Panaray® System Digital Controller

General Description

The Bose® Panaray® system digital controller utilizes digital signal processing (DSP) architecture to provide smooth, accurate spectral response for any Bose professional loudspeaker product requiring active equalization (EQ) or additional processing. Any Bose professional loudspeaker EQ can be accessed by simply selecting the appropriate preset and configuration. No programming is required.

The controller has two balanced XLR analog inputs and four balanced XLR outputs. It can be configured to run two mono Bose EQ presets or a single stereo Bose EQ preset (including preset crossover settings). In addition to providing Bose speaker EQ presets, the controller also has the following easy-to-use programmable features:

- Four independent signal delays (200 ms per output) which can be used for decentralized or distributed speaker alignment and for creating custom bass arrays.
- Four independent output limiters that can be set to protect speakers from unpredictable spikes in program material.
- A programmable signal router which allows each output to select full-range and high- or low-pass combinations of input signals.

Technical Information (cont.)

Control interface:

Finish
Black anodized aluminum front-plated and painted steel chassis

Mains voltage
100 to 240VAC, 50Hz to 60Hz (auto switching)

Power consumption
< 15W

Sample Rate
44.1kHz

Analog Inputs:
Connectors
(2) XLR balanced
Impedance balanced
21kΩ
Input level
Maximum: +18dBu
Minimum: 0dBu
Sensitivity
@9dB headroom: -12dBu to +9dBu
A to D conversion
24 bit, 128x oversampling bitstream
A to D delay
0.70ms @ 44.1kHz
Dynamic range
95dB typ, 20Hz - 20kHz
THD
Typ < 92dB (0.0025%) @ 1kHz
Frequency response
20Hz to 20kHz, +0/-0.5dB
Crosstalk
-95dB, 20Hz to 20kHz

Front Panel Attributes:
Standby button
Standby on/off
Channel 1 and 2 input meters
Display the individual input levels of Channels 1 and 2. The meter range is: O (overload red LED), 0, -6, -12, -18, -24, and -40dB (green LEDs).
Display
2 x 16 backlit LCD display
Arrow up/arrow down
Press to navigate up or down through the user interface
Preset key (green LED)
Press to enter preset mode
Delay key (green LED)
Press to edit the delay parameters
Utility key (green LED)
Press to edit routing, level, and system parameters
Limiter key (green LED)
Press to edit the limiter parameters
Rotary encoder
Selects presets and edits values

Environment:
Operating temperature
32°F to 122°F (0°C to 50°C)
Storage temperature
-22°F to 167°F (-30°C to 70°C)
Humidity
Maximum 90% non-condensing
Panaray® system digital controller configuration: Stereo operation using Panaray 802®-III speakers:

**Controller Configuration**
- 802-III Full-range speaker

**Controller Inputs**
- **Ch1**: Left from mixer
- **Ch2**: Right from mixer

**Controller Outputs**
<table>
<thead>
<tr>
<th></th>
<th>Ch1</th>
<th>Ch2</th>
<th>Ch3</th>
<th>Ch4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Routing</strong></td>
<td>802-III speaker</td>
<td>802-III speaker</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Left main</strong></td>
<td>Left main</td>
<td>Right main</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Limiter</strong></td>
<td>On</td>
<td>On</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Delay</strong></td>
<td>Off</td>
<td>Off</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Panaray® system digital controller configuration: Stereo operation using Panaray 802-III speakers and an MB4 2x Endfire bass array:

**Controller Configuration**
- 802-III speaker with MB4 2x Endfire bass array

**Controller Inputs**
- **Ch1**: Left from mixer
- **Ch2**: Right from mixer

**Controller Outputs**
<table>
<thead>
<tr>
<th></th>
<th>Ch1</th>
<th>Ch2</th>
<th>Ch3</th>
<th>Ch4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Routing</strong></td>
<td>802-III speaker</td>
<td>802-III speaker</td>
<td>MB4 speaker (mono)</td>
<td>MB4 speaker (mono)</td>
</tr>
<tr>
<td><strong>Left main</strong></td>
<td>Left main</td>
<td>Right main</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Limiter</strong></td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td><strong>Delay</strong></td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
</tr>
</tbody>
</table>
**Figure 3: Engineered System Configuration (Medium Church)**

Panaray® system digital controller configuration: Mono operation using Panaray 502® A, 302® A, and MB4 speakers:

**Controller Configuration**
- 502A speaker with MB4 speaker

**Controller Inputs**

| Ch1 | Mono from mixer |
| Ch2 | No input |

**Controller Outputs**

<table>
<thead>
<tr>
<th>Ch1</th>
<th>Ch2</th>
<th>Ch3</th>
<th>Ch4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routing</td>
<td>502A speaker Mains</td>
<td>MB4</td>
<td>302A speaker Balcony (no EQ)</td>
</tr>
<tr>
<td>Limiter</td>
<td>On</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>Delay</td>
<td>Off</td>
<td>Off</td>
<td>3ms</td>
</tr>
</tbody>
</table>

**Figure 4: Engineered System Configuration (Small Church)**

Panaray system digital controller configuration: Mono operation using Panaray LT 9702® speaker with MB4 speakers:

**Controller Configuration**
- LT 9702 speaker with MB4 speaker

**Controller Inputs**

| Ch1 | Mono from mixer |
| Ch2 | No input |

**Controller Outputs**

<table>
<thead>
<tr>
<th>Ch1</th>
<th>Ch2</th>
<th>Ch3</th>
<th>Ch4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routing</td>
<td>LT 9702 speaker Mains</td>
<td>MB4</td>
<td>MB4</td>
</tr>
<tr>
<td>Limiter</td>
<td>On</td>
<td>On</td>
<td>N/A</td>
</tr>
<tr>
<td>Delay</td>
<td>Off</td>
<td>Off</td>
<td>N/A</td>
</tr>
</tbody>
</table>
**Engineers’ and Architects’ Specifications**

The controller shall use a digital signal processing architecture running at a 44.1kHz sample rate. The frequency response shall be from 20Hz to 20kHz (+0/-0.1dB). The dynamic range shall be 95dB typical 20Hz to 20kHz.

The controller shall include a single analog XLR balanced input connector for each of the two input channels. It shall have a single analog XLR balanced output for each of its four outputs. The Maximum Input Level shall be +18dBu (balanced). The Maximum Output Level shall be +18dBu (balanced). The input impedance shall be 21k ohms for balanced operation. The throughput delay time through the controller shall be 0.63ms.

Crosstalk shall be < -95dB, 20Hz to 20kHz. The THD shall be < 92dB typical at 1kHz.

A 5-pin DIN connector COM port shall be used for software updates.

The power supply shall be auto switching from 100 to 240 VAC, 50 to 60Hz. Power consumption shall be < 15W.

**Safety and Regulatory Compliance**

All versions of the Bose Panaray system digital controller comply with EN-55103 and 55103-2, FCC part 15, Class B, CISPR 22, Class B, IEC 65, EN 60065, UL6500, and CSA E65.