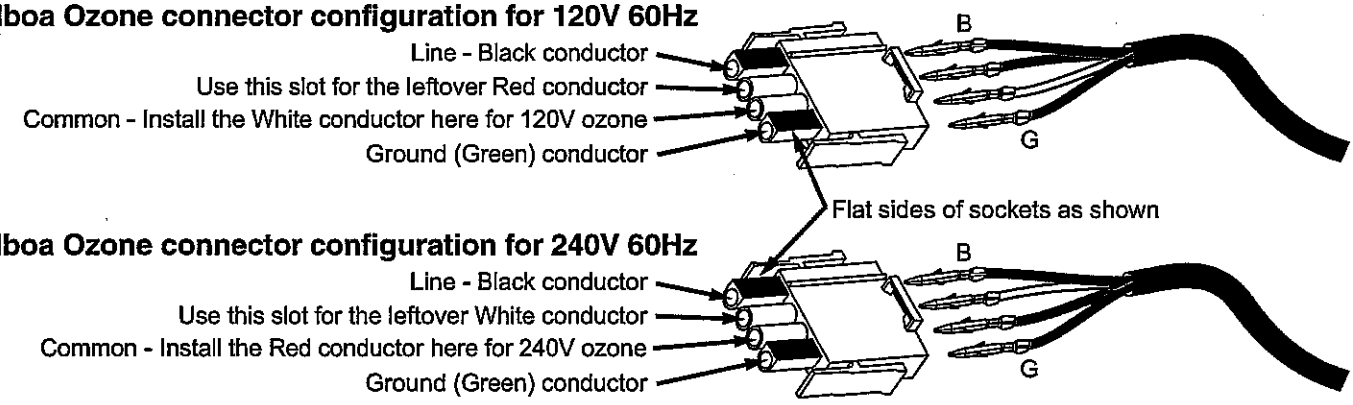
The voltage to the ozone connector can be changed in the field if required. W2 just needs to be set for the required voltage.

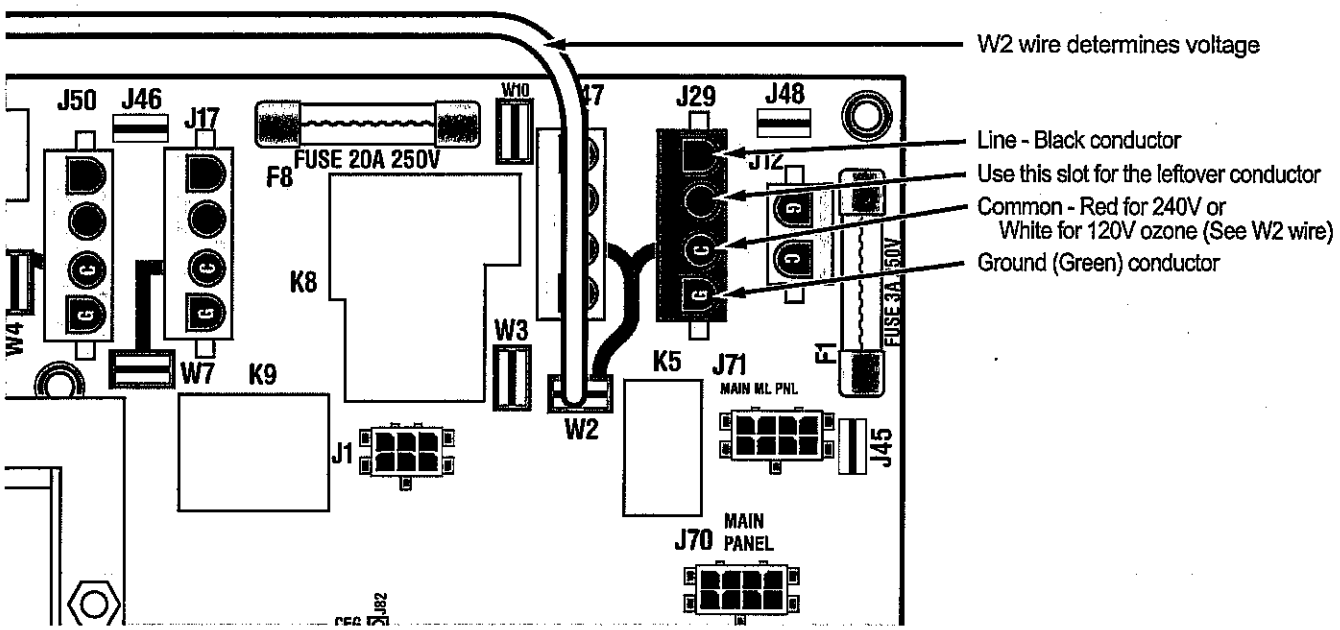
Balboa Ozone Generator: If the board is set up to operate a 120V ozone generator, the connector on the ozone generator is likely to be configured correctly, but should be compared to the illustration below.

If a 240V ozone generator is required, be sure the red wire in the ozone cord is positioned in the connector next to the green ground wire as described below.

Note: A special tool is required to remove the pins from the connector body once they are snapped in place. Check with your Balboa Account Manager for information on purchasing a pin-removal tool.

Balboa Ozone connector configuration for 120V 60Hz



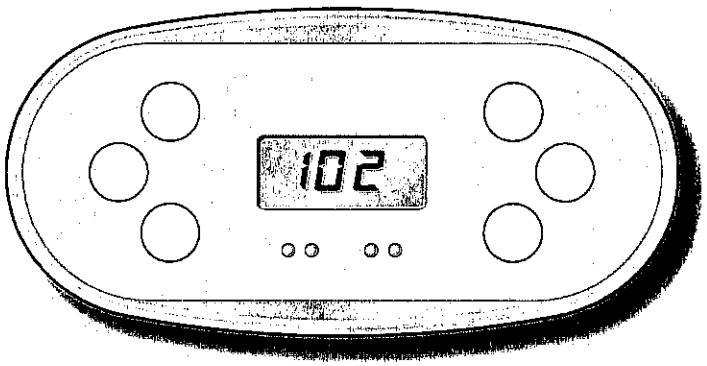


Panel Configurations

Time Capable

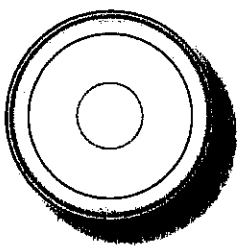
ML700
PN 52798-01 with No Overlay (Customer supplied)
• Connects to Main Panel terminal J70, or J71

Non-Time Capable

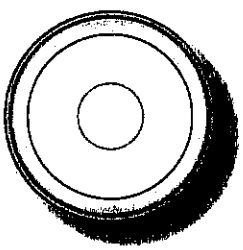


ML553
PN 55381 with No Overlay (Customer supplied)
• Connects to Main Panel terminal J70, or J71

Aux. Panels



AX10A1 – Jets 1
PN 52803 with No Overlay
(Customer supplied)
• Connects to Main Panel terminal J1, or J2



AX10A2 – Jets 2
PN 52804 with No Overlay
(Customer supplied)
• Connects to Main Panel terminal J1, or J2