System PN 53340-03
Balboa Instruments

System Model # GS5-GS01-RCA-3.0k

PCBA PN
GS501 – 53341-01

Base Panels
"Duplex" and "Mini bath" style panels
INPUT
• 230V; 3 wires (line, neutral, ground)

OUTPUTS
• 230V Pump 1, dual speed (high speed: 15-minute timeout; low-speed; 4-hour timeout)
• 230V Blower or Pump 2, single speed (15-minute timeout; low-speed; 30-second for purge cycle w/filter)
• 230V Ozone (ozone runs with low-speed of Pump 1)
• 10V Spa Light (4-hour timeout)
• Heater: 3.0kw @ 230V

* Note: If your system has a Pump 2 instead of a blower, please install a black wire from J50 to J46 (see next page).

FEATURES
• See CIRC Operation reference card (pages 7-8 of this document)
• See Non-CIRC Operation reference card (pages 9-10 of this document)
Circuit Board Configuration

Single Service Connection Shown Above - One 16 Amp or One 32 Amp Service. For 32 Amp service, DIP Switch A10 may be changed to the “High Amp” setting.

Converting from Single Service to Dual Service - Two 16 Amp Services:

Remove the white wire connecting pins J26 and J32.

Insert and secure the second brown wire into the #1 slot of the terminal block and the second blue wire into the #2 slot of the terminal block.

DIP Switch A10 may be changed to the “High Amp” setting.

If using Pump 2, install black wire from J50 to J46.
DIP Switches and Jumpers

Switchbank A

A1, Test Mode OFF
A2, Mode Change
A3, Duplex Panel
A4, Must be OFF
A5, 1-speed P1 w/Circ
A6, 50 Hz

A7, Blower ON
A8, Degrees C
A9, Circ Pump OFF
A10, Low Amp

DIP Switch Key

A 1 ............... Test Mode (normally Off)
A 2 ............... In “ON” position, Always in Standard mode
A 3 ............... In “OFF” position, Allow mode change
A 4 ............... In “ON” position, use Mini Panel
A 5 ............... In “OFF” position, use Digital Duplex or Light Duplex panel
A 6 ............... Aux Freeze (must be OFF).
A 7 ............... In “ON” position, Two-speed pump 1 when in Circ Mode (A9 On)
A 8 ............... In “OFF” position, One-speed pump 1 when in Circ Mode (A9 On)
A 9 ............... In “ON” position, 50Hz operation
A 10 ............. In “OFF” position, 60Hz operation
A  7 .............. In “ON” position, Blower is enabled
A  8 .............. In “OFF” position, Blower is disabled
A  9 .............. In “ON” position, temperature is displayed in degrees Celsius
A 10 ............. In “OFF” position, temperature is displayed in degrees Fahrenheit
A  9 .............. In “ON” position, 24 Hour Circ Pump
A 10 ............. In “OFF” position, no circ pump
A  9 .............. In “ON” position, heater is disabled while any high-speed pump or blower is running
A 10 ............. In “OFF” position, heater can run while any/all high-speed pumps or blowers are running

(Optional external relay board will allow 3º shut off for circ pump)
(Low amperage, single 16A service)
(High amperage, dual 16A or single 32A service)
Ozone Connections

Ozone connector configuration for 240VAC 50Hz:

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

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

Several configurations of the panels above can be created as custom parts. Separate Temperature Up and Down buttons can be done if no Blower is present. Jets 2 button available if no Blower is present.

There are two Master Panel connectors on the board.

Non-Circ Operation

Initial Start-up
When your spa is first actuated, it will go into Priming mode, indicated by “Pr.” Please see the M-7 Installation Instruction Manual for complete instructions on Power-up and Pump Priming. The Priming mode will last for less than 5 minutes (press "Temp" or "Set" to skip Priming Mode) and then the spa will begin to heat the spa and maintain the water temperature in the Standard mode.

Temp/Set (80°F - 104°F / 26°C - 40°C)
The start-up temperature is set at 100°F/37°C. The last measured temperature is constantly displayed on the LCD.

Note that the last measured spa temperature displayed is current only when the pump has been running for at least 2 minutes.

To display the set temperature, press the “Temp” or “Set” pad once.

To change the set temperature, press the pad a second time before the LCD stops flashing. Each press of the “Temp” or “Set” pad will continue to either raise or lower the set temperature.

If the opposite direction is desired, release the pad and let the display revert to the current water temperature. Press the pad to display the set temperature, and again to make the temperature change in the desired direction.

After three seconds, the LCD will stop flashing and display the current spa temperature.

Note: If there is not a blower on the system, an alternate panel with separate "Up" and "Down" buttons in place of a "Set" or "Temp" button may be used. Simply press "Up" or "Down" where a "Temp" or "Set" button press is indicated. (Ignore the "direction reversal paragraph.*)

Jets
Touch the “Jets” button once to activate the low speed of the pump and again for the high speed. Press the “Jets” button again to turn off the pump. If left running, the low speed of the pump will automatically turn off after 4 hours, and the high speed will automatically turn off after 15 minutes. The low speed of the pump runs when the blower is on. It may also activate for at least 2 minutes every 30 minutes to detect the spa temperature and then to heat to the set temperature if needed, depending upon mode. When the low speed turns on automatically, it cannot be deactivated from the panel; however, the high speed may be started.

Blower (optional on VS501/502 or GS501/502)
This button is used to turn the blower on and off. If left on, the blower automatically turns off after 15 minutes.

Jets 2 (optional on VS501/502 or GS501/502)
If your system has a pump 2 installed instead of a blower, it behaves exactly like a blower would.

Light
Press the “Light” button to turn the light on and off. If left on, the light automatically turns off after 4 hours.

Mode
Mode is changed by pressing the “Temp” or “Set” button, then pressing the “Light” button.

Standard Mode is programmed to maintain the desired temperature. Note that the last measured spa temperature displayed is current only when the pump has been running for at least 2 minutes. “S” will be displayed momentarily when you switch into Standard Mode.

Economy Mode heats the spa to the set temperature only during filter cycles. “Ec” will display solid when temperature is not current, and will alternate with temperature when temperature is current.

Sleep Mode heats the spa to within 20°F/10°C of the set temperature only during filter cycles. “SL” will display solid when temperature is not current, and will alternate with temperature when temperature is current.

Preset Filter Cycles
The first filter cycle begins 6 minutes after the spa is energized. The second filter cycle begins 12 hours later. Filter duration is programmable for 2, 4, 6, 8 hours or for continuous filtration (indicated by “EC”). The default filter time is 2 hours.

To program, press “Temp” or “Set,” then “Jets.” Press “Temp” or “Set” to adjust. Press “Jets” to exit programming.

The blower purges for 30 seconds at the beginning of each filter cycle. The low speed of the pump runs during filtration and the ozone generator (if installed) will be enabled.

Freeze Protection
If the temperature sensors detect a drop to below 44°F/6.7°C within the heater, the pump and blower will automatically activate to provide freeze protection. The equipment stays on until 4 minutes after the sensors detect that the spa temperature has risen to 45°F/7.2°C or higher. In colder climates, an optional additional freeze sensor may be added to protect against freeze conditions that may not be sensed by the standard sensors. Aux freeze sensor protection acts similarly except with the temperature thresholds determined by the switch and without a 4-minute delay in turnoff. See your dealer for details.

(over)
### Diagnostic Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>No message on display. Power has been cut off to the spa.</td>
<td>The control panel will be disabled until power returns. Spa settings will be preserved until next power up.</td>
<td></td>
</tr>
<tr>
<td>Temperature unknown.</td>
<td>After the pump has been running for 2 minutes, the temperature will be displayed.</td>
<td></td>
</tr>
<tr>
<td>“Overheat” - The spa has shut down. One of the sensors has detected 118°F/48°C at the heater.</td>
<td>DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. Once the heater has cooled, reset by pushing any button. If spa does not reset, shut off the power to the spa and call your dealer or service organization.</td>
<td></td>
</tr>
<tr>
<td>“Overheat” - The spa has shut down. One of the sensors has detected that the spa water is 110°F/43°C.</td>
<td>DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. At 107°F/42°C, the spa should automatically reset. If spa does not reset, shut off the power to the spa and call your dealer or service organization.</td>
<td></td>
</tr>
<tr>
<td>“Ice” - Potential freeze condition detected.</td>
<td>No action required. The pump and blower will automatically activate regardless of spa status.</td>
<td></td>
</tr>
<tr>
<td>Spa is shut down. The sensor that is plugged into the Sensor “A” jack is not working.</td>
<td>If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat situation and disappear when the heater cools.)</td>
<td></td>
</tr>
<tr>
<td>Spa is shut down. The sensor that is plugged into the Sensor “B” jack is not working.</td>
<td>If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat situation and disappear when the heater cools.)</td>
<td></td>
</tr>
<tr>
<td>Sensors are out of balance. If alternating with spa temperature, it may just be a temporary condition. If flashing by itself, spa is shut down.</td>
<td>If the problem persists, contact your dealer or service organization.</td>
<td></td>
</tr>
<tr>
<td>A significant difference between temperature sensors has been detected. This could indicate a flow problem.</td>
<td>Check water level in spa. Refill if necessary. If the water level is okay, make sure the pumps have been primed. If problem persists, contact your dealer or service organization.</td>
<td></td>
</tr>
<tr>
<td>Persistent low flow problems. (Displays on the fifth occurrence of “HL” message within 24 hours.) Heater is shut down, but other spa functions continue to run normally.</td>
<td>Follow action required for “HL” message. Heating capability of the spa will not reset automatically; you may press any button to reset.</td>
<td></td>
</tr>
<tr>
<td>Possible inadequate water, poor flow, or air bubbles in detected in the heater. Spa is shut down for 15 minutes.</td>
<td>Check water level in spa. Refill if necessary. If water level is okay, make sure the pumps have been primed. Press any button to reset, or this message will automatically reset within 15 minutes. If problem persists, contact your dealer or service organization.</td>
<td></td>
</tr>
<tr>
<td>Inadequate water detected in heater. (Displays on third occurrence of “dr” message.) Spa is shut down.</td>
<td>Follow action required for “dr” message. Spa will not automatically reset. Press any button to reset.</td>
<td></td>
</tr>
</tbody>
</table>

**Warning! Shock Hazard! No User Serviceable Parts.**

Do not attempt service of this control system. Contact your dealer or service organization for assistance. Follow all owner’s manual power connection instructions. Installation must be performed by a licensed electrician and all grounding connections must be properly installed.
VS500/501 and GS500/501 - Your system has a 24-hour circ pump. The circ pump and the ozone generator run continuously.

VS502 and GS502 - Your system has a 24-hour circ pump. The circ pump and the ozone generator run continuously with the exception of shutting off for 30 minutes at a time in hot environments.

Temp/Set (80°F - 104°F / 26°C - 40°C)
The start-up temperature is set at 100°F/37°C. The last measured temperature is constantly displayed on the LCD. Note that the last measured spa temperature displayed is current only when the circ pump has been running for at least 2 minutes.

To display the set temperature, press the “Temp” or “Set” pad once.
To change the set temperature, press the pad a second time before the LCD stops flashing. Each press of the “Temp” or “Set” pad will continue to either raise or lower the set temperature.
If the opposite direction is desired, release the pad and let the display revert to the current water temperature. Press the pad to display the set temperature, and again to make the temperature change in the desired direction.
After three seconds, the LCD will stop flashing and display the current spa temperature.

Note: If there is not a blower on the system, an alternate panel with separate “Up” and “Down” buttons in place of a “Set” or “Temp” button may be used. Simply press “Up” or “Down” where a “Temp” or “Set” button press is indicated.

Jets
Touch the “Jets” button once to turn pump 1 on or off, and to shift between low and high speeds (if equipped). If left running, the low speed of the pump will automatically turn off after 4 hours, and the high speed will automatically turn off after 15 minutes.

Blower (optional on VS501/502 or GS501/502)
This button is used to turn the blower on and off. If left on, the blower automatically turns off after 15 minutes.

Jets 2 (optional on VS501/502 or GS501/502)
If your system has a pump 2 installed instead of a blower, it behaves exactly like a blower would.

Light
Press the “Light” button to turn the light on and off. If left on, the light automatically turns off after 4 hours.

Mode
Mode is changed by pressing the “Temp” or “Set” button, then pressing the “Light” button.

Standard Mode is programmed to maintain the desired temperature. Note that the last measured spa temperature displayed is current only when the circ pump has been running for at least 2 minutes. “SE” will be displayed momentarily when you switch into Standard Mode.

Economy Mode heats the spa to the set temperature only during filter cycles. “EE” will display solid when temperature is not current, and will alternate with temperature when temperature is current.

Sleep Mode heats the spa to within 20°F/10°C of the set temperature only during filter cycles. “SL” will display solid when temperature is not current, and will alternate with temperature when temperature is current.

Preset Filter Cycles
The first filter cycle begins 6 minutes after the spa is energized. The second filter cycle begins 12 hours later. Filter duration is programmable for 2, 4, 6, 8 hours or for continuous filtration (indicated by “FC”). The default filter time is 2 hours.
To program, press “Temp” or “Set,” then “Jets.” Press “Temp” or “Set” to adjust. Press “Jets” to exit programming.
At the beginning of each filter cycle the blower purges for 30 seconds; the pump purges for 5 minutes. The only effect filter duration has is: 1) During the filter, the circ pump never turns off, and 2) In Economy and Sleep Modes, heating only occurs during the filter cycle.

Freeze Protection
If the temperature sensors detect a drop to below 44°F/6.7°C within the heater, the pump and blower will automatically activate to provide freeze protection. The equipment stays on until 4 minutes after the sensors detect that the spa temperature has risen to 45°F/7.2°C or higher. In colder climates, an optional additional freeze sensor may be added to protect against freeze conditions that may not be sensed by the standard sensors. Aux freeze sensor protection acts similarly except with the temperature thresholds determined by the switch and without a 4-minute delay in turnoff. See your dealer for details.
Diagnostic Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>- -</td>
<td>No message on display. Power has been cut off to the spa.</td>
<td>The control panel will be disabled until power returns. Spa settings will be preserved until next power up.</td>
</tr>
<tr>
<td>HH</td>
<td>“Overheat” - The spa has shut down. One of the sensors has detected 118°F/48°C at the heater.</td>
<td>After the circ pump has been running for 2 minutes, the temperature will be displayed.</td>
</tr>
<tr>
<td>DH</td>
<td>“Overheat” - The spa has shut down. One of the sensors has detected that the spa water is 110°F/43°C.</td>
<td>DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. Once the heater has cooled, reset by pushing any button. If spa does not reset, shut off the power to the spa and call your dealer or service organization.</td>
</tr>
<tr>
<td>IC</td>
<td>“Ice” - Potential freeze condition detected.</td>
<td>DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. At 107°F/42°C, the spa should automatically reset. If spa does not reset, shut off the power to the spa and call your dealer or service organization.</td>
</tr>
<tr>
<td>SA</td>
<td>Spa is shut down. The sensor that is plugged into the Sensor “A” jack is not working.</td>
<td>No action required. The pump and blower will automatically activate regardless of spa status.</td>
</tr>
<tr>
<td>Sb</td>
<td>Spa is shut down. The sensor that is plugged into the Sensor “B” jack is not working.</td>
<td>If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat situation and disappear when the heater cools.)</td>
</tr>
<tr>
<td>Sn</td>
<td>Sensors are out of balance. If alternating with spa temperature, it may just be a temporary condition. If flashing by itself, spa is shut down.</td>
<td>If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat situation and disappear when the heater cools.)</td>
</tr>
<tr>
<td>HL</td>
<td>A significant difference between temperature sensors has been detected. This could indicate a flow problem.</td>
<td>If the problem persists, contact your dealer or service organization.</td>
</tr>
<tr>
<td>LF</td>
<td>Persistent low flow problems. (Displays on the fifth occurrence of “HL” message within 24 hours.) Heater is shut down, but other spa functions continue to run normally.</td>
<td>Check water level in spa. Refill if necessary. If the water level is okay, make sure the pumps have been primed. If problem persists, contact your dealer or service organization.</td>
</tr>
<tr>
<td>dR</td>
<td>Possible inadequate water, poor flow, or air bubbles in detected in the heater. Spa is shut down for 15 minutes.</td>
<td>Follow action required for “HL” message. Heating capability of the spa will not reset automatically; you may press any button to reset.</td>
</tr>
<tr>
<td>dY</td>
<td>Inadequate water detected in heater. (Displays on third occurrence of “dR” message.) Spa is shut down.</td>
<td>Check water level in spa. Refill if necessary. If water level is okay, make sure the pumps have been primed. Press any button to reset, or this message will automatically reset within 15 minutes. If problem persists, contact your dealer or service organization.</td>
</tr>
<tr>
<td></td>
<td>Follow action required for “dR” message. Spa will not automatically reset. Press any button to reset.</td>
<td></td>
</tr>
</tbody>
</table>

Warning! Shock Hazard! No User Serviceable Parts.

Do not attempt service of this control system. Contact your dealer or service organization for assistance. Follow all owner’s manual power connection instructions. Installation must be performed by a licensed electrician and all grounding connections must be properly installed.