

EL1500 Tech Sheet v35 Template

Customer; _____

System PN _____

System Model # E2P-_____ - **CA**

Software Version # 35

EPN # _____

Base PCBA – PN _____

PCB EL1500 – PN 22075 Rev B

HEX File – _____

See last page for Panel and Overlay selection.

Main Panel PN _____

Main Panel Overlay PN _____

Aux Panel PN _____

Aux Panel Overlay PN _____

Redlines created by: _____

Date: _____

Template used: 40916_01_C.pdf 04/24/2009
40916_01_C.pdf 04/24/2009

Configuration Method (Check One)	
N/A	DIP Switch Configured
	Software Configured
	Configuration Signature _____

This is not a shippable model.
This document template is merely a starting point for custom models.



Optional Custom Box Overlay (Circle One)

- No

- Yes, Overlay PN _____

System Revision History

This page is for listing the changes made to this system and will be filled in as the tech sheet are created/updated.

This will provide a quick reference of what was changed from one system version to the next.

Basic System Features and Functions **Software Configured**

Service - Input Power Requirements (Circle Letter Assignment)

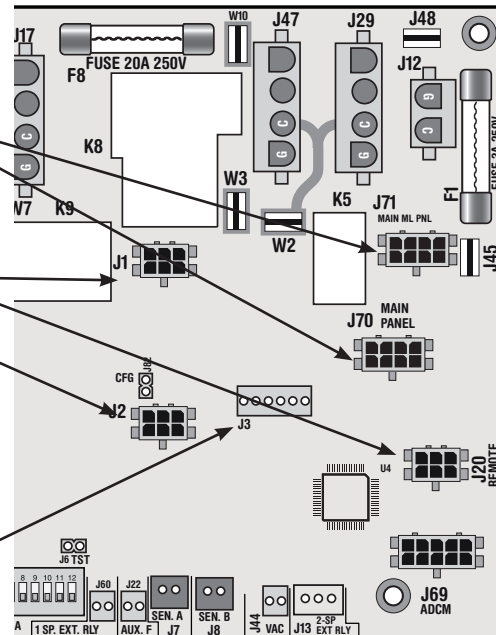
Y	240VAC, 60Hz, 48A, Class A GFCI-protected service (Circuit Breaker rating = 60A max.), 4 wires (hot, hot, neutral, ground)
D	240VAC, 60Hz, 40A, Class A GFCI-protected service (Circuit Breaker rating = 50A max.), 4 wires (hot, hot, neutral, ground)
Z	120/240VAC, 60Hz, 16/48A, Class A GFCI-protected service (Circuit Breaker rating = 20/60A max.), 3 or 4 wires (hot, hot (opt), neutral, ground)

System Outputs (Circle Configurations)

Pump 1	240V	120V	1-Speed	2-Speed	Disabled
Pump 2	240V	120V	1-Speed	2-Speed	Disabled
Pump 3	240V	120V	1-Speed	N/A	Disabled
Pump 4	240V	120V	1-Speed	N/A	Disabled
Blower	240V	120V	1-Speed	___-Speed	Disabled
Circ Pump	240V	120V	N/A	N/A	Disabled
Ozone	240V	120V	N/A	N/A	Disabled
Spa Light	12V	120V	N/A	N/A	Disabled
Audio/Visual	240V	120V	N/A	N/A	Disabled
Mister	240V	120V	N/A	N/A	Disabled
Heater	240V	120V	5.5kW	4.0kW	___ kW

Additional Options

- Full Feature Dolphin Remote and Spa-only Dolphin Remote
Connects to Main Panel terminal J70 or J71
- Spa Monitor
Connects to Remote terminal J20
- IR or RF Dolphin Receiver Module
Connects to Remote terminal J20
- Auxiliary Panel Connections J1 and J2
- Ozone Generator
Connects to terminal J29 or J17
- MoodEFX Lighting
Connects to Spa Light terminal J12
- Stereo System
Connects to A.V. terminal J50
- Real-Time Clock option plugs into J3



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 separately).

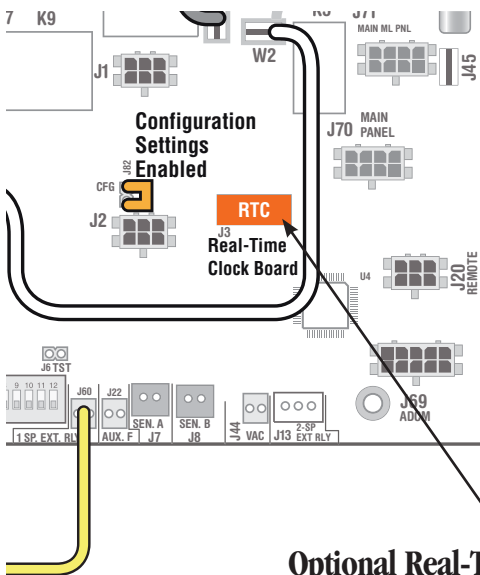
To reset Persistent Memory:

- Power down.
- Set A12 ON (See illustration below).
- Power up.
- Wait until “*P_r*” 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 an optional Real-Time-Clock (RTC) board 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 RTC Board. This board should be installed on any system that uses a control panel that displays time-of-day. The RTC Board must be removed from any system that does not have a panel installed that supports time-of-day.



Optional Real-Time-Clock board plugs into J3.

CFE message on power up:

If “*CFE*” appears before (and instead of) “*P_r*” 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:

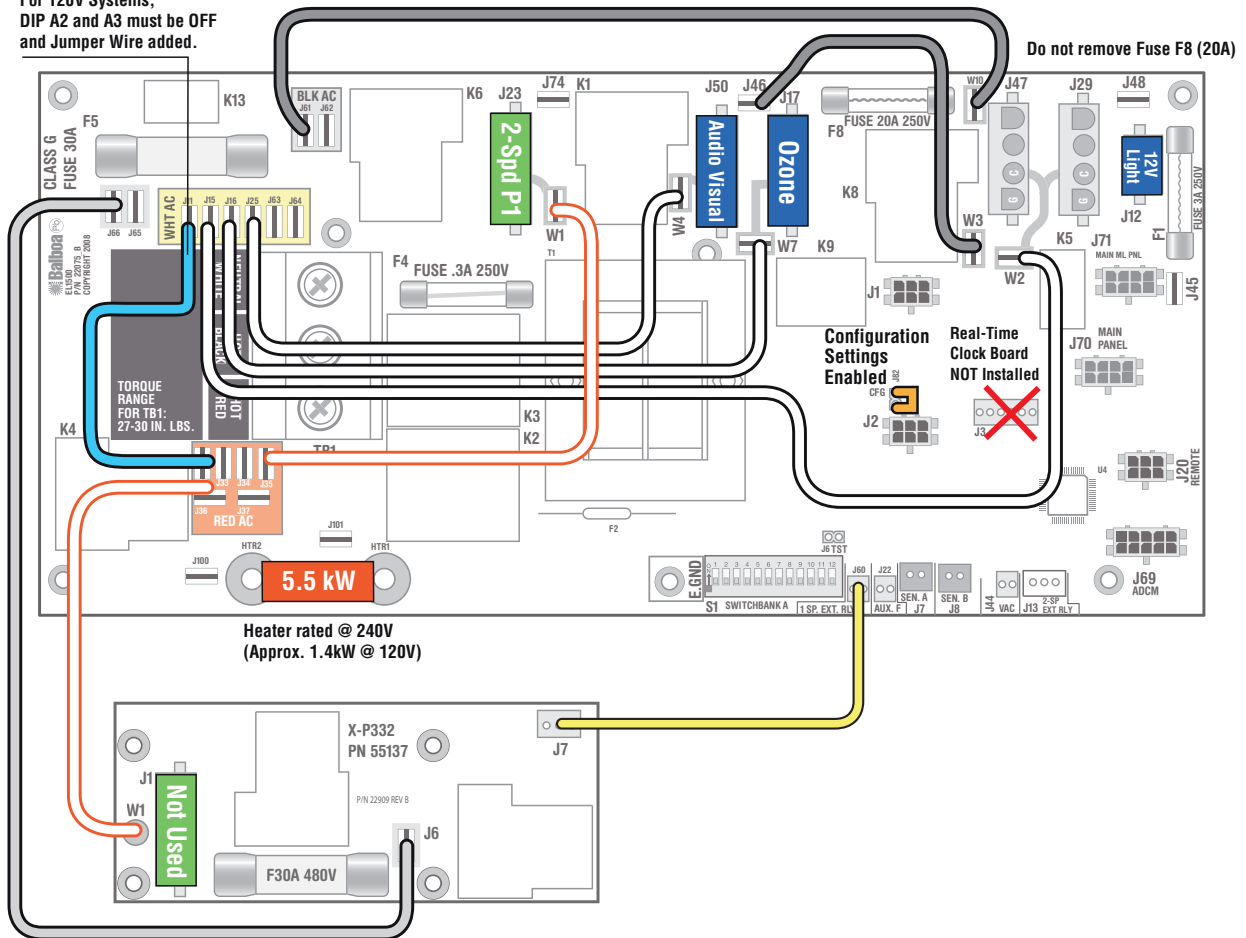
- Three numbers in a row, which are the SSID (the System Software ID). The third display of these numbers is the Software Version, which should match the version of your system. For example, if these three numbers are *100 134 26*, that is a Mach 3 EL8000 at version 26.
- If there is a Configuration 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.
- “*P_r*” 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

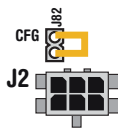
Setup 1 (As Manufactured)

For 120V Systems,
DIP A2 and A3 must be OFF
and Jumper Wire added.

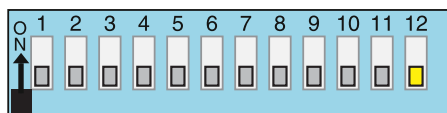


Indicate DIP positions needed for this system.

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



Switchbank A



Special Connections/Notes: _____

Expander Boards (Select configuration)		
Device	Ex Board Model	Voltage
Blower (2/3-Spd)	X-B	120V
Pump 3 - 1 Spd	X-TB	240V
Pump 4 - 1 Spd	X-P	
Mister	X-P231	
ADCM Splitter	X-P332	
	Cables/Adapters	
	PS-34	

- Ozone on J17
- Ozone on J29
- Include Real-Time Clock capability

DIP Switches and Jumpers Definitions **Software Configured**

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

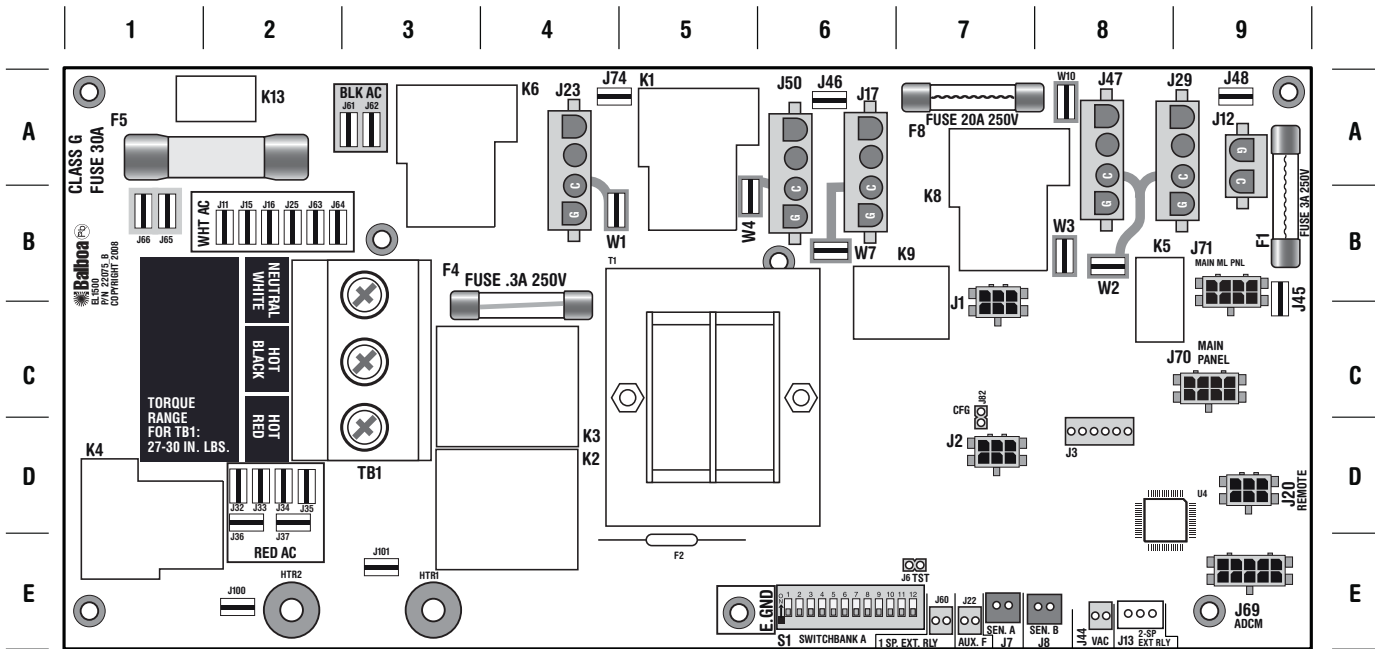
- A1Test Mode (normally Off)
- A2See Table 1
- A3See Table 1
- A10When switched ON when spa is on, system will enter the Edit Menu for Configuration Settings. **Do not start spa with A10 turned on or CFE* error will occur**
- A11In "ON" position, enables Special Amperage Rule, see "SA" in Software Configuration section for functionality with your system
.....In "OFF" position, disables Special Amperage Rule
- A12Persistent 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.

A2	A3	
OFF	OFF	0
ON	OFF	1
OFF	ON	2
ON	ON	Up to 4

To be filled is as individual system requires.

Configuration Options



Output Features

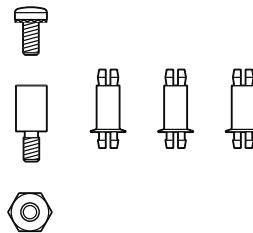
Component	Options	Quadrant
J23	+ W1 - 2-Speed Pump 1 - OR 1-Speed Pump 1 when in Circ Mode	4-A
J50	+ W4 - Audio Visual - always hot, no relay	6-A
J17	+ W7 - 1-Speed Blower (W3 to J46) - OR Single-Speed Pump 2 or Pump 3 (W3 to J62) - OR Ozone (W3 to J46)	6-A
J47	+ W2 - Circ Pump	8-A
J29	+ W2 - Ozone (Same voltage as Circ Pump, if used) - Note X-03 option board for retro fit	9-A
J12	- Spa Light (12V only)	9-A

Note: Some panels styles are not available depending on system configuration. Consult your Balboa product representative for details.

Other Features

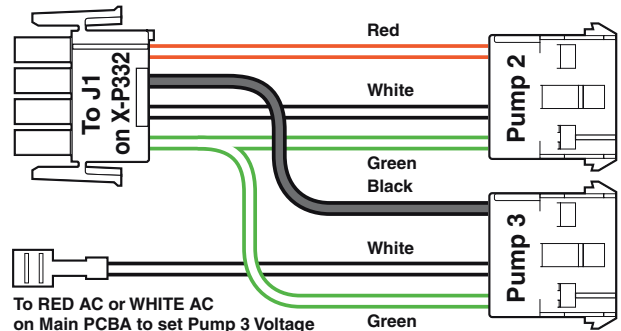
Component	Options	Quadrant
J3	- Real-time Clock Board can be installed - Allows programming by time of day - Stores time settings for 30 days without power	8-D

120V Conversion Option - Add jumper from Red AC (J32) to White AC (J11) and set DIP switch A10 to ON.



X-Mount P PN 53933

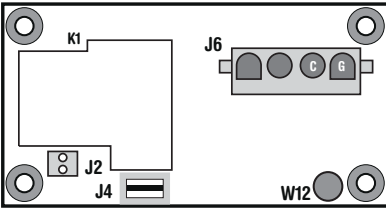
Used for mounting any Expander Board in a plastic enclosure. Standoffs attach to heater mounting bracket.



PS-23 PN 25089

Used to split the output from a 2-Speed Connector into a single-speed Pump 2 and single-speed Pump 3. White wire quick connect goes to Red AC or White AC on Main PCB.

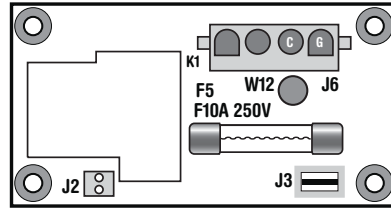
Expander Options



X-P PN 53544

Used for a 1-speed Pump output.

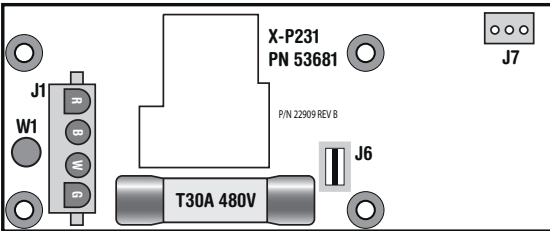
- J4 on X-P connects directly to Black AC using J62 or J61 on the main EL1500 PCBA.
- J2 on X-P connects to J60 on the main board.
- W12 on X-P connects directly to Red AC (240V) or White AC (120V) on the main EL1500 PCBA.



X-B PN 53310

Used for a Single-Speed Blower output ONLY.

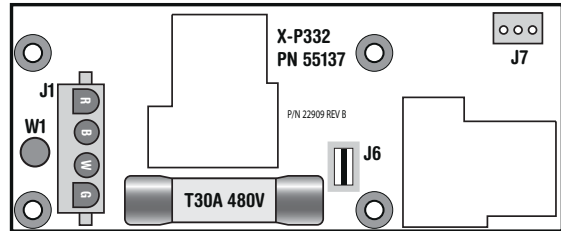
- J3 on X-B connects directly to Black AC using J61 or J62 on the main EL1500 PCBA (3-A).
- J2 on X-B connects to J60 (7-E) on the main board.
- W12 on X-B connects directly to Red AC (240V) or White AC (120V) on the main EL1500 PCBA.



X-P231 PN 53681

Can replace the X-P in cases where branch circuit protection is needed for high amperage devices that would over-burden power input fuse F5 (1-A) on the main PCBA.

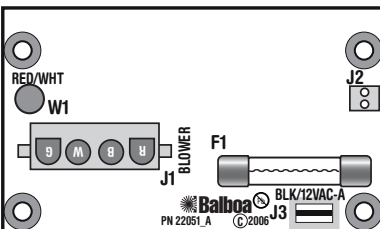
- J6 on the X-P231 connects directly to Black AC by using J66 or J65 on the main board (1-B).
- Connect J7 wire on the X-P231 to **J13** on the main board (8-E).
- Connect W1 on the X-P231 to Red AC (240V) or White AC (120V) on the main board.



X-P332 PN 55137

Used for an additional 2-speed Pump output.

- J6 on the X-P332 connects directly to Black AC by using J66 or J65 on the main board (1-B).
- Connect J7 wire on the X-P332 to J13 on the main board (8-E).
- Connect W1 on the X-P332 to Red AC (240V) or White AC (120V) on the main board. Can also be used with a PS-23 cable (PN 25089) to control two 1-speed Pumps.



X-TB PN 55344

Used for a multi-speed Blower (requires v29+ software and “bL” set to “2” or “3”) Or can be used for a 1-speed Blower.

- W1 connects to Red AC (240V) or White AC (120V) on Main PCBA.
- J3 connects to J61 or 62 (Black AC) on Main PCBA (3-A).
- J2 connects to J60 (7-E) on Main PCBA.

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
F1	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
1t	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

<i>P1</i>	Pump 1 Speeds	1 2 _ 1 = 1 speed; 2 = 2 speed; _ = 1 DIP Switch
<i>P2</i>	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
<i>P3</i>	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
<i>P4</i>	Pump 4 Speeds	0 Y _ 0 = Disabled; Y = On/Off on pin 2 of X-P332 board; _ = 3 DIP Switch
<i>bL</i>	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
<i>15</i>	Mister 1	n Y _ n = Disabled; Y = On/Off on X-P or X-P231 board; _ = 1 DIP Switch
<i>12</i>	Mister 2	n Y _ n = Mister Disabled; Y = Mister Enabled on pin 1 of X-P332 board; _ = 1 DIP Switch
<i>13</i>	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	0E	Option 1*	<input checked="" type="radio"/> n Y P _ n = Disabled; Y/P = Enabled on J17; _ = 2 DIP Switch
	03	Option 3*	<input checked="" type="radio"/> n Y P _ n = Disabled; Y/P = Enabled on pin 1 of X-P332 board; _ = 2 DIP Switch
	04	Option 4*	<input checked="" type="radio"/> 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**	<input checked="" type="radio"/> 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	<input checked="" type="radio"/> n Y n = Only in Configuration Settings; Y = Over-rideable by User via User Preferences
OZONE	03	Ozone Operation	<input checked="" type="radio"/> A F _ A = Operates with Heater Pump (Pump 1 Low or Circ Pump); F = Operates in Filter and Cleanup Cycles only; _ = 1 DIP Switch
	05	Ozone Suppression	<input checked="" type="radio"/> n Y _ n = No Suppress; Y = 1-hour suppress on button press; _ = 1 DIP Switch
	0I	Ozone Icon	n <input checked="" type="radio"/> Y n = O ₃ Icon on Panels Disabled; Y = O ₃ Icon on Panels Enabled
	0L	Ozone Location	<input checked="" type="radio"/> o b o = Ozone on J29 (Shares relay with Circ Pump in Circ Mode.) b = Ozone on J17 (Neither a 1-Spd Blower or 1-Spd Pump 2 can be used.)

Software Configuration Settings Continued

AUXILIARY BUTTONS

<i>A1</i>	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
<i>A2</i>	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
<i>A3</i>	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
<i>A4</i>	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

<i>b1</i>	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
<i>b2</i>	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
<i>b3</i>	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
<i>b4</i>	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

<i>AU</i>	Aux Button Bank Select	A b _ A = Bank A; b = Bank B; _ = 1 DIP Switch
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REMINDERS

<i>Sr</i>	Suppress all Reminders	n Y _ n = Display Reminders; Y = Suppress all Reminders; _ = 1 DIP Switch
<i>rP</i>	Check pH Reminder Period	0 1 2 3 4 5 6 7 8 9 t
<i>rS</i>	Check Sanitizer Reminder Period	0 1 2 3 4 5 6 7 8 9 t
<i>rF</i>	Clean Filter Reminder Period	0 1 2 3 4 5 6 7 8 9 t
<i>rG</i>	Test GFCI Reminder Period	0 1 2 3 4 5 6 7 8 9 t
<i>rd</i>	Drain Water Reminder Period	0 1 2 3 4 5 6 7 8 9 t
<i>rA</i>	Change Mineral Cartridge	0 1 2 3 4 5 6 7 8 9 t
<i>rC</i>	Clean Cover Reminder Period	0 1 2 3 4 5 6 7 8 9 t
<i>ro</i>	Treat Wood Reminder Period	0 1 2 3 4 5 6 7 8 9 t
<i>rt</i>	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.	
Ut	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

	LC	Light Cycle Programming	<input checked="" type="radio"/> n Y n = Disabled; Y = Enabled
FILTER CYCLES	1r	Filter 1 Start Hour (Set 1)*	<input checked="" type="radio"/> - 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)*	<input checked="" type="radio"/> - 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)*	<input checked="" type="radio"/> - 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)*	<input checked="" type="radio"/> - 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)**	<input checked="" type="radio"/> - 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)**	<input checked="" type="radio"/> - 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)**	<input checked="" type="radio"/> - 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)**	<input checked="" type="radio"/> - 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***	<input checked="" type="radio"/> 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*	<input checked="" type="radio"/> 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	<i>PP</i>	Pump Purge Duration	3 1 2 5 t
			3 = 30 seconds; 1 - 5 = 1 - 5 minutes; t = 10 minutes
	<i>bP</i>	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
	<i>LP</i>	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

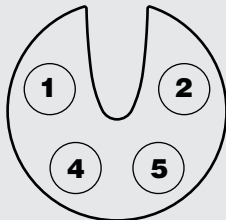
Software Configuration Settings Continued

REMOTE BUTTONS SET A

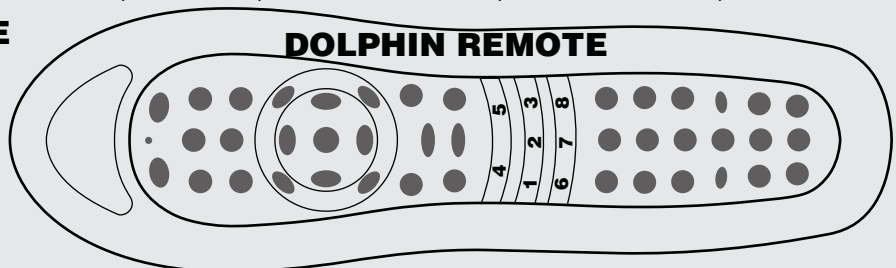
<i>n1</i>	Remote Button 1 (Set A)	1 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
<i>n2</i>	Remote Button 2 (Set A)	1 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
<i>n3</i>	Remote Button 3 (Set A)	1 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
<i>n4</i>	Remote Button 4 (Set A)	1 2 3 4 5 6 b g F E o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

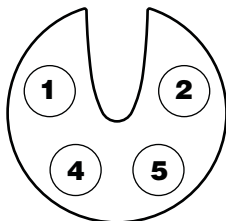


REMOTE BUTTONS SET B

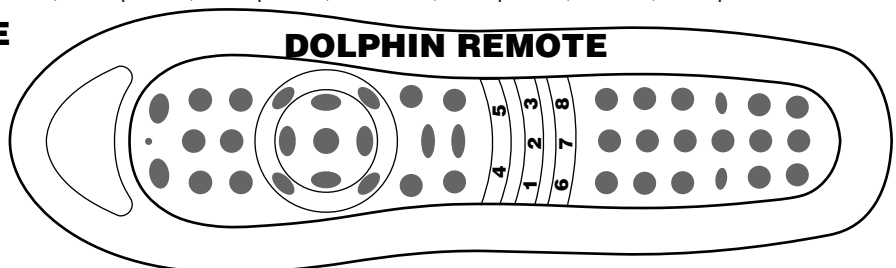
<i>H1</i>	Remote Button 1 (Set B)	1 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
<i>H2</i>	Remote Button 2 (Set B)	1 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
<i>H3</i>	Remote Button 3 (Set B)	1 2 3 4 5 6 b g F E o t d P n A U r O H 9 L 8 7
<i>H4</i>	Remote Button 4 (Set B)	1 2 3 4 5 6 b g F E o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



<i>d0</i>	Remote Button Bank Select	A b _
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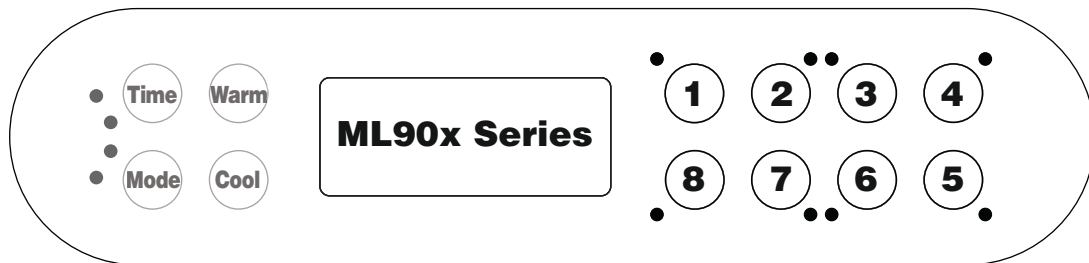
A = Bank A; **b** = Bank B; **_** = 1 DIP Switch

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

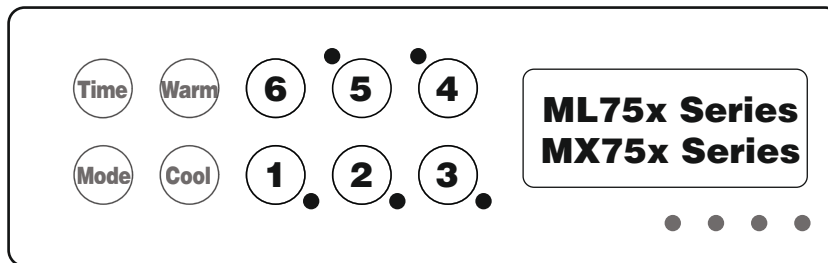


8C	ML90x Custom Buttons Enable	n Y _ n = Disabled; Y = Enabled; _ = 1 DIP Switch
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ML75x/MX75x SERIES BUTTONS

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
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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

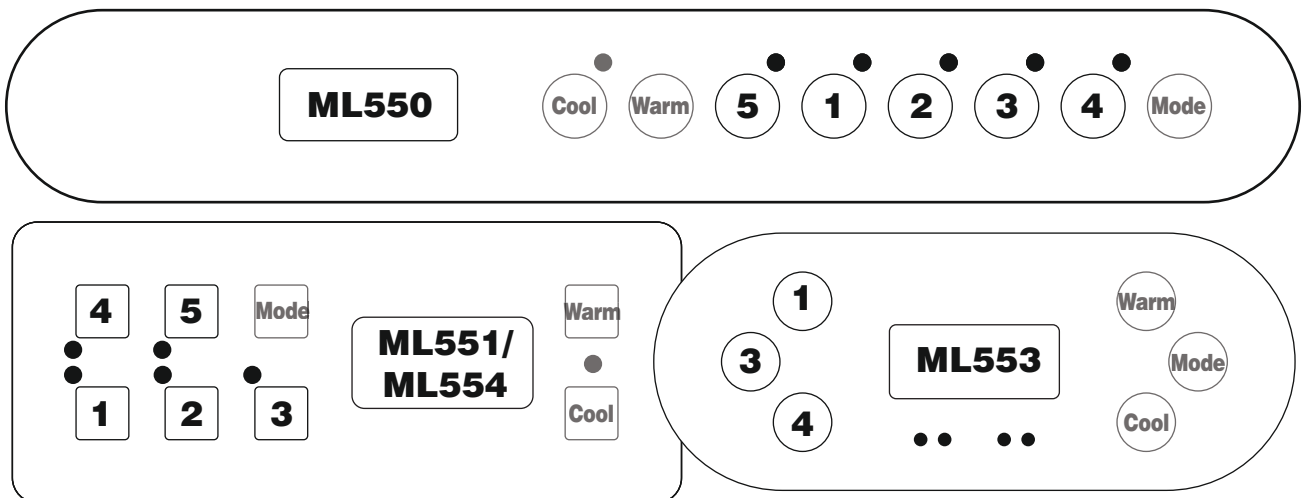


4C	ML70x Custom Buttons Enable	n	Y _	n = Disabled; Y = Enabled; _ = 1 DIP Switch
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ML55X SERIES BUTTONS

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



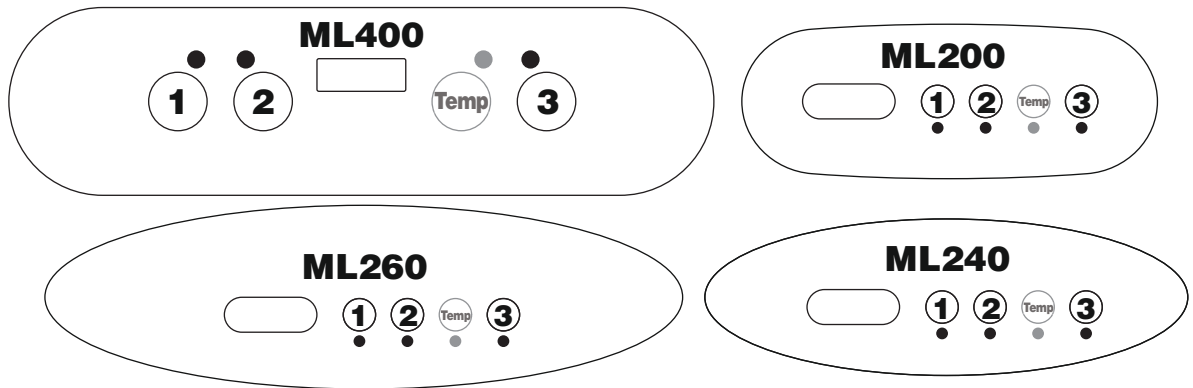
5C	ML55x Custom Buttons Enable	n	Y _	n = Disabled; Y = Enabled; _ = 1 DIP Switch
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Software Configuration Settings Continued

ML40x/ML2xx SERIES BUTTONS

31	ML40x/ML2xx Custom Button 1	<input checked="" type="radio"/> 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	<input checked="" type="radio"/> 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	<input checked="" type="radio"/> 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	<input checked="" type="radio"/> n	Y _
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n = Disabled; **Y** = Enabled; **_** = 1 DIP Switch

5A	Special Amperage Rule*	<input checked="" type="radio"/> 1	2 3 4
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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	<input checked="" type="radio"/> n	Y
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n = Disabled; **Y** = Enabled

dE	Demo Mode	<input checked="" type="radio"/> n	Y
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n = Disabled; **Y** = Enabled

9F	GFCI Test Enable	<input checked="" type="radio"/> n	1 2 3 4 5 6 7
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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 or J17). See the ratings table on the wiring diagram attached to the cover of the enclosure for the configured voltage and output connector. For 240V output, W2 (J29) or W7 (J17) connects to Red AC. For 120V output, W2 or W7 connects to White AC.

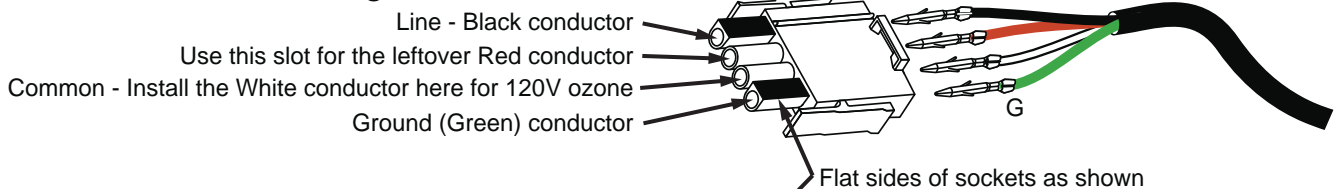
The voltage to the ozone connector can be changed in the field if required. W2 or W7 just need to be set for the required voltage.

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.

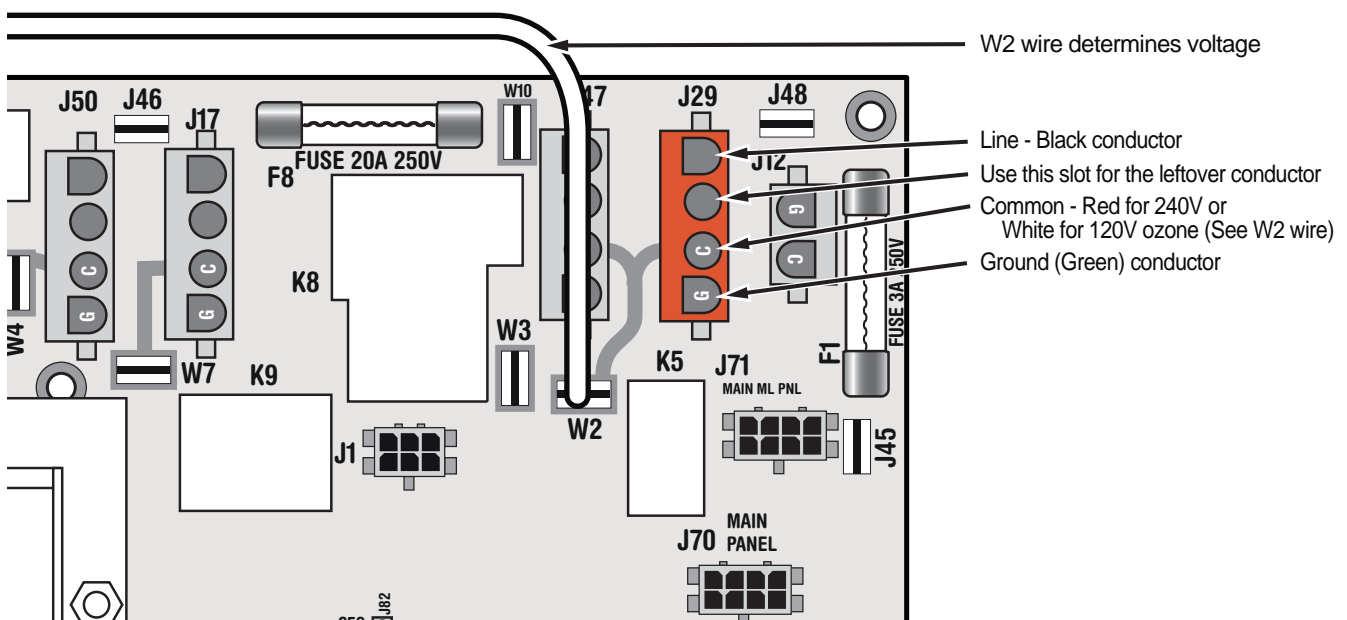
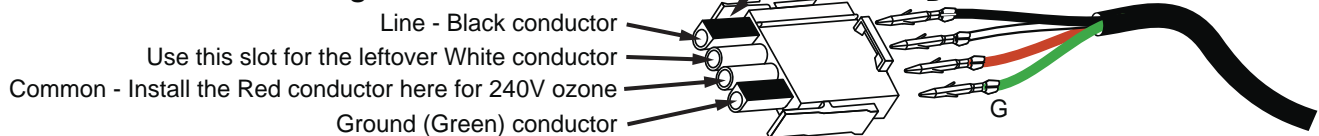
If a 240V ozone generator is required, be sure the red wire in the ozone cord is positioned in the connector next to the green ground wire as described below.

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



Balboa Ozone connector configuration for 240V 60Hz



Panel Configurations

TIME CAPABLE

Note: Connects to Main Panel terminal J70 or J71
Real-time clock board **MUST** be installed to save time-of-day if power is shut off to the spa.

MLM990S or MLM990H (MLM990H requires a RF transceiver)

PN _____ with Overlay PN _____

- Connects to ADCM Splitter

ML900

PN _____ with Overlay PN _____

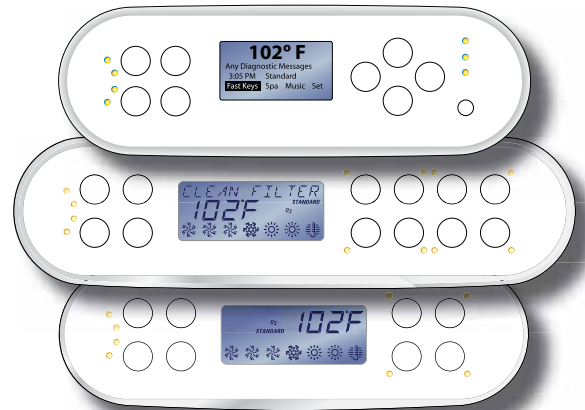
- Connects to Main Panel terminal J70 or J71

ML700

PN _____ with Overlay PN _____

- Connects to Main Panel terminal J70 or J71

Images not shown to scale.



NON-TIME CAPABLE

Note: Connects to Main Panel terminal J70 or J71
Real-time clock board must be **REMOVED**.

ML554 or ML551

PN _____ with Overlay PN _____

ML553

PN _____ with Overlay PN _____

ML550

PN _____ with Overlay PN _____

ML400

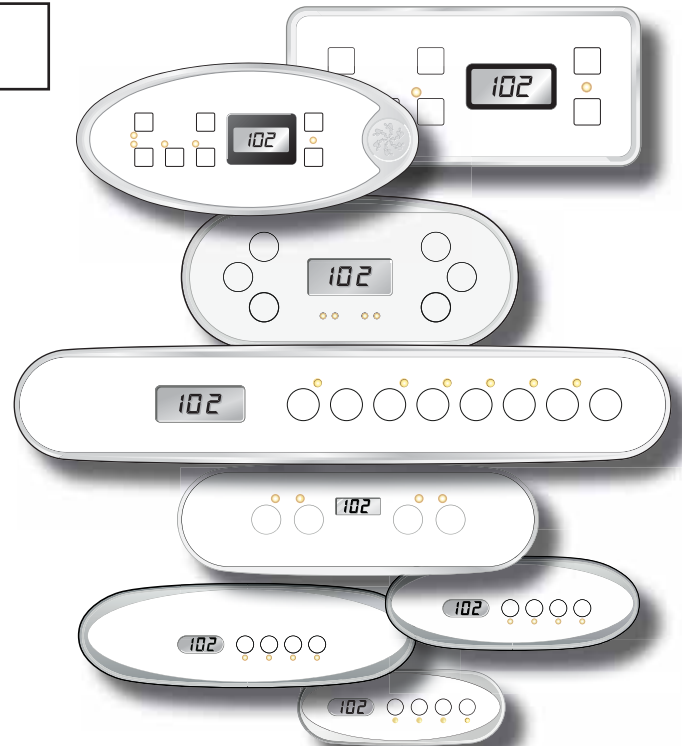
PN _____ with Overlay PN _____

ML260 or ML240

PN _____ with Overlay PN _____

ML200

PN _____ with Overlay PN _____



AUXILIARY

Note: Connects to Aux Panel terminal J1 or J2

AX40

PN _____ with Overlay PN _____

AX20

PN _____ with Overlay PN _____

AX10 (Up to two can be used)

PN _____ with Overlay PN _____

PN _____ with Overlay PN _____

