



KNOWLES BALANCED ARMATURE DRIVERS FOR  
PREMIUM SOUND: PROFESSIONAL IN-EAR  
MONITORS, AUDIOPHILE & CONSUMER EARPHONE  
SELECTION GUIDE

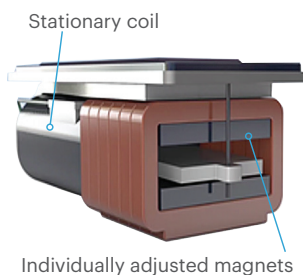
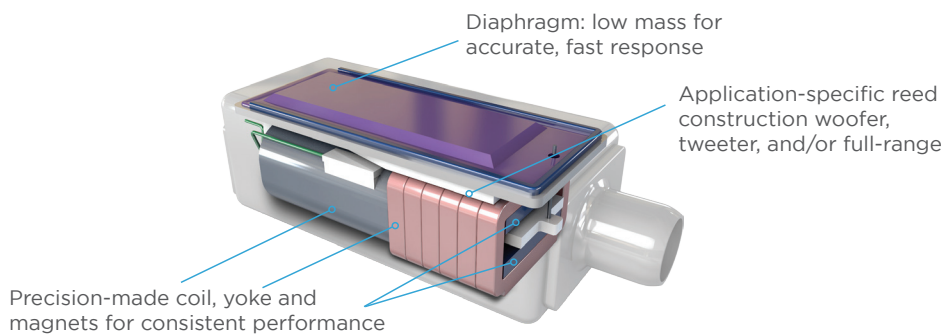


## Small Size, Premium Sound

Multiple Balanced Armature (BA) drivers, in many cases custom tuned, provide precise reproduction with superior soundstage and imaging.

Unlike ordinary speakers, the stationary coil of a BA can be wound with a wide range of impedances, making it easier to control the interaction between multiple drivers. Together with venting options and acoustic dampers, this simplifies crossover circuits and gives designers wide latitude in tuning In-ear monitors.

BA midrange drivers, tweeters, and supertweeters can be combined with dynamic woofers to create hybrid audiophile earphones.



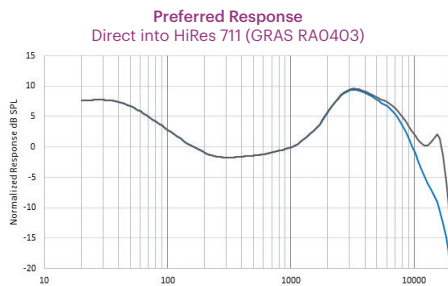
### THE BALANCED ARMATURE ADVANTAGE

- ▶ Balanced Armature (BA) drivers offer improved fidelity, realism and detail over traditional dynamic drivers. They are incredibly small and lightweight, and provide greater output with less power.
- ▶ A BA driver can also be combined with a dynamic speaker to form a hybrid earphone. In this configuration, the BA drivers focus on the critical high end portion of the audio spectrum, bringing a new level of clarity and realism.

|            | PART NUMBER                                     | CONFIGURATION              | SIZE IN (mm) | Z @ 1kHz (Ω)   | SENS (dB SPL) TO 100mV / TO 1mW | MAX SPL 10% THD 1kHz (dB SPL) | THD@ 94dB SPL / THD@ 100dB SPL            | VENTED              |   |
|------------|---|----------------------------|--------------|----------------|---------------------------------|-------------------------------|---|---------------------|---|
| TWEETER    | RAN-33860-B148                                  | Single                     | 5.1×2.8×2.0  | 14             | 94                              | 108                           | 0.3% / 0.5%                               | No                  |    |
|            | SWFK-31736-000                                  | Dual                       | 5.0×2.7×3.9  | 6.9            | 102 / 100                       | 114                           | 0.2% / 0.2%                               | No                  |    |
|            | RAU-34832-B148                                  | Single Supertweeter        | 5.1×2.8×2.0  | 14(*)          | 103(*) / n/a                    | 122(*)                        | 0.3% / 0.3%(*)                            | No                  |    |
|            | RDU-35000-000                                   | Dual Supertweeter          | 5.1×2.8×4.1  | 7(*)           | 109(*) / n/a                    | 127(*)                        | 0.2% / 0.2%(*)                            | No                  |    |
| FULL RANGE | RAQ-35091-000<br>RAQ-33862-000<br>RAQ-33985-000 | Single                     | 5.3×2.7×1.6  | 74<br>56<br>56 | 109/117<br>106/113<br>106/113   | 122<br>120<br>120             | 1.1% / 1.3%<br>0.7% / 0.8%<br>2.2% / 2.4% | Yes<br>No<br>Damped |    |
|            | RLQ-34240-000                                   | Dual-diaphragm high-output | 5.3×3.1×2.7  | 57             | 111 / 120                       | 126                           | 0.3% / 0.4%                               | Yes                 |    |
|            | ED-26805-000<br>ED-31305-163                    | Single                     | 6.3×4.3×3.0  | 28<br>84       | 109 / 113<br>102 / 111          | 123<br>119                    | 0.3% / 0.3%<br>2.8% / 3.9%                | Yes                 |    |
|            | BK-26824-000                                    | Single                     | 7.9×5.6×4.0  | 22             | 114 / 118                       | 127                           | 0.2% / 0.2%                               | Yes                 |    |
|            | DWFK-31785-000                                  | Dual                       | 5.0×2.7×3.8  | 30             | 106 / 111                       | 120                           | 0.4% / 0.5%                               | Yes                 |   |
|            | TWFK-30017-000                                  | Dual                       | 5.0×2.7×3.9  | 43             | 106 / 112                       | 117                           | 0.5% / 0.6%                               | Yes                 |  |
|            | GM-34020-000                                    | 2-way                      | 5.2×3.0×4.5  | 95             | 103 / 114                       | 119                           | 0.4% / 0.6%                               | Yes                 |  |
|            | GQ-30783-000                                    | 2-way                      | 6.3×4.3×4.5  | 38             | 111 / 116                       | 125                           | 0.1% / 0.5%                               | Yes                 |  |
|            | GU-32829-000                                    | 2-way                      | 7.9×5.6×5.9  | 17             | 113 / 116                       | 131                           | 0.1% / 0.2%                               | Yes                 |  |
|            | HE-31751-000                                    | 2-way                      | 9.5×7.2×8.3  | 112            | 112 / 123                       | 132                           | 0.1% / 0.2%                               | No                  |  |
|            | GK-31732-000                                    | 3-way                      | 9.5×7.2×8.4  | 11             | 113 / 113                       | 131                           | 0.1% / 0.2%                               | No                  |  |
|            | GV-32830-000                                    | 4-way                      | 7.9×5.6×6.8  | 28             | 113 / 116                       | 125                           | 0.2% / 0.3%                               | Damped              |  |
| WOOFER     | CI-22955-000                                    | Single                     | 9.5×7.2×4.1  | 80             | 112 / 122                       | 133                           | 0.1% / 0.1%                               | No                  |  |
|            | HODVTEC-31618-000                               | Dual                       | 7.9×4.1×5.6  | 48             | 123 / 130                       | 141                           | 0.1% / 0.1%                               | Yes                 |  |
|            | RDI-34006-000                                   | Dual                       | 7.9×4.1×5.2  | 25             | 118 / 122                       | 141                           | 0.1% / 0.1%                               | Yes                 |  |

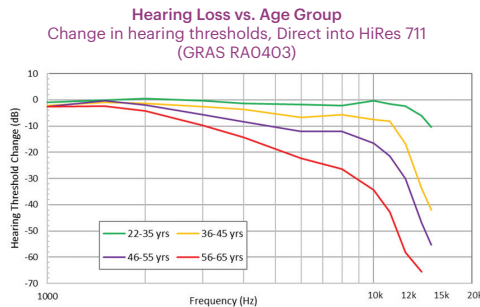
\* Supertweeter performance is specified at 10kHz

Other models available, please contact a Knowles representative



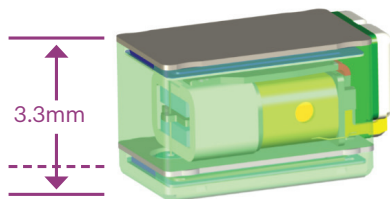
## PREFERRED RESPONSE CURVE FOR EARPHONES

- ▶ A traditional industry-standard target response curve (blue) characterized the preferred earphone response curve up to 10kHz.
- ▶ With evolution of Hi Res Audio, Knowles studied user preference between 8kHz and 20kHz (black).
- ▶ Preferred response white paper: <https://www.knowles.com/preferred-listening-response>



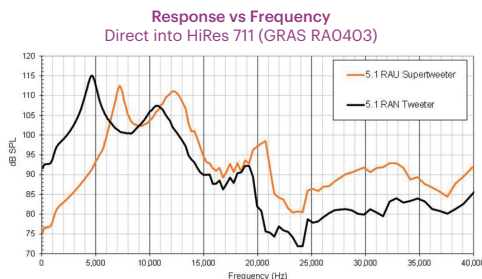
## DELIVERING HD AUDIO EXPERIENCE AT ANY AGE REQUIRES HIGH-PERFORMANCE DRIVERS

- ▶ Biggest difference with HD audio is in the treble.
- ▶ Threshold of hearing changes as we age.
- ▶ With BA drivers, running high gain for hearing personalization avoids overloading the equalizer, DAC, and power amp while minimizing power draw.



## NEW DUAL-DIAPHRAGM RLQ DELIVERS BEST-IN-CLASS OUTPUT FOR SIZE

- ▶ Patented design has two separate diaphragms driven by a single motor.
- ▶ 5 dB more output than single diaphragm RAQ with very little size impact.
- ▶ Each diaphragm is in its own chamber, resulting in rich sound.



## NEW RAU SUPERTWEETER DELIVERS SUPERIOR OUTPUT LEVEL AND TREBLE EXTENSION TO 40 KHZ AND BEYOND

- ▶ Knowles BA tweeter and new Supertweeter deliver hi-res audio with superior performance.
- ▶ Drive directly from DSP.
- ▶ No high voltage amplifier or transformer needed.
- ▶ Micro-sized RAU: 5.1 × 2.8 × 2.0mm.
- ▶ Also available in Dual and Quad configurations.

### ADDITIONAL RESOURCES

Knowles Premium Sound: [www.KnowlesPremiumSound.com](http://www.KnowlesPremiumSound.com)

The evolution of in-ear video: <https://vimeo.com/252195208>

Datasheets: <https://www.knowles.com/subdepartment/dpt-balanced-armature-receivers-and-speakers/subdpt-premium-audio>

White papers: <https://www.knowles.com/applications/ear-solutions/premium-sound/resource-center>

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