Balboa Instruments
System PN 55470-01

System Model # GL8-GL8000M3-RCA-3.0
Software Version # 32
EPN # 2833
Base PCBA – PN 53860-04
PCB GL8000 – PN 22960 Rev B or C
HEX File – 10013932

Base Panels
ML900 – PN 52654-01
<table>
<thead>
<tr>
<th>System PN</th>
<th>EPN</th>
<th>Date</th>
<th>Requested By</th>
<th>Changes Made</th>
</tr>
</thead>
<tbody>
<tr>
<td>55470</td>
<td>2817</td>
<td>04.07.2008</td>
<td>Balboa</td>
<td>New system</td>
</tr>
<tr>
<td>55470-01</td>
<td>2833</td>
<td>05.06.2008</td>
<td>Balboa</td>
<td>Software update to v32</td>
</tr>
</tbody>
</table>
Basic System Features and Functions

Power Requirements

Single Service [3 wires (line, neutral, ground)]
- 230VAC, 50Hz, 1~, 16A/32A, (Circuit Breaker rating = 20A/40A max.)

Dual Service [5 wires (line 1, neutral 1, line 2, neutral 2, ground)]
- 230VAC, 50Hz, 1~, 2x 16A, (Circuit Breaker rating = 20A max each service.)

3-Phase Service [5 wires (line 1, line 2, line 3, neutral, ground)]
- 400VAC, 50Hz, 3N~, 16A, (Circuit Breaker rating = 20A max each phase line.)
- IMPORTANT - Service must include a neutral wire, with a line to neutral voltage of 230VAC.

Setup 1 (As Manufactured)
- 230V Pump 1, 2-Speed
- 230V Pump 2, 2-Speed
- 230V Pump 3, 2-Speed
- 230V Blower, 1-Speed
- 230V Ozone
- 230V Fiber-optic Light
- 10V Spa Light
- 230V Audio\Visual (Stereo)
- 3.0kW Titanium Heater *

Optional Devices
- 230V Circ Pump
- 230V Mister

* Heater wattage is rated at 240V.

Additional Options
- Full Feature Dolphin Remote and Spa-only Dolphin Remote
- Spa Monitor
  - Connects to Main Panel terminal J70, J71, J72, or J73
- IR or RF Dolphin Receiver Modules
  - Connects to Remote terminal J20
- Ozone Generator
  - Connects to terminal J4
- MoodEFX Lighting
  - Connects to Spa Light terminal J10
- FiberEFX Lighting
  - Connects to Spa Light terminal J10
- Stereo System
  - Connects to A.V. terminal J5
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 “CFE” 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 non-conductive 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) 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 bL F” 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 F” 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/EL2000), or the heater wattage range supported (EL8000/GL2000/GL8000).
  - Heater wattage display: “3-6” 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 “H 6” 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 (As Manufactured)**

- 230V Pump 1, 2-Speed
- 230V Pump 2, 2-Speed
- 230V Pump 3, 2-Speed
- 230V Blower, 1-Speed
- 10V Spa Light
- 230V Ozone
- 230V Fiber w/ Wheel
- 230V AV (Stereo)
- 3.0kW Titanium Heater
- ML900 Main Panel
- 230V Circ Pump (opt)
- 230V Mister (opt)

**HiPot Testing Note:**
Disconnect slip terminal with green wires from J90 prior to performing HiPot test. Failure to disconnect will cause a false failure of the test. Reconnect terminal to J90 after successful completion of HiPot test.

**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)

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**Switchbank A**

- A1, Test Mode OFF
- A2/A3, Four H.S. Pumps w/Heater
- A4, 12 Hour Time
- A5, Degrees C
- A6, Short Timeouts
- A7, Cleanup Cycle OFF
- A8, 1Hr O3 Disable OFF
- A9/A10, No Circ Pump
- A11, Ozone w/P1 low
- A12, Memory ON

**Switchbank B**

- B1, Pump 2 2-Speed
- B2, N/A
- B3, Blower ON
- B4, F/O Light ON
- B5, Option OFF
- B6, Scrunching OFF
- B7, Spa Light On/Off
- B8, Spa Light Button
- B9, Pump 3 2-speed
- B10, Pump 3 Enabled
- B11, Mister Disabled
- B12, Mist Aux Pnl OFF

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**Board Connector Key**

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

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**Wiring Color Key**

- Neutral (Common) AC Connections
- Special AC Connections
- Line AC Connections
- 10 Volt Connections
- Relay Control Wires

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**SSID #**

- 100
- 139
- 32

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**2-Spd P1**

- 3.0 kW

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**3-Spd P2**

- 250V

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**3-Spd P3**

- 250V

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**Fiber Optic**

- 230V
**DIP Switches and Jumper 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

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Test Mode (normally Off)</td>
</tr>
<tr>
<td>A2 and A3</td>
<td>Control amp draw requirements. See Table 1</td>
</tr>
<tr>
<td>A4*</td>
<td>In “ON” position, displays time in 24 hours (military/European time)</td>
</tr>
<tr>
<td>A5*</td>
<td>In “OFF” position, displays temperature in Fahrenheit</td>
</tr>
<tr>
<td>A6</td>
<td>In “ON” position, Equipment timeout 30 minutes (4 hours for Pump 1 Low)</td>
</tr>
<tr>
<td>A7</td>
<td>In “ON” position, CleanUp Cycle – 30 minutes after spa use/timeout, Pump 1 Low &amp; Ozone run for 1 hour</td>
</tr>
<tr>
<td>A8</td>
<td>In “ON” position, Ozone suppressed for 1 hour after pump or blower button press</td>
</tr>
<tr>
<td>A9 and A10</td>
<td>Circ Pump Behavior settings. See Table 2</td>
</tr>
<tr>
<td>A11</td>
<td>In “ON” position (non-circ mode operation) Pump 1 is two-speed, Ozone is ON in Filter &amp; CleanUp Cycles only (in any circ mode), Pump 1 is one-speed, Ozone is ON with Circ Pump</td>
</tr>
<tr>
<td>A12</td>
<td>Persistent Memory Reset (used when the spa is powering up)</td>
</tr>
</tbody>
</table>

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

### Table 1

<table>
<thead>
<tr>
<th># of Hi-Speed Pumps/Blower</th>
<th>Before Heat Disabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2 A3</td>
<td></td>
</tr>
<tr>
<td>OFF OFF</td>
<td>0</td>
</tr>
<tr>
<td>ON OFF</td>
<td>1</td>
</tr>
<tr>
<td>OFF ON</td>
<td>2</td>
</tr>
<tr>
<td>ON ON</td>
<td>Up to 4</td>
</tr>
</tbody>
</table>

### DIP Switchbank B Key

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>In “ON” position, single-speed Pump 2</td>
</tr>
<tr>
<td>B2</td>
<td>N/A</td>
</tr>
<tr>
<td>B3</td>
<td>In “ON” position, Blower is enabled</td>
</tr>
<tr>
<td>B4 and B8</td>
<td>Fiber Optic and Color wheel control; Spa Light Enable</td>
</tr>
<tr>
<td>B5</td>
<td>In “ON” position, Option is enabled - B11 must be OFF</td>
</tr>
<tr>
<td>B6</td>
<td>In “ON” position, Alternate Panel layout (ML900 scrunching enabled; ML550 and ML700 Jets 3 replaces Blower)</td>
</tr>
<tr>
<td>B7</td>
<td>In “ON” position, Spa Light operation is On/Off</td>
</tr>
<tr>
<td>B9</td>
<td>In “ON” position, single-speed Pump 3</td>
</tr>
<tr>
<td>B10</td>
<td>In “ON” position, Pump 3 enabled (Jets 3 replaces Light button on Aux panel)</td>
</tr>
<tr>
<td>B11</td>
<td>In “ON” position, Mister enabled</td>
</tr>
<tr>
<td>B12</td>
<td>In “ON” position, Mister or Option replaces Blower button on Aux panels</td>
</tr>
</tbody>
</table>

### Jumper Key

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>J91</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Jumpers Key

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4 OFF</td>
<td>No separately-controlled fiber light; spa light enabled on both SpaLight and EitherLight buttons; fiber light (not wheel) comes on with spa light (at any intensity)</td>
</tr>
<tr>
<td>B4 ON</td>
<td>No separately-controlled spa light; fiber light enabled on both FiberLight and EitherLight buttons; spa light comes on with fiber light</td>
</tr>
<tr>
<td>B8 OFF</td>
<td>Spa light and fiber light each separately controlled; fiber light enabled on both FiberLight and EitherLight buttons; spa light enabled on SpaLight buttons only</td>
</tr>
</tbody>
</table>
Single Service (1 x 16 Amp or 1 x 32 Amp)
This option is configured and shipped as the default.
For 1 x 32 Amp Service:
  DIP Switch A2 and A3 can be ON
For 1 x 16 Amp Service:
  DIP Switch A2 and A3 must be OFF

Dual Service Option (2 x 16 Amp)
Completely remove the white wire from J26 and J32.

Note: J32 and J23 are electrically identical. The white wire may be attached to either terminal before removal.
DIP Switch A2 and A3 must be ON

3-Phase Service Option
IMPORTANT - Service MUST include a neutral wire, with a line to neutral voltage of 230VAC.
Completely remove the white wire from J26 and J32.

Note: J32 and J23 are electrically identical. The white wire may be attached to either of these terminals before removal.
Completely remove the blue wire from J28 and J57.

Note: J57, J58 and J59 are electrically identical. The blue wire may be attached to any of these terminals before removal.
Move the brown wire from J23 or J32 to J28.
DIP Switch A2 and A3 must be ON
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 230VAC 50Hz:

- Black or Brown Line Conductor
- Empty
- White or Blue Neutral Conductor
- Empty

Flat sides of sockets as shown

Line - Black or Brown conductor
Neutral - White or Blue conductor
Not used

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.
Panel Configurations

Note: RTC jumper (J91) on Main PCBA must be OFF (1 pin only)

ML900
PN 52654-01 with Overlay PN 40026
- Connects to Main Panel terminal J70, J71, J72, or J73