

DyadBA3 Electronics Module for Stereo/Mono Bluetooth Speakers

✓ **RoHS**
COMPLIANT



Headline Features

- Stereo audio power amplifier design with Mono modes (monoblock and active crossover)
- Based on AS2002 amplifier IC:
 - 1x30W burst power output (4Ω)
 - 2x15W burst power output (8Ω)
- Bluetooth audio receiver; includes A2DP, AVRCP 1.4 and supports apt-X, AAC and HFP
- Auto-sensing analogue AUX-IN input
- Designed for battery powered applications:
 - From Li-Ion cell: 3.0V – 4.2V operation
 - 5V DC operation also possible
- Integrated battery management, supporting:
 - USB charging 500mA / 1.5A with auto-detection per USB CS 1.2
 - Higher power charging option up to 2.5A from AC adaptor
- Graceful volume limiting at full power:
 - Preserves amplifier's dynamic power
 - No harsh clipping or compression effects
- Audio processing:
 - Configurable volume control
 - Volume-overdrive capability
 - 16 user-configurable biquad filters
 - Mute, with adjustable ramping
 - Bass Boost and Stereo Wide
- Automatic power-save modes when no audio content is present
- Self-configuring on power-up; autonomous operation and flexible user configuration
- Amplifier outputs protected against short circuit and short to ground
- Small form factor module:
 - 110 x 46 x 29mm
 - Amplifier's power efficient operation eliminates heat sinks

Description

The DyadBA3 is a fully integrated electronics module for high-efficiency battery-powered Bluetooth speakers. It is built around the AS2002 boost amplifier with DSP. The module is powered by a 3.7V lithium-ion battery (not included), which may be a single cell, or may be multiple cells in parallel for higher capacity. It includes sophisticated battery management, for recharging the battery and simultaneously powering the system from an AC adaptor or from a USB port. Wireless communications are performed by an integral Bluetooth submodule with on-board antenna. It comes complete with **A2DP**, **HFP**, and **AVRCP 1.4**. **AAC** and **apt-X** are also supported subject to licencing agreements.

Class Leading Battery Life

DyadBA3 provides class leading battery life, potentially 400% better than comparable competitors. Operating at volume level 22, typical tests have shown **more than 45 hours music playback from a single 2.2Ah cell** is possible (8 ohm loads). This is because the high peak-to-average power ratios of audio signals, together with the real-world usage of volume controls, mean that amplifiers spend most of their time delivering rather less than full output power. Class-D amplifiers only achieve their rated efficiencies at full output power, i.e. when passing fullscale sinewaves. In contrast, the DyadBA3 module maintains its efficiency over a much-wider range of signal types and volume settings.

Truly Wireless Speakers

Exceptional battery life gives extended playback with built in battery management for hassle free recharging. Wide compatibility ensured through Bluetooth v3.0 technology playback from all Bluetooth enabled sources, e.g. Pandora®, Spotify™, Rhapsody®, TuneIn® as well as all cloud and local media files. Excellent portability guaranteed from light weight and more than 10m wireless range. Extreme flexibility from customisable buttons including Play/Pause, Track Fwd/Back, Pairing, Power, Volume, EQ switching, Hands Free – and various indicator LEDs.

Configurable Options

The flexibility and customisation of the Tectonic Elements Bluetooth amplifier module is enabled via our programming tool, Bongo. These are simply listed as below;

- Configurable Bluetooth Customer Friendly Name
- Fully configurable user interface buttons
 - Power on/off
 - Bluetooth pair/disconnect/memory reset
 - Volume up/down buttons
 - Track control buttons – Play, Pause, Forward, Backward
 - Hands Free telephone call answer/end
 - Stereo wide on/off
 - Bass boost on/off
 - Bass boost/Stereo wide 4-option step cycle
 - Config cycle button – use to change EQ, button and LED functionality
 - Special combinations (multi-button presses and/or extended button holds) to activate extra features
- Fully configurable LED outputs
 - Blue Bluetooth LED
 - Green Power/Aux LED
 - Blue/Green LED briefly extinguish on volume change
 - Red Charging and Battery State LED
 - Red audio clip LED
 - Multi-colour LED support
 - Extremely flexible LED output actions based on internal statuses and events, with multiple LED output states
- Audio streaming codecs
 - A2DP
 - AAC
 - apt-X
- Hands Free Phone operation
 - HFP
- Configurable volume control – 0 to limit steps, 1.5dB per step
 - Startup volume setting
 - Battery backed last volume option
 - Normal volume limit
 - Volume overdrive feature (to cope with under-modulated source material)
 - Volume overdrive limit
- Configurable audio amplifier modes
 - Stereo 2x15W (2.0)
 - Mono active crossover 2x15W (1.1)
 - Mono 1x30W (1.0)
- 16 Fully configurable EQ biquad filters
 - Assign to audio paths as desired – inputs and outputs can be at any filter, an unequal number of filters can be used on each path

- Each biquad filter can be almost any realisable audio filter – including analogue equivalents and pole-zero filters
- Switchable 1st order DC blocking filter in audio signal path
- Amplifier Bass boost feature
 - Frequency and level configurable
 - Active at power-on configurable
- Amplifier Stereo wide feature
 - Gain configurable
 - Active at power-on configurable
- Configurable battery charger
 - Combined Charging inputs
 - Battery charging current
 - Charging termination current
 - Charging regulation voltage
 - Protection thermistor present
- Perpetual pairing option – DyadBA3 automatically switches from connectable to discoverable when not connected to a device (allows clean design with no visible Bluetooth button)

Firmware and Hardware Features

- Class leading battery life – Potentially 400% better than competitors
 - Extremely high efficiency (better than class-D) from unique AS2002 amplifier
 - Automatic energy saving features when no audio present
 - amplifier muting
 - Auto-Power-Off
 - power down of sections of the board not currently in use
 - Allows use of smaller capacity battery, reducing cost
 - No heatsinks required, minimal energy wasted as heat
- Bluetooth Audio Profile AVRCP 1.4
- Automatic Bluetooth re-pairing
- Integrated Bluetooth antenna – no SIG approval required (DyadBA3 is pre-approved)
- 6 device Bluetooth memory
- Power from Li-ion cell or 5V DC supply
- Charging from USB at 500mA or 1.5A with auto-detection as per USB Charging Specification 1.2
- Charging from 5V DC supply (AC low voltage adaptor) at up to 2.5A
- Automatic volume scaling as battery becomes depleted – full volume immediately available when charger connected
- Graceful volume limiting at full output power – no harsh clipping or compression effects
- Thermal control to prevent overheat
- Amplifier protection against short circuit and short-to-ground
- Built in Li-ion charging, battery and power management
- Li-ion protection thermistor
- Analogue aux-in with configurable switching (automatic or manual switch)
- Analogue mic-in for Hands Free Phone operation
- Multifunction User Interface connection
- Entire board automatically configured from data stored in an inexpensive EEPROM located on customer side - all DyadBA3s are standard and service replacement is therefore easy (no reprogramming to do, should swap-out ever be required)
- Default (fail-safe) built-in Config in case of EEPROM failure
- Automatic indication of low battery state
- Easy configuration and engineering development via Bongo software and level shifter dongle hardware
- Extremely good EMC performance – no additional capacitors or ferrites needed

Disclaimer: The information in this Product Brief is subject to change without notification. For the latest specifications, additional product information and information about Tectonic Elements, please visit www.tectonicelements.com