ALCHIMIST

GERMAN ENGINEERED CAR AUDIO | SINCE 1943

AD12H-1500

User Guide

Complete Hardware Setup, Software Configuration & Tuning Guide

12-Channel DSP Class AB Processor | 1500W RMS | Bluetooth 5.3

alchimists.com | Reinhard Group | Waiblingen, Germany

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Table of Contents

CHAPTER 1

Product Overview

ALCHIMIST AD12H-1500 — 12-Channel DSP Class AB Processor

The Alchimist AD12H-1500 is an ultra-precision 12-channel DSP Class AB processor powered by the advanced 12H1500 chip. With 1500W RMS total output power, Bluetooth 5.3 lossless audio streaming, and 31-band per-channel equalization, it represents the pinnacle of Alchimist's car audio DSP technology.

Package Contents

- 1x AD12H-1500 DSP Processor Unit
- 1x High-Level Speaker Input Harness
- 1x USB Cable (Type-A to Micro-B)
- 1x Quick Start Guide

Safety Information

This product must be installed by a qualified car audio technician. Disconnect the vehicle battery before installation. Do not expose the unit to water or excessive moisture. Ensure adequate ventilation around the unit during operation. Do not exceed the rated power specifications for connected speakers.

CHAPTER 2

Hardware Specifications

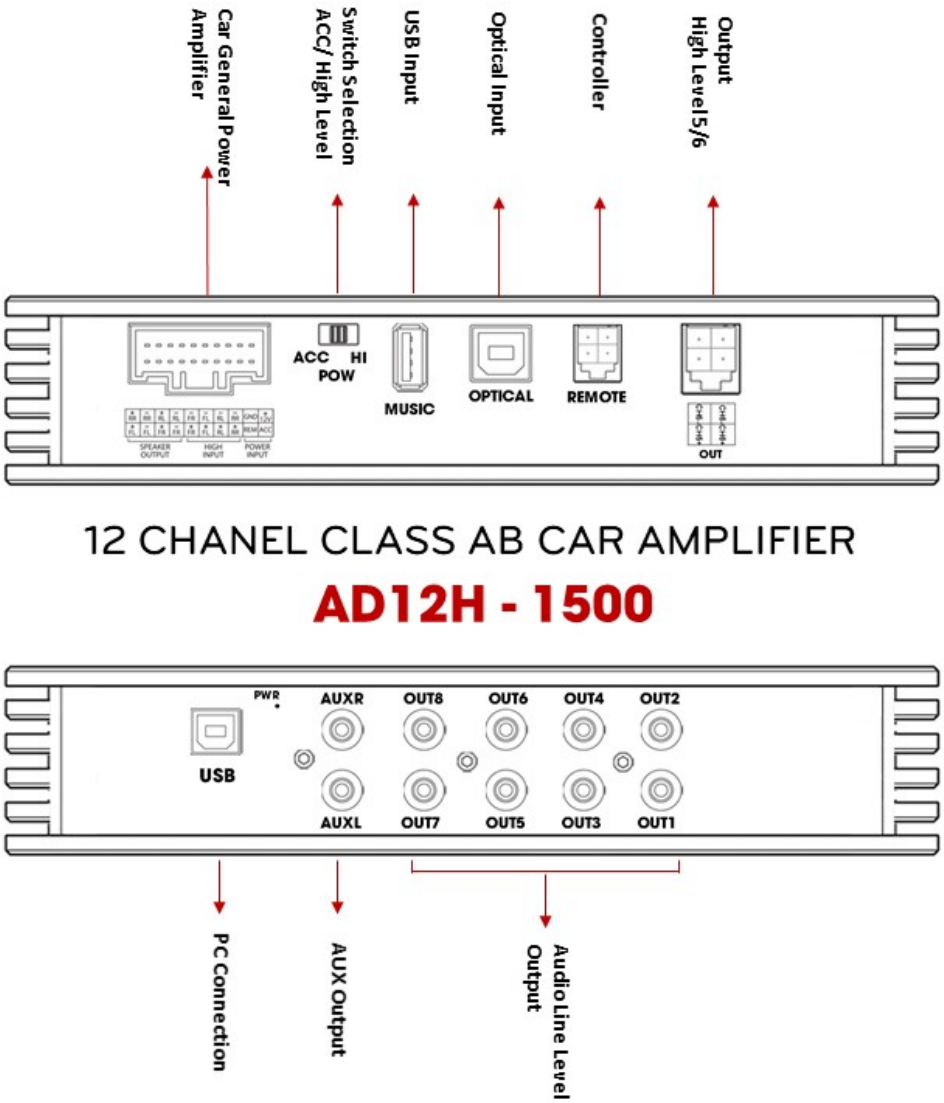
AD12H-1500 Technical Specification Sheet

Model	ALCHIMIST AD12H-1500
DSP Chip	12H1500 High-Performance
Output Channels	12 (6 pairs)
Total Power	1500W RMS
Amplifier Class	Class AB
EQ	31-Band Graphic per Channel
Crossover	HPF / LPF / BPF (12/24 dB/oct)
Time Delay	0 – 20ms per Ch (0.02ms steps)
Phase	0° / 180° per Channel
Level	-40dB to +12dB per Channel
Bluetooth	5.3 (LDAC, aptX HD, SBC)
Input	High Level / RCA / Optical / USB
SNR	> 115 dB
THD+N	< 0.005%
Freq. Response	20Hz – 20kHz (±0.5dB)
Presets	6 User Presets
Dimensions	250 × 170 × 55 mm
Weight	1.8 kg

CHAPTER 3

Connection Diagram

The diagram below shows all input and output connections on the AD12H-1500. The front panel provides power, signal input, and control connections. The rear panel provides USB, AUX, and all 12 speaker output channels.



AD12H-1500 Connection Diagram — Front Panel (top) & Rear Panel (bottom)

Front Panel Connections

- Car General Power / Amplifier — Main 12V power input
- Switch Selection ACC / High Level — Input mode selector
- USB Input — For PC software connection and firmware updates
- Optical Input — S/PDIF digital audio input (up to 192kHz/24-bit)
- Controller / Remote — Remote control receiver connection
- Output High Level 5/6 — Speaker output channels 5 and 6

Rear Panel Connections

- USB — PC connection for DSP software control
- AUX L/R — Auxiliary line-level audio output
- OUT 1–8 — Speaker output channels via RCA connectors

CHAPTER 4

Installation Guide

Step 1: Disconnect Battery

IMPORTANT: Always disconnect the negative (–) battery terminal before beginning any installation work. Wait at least 5 minutes for all capacitors to fully discharge.

Step 2: Choose Mounting Location

Select a flat, vibration-free surface with adequate airflow — under the front seat or in the trunk are ideal locations. Avoid areas with excessive heat or moisture. Leave the USB port accessible for future software updates.

Step 3: Power Connections

B+ (Red wire): Route from battery positive terminal through the firewall. Install an inline fuse (30A) within 18 inches of the battery. Use minimum 10 AWG wire for runs over 10 feet.
Ground (Black wire): Connect to a clean, bare metal chassis ground point within 18 inches of the unit. Sand paint/coating for solid contact.
Remote (Blue wire): Connect to the head unit’s remote turn-on output, or to an ACC-switched 12V source.

Step 4: Signal Input Wiring

Factory head unit: Use the included High-Level input harness. Connect directly to the speaker wires behind the head unit.
Aftermarket head unit: Use low-level RCA cables from the head unit’s preamp outputs for best quality.
Digital source: Connect an optical S/PDIF cable for the highest fidelity digital audio input.

Step 5: Speaker Output Wiring

Connect each of the 12 output channels to your speakers. Recommended configuration:
CH 1–2: Front Tweeters | CH 3–4: Front Midrange
CH 5–6: Front Midbass | CH 7–8: Rear Speakers
CH 9–10: Rear Fill or Center | CH 11–12: Subwoofers
Maintain correct polarity (+ to +, – to –) on every connection. Use proper gauge wire for the cable run length.

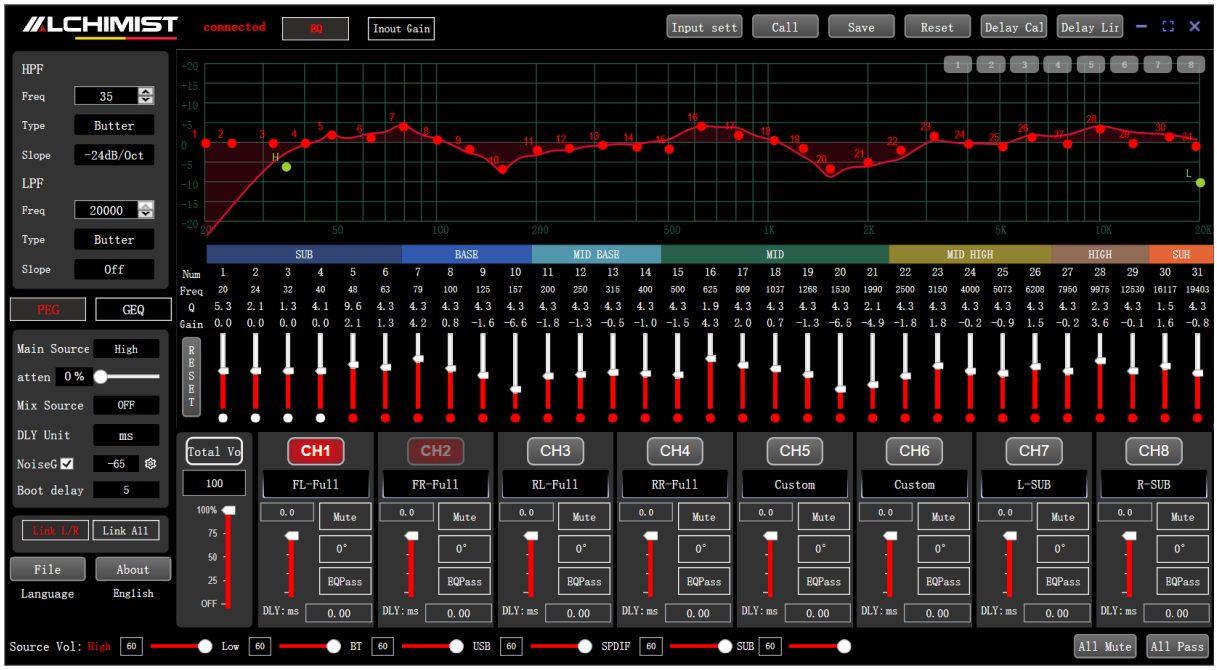
Step 6: Verify & Power On

Double-check all connections. Reconnect the negative battery terminal. Turn on the vehicle ignition. Verify the DSP power LED illuminates. If not, check the fuse, ground, and remote connections.

CHAPTER 5

Software Overview

The Alchimist DSP software provides complete control over all DSP functions. Download from alchimists.com/documents. Connect via USB cable or Bluetooth. The software runs on Windows PC and Android devices.



Main Software Interface — EQ Curve, 31-Band Graphic EQ, Channel Controls, Crossover Settings

Interface Overview

- Top Bar: Connection status, Input settings, Save/Load presets, Delay List, navigation buttons
- EQ Graph: Real-time frequency response curve (20Hz – 20kHz) with adjustable points
- Left Panel: HPF/LPF crossover settings (frequency, type, slope), GEQ/PEQ toggle
- Left Panel: Main/Mix source selection, Attenuation, DLY unit, Noise gate, Boot delay
- Channel Faders: Individual volume control for each of the 8 output channels
- Channel Labels: CH1–CH8 with custom naming (FL-Full, FR-Full, RL-Full, RR-Full, etc.)
- Channel Controls: Mute, Phase (°), Delay (ms), Crossover per channel
- Bottom Bar: Source volume, input source selector (BT, USB, Optical, S/PDIF)

CHAPTER 6

EQ — 31-Band Equalizer

Each output channel features a professional 31-band graphic equalizer covering the full audible spectrum from 20Hz to 20kHz. Each band can be adjusted from -12dB to +12dB in 0.5dB steps, with fixed Q at standard 1/3 octave spacing.

Frequency Ranges & Purpose

Frequency	Band	Character
20 – 60 Hz	Sub-bass	Deep rumble, subwoofer foundation
60 – 250 Hz	Bass	Body, warmth, kick drums
250 Hz – 4 kHz	Midrange	Vocals, instruments, clarity
4 – 8 kHz	Presence	Detail, attack, articulation
8 – 20 kHz	Brilliance	Air, sparkle, cymbal shimmer

Tuning Methodology

1. Start with all bands at 0 dB (flat response).
2. Play a familiar reference track at moderate volume.
3. Identify problem frequencies — peaks (harsh) or dips (thin).
4. CUT problem frequencies first (subtractive EQ is cleaner).
5. Boost desired frequencies gently — maximum +3 dB recommended.
6. A/B compare with flat response frequently.
7. Tune at the volume level you normally listen to.
8. Save your tuning as a preset when satisfied.

CHAPTER 7

Crossover Settings

The crossover section allows you to set High-Pass Filter (HPF), Low-Pass Filter (LPF), and Band-Pass Filter (BPF) for each channel. This ensures each speaker only receives frequencies within its optimal range, improving sound quality and protecting speakers from damage.

High-Pass Filter (HPF)

Blocks frequencies below the set point. Apply to:

- Tweeters: 3,000 – 6,000 Hz at 24 dB/octave
- Midrange: 250 – 500 Hz at 12 dB/octave
- Midbass: 60 – 100 Hz at 12 dB/octave

This prevents low frequencies from reaching small speakers that cannot reproduce them.

Low-Pass Filter (LPF)

Blocks frequencies above the set point. Apply to:

- Subwoofer: 60 – 120 Hz at 24 dB/octave
- Woofer: 200 – 500 Hz at 12 dB/octave

Ensures only bass frequencies reach the subwoofer for clean, tight low-end response.

Band-Pass Filter (BPF)

Combines HPF + LPF to create a frequency window for midrange drivers.

- Typical midrange band-pass: 250 Hz – 4,000 Hz

Adjust based on speaker specifications and vehicle acoustics.

Filter Slope Options

- Butterworth 12 dB/oct: Gentle, natural rolloff with slight overlap
- Butterworth 24 dB/oct: Steep, clean separation between drivers

The AD12H-1500 supports both slopes. Select in the left panel under HPF/LPF Type and Slope settings.

Software Settings

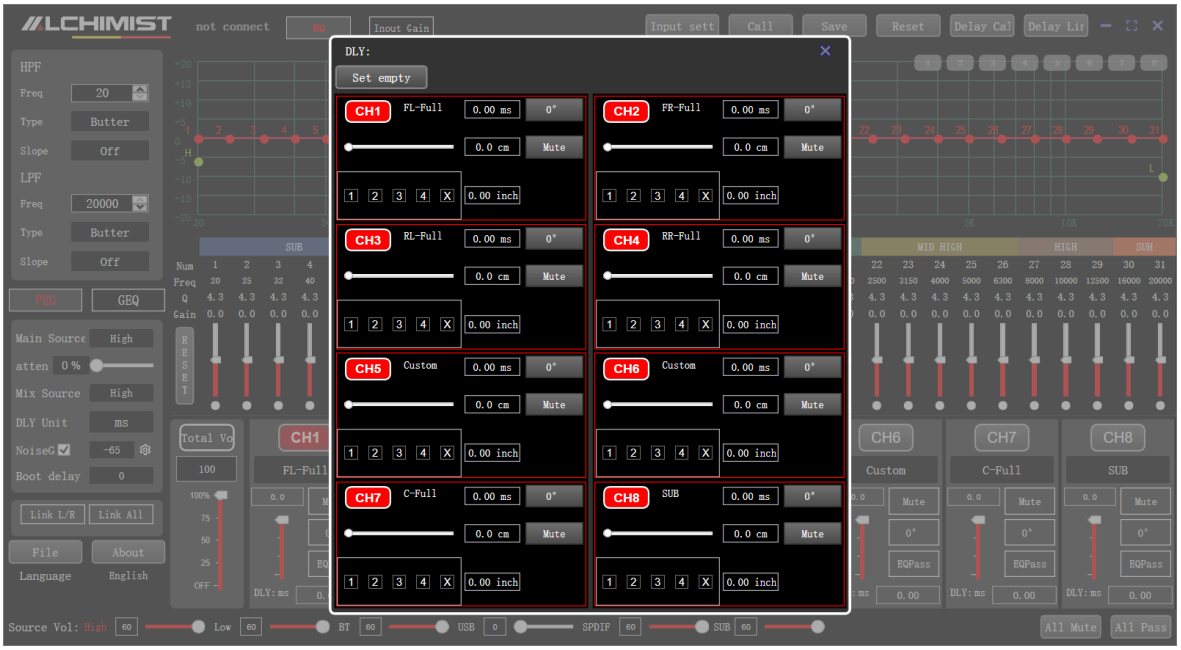
In the left panel of the DSP software:

- HPF Freq: Set the high-pass frequency
- HPF Type: Butterworth
- HPF Slope: -12dB/oct or -24dB/oct
- LPF Freq: Set the low-pass frequency
- LPF Type: Butterworth
- LPF Slope: OFF / -12dB/oct / -24dB/oct

CHAPTER 8

Time Delay & Alignment

Time delay compensates for the different distances between each speaker and the listener. Without delay correction, the closest speaker's sound arrives first, pulling the soundstage to one side. Proper alignment creates a focused, centered soundstage.



Time Delay Settings Dialog — Individual delay for each channel with distance input

How to Set Time Delay

1. Sit in the driver's seat (primary listening position).
2. Measure the distance from your head to each speaker (in cm).
3. Enter distances in the Delay dialog for each channel.
4. The DSP calculates delay automatically, or use the Delay Calculator.
5. Closest speakers get the most delay (so their sound is "slowed down").
6. Fine-tune by ear: play a mono vocal track and adjust until the voice appears centered on the dashboard directly in front of you.

Calculation Formula

Delay (ms) = (Farthest speaker distance – This speaker distance) ÷ 34.3

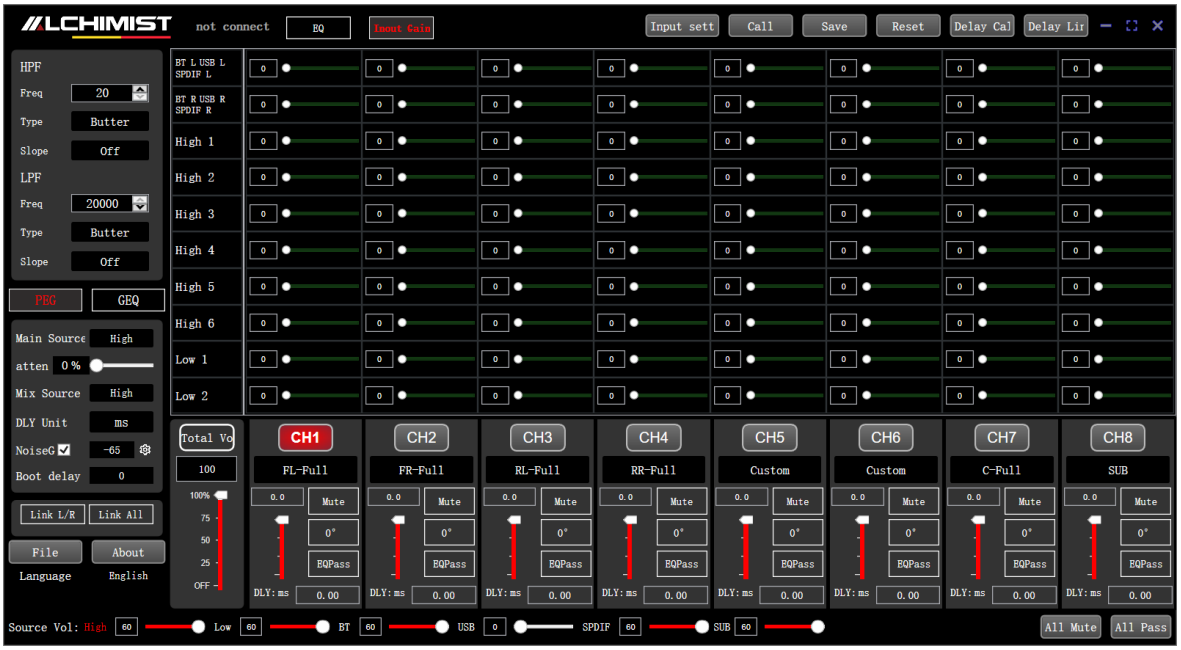
Example (Driver Position)

Left Tweeter: 60 cm → (150 – 60) / 34.3 = 2.62 ms delay
Right Tweeter: 150 cm → (150 – 150) / 34.3 = 0.00 ms delay
Left Midbass: 80 cm → (150 – 80) / 34.3 = 2.04 ms delay
Right Midbass: 140 cm → (150 – 140) / 34.3 = 0.29 ms delay
Subwoofer: 120 cm → (150 – 120) / 34.3 = 0.87 ms delay

CHAPTER 9

Input Gain & Routing

The Input Gain screen allows you to configure which physical inputs are routed to which DSP processing channels. This is essential for setting up the correct signal flow from your head unit to the DSP.



Input Gain & Routing Matrix — Map physical inputs to processing channels

Input Source Options

- High Level (Speaker Wire Input) — For factory head units without RCA outputs
- Low Level (RCA Input) — For aftermarket head units with preamp outputs
- Optical S/PDIF — Digital input for highest quality (up to 192kHz/24-bit)
- USB Audio — Digital audio from PC or compatible device
- Bluetooth 5.3 — Wireless streaming (LDAC, aptX HD, aptX, SBC)

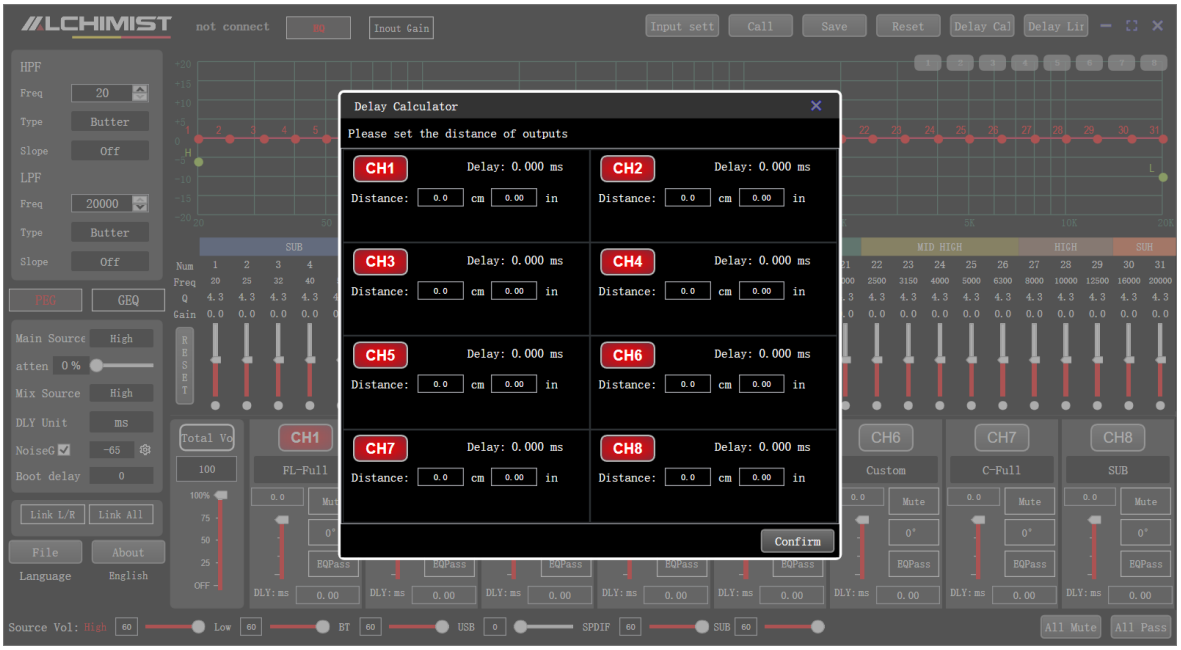
Gain Structure Tips

- Set input sensitivity to match your source output level
- Avoid clipping: if the signal distorts, reduce gain
- Use the Main Source selector to choose the primary input
- Mix Source allows blending a second input (e.g., navigation audio)
- The routing matrix (grid) maps each input channel to output channels

CHAPTER 10

Delay Calculator

The built-in Delay Calculator automatically computes the correct time delay for each channel based on the speaker distances you enter. This eliminates manual calculation and ensures precise alignment.



Delay Calculator — Enter speaker distances, auto-calculate delay values

How to Use the Delay Calculator

1. Click "Delay Cal" button in the top navigation bar.
2. For each channel (CH1 – CH8), enter the Distance from the listening position.
3. You can enter distance in centimeters (cm) or inches (in).
4. The calculator automatically computes the optimal Delay in milliseconds.
5. Click "Confirm" to apply the calculated delay values to all channels.
6. Fine-tune individual channels as needed for perfect staging.

Presets & Saving (Chapter 11)

The AD12H-1500 supports 6 user presets. Save your current configuration via the "Save" button in the top bar. Load saved presets with the "Call" button. Export presets to file for backup using "Input sett" menu. This allows you to quickly switch between different tuning profiles — for example, one for daily listening and another for competition.

Bluetooth & Streaming (Chapter 12)

Bluetooth 5.3 with support for:

- LDAC: Up to 990 kbps (near Hi-Res quality)
- aptX HD: Up to 576 kbps (24-bit/48kHz)
- aptX: Up to 384 kbps (CD quality)
- SBC: Standard Bluetooth audio

Pairing: Hold the BT button for 3 seconds. LED flashes rapidly. Find "ALCHIMIST-AD12H" in your phone's Bluetooth settings. No PIN required. LED turns solid when connected. Select BT as input source in the software. Full DSP processing applies to Bluetooth audio.

CHAPTER 13

Troubleshooting

Unit does not power on

- Check inline fuse — replace if blown (30A)
- Verify B+ wire has 12V+ at the DSP unit (use multimeter)
- Check ground connection — must be clean, tight, bare metal
- Verify remote wire has 12V when ignition is ON
- Check for loose or corroded connectors

No sound from speakers

- Verify input source selection in the software matches your connection
- Check speaker wire connections at both DSP and speaker ends
- Ensure channel levels are not muted (check Mute buttons in software)
- Test with a different input source (e.g., switch from High Level to USB)
- Verify speaker impedance matches rated specifications

Distorted or clipping sound

- Reduce input sensitivity / gain level
- Check speaker wiring polarity (– speakers out of phase cause distortion)
- Reduce EQ boost levels — excessive boost causes clipping
- Verify crossover settings match your speaker specifications
- Check for loose or damaged speaker connections

Bluetooth connection issues

- Reset Bluetooth: Hold BT button for 10 seconds until LED changes
- Delete the pairing on your phone and on the DSP, then re-pair
- Ensure your phone’s Bluetooth is enabled and updated
- Try pairing with a different device to isolate the issue
- Update DSP firmware from alchimists.com/documents

Software cannot detect DSP via USB

- Use the USB cable that came with the unit (must be data-capable)
- Try a different USB port on your computer
- Reinstall the Alchimist DSP software
- Check Windows Device Manager for driver issues
- Restart both the DSP unit and your computer

CHAPTER 14

Warranty & Support

12-Month Global Warranty

Your AD12H-1500 is covered by a 12-month global warranty from the date of purchase. This warranty covers defects in materials and workmanship under normal use conditions. Valid worldwide through any authorized Alchimist dealer.

Warranty Registration

Register your product at alchimists.com/warranty within 30 days of purchase.

Required information:

- Product serial number (printed on the unit label)
- Date of purchase
- Authorized dealer name
- Proof of purchase (receipt or invoice)

What Is NOT Covered

- Damage from improper installation or modifications
- Accidental damage, water damage, or power surges
- Use outside recommended specifications
- Normal wear and cosmetic damage
- Products purchased from unauthorized sources

Claim Process

1. Visit alchimists.com/warranty to check your warranty status
2. Contact your authorized dealer or email warranty@alchimists.com
3. Provide serial number, proof of purchase, and issue description
4. Ship the product to the designated service center

Technical Support

- Email: support@alchimists.com
- Software downloads: alchimists.com/documents
- Dealer network: alchimists.com/dealers
- Check regularly for firmware and software updates

Thank you for choosing Alchimist Car Audio.

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