Introduction of Receivers

Introduction

Common

The receivers can be divided into eight product lines. All of them are of the Balanced Armature Type.

The main differences between the receiver series are the dimensions, sensitivity and maximum output.

Overview of the Receivers

<table>
<thead>
<tr>
<th>Series</th>
<th>Measured @ Drive</th>
<th>Sensitivity @ 1000Hz</th>
<th>Maximum output SPL</th>
<th>Typical Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1700</td>
<td>1.00 mVA</td>
<td>122 dB</td>
<td>138 dB</td>
<td>7.95 x 5.60 x 4.07 mm</td>
</tr>
<tr>
<td>1800</td>
<td>1.00 mVA</td>
<td>124 dB</td>
<td>140 dB</td>
<td>9.45 x 7.13 x 4.10 mm</td>
</tr>
<tr>
<td>1900</td>
<td>1.00 mVA</td>
<td>126 dB</td>
<td>138 dB</td>
<td>7.95 x 5.60 x 4.07 mm</td>
</tr>
<tr>
<td>2000</td>
<td>1.00 mVA</td>
<td>124 dB</td>
<td>140 dB</td>
<td>9.45 x 7.13 x 4.10 mm</td>
</tr>
<tr>
<td>2300</td>
<td>0.35 mVA</td>
<td>104 dB</td>
<td>129 dB</td>
<td>6.30 x 4.29 x 2.96 mm</td>
</tr>
<tr>
<td>2600</td>
<td>0.55 mVA</td>
<td>103 dB</td>
<td>126 dB</td>
<td>5.25 x 3.05 x 2.55 mm</td>
</tr>
<tr>
<td>2600U</td>
<td>0.55 mVA</td>
<td>106 dB</td>
<td>127 dB</td>
<td>5.25 x 3.05 x 2.55 mm</td>
</tr>
<tr>
<td>2800U</td>
<td>0.70 mVA</td>
<td>107 dB</td>
<td>132 dB</td>
<td>5.25 x 3.26 x 3.05 mm</td>
</tr>
<tr>
<td>3000</td>
<td>0.35 mVA</td>
<td>117 dB</td>
<td>138 dB</td>
<td>7.87 x 4.09 x 2.80 mm</td>
</tr>
<tr>
<td>3300</td>
<td>0.70 mVA</td>
<td>123 dB</td>
<td>143 dB</td>
<td>7.87 x 5.60 x 4.09 mm</td>
</tr>
<tr>
<td>4400</td>
<td>0.35 mVA</td>
<td>96 dB</td>
<td>122 dB</td>
<td>5.00 x 2.70 x 1.96 mm</td>
</tr>
</tbody>
</table>

All performance values are measured under acoustical loading with a 2cc coupler.
Response curves

Response shaping is obtained by:

- Damping screen: A damping screen in the sound outlet will damp the level at the peak frequencies.
- Internal modifications: This modification consists of 5 holes in the diaphragm. The result is low frequency roll off, a damped level at the second peak frequency, but an undamped level at the first peak frequency.

Special response curves can be discussed with the Technical Account Management department.

Electrical parameters

- Coils
  We can distinguish two types of coils:

  - ST
    - Biased: Standard two-terminal receiver.
    - Non-biased: To be used in Class A applications.
  - CT
    - Non-biased: Centre tapped receiver with three terminals.

  The bias current ranges from 0 to 6.0mA and depends on impedance and $R_{DC}$.

  - Impedance and $R_{DC}$
    The impedance which is determined by the coil is limited by the coil size, maximum number of windings and wire gauge.

    The value of the DC resistance $R_{DC}$ is limited due to the relation of $R_{DC}$ with the impedance. The ratio between the impedance and $R_{DC}$ of the receiver can approximately be:

    - $Z_{coil} : R_{DC} = 4 : 1$  To be used in current driven applications.
    - $Z_{coil} : R_{DC} = 2 : 1$  Has less intermodulation distortion, is better suitable for voltage-driven applications.
Schematic of port locations

View: looking at the front (cover) of the receiver. The numbers correspond with positions on a clock face with terminals at 6 o’clock and they denote the location of the signal port. Letters give further information on port location and type.
1700 series receivers
The 1700 series is designed for ‘In The Ear Monitoring’ applications.

Available port locations for the 1700: 12c.

Typical response curves are measured under the following conditions:
The acoustical termination consist of:

11 x 1.9mm ID + 4.5 x 1.4mm ID + IEC711 coupler.
At constant voltage input, 0.35mVA input power.
1800 series receivers
The 1800 series is best suited for “Behind the Ear” applications.

Available port locations for the 1800 are: 12s, 1s.

![Diagram of 1800 series receiver]

Typical response curve measured under the following conditions:
The acoustical termination consist of:
8 x 1mm ID + 28 x 1.5mm ID + 25 x 2mm ID + 18 x 3mm ID + 2cc coupler.
At constant current input, 1mVA input power.
1900 series receivers
The 1900 series is best suited for “Behind The Ear” applications.

Available port locations for the 1900 are: 12s, 12c, 1s.

The available response curve is the standard response.

Typical response curves are measured under the following conditions:
The acoustical termination consist of:
8 x 1mm ID + 28 x 1.5mm ID + 25 x 2mm ID + 18 x 3mm ID + 2cc coupler.
At constant current input, 1mVA input power.
2000 series receivers
The 2000 series is best suited for ‘Behind The Ear’ applications.

Available port locations for the 2000: 12s, 12c, 1s, 1e, 2e, 11c, 5s, 6n.

The available response curve is the standard curve.

Typical response curves are measured under the following conditions:
The acoustical termination consist of:
8 x 1mm ID + 28 x 1.5mm ID + 25 x 2mm ID + 18 x 3mm ID + 2cc coupler.
At constant current input, 1mVA input power.
2300 series receivers
The 2300 series is designed for use in “In The Ear” applications and is also suitable for “Behind The Ear” applications.

Available port locations for the 2300 are: 12c, 12Jd, 9c, 0Jm.

There are four types of response curves possible:
- Standard: Standard response curve.
- Damped (I): A damping screen is placed in the sound outlet in order to damp the level at the peak frequencies.
- Damped and Modified (II): A combination of Damped and Modified response. The result is a low frequency roll off, and a low output at second peak and a damped first peak.
- Modified (III): Five holes in the diaphragm resulting in lower low frequency response, a damped second peak, but an undamped first peak.

Typical response curves are measured under the following conditions:
The acoustical termination consist of:
10 x 1 mm tubing into a 2cc coupler.
At constant current input, 0.35 mVA input power.
**2600 series receivers**

The 2600 series is designed for use in “Completely In the Canal” and “In The Ear” applications.

Available port locations for the 2600 are: 12c, 9c.

There are four types of response curves possible:
- **Standard**
- **Damped (I)**
- **Damped and Modified (II)**
- **Modified (III)**

• Standard response curve.
• A damping screen is placed in the sound outlet in order to damp the level at the peak frequencies.
• A combination of Damped and Modified response. The result is a low frequency roll off, and a low output at second peak and a damped first peak.
• Five holes in the diaphragm resulting in lower low frequency response, a damped second peak, but an undamped first peak.

The coding has the following format: 26@##, where 26 designates the 2600 series, the digit @ designates the response and coil configuration according to table 1. The ## are 2 digits that determine the 1000 Hz impedance, when the receiver is loaded with a 10 mm tubing with an ID of 1 mm; the available types are listed in table 2.

We have a mu-metal flak jacket version of the 2600 series receiver, the models are referred as version 2600/7. The benefits of these flak jacket versions are the reduction of acoustic radiation, higher mechanical strength and lower magnetic radiation.

### Table 1. Available response types and sound outlet positions

<table>
<thead>
<tr>
<th>Sound outlet position</th>
<th>12c</th>
<th>9c</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard</td>
<td>Type I</td>
</tr>
<tr>
<td>2 term zero-bias</td>
<td>A</td>
<td>D</td>
</tr>
<tr>
<td>2 term bias</td>
<td>B</td>
<td>E</td>
</tr>
<tr>
<td>3 term center tap</td>
<td>C</td>
<td>F</td>
</tr>
</tbody>
</table>

### Table 2. Available impedances with associated DC resistance

<table>
<thead>
<tr>
<th>Type</th>
<th>Impedance</th>
<th>DC resist.</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>100</td>
<td>49</td>
</tr>
<tr>
<td>02</td>
<td>221</td>
<td>120</td>
</tr>
<tr>
<td>03</td>
<td>330</td>
<td>161</td>
</tr>
<tr>
<td>04</td>
<td>405</td>
<td>180</td>
</tr>
<tr>
<td>05</td>
<td>505</td>
<td>248</td>
</tr>
<tr>
<td>08</td>
<td>800</td>
<td>405</td>
</tr>
<tr>
<td>11</td>
<td>1055</td>
<td>458</td>
</tr>
<tr>
<td>16</td>
<td>1600</td>
<td>684</td>
</tr>
<tr>
<td>22</td>
<td>2150</td>
<td>992</td>
</tr>
<tr>
<td>28</td>
<td>2800</td>
<td>1291</td>
</tr>
</tbody>
</table>

Table 1. Available response types and sound outlet positions

Table 2. Available impedances with associated DC resistance
Typical response curves are measured under the following conditions:
The acoustical termination consist of:
10 x 1mm tubing into a 2cc coupler.
At constant current input, 0.55mA input power.
2600U series receivers

The 2600U series is designed for use in “Completely In the Canal” and “In The Ear” applications.

Available port location for the 2600 is: 12c.

The coding has the following format: 26@@##, where 26 designates the 2600 series, the first digit @ stands for the high efficient U version. The second digit @ designates the standard response type. The ## are 2 digits that indicate the 1000 Hz impedance, the available types are listed in table 1.

We have a mu-metal flak jacket version of the 2600 series receiver, the models are referred as version 2600/7. The benefits of these flak jacket versions are the reduction of acoustic radiation, higher mechanical strength and lower magnetic radiation.

<table>
<thead>
<tr>
<th>Type</th>
<th>Impedance</th>
<th>DC resist.</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>130</td>
<td>49</td>
</tr>
<tr>
<td>03</td>
<td>305</td>
<td>120</td>
</tr>
<tr>
<td>04</td>
<td>400</td>
<td>161</td>
</tr>
<tr>
<td>05</td>
<td>575</td>
<td>187</td>
</tr>
<tr>
<td>06</td>
<td>640</td>
<td>248</td>
</tr>
</tbody>
</table>

Table 1. Available impedances with associated DC resistance.
2800U series receivers

The 2800U series is designed for “Behind The Ear” and “In The Ear” applications.

This product is a dual driver system consisting of two 2600U drivers.

Available port location for the 2800 is: 12s.

The coding has the following format: 28@@##, where 28 designates the 2800 series, the first digit @ stands for the high efficient U version. The second digit @ designates the standard response type. The ## are 2 digits which stands for the 1000 Hz impedance of the single drivers used. The total impedance of the product depends on parallel or serial prepping.

Typical response curves are measured under the following conditions:
The acoustical termination consist of:
ITE: 10 x 1mm tubing into a 2cc coupler.
BTE: 8 x 1mm ID + 28 x 1.5mm ID + 25 x 2mm ID + 18 x 3mm ID + 2cc coupler.
26UA01 at constant voltage input, 0.35mVA input power.
28UA01 at constant voltage input, 0.70mVA input power.
3000 series receivers
The 3000 series is designed for “Behind The Ear” and “In The Ear” applications.

Available ports for the 3000 are: 12s and spoutless.

The coding has the following format: 3X@@### where 3 stands for the 3000 series.
The 3000 receiver can be configured as single driver receiver or dual receiver driver. The standard single driver receiver is the 3100.

For the Advanced Audio market there is the 3200 version which has a wider bandwidth and lower output. The 3500 version has smaller bandwidth compared to the 3100 but has extra output available.

The first digit @ stands for the damping applied. The A version is the standard response while the D version has type I damping.
The second digit shows special spout configurations, the A stands for no spout. If this second digit is not used the standard 12s spout is used.
The ### are 3 digits which stands for the 1000 Hz impedance, the available types are listed in table 1.

<table>
<thead>
<tr>
<th>Type</th>
<th>Impedance</th>
<th>DC resist.</th>
</tr>
</thead>
<tbody>
<tr>
<td>007</td>
<td>70</td>
<td>25</td>
</tr>
<tr>
<td>011</td>
<td>110</td>
<td>36</td>
</tr>
<tr>
<td>015</td>
<td>155</td>
<td>50</td>
</tr>
<tr>
<td>029</td>
<td>291</td>
<td>91</td>
</tr>
<tr>
<td>042</td>
<td>426</td>
<td>143</td>
</tr>
<tr>
<td>062</td>
<td>620</td>
<td>202</td>
</tr>
</tbody>
</table>

Table 1. Available impedances with associated DC resistance.
Typical response curves are measured under the following conditions:
The acoustical termination consist of:
8 x 1mm ID + 28 x 1.5mm ID + 25 x 2mm ID + 18 x 3mm ID + 2cc coupler.
At constant voltage input, 0.35mVA input power.
3300 series receivers
The 3300 series is designed for “Behind The Ear” applications.

Available port locations for the 3300 are: 12s, 1s.

The coding has the following format: 3X@@@### where 3 stands for the 3000 series.
The 3000 receiver can be configured as single driver receiver or dual receiver driver. The standard dual driver receiver is the 3300.
The 3700 version has smaller bandwidth compared to the 3300 but has extra output available.

The first digit @ stands for the damping applied. The A version is the standard response while the D version has type I damping.

The second digit shows special spout configurations. If this second digit is not used the standard 12s spout is used, the A stands for no spout. The E is used for the 1s spout.

The third digit is used for the prepping configuration. S for serial and P used for parallel prepping.

The ### are 3 digits which stands for the 1000 Hz impedance of the single drivers used. The total impedance of the product depends on parallel or serial prepping.

Typical response curves are measured under the following conditions:
The acoustical termination consist of:
8 x 1mm ID + 28 x 1.5mm ID + 25 x 2mm ID + 18 x 3mm ID + 2cc coupler.
At constant voltage input, 0.7mVA input power.
4400 series receivers
The 4400 series is designed for use in “Completely In the Canal” and “In The Ear” applications.

Available ports for the 4400 are: 12s and spoutless.

The coding has the following format: 44@@###R where 44 indicates the 4400 series. The product consists of a dual driver system.

The first digit @ stands for the damping applied. The A version is the standard response.

The second digit shows spout configurations. If this second digit is not used the standard 12s spout is used, the A stands for no spout.

The ### are 3 digits which stands for the 1000 Hz impedance. For available impedances of the total product refer to table 1.
When the product name is ending with the R, the product has flat gold contacts instead of solder pads. These gold contacts can be used for pressure contact connection technology.

<table>
<thead>
<tr>
<th>Type</th>
<th>Impedance</th>
<th>DC resist.</th>
</tr>
</thead>
<tbody>
<tr>
<td>004</td>
<td>38</td>
<td>28</td>
</tr>
<tr>
<td>007</td>
<td>79</td>
<td>57</td>
</tr>
<tr>
<td>015</td>
<td>152</td>
<td>110</td>
</tr>
<tr>
<td>030</td>
<td>320</td>
<td>218</td>
</tr>
</tbody>
</table>

Table 1. Available impedances with associated DC resistance.
Typical response curves are measured under the following conditions:
The acoustical termination consist of:
10 x 1mm tubing into a 2cc coupler versus 10 x 1 mm tubing into a IEC 711 coupler.
At constant voltage input, 0.35mVA input power.