

460 Tech Sheet

Customer: Maax Spas

Part Number: 54301-05

Custom Box Overlay

Box Overlay Part Number 40547

System Model: E2P-460-YCAH

Software Version (SSID): 100 114 40

File Name: 10011440_460_2.hex

Software Configured

Configuration Signature: 08AFFEB9

Eng. Project Number: 3612

Base PCBA: 54302-04

Bare Board: 22896 Rev B

Control Panels Listed on Last Page.



System Revision History

Part #	EPN	Date	Originator	Changes Made
54301-02	2130	2.13.2007	Balboa	Update software to v28
54301-03	2161	6.29.2007	Customer	Bulk packaging
54301-04	2485	7.27.2007	Customer	Update software to v30
54301-04	2485	8.24.2007	Customer	Created Option 4
54301-05	3612	01.05.2012	Customer	Update to use Assigned DIP Switches; Circ to 120V; 2 pumps with heat

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. © Copyright 2009 Balboa Water Group.



Basic Functions

Electrical Service Requirements:

240VAC, 60Hz, 48A, Class A GFCI-protected service (Circuit Breaker = 60A max.),
4 wires [hot, hot, neutral, ground]

System Outputs – Setup 1 (As Manufactured):

Pump 1	12A max	<input checked="" type="checkbox"/> 240 VAC	<input type="checkbox"/> 120 VAC	<input checked="" type="checkbox"/> 2-Speed	<input type="checkbox"/> 1-Speed	<input type="checkbox"/> Disabled
		2-hour timer for Low Speed, 15 minutes for High Speed				
Pump 2	12A max	<input checked="" type="checkbox"/> 240 VAC	<input type="checkbox"/> 120 VAC	<input checked="" type="checkbox"/> 2-Speed	<input type="checkbox"/> 1-Speed	<input type="checkbox"/> Disabled
		15-minute timer				
Pump 3	12A max	<input checked="" type="checkbox"/> 240 VAC	<input type="checkbox"/> 120 VAC	<input type="checkbox"/> 2-Speed	<input type="checkbox"/> 1-Speed	<input checked="" type="checkbox"/> Disabled
		15-minute timer				
Blower	8A max	<input checked="" type="checkbox"/> 240 VAC	<input type="checkbox"/> 120 VAC		<input type="checkbox"/> 1-Speed	<input checked="" type="checkbox"/> Disabled
		15-minute timer				
Circ Pump	2A max	<input type="checkbox"/> 240 VAC	<input checked="" type="checkbox"/> 120 VAC		<input type="checkbox"/> 1-Speed	<input checked="" type="checkbox"/> Disabled
Ozone	1A max	<input type="checkbox"/> 240 VAC	<input checked="" type="checkbox"/> 120 VAC			<input type="checkbox"/> Disabled
Spa Light	1A max	<input checked="" type="checkbox"/> 12 VAC	<input type="checkbox"/> 120 VAC*	<input type="checkbox"/> Dimmable		<input type="checkbox"/> Disabled
		4-hour timer				
Light 2	4A max	<input type="checkbox"/> 240 VAC	<input type="checkbox"/> 120 VAC	<input type="checkbox"/> 12 VAC		<input checked="" type="checkbox"/> Disabled
		4-hour timer				
A/V Stereo	6A max	<input type="checkbox"/> 240 VAC	<input checked="" type="checkbox"/> 120 VAC			<input type="checkbox"/> Disabled
		Hot output. Fused equipment or in-line fuse required.				
Heater	23A max	<input checked="" type="checkbox"/> 240 VAC	<input type="checkbox"/> 120 VAC	<input checked="" type="checkbox"/> 5.5 kW	<input type="checkbox"/> 4.0 kW	<input type="checkbox"/> _____ kW

*A 120VAC light may allow more than 1A max.

Additional Options:

- Full-featured Dolphin Remote
- Spa-only Dolphin Remote
- Radio Frequency Dolphin RF Receiver Modules –
Connect to Remote plug on circuit board: **J20**
- Infrared Dolphin IR Receiver Modules –
Connect to Remote plug on circuit board: **J20**
- Spa Monitor RF Receiver Module –
Connects to Main Panel plugs on circuit board:
J70, J71, J72
- Round Remote

Hardware Setup

Settings (Software Configured)

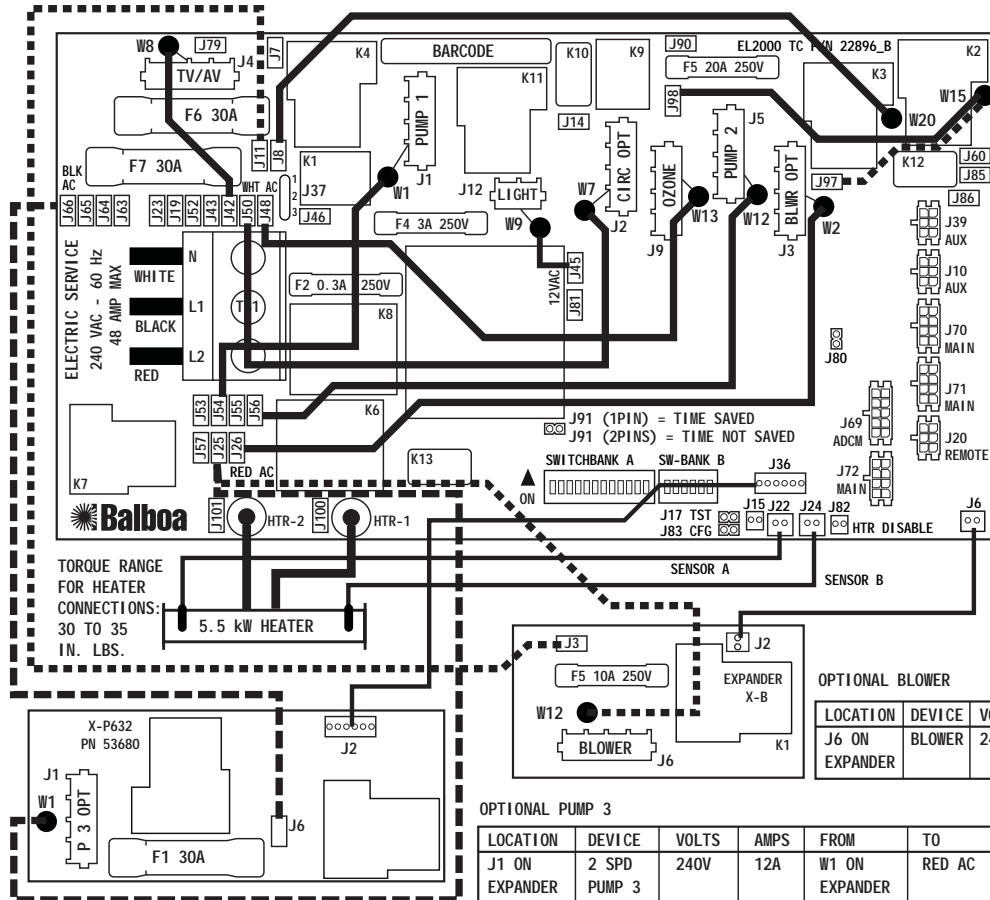


Maax 460 - PN 54301-05
07-21-11

CONNECT ONLY TO CIRCUITS PROTECTED BY A CLASS A GFCI.

A DISCONNECTING MEANS MUST BE INSTALLED WITHIN SIGHT FROM THE EQUIPMENT AND AT LEAST 5 FEET (1.52 M) FROM THE INSIDE WALLS OF THE POOL, SPA, OR HOT TUB.

ML (MAIN) PANELS
J70, J71 or J72



W15 TO J98 FOR 2-SPEED P2

W15 TO J97 FOR BLOWER ON MAIN BOARD AND 1-SPEED P2

A6 IS USED WITH MX700 MX700T AND MX770 PANELS.

USE COPPER CONDUCTORS ONLY. EMPLOYER UNIQUIMENT DES CONDUCTEURS DE CUIVRE. #6 AWG MIN. WIRE= 90°

FOR SUPPLY CONNECTIONS, USE CONDUCTORS SIZED ON THE BASIS OF 60°C AMPACITY BUT RATED MINIMUM OF 90°C.

TORQUE RANGE FOR MAIN TERMINAL BLOCK (TB1): 27-30 IN. LBS.

J83 ON 2 PINS

SWITCHBANK A OFF (DOWN)

SWITCHBANK A ON (UP)

TEST MODE OFF	◀ A1	TEST MODE ON
DON'T ADD 1 HS PUMP W/HTR	◀ A2	ADD 1 HS PUMP WITH HEAT
DON'T ADD 2 HS PUMPS W/HTR	▶ A3	ADD 2 HS PUMPS WITH HEAT
DON'T ADD 4 HS PUMPS W/HTR	◀ A4	ADD 4 HS PUMPS WITH HEAT
BLOWER BUTTON	◀ A5	JETS 3 BUTTON (SCRUNCHING)
SEE CIRC PUMP TABLE	◀ A6	SEE CIRC PUMP TABLE
SEE CIRC PUMP TABLE	◀ A7	SEE CIRC PUMP TABLE
SEE PUMP 2 TABLE	▶ A8	SEE PUMP 2 TABLE
SEE PUMP 2 TABLE	◀ A9	SEE PUMP 2 TABLE
NO EDIT	◀ A10	EDIT
SPECIAL AMPERAGE RULE OFF	◀ A11	SPECIAL AMPERAGE RULE ON
STORE SETTINGS	◀ A12	MEMORY RESET

SWITCHBANK B OFF (DOWN)

SWITCHBANK B ON (UP)

SEE PUMP 3 TABLE	◀ B1	SEE PUMP 3 TABLE
SEE PUMP 3 TABLE	◀ B2	SEE PUMP 3 TABLE
SEE PUMP 3 TABLE	◀ B3	SEE PUMP 3 TABLE
MUST BE OFF	◀ B4	N/A
NO BLOWER	◀ B5	BLOWER ON MAIN BOARD**
N/A	◀ B6	N/A

**BLOWER ON X-B IF 2-SP PUMP 2 ALL UNUSED SWITCHES SHOULD BE OFF

LOCATION	DEVICE	VOLTS	AMPS	FROM	TO
J1	2 SPD P1	240V	12A	W1	RED AC
J2	CIRC PUMP	120V	4A	W7	WHT AC
J3	BLOWER	240V	8A	W2	RED AC
J4	TV/ AV	120V	2A	W8	WHT AC
J5	2 SPD P2	240V	12A	W12	RED AC
J9	OZONE	120V	1A	W13	WHT AC
J12	LIGHT	12V***	2A	W9	J45
HTR	HEATER	240V	5.5kW	HTR TERM	HTR 1/2

***J37 MUST ALSO BE SET ON PINS 2 AND 3 FOR A 12V SPA LIGHT

TOTAL OUTPUT AMP DRAW NOT TO EXCEED MAX INPUT RATING OF SPA USE EARTH GROUND CONNECTIONS AS INDICATED INSIDE THE SYSTEM ENCLOSURE

Hardware Setup

Settings (CONTINUED)

PUMP 2 BEHAVIOR	A8	A9
NO PUMP 2	OFF	OFF
ON / OFF	OFF	ON
2-SPEED	ON	OFF

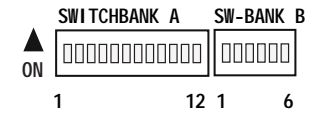
CIRC PUMP BEHAVIOR	A6	A7
NO CIRC PUMP	OFF	OFF
24-HR CIRC	OFF	ON
3°F SHUT-OFF	ON	OFF
FILTERS/POLLS ONLY	ON	ON

PUMP 3 BEHAVIOR	B1	B2	B3
NO PUMP 3	OFF	OFF	OFF
ON / OFF (ON BOARD)	OFF	OFF	ON
ON / OFF (X-P)	OFF	ON	ON
ON / OFF (X-P632)	ON	OFF	OFF
2-SPEED (X-P632)	ON	OFF	ON

DIP Switch Functions (CFG J83 ON)

Fixed-function DIP Switches

- A1 Test Mode (normally Off).
- A2 In "ON" position, add one high-speed pump (or blower) with Heater.
- A3 In "ON" position, add two high-speed pumps (or 1 HS Pump and Blower) with Heater.
- A4 In "ON" position, add four high-speed pumps (or 3 HS Pumps and Blower) with Heater.
- A10 When switched ON when spa is on, system will enter the Edit Menu for Configuration Setting.
Do not start spa with A10 turned on or CFE error will occur.
*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.*
- A12 Persistent memory reset (Used when the spa is powering up to restore factory settings as determined by software configuration).



A2, A3, and A4 work in combination to determine the number of high-speed devices and blowers that can run before the heat is disabled. i.e. A2 and A3 in the ON position and A4 in the OFF position will allow the heater to operate with up to 3 high-speed pumps (or two HS Pumps and Blower) running at the same time. Heat is disabled when the fourth high-speed pump or blower is turned on.

Note: A2/A3/A4 all off = No heat with any high-speed pump or blower.

DIP Switch Functions (CONTINUED)

Assignable DIP Switches

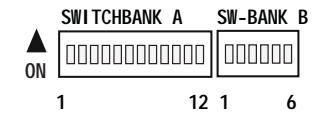
- A5 In "ON" position, enables Panel Scrunching.
In "OFF" position, disables Panel Scrunching.
- A6 & A7 See Table 1 - Circ Pump Behavior
- A8 & A9 See Table 2 - Pump 2 Behavior
- A11 Not Assigned
- B1, B2 & B3 See Table 3 - Pump 3 Behavior
- B4 Must be OFF
- B5 In "ON" position, enables Blower (ON/OFF) on main board unless 2-spd P2.
If P2 is 2-spd, Blower is on expander board X-B.
In "OFF" position, disables Blower.
- B6 In "ON" position, ozone is on in filter cycles and cleanup cycles only.
In "OFF" position, ozone is on with Heater Pump.

Undesignated switches are not assigned a function.

Table #1			Circ Pump Behavior
A6	A7		
OFF	OFF		No Circ Pump
OFF	ON		24 Hr
ON	OFF		24 Hr w/3° Shutoff
ON	ON		Acts like P1 Low (Filter Cycles, Polls)

Table #2			Pump 2 Behavior
A8	A9		
OFF	OFF		No Pump 2
OFF	ON		1-Speed
ON	OFF		2-Speed

Table #3				Pump 3 Behavior
B1	B2	B3		
OFF	OFF	OFF		No Pump 3
OFF	OFF	ON		On/Off on Main Board
OFF	ON	ON		On/Off on X-P
ON	OFF	OFF		On/Off on X-P632
ON	OFF	ON		2-Spd on X-P632



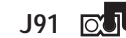
Jumper Definitions

J37 Jumper on Pins 1 and 2 will power one leg of J12-pin 2 (Spa Light) at 120/240 Volts AC.
Jumper on Pins 2 and 3 will power one leg of J12-pin 2 (Spa Light) at 12 Volts AC.

Note: *W9 controls voltage on the return line of J12-pin 1 and must be set for the same voltage.*



J91 Jumper on 1 Pin only enables Real Time Clock function, for use with time-capable panels.
Jumper on Pins 1 and 2 will disable RTC function, for use with non-time-capable panels.



J82 Heater Disable Switch Connection. If J82 is shorted by any means, the heater will not run until J82 is no longer shorted.
If J82 is shorted during power-up “J82” (or “J82 WARNING” on an ML900 panel) will appear on the panel.
The message can be dismissed with a button press, and is the only control panel notification of J82 being shorted.
No message is displayed if J82 is shorted after power-up, but the heater will not run until J82 is no longer shorted.




Warning!

Setting DIP switches or jumpers 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.

EL2000 Configuration Settings

Filtration Features

Fd	Program Filter Cycles by Duration	<input type="checkbox"/> n <input type="checkbox"/> Y <input type="checkbox"/> _ (J91 Must be set accordingly. See page 7) n = Start and stop times – for time capable panels; Y = Duration – for non-time capable panels; _ = 1 DIP Switch	—————→ J91 
Fi	Pump 1 in Filter (w/Circ Pump)	<input type="checkbox"/> n <input type="checkbox"/> Y (This feature is used in Circ Mode only.) <i>Allows Pump 1 Low to operate in Filter Cycles and Cleanup Cycles to add extra filtration.</i> n = Normal; Y = Pump 1 with Circ	
FO	Minimal Filtering	<input type="checkbox"/> n <input type="checkbox"/> Y <input type="checkbox"/> _ <i>Use only with a uniquely dedicated filter system/pump, or if depending on Cleanup Cycles for filtration.</i> n = Normal Filtering; Y = Minimal filtering in Standard Mode; _ = 1 DIP Switch	

General Features

24	24-Hour Time	<input type="checkbox"/> n <input type="checkbox"/> Y <input type="checkbox"/> _ <i>Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.</i> n = 12-hour (am/pm); Y = 24-hour (military\European); _ = 1 DIP Switch	
tC	Celsius	<input type="checkbox"/> n <input type="checkbox"/> Y <input type="checkbox"/> _ <i>Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up</i> n = Fahrenheit; Y = Celsius; _ = 1 DIP Switch	
tO	Timeouts	1 <input type="checkbox"/> 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 <input type="checkbox"/> 2 3 4 _ d = Use "Timeouts" value above; 1-4 = number of hours; _ = 3 DIP Switch Combination	
Lt	Light Timeout	d <input type="checkbox"/> 1 2 3 4 d = Use "Timeouts" value above; 1-4 = number of hours	
Sc	Alternate Panel Layout (Scrunch)	n Y <input type="checkbox"/> _ n = Normal panel layout; Y = Alternate panel layout (ML900 scrunching enabled - ML550/700 Jets 3 replaces Blower); _ = 1 DIP Switch	

EL2000 Configuration Settings

Circ Pump, Jet Pumps and Blower

CL	Circ Type (behavior)	n A 3 P <input type="checkbox"/>	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.); <input type="checkbox"/> = 2 DIP Switch Combination
P1	Pump 1 Speeds	1 <input type="checkbox"/> 2 <input type="checkbox"/> _	1 = 1 speed; 2 = 2 speed; <input type="checkbox"/> = 1 DIP Switch
P2	Pump 2 Speeds	0 1 2 <input type="checkbox"/>	0 = Disabled; 1 = On/Off on; 2 = 2 speed; <input type="checkbox"/> = 2 DIP Switch
P3	Pump 3 Speeds	0 1 E H L <input type="checkbox"/>	0 = Disabled; 1 = On/Off on board; E = External X-P or X-P231 board H = On/Off on pin 1 of X-P632 board; L = 2 speed on X-P632 board; <input type="checkbox"/> = 3 DIP Switch
P4	Pump 4 Speeds	<input type="checkbox"/> 1 H L _	0 = Disabled; 1 = On/Off on External X-P or X-P231 board; H = On/Off on pin 1 of X-P632 board; L = 2 speed on X-P632 board; <input type="checkbox"/> = 3 DIP Switch
P5	Pump 5 Speeds	<input type="checkbox"/> L _	0 = Disabled; L = On/Off on pin 2 of X-P632 board; <input type="checkbox"/> = 2 DIP Switch
BL	Blower Speeds	0 1 2 3 <input type="checkbox"/>	Note: Options 2 and 3 required X-TB board. 0 = Disabled; 1 = On/Off; 2 = 2 speeds; 3 = 3 speeds; <input type="checkbox"/> = 2 DIP Switch combination

EL2000 Configuration Settings

Lighting Control

F₀ Fiber Optics / Light 2 **n** Y o _
 n = Disabled; Y = Light and Wheel Enabled; o = On/Off only. Light 2 enabled on J7 (*see note below);
 _ = 2 DIP Switch combination

*When **F₀** is set to **Y** and **cl** is set to **n**, then Fiber uses the J2 connector on the main PCBA.

*When **F₀** is set to **Y** and **cl** is NOT set to **n**, then Fiber requires X-FOW Kit to be installed.

Mist/Water Features

15 Mister 1 **n** Y _
 n = Mister Disabled; Y = Mister Enabled on J9; _ = 1 DIP Switch

12 Mister 2 **n** Y _
 n = Mister Disabled; Y = Mister Enabled on pin 1 of X-P632 board; _ = 1 DIP Switch

13 Mister 3 **n** Y _
 n = Mister Disabled; Y = Mister Enabled on pin 2 of X-P632 board; _ = 1 DIP Switch

14 Mister 4 **n** Y _
 n = Mister Disabled; Y = Mister Enabled on J3; _ = 1 DIP Switch

Misc (Non-Water, Non-Lighting) Feature

02 Option 2* **n** Y P _
 n = Disabled; Y/P = Enabled on "alarm" relay; _ = 2 DIP Switch Combination

03 Option 3* **n** Y P _
 n = Disabled; Y/P = Enabled on pin 1 of X-P632 board; _ = 2 DIP Switch Combination

04 Option 4* **n** Y P _
 n = Disabled; Y/P = Enabled on pin 2 of X-P632 board; _ = 2 DIP Switch Combination

*Note: Options 2-4: Y = On/Off w/no timeout (toggle) mode; P = Pulse (momentary) mode

EL2000 Configuration Settings

Cleanup Cycles

- CC Cleanup Cycles** 0 2 3 4 _
Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up.
0 = Disabled; 1-4 = Number of hours; _ = 3 DIP Switch Combination
-
- CU Cleanup Cycles as User Preference** n
n = Only in Configuration Settings; Y = End user may over-ride via User Preferences

Ozone

- o3 Ozone Operation** A _
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 _
n = No Suppress; Y = 1-hour suppress on button press; _ = 1 DIP Switch
-
- oI Ozone Icon** n
n = Disabled; Y = Enabled

Divide and Stir

- dI Divide** n 3 _
Divides pumps between Spa Pumps and Swim Pumps. A button press turning on any Swim Pump, at any speed, shuts off the heater and all Spa Pumps (including circ pump, if used).
n = No Divide; 2 = Pumps 2 and above are swim pumps; 3 = Pumps 3 and above are swim pumps; _ = 2 DIP Switches
-
- SP Stir Pump Group** A 3 4 _
Determines what group of pumps the Stir Button turns on (at high-speed).
A = All Pumps; 2 = Pumps 2 and up; 3 = Pumps 3 and up; 4 = Pumps 4 and up; _ = 2 DIP Switches
-
- SD Stir Duration** 1 F 2 3 4 5 6 t
Determines the timeout for the Stir Button.
1 = 10 minutes; F = 15 minutes; 2 = 20 minutes; 3 = 30 minutes;
4 = 40 minutes; 5 = 50 minutes; 6 = 60 minutes; E = 5 minutes; t = 2 minutes

EL2000 Configuration Settings

Auxiliary Button Mapping

A1	Aux Button 1 – Configuration A	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
A2	Aux Button 2 – Configuration A	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
A3	Aux Button 3 – Configuration A	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
A4	Aux Button 4 – Configuration A	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7

1-6 = Assigns Pump (Pump 1, Pump 2, etc); b = Blower; g = Spa Light; F = Fiber-Optic / Light 2; 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; 0 = Option 2; H = Option 3; 9 = Invert; L = Option 4; 8 = Stir; 7 = Option 5

b1	Aux Button 1 – Configuration B	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
b2	Aux Button 2 – Configuration B	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
b3	Aux Button 3 – Configuration B	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
b4	Aux Button 4 – Configuration B	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7

1-6 = Assigns Pump (Pump 1, Pump 2, etc); b = Blower; g = Spa Light; F = Fiber-Optic / Light 2; 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; 0 = Option 2; H = Option 3; 9 = Invert; L = Option 4; 8 = Stir; 7 = Option 5

AU	Aux Button Configuration Select	A	b	_																				
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A = Configuration A; b = Configuration B; _ = 1 DIP Switch

EL2000 Configuration Settings

Reminder Messages

5r 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
rG	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
re	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

EL2000 Configuration Settings

Temperature Parameters

LS	Lowest Set Temperature*	8 7 6 8 = 80°F/26.0°C; 7 = 70°F/21.0°C; 6 = 60°F/15.5°C
SE	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
UE	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

*Setting LS at 7 and Fr at 5 will cause a CFE error. Setting LS at 6 and Fr at 4, 5, or 9 will cause a CFE error.

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

Light Cycle

LC	Light Cycle Programming	n Y n = Disabled; Y = Enabled
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EL2000 Configuration Settings

Filter Cycles

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

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.

- = 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)

When Fd.n (See page 10 for Filter Cycle Duration Setting) 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.

3r	Filter 1 Start Hour (Set 2)*	<input type="checkbox"/> -	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 type="checkbox"/> -	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 type="checkbox"/> -	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 type="checkbox"/> -	0	1	2	3	4	5	6	7	8	9	A	b	C	d	E	F	g	H	J	L	n	o	P	r

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.

- = 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)

When Fd.n (See page 10 for Filter Cycle Duration Setting) 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.

FS	Filter Default Start Time Set*	<input type="checkbox"/> 1	2	_
-----------	---------------------------------------	----------------------------	---	---

1 = Set 1; 2 = Set 2; _ = 1 DIP Switch

FP	Filter Default Duration Set*	<input type="checkbox"/> 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.

EL2000 Configuration Settings

Purge Timers

<i>PP</i>	Pump Purge Duration	<input type="text" value="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 <input type="text" value="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>MP</i>	Mister Purge Duration	<input type="text" value="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

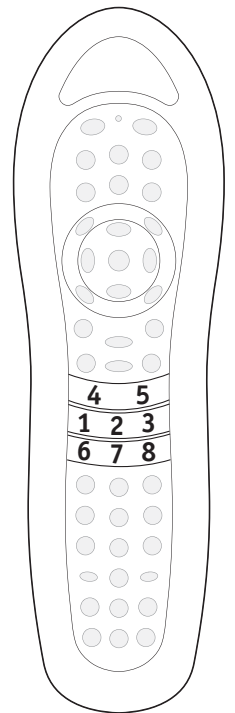
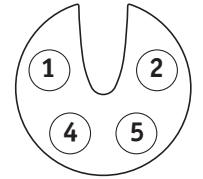
Air Valve

<i>AV</i>	Air Valve	<input type="text" value="n"/> Y n = Disabled; Y = Enabled on "alarm" relay
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EL2000 Configuration Settings

Wireless Remote Button Mapping

R1	Remote Button 1 (Mapping 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
R2	Remote Button 2 (Mapping 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
R3	Remote Button 3 (Mapping 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
R4	Remote Button 4 (Mapping 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
R5	Remote Button 5 (Mapping 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
R6	Remote Button 6 (Mapping 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
R7	Remote Button 7 (Mapping 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
R8	Remote Button 8 (Mapping 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
H1	Remote Button 1 (Mapping 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 (Mapping 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 (Mapping 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 (Mapping 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 (Mapping 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 (Mapping 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 (Mapping 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 (Mapping 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



Mapping Options for A and B

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); b = Blower; g = Spa Light;
 F = Fiber-Optic / Light 2; 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

d0	Remote Button Set Select	A	b	_
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A = Button Mapping A; b = Button Mapping B; _ = 1 DIP Switch

EL2000 Configuration Settings

ML90x Custom Button Mapping Options

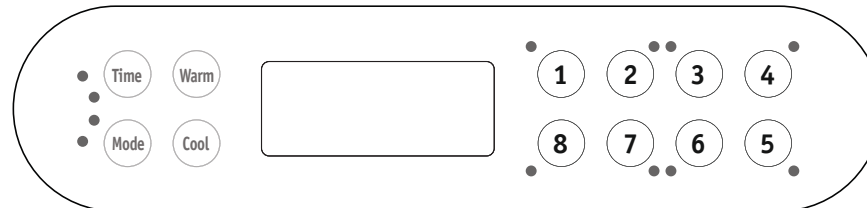
81	ML90x Custom Button 1	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
82	ML90x Custom Button 2	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
83	ML90x Custom Button 3	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
84	ML90x Custom Button 4	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
85	ML90x Custom Button 5	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	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	0	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	0	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	0	H	9	L	8	7

Custom Mapping Options

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); b = Blower; g = Spa Light; F = Fiber-Optic / Light 2; 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; 0 = 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



EL2000 Configuration Settings

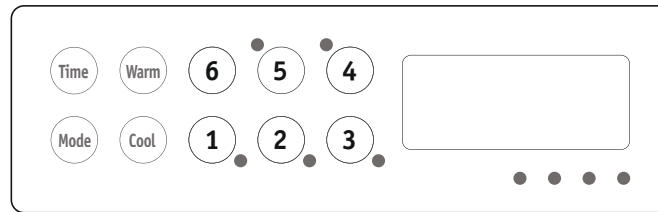
ML75x and MX75x Custom Button Mapping Options

61	ML/MX 750x Custom Button 1	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
62	ML/MX 750x Custom Button 2	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
63	ML/MX 750x Custom Button 3	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
64	ML/MX 750x Custom Button 4	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
65	ML/MX 750x Custom Button 5	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
66	ML/MX 750x Custom Button 6	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7

Custom Button Mapping Options

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); b = Blower; g = Spa Light; F = Fiber-Optic / Light 2; 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; 0 = Option 2; H = Option 3; 9 = Invert; L = Option 4; 8 = Stir; 7 = Option 5

6C ML/MX 750x Custom Buttons Enable **n** Y _
n = Disabled; Y = Enabled; _ = 1 DIP Switch



EL2000 Configuration Settings

ML70x Custom Button Mapping Options

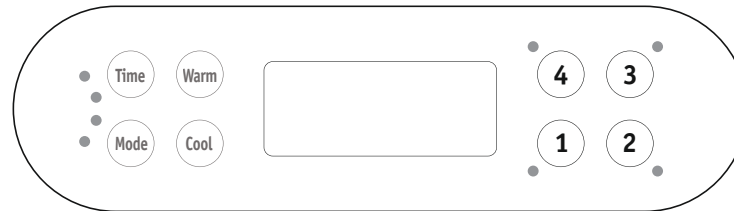
41	ML70x Custom Button 1	<input type="checkbox"/>	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
42	ML70x Custom Button 2	<input type="checkbox"/>	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
43	ML70x Custom Button 3	<input type="checkbox"/>	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
44	ML70x Custom Button 4	<input type="checkbox"/>	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7

Custom Button Mapping Options

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); b = Blower; g = Spa Light; F = Fiber-Optic / Light 2; 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; 0 = Option 2; H = Option 3; 9 = Invert; L = Option 4; 8 = Stir; 7 = Option 5

45	ML70x Custom Buttons Enable	<input type="checkbox"/>	Y	_
----	-----------------------------	--------------------------	---	---

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



EL2000 Configuration Settings

ML55x Custom Button Mapping Options

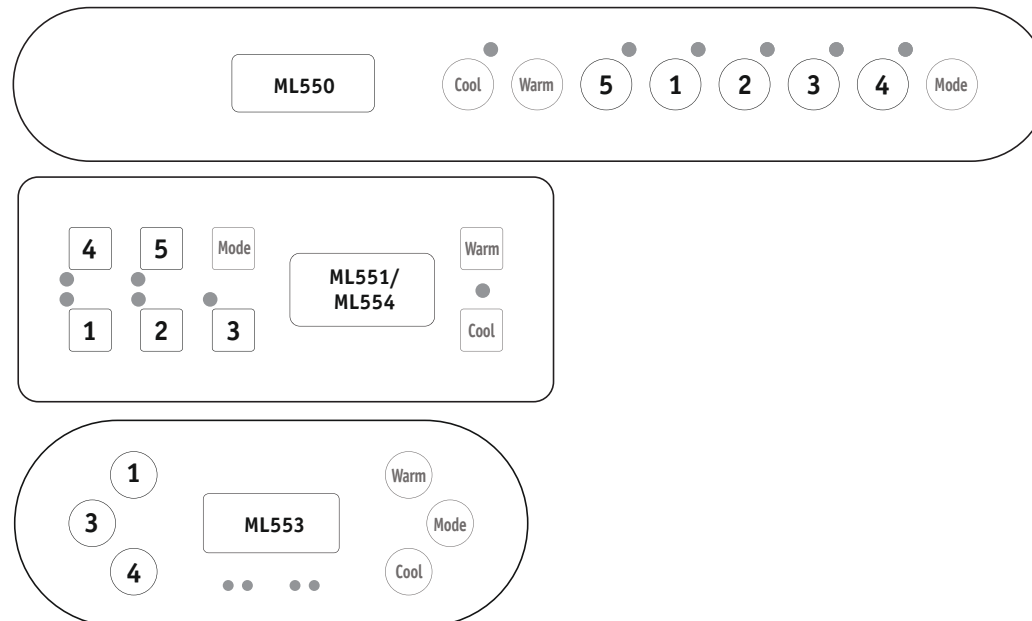
51	ML55x Custom Button 1	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
52	ML55x Custom Button 2	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
53	ML55x Custom Button 3	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
54	ML55x Custom Button 4	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
55	ML55x Custom Button 5	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7

Custom Mapping Options

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); b = Blower; g = Spa Light; F = Fiber-Optic / Light 2; 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; 0 = 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



EL2000 Configuration Settings

ML40x/ML2xx Custom Button Mapping Options

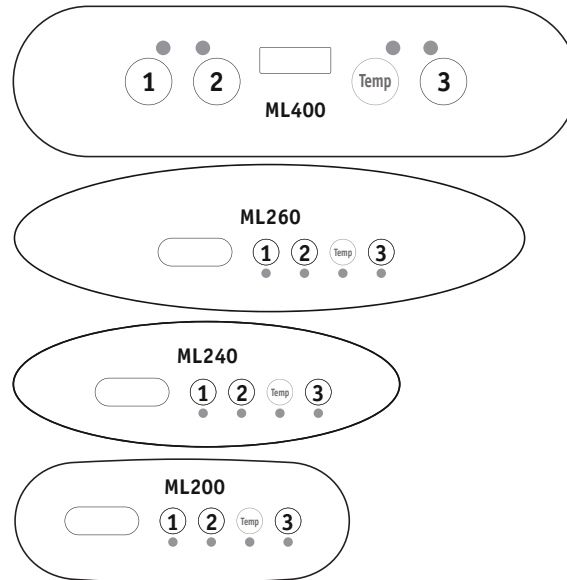
31	ML40x/ML2xx Custom Button 1	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
32	ML40x/ML2xx Custom Button 2	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7
33	ML40x/ML2xx Custom Button 3	1	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	0	H	9	L	8	7

Custom Button Mapping Options

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); b = Blower; g = Spa Light; F = Fiber-Optic / Light 2; 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; 0 = Option 2; H = Option 3; 9 = Invert; L = Option 4; 8 = Stir; 7 = Option 5

3C	ML40x/2xx Custom Buttons Enable	n	Y	_
----	---------------------------------	---	---	---

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



EL2000 Configuration Settings

Spa Monitor Custom Button Mapping Options

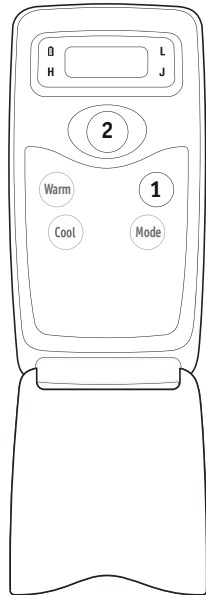
21	Spa Monitor Custom Button 1	<input type="checkbox"/>	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	O	H	9	L	8	7
22	Spa Monitor Custom Button 2	<input type="checkbox"/>	2	3	4	5	6	b	g	F	E	o	t	d	P	n	A	U	r	O	H	9	L	8	7

Custom Button Mapping Options

1-6 = Assigns Pump Number (Pump 1, Pump 2, etc); b = Blower; g = Spa Light; F = Fiber-Optic / Light 2; 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

2C	Spa Monitor Custom Buttons Enable	<input type="checkbox"/>	Y	_
----	-----------------------------------	--------------------------	---	---

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



The Spa Monitor always shows Jets 1 status on the "J" LED even if Button 1 (normally Jets 1) is mapped to a different device.

EL2000 Configuration Settings

Misc Features

SA	Special Amperage Rule	<input type="checkbox"/> 1 2 3 4 5 6
	<i>DIP A11 must be ON to use Special Amperage Rule.</i>	
	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; 5 = Max 3 high-speed pumps; 6 = Max 4 high-speed pumps	
HC	Heat Cool Feature	<input type="checkbox"/> Y _ n = Disabled; Y = Enabled; _ = 1 DIP Switch
DR	DR Mode	<input type="checkbox"/> Y n = Disabled; Y = Enabled
DE	Demo Mode	<input type="checkbox"/> Y n = Disabled; Y = Enabled
GC	Graphic Clock	<input type="checkbox"/> Y n = Disabled; Y = Enabled (<i>Panel must be able to support this feature</i>)
SO	Sound Mode Select Enable	<input type="checkbox"/> Y _ (Requires correct version of sound hardware) <i>Enables panel/aux/remote button access, if properly configured and User Preference access.</i> <i>Example: To select Sound Modes (see "So" below) by pressing Aux Button 1, configure setting "A1" to code assignment "A"</i> n = No; Y = User Preference; _ = 1 DIP Switch
So	Sound Mode Select	<input type="checkbox"/> A b c n (Values dependent on sound hardware used) A = Sound choice 1; b = Sound choice 2; c = Sound choice 3; n = No sounds
GF	GFCI Test Enable	n 1 2 3 4 5 6 <input type="checkbox"/> 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

Control Panel Configurations

Time-Capable Panels

RTC Jumper (J91) on the main circuit board must be OFF (jumper installed on one pin only).

This enables the real-time clock.

J91 

MX770 (8 button panel)

Connects to J70, J71, J72 or J73 on the main circuit board.



Panel Part Number **54540**

Overlay Part Number **11784**

MX770

PN 54540 with Overlay PN 11784 (Customer supplied)

• Connects to Main Panel terminal J70, J71, or J72

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. © Copyright 2009 Balboa Water Group.

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Control Panel Configurations

Time-Capable Panels

RTC Jumper (J91) on the main circuit board must be OFF (jumper installed on one pin only).

This enables the real-time clock.

J91 

ML700 (8 button panel)

Connects to J70, J71, J72 or J73 on the main circuit board.

Panel Part Number 108079 (BWG 52798-01)
(No Overlay)



Overlay Part Number 12180



Overlay Part Number 12406

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. © Copyright 2009 Balboa Water Group.


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Control Panel Configurations

Time-Capable Panels

RTC Jumper (J91) on the main circuit board must be OFF (jumper installed on one pin only).

This enables the real-time clock.

J91 

MX700T (8 button panel)

Connects to J70, J71, J72 or J73 on the main circuit board.

Panel Part Number 108063 (BWG 55755)
(No Overlay)



Overlay Part Number 12144



Overlay Part Number 12145



Overlay Part Number 12146



Overlay Part Number 12186



Overlay Part Number 12187

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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Control Panel Configurations

Auxiliary Panels

See **Auxiliary Button Mapping** under the **EL2000 Configuration Settings** section

These panels connect to J31, J34, J40 or J13 on the main circuit board

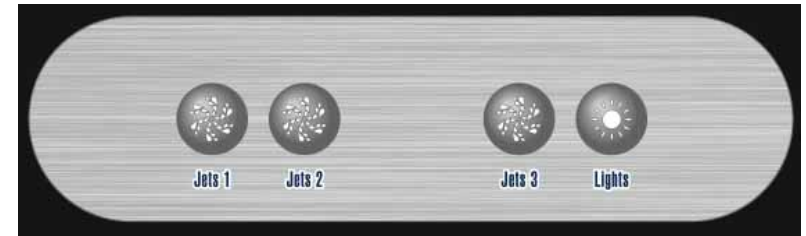
4-Button Panel

AX40

A1, A2, A3, A4

Auxiliary Panel Part Number 103744 (BWG 54280)

Overlay Part Number 11743



2-Button Panels

The left-hand button is always A1.

The right-hand button is set as A2, A3 or A4, depending on the part number.

AX20 A1A2

AX20 A1A3

AX20 A1A4

Single-Button Panels

Up to 4 can be used

AX10 A1

AX10 A2

AX10 A3

AX10 A4

Auxiliary Panel Part Number _____

Overlay Part Number 12041



Auxiliary Panel Part Number _____

Overlay Part Number 12173

