

PhaseAlign Lite: Code Analysis and User Guide

This is the source code for **PhaseAlign Lite** - an audio phase alignment tool written in JSFX (JavaScript Effects) language for audio software like REAPER.

Overview of PhaseAlign Lite

PhaseAlign Lite is a specialized plugin designed to solve phase issues when recording with multiple microphones or when combining different audio sources. This plugin is particularly useful for synchronizing phase between stereo audio channels.

Structure and Main Functions

Control Parameters

The plugin provides 13 main control sliders:

- **Sample Delay:** Sample-based delay (-1000 to 1000)
- **MS Delay:** Millisecond-based delay (-50ms to 50ms)
- **Phase Rotation:** Global phase rotation (0-360 degrees)
- **Polarity:** Polarity inversion (Normal/Inverted)
- **Auto Learn:** Automatic learning and optimization
- **Bass Lock:** Lock bass frequencies below 100Hz
- **Mono Check:** Mono compatibility check
- **Monitor Mode:** Various monitoring modes
- **Bass/Mid/High Phase:** Phase adjustment by frequency bands
- **Bypass:** Processing bypass
- **Preset:** 8 built-in presets for different scenarios

Key Features

Phase Correlation Analysis: The plugin calculates and displays the phase correlation level between two audio channels, helping users assess synchronization quality.

Frequency Band Processing: Allows separate phase adjustment for three frequency bands (bass, mid, high), providing high flexibility in editing.

Auto Learn Mode: Automatically analyzes and finds optimal settings within 2 seconds, saving time for users.

Detailed User Guide

Step 1: Select Appropriate Preset

First, choose a preset suitable for your recording situation:

- **Drum OH:** Optimized for drum overhead microphones
- **Snare:** For top/bottom snare microphones
- **Kick:** For inside/outside kick drum microphones
- **Bass DI+Amp:** Combining bass DI and amplifier
- **Guitar Multi:** Multiple guitar microphone setup
- **Vocal:** Harmony and lead vocals
- **Piano:** Stereo piano microphones

Step 2: Use Auto Learn

1. Enable **Auto Learn** mode by switching slider5 to "On"
2. Play music for 2 seconds for the plugin to analyze
3. The plugin will automatically find optimal settings and apply them
4. Observe the **Phase Correlation** meter to evaluate results

Step 3: Manual Adjustment (if needed)

If Auto Learn results don't meet requirements, you can manually adjust:

Delay Adjustment:

- Use **Sample Delay** for precise adjustment
- Use **MS Delay** for real-time adjustment

Phase Rotation:

- **Phase Rotation:** Rotate phase of entire signal
- **Bass/Mid/High Phase:** Rotate phase separately for each frequency band

Step 4: Check and Optimize

1. Monitor Phase Correlation meter:

- Green: Good correlation (>0.5)
- Yellow: Average correlation ($0-0.5$)
- Red: Poor correlation (<0)

2. Use Monitor Mode:

- **Mono:** Check mono compatibility
- **Difference:** Listen to differences between two channels
- **L Only/R Only:** Listen to each channel separately

3. Bass Lock: Enable this feature when you need to keep bass frequencies in mono mode

Step 5: Final Check

- Switch to **Mono Check** mode to ensure no phase cancellation occurs

- If you see "Severe phase cancellation detected" warning, readjust parameters

Important Notes

- The plugin works best with stable audio signals for analysis
- Use appropriate presets before applying Auto Learn
- Always check results in mono mode to ensure compatibility
- Phase correlation meter is a crucial tool for assessing synchronization quality

PhaseAlign Lite is a powerful and easy-to-use tool, suitable for both beginners and audio professionals in solving audio phase issues.