

# Envelop4Live User Manual for Spatial Sound Studio

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## Introduction

Envelop4Live (E4L) is a comprehensive spatial audio production toolkit that integrates seamlessly with Ableton Live Suite. This manual is designed specifically for students working independently in spatial sound studios, providing both fundamental concepts and practical workflows for creating immersive audio experiences.

## What is Spatial Audio?

Spatial audio creates three-dimensional sound experiences where audio sources can be positioned anywhere in a 3D space around the listener. E4L uses Ambisonics, a mathematical approach to spatial audio that captures and reproduces sound fields in full 360-degree surround sound.

## Key Benefits of E4L:

- Real-time spatial audio processing within Ableton Live
- Support for various speaker configurations (stereo, quadraphonic, 5.1, dome systems)
- Intuitive visual interface for positioning sounds in 3D space
- Integration with VR/AR applications
- Open-source and freely available

## Studio Setup and Prerequisites

### Required Software:

- **Ableton Live Suite 10 or 11+** (Standard version will not work)

- **Max for Live** (included with Live Suite)
- **Envelop4Live package** (already installed in your studio)

## **Recommended Hardware:**

- Multi-channel audio interface (minimum 8 outputs for quadraphonic setup)
- Studio monitors arranged in spatial configuration
- MIDI controller for real-time spatial manipulation
- VR headset (optional, for immersive monitoring)

## **Audio Interface Configuration:**

1. Set your audio interface to the highest sample rate your system supports (96kHz recommended)
2. Configure outputs to match your studio's speaker layout
3. Ensure low-latency monitoring is enabled
4. Test all speaker outputs before beginning work

## **Quick Start Guide**

### **1. Launch Ableton Live**

- Open Live Suite and create a new project
- Set your sample rate to 48kHz or higher
- Configure your audio interface outputs

### **2. Load E4L Master Bus**

- Create a new audio track
- In the Max for Live section of your browser, locate "E4L Master Bus"
- Drag it onto a Return track (typically Return A)
- This device will handle your master spatial decoding

### **3. Create Your First Spatial Sound**

- Load an audio clip onto an audio track
- Add "E4L Source Panner" device to the track
- Play your audio and use the 3D interface to move the sound around the space

### **4. Monitor Your Output**

- Ensure your studio monitors are receiving signal from the correct outputs
- Use headphones initially if you're unsure about the speaker configuration

# Core Components Overview

## E4L Source Panner

**Purpose:** Positions mono or stereo audio sources in 3D space **Key Controls:**

- **3D Visualizer:** Drag the source icon to position sound in space
- **Distance:** Controls proximity/presence of the source
- **Gain:** Adjusts source volume
- **Elevation:** Vertical positioning control
- **Width:** For stereo sources, controls spatial width

**Best Practices:**

- Start with sounds at moderate distances before moving to extremes
- Use elevation sparingly unless your studio has height speakers
- Monitor mono sources before applying stereo width

## E4L Master Bus

**Purpose:** Decodes spatial audio for your specific speaker configuration **Key Controls:**

- **Decoder Type:** Select your studio's speaker layout
- **Room Correction:** Compensates for acoustic irregularities
- **Master Gain:** Overall output level control
- **Visualization:** Shows the decoded spatial field

**Configuration Steps:**

1. Select the appropriate decoder for your studio setup
2. Route the return track to your main outputs
3. Adjust room correction if provided calibration data exists
4. Monitor levels to prevent clipping

## E4L Send Device

**Purpose:** Creates spatial sends/reverbs within the ambisonic domain **Applications:**

- Spatial reverbs that maintain positioning
- Creative spatial effects processing
- Building immersive environments

## E4L VST Loader

**Purpose:** Integrates third-party spatial audio VST plugins **Supported Formats:**

- Ambisonic effect plugins
- Spatial synthesizers
- VR audio tools

## Setting Up Your First Spatial Project

### Project Template Setup

#### 1. Create Track Structure:

Track 1-8: Audio sources with E4L Source Panner  
Track 9-10: Spatial synthesis/instruments  
Return A: E4L Master Bus (decoder)  
Return B-D: Spatial sends/effects

#### 2. Configure Sends:

- Route all spatial tracks to Return A at 100%
- Use additional returns for spatial effects
- Keep original track outputs at 0dB to monitor individual sources

#### 3. Set Up Monitoring:

- Create a monitoring setup that matches your studio configuration
- Use Control+Option+Click (Mac) or Ctrl+Alt+Click (PC) to audition individual ambisonic channels

## Basic Mixing Approach

1. **Start Dry:** Begin with all sources positioned and no effects
2. **Balance Levels:** Ensure no individual source dominates
3. **Add Movement:** Use automation to create spatial trajectories
4. **Apply Effects:** Add spatial reverbs and processing
5. **Master Output:** Fine-tune the master decoder settings

## Working with E4L Devices

### Source Positioning Strategies

#### Static Positioning:

- Place rhythmic elements (drums) in stable positions

- Use front positions for lead vocals/instruments
- Position ambient sounds at medium distances

### **Dynamic Movement:**

- Automate position parameters for moving sources
- Use LFOs for gentle, continuous motion
- Create trajectory patterns that support musical structure

### **Distance Modeling:**

- Near field (0.1-0.3): Intimate, present sounds
- Mid field (0.3-0.7): Natural positioning
- Far field (0.7-1.0): Ambient, distant sounds

## **Automation Techniques**

### **1. Position Automation:**

- Record real-time movement using mouse/controller
- Draw automation curves for precise control
- Use step sequencing for rhythmic spatial patterns

### **2. Parameter Modulation:**

- Map MIDI controllers to spatial parameters
- Use Max for Live devices to create complex modulation
- Combine multiple parameters for rich spatial textures

## **Working with Groups and Racks**

### **Ambisonic Groups:**

- Group related sources that move together
- Apply group-level spatial processing
- Maintain individual source control within groups

### **Drum Rack Integration:**

- Use E4L Source Panner on individual drum rack chains
- Create spatial drum kits with positioned elements
- Combine with traditional drum processing

# Advanced Techniques

## Multi-Order Ambisonics

E4L supports different Ambisonic orders:

- **1st Order (B-format):** 4 channels, basic spatial resolution
- **2nd Order:** 9 channels, improved localization
- **3rd Order:** 16 channels, high-resolution spatial audio

Higher orders require more processing power but provide better spatial accuracy.

## Field Recording Integration

1. Import ambisonic field recordings
2. Use E4L Import Device to properly decode multichannel files
3. Position imported ambiences in your spatial mix
4. Blend with synthetic spatial elements

## Spatial Synthesis

- Use E4L VST Loader with spatial synthesizers
- Create evolving spatial textures with multiple layers
- Combine traditional synthesis with spatial positioning

## Interactive Systems

- Map spatial parameters to external controllers
- Use OSC (Open Sound Control) for networked control
- Integrate with visual programming environments (Max/MSP, TouchDesigner)

## Studio-Specific Workflows

### Session Planning

1. **Pre-production:**
  - Sketch spatial arrangements on paper
  - Identify key spatial moments in your composition
  - Plan speaker configuration needs
2. **Production:**
  - Start with basic stereo mix
  - Gradually add spatial elements
  - Test regularly on studio speakers

### 3. Post-production:

- Fine-tune spatial balance
- Prepare alternative mixes (stereo, 5.1, etc.)
- Document spatial arrangement for future reference

## Studio Etiquette and Best Practices

### Before Starting:

- Test all speakers and connections
- Verify sample rate and buffer settings
- Save a project template for consistency

### During Work:

- Monitor at reasonable levels
- Take breaks to rest your ears
- Keep notes about spatial choices and settings

### After Sessions:

- Save multiple project versions
- Export stems and spatial metadata
- Reset studio to default configuration

## Quality Control Checklist

- ☐ All speakers functioning correctly
- ☐ No phase cancellation issues
- ☐ Appropriate level balancing
- ☐ Spatial positioning serves the music
- ☐ Export formats match intended playback systems

## Troubleshooting

### Common Issues and Solutions

#### No Sound Output:

- Check E4L Master Bus routing
- Verify audio interface configuration
- Ensure sends to Return A are active

#### Spatial Image Unclear:

- Check speaker positioning and calibration
- Verify decoder settings match studio setup
- Reduce conflicting spatial sources

### **Performance Issues:**

- Increase buffer size for complex projects
- Freeze tracks with heavy processing
- Use lower Ambisonic orders when appropriate

### **Phase Problems:**

- Check speaker polarity
- Verify ambisonic channel ordering
- Use correlation meters to identify issues

## **Error Messages**

### **"Max Runtime Error":**

- Restart Max for Live
- Check Max for Live version compatibility
- Verify E4L installation integrity

### **"Device Not Found":**

- Refresh Max for Live browser
- Check installation path
- Reinstall E4L package if necessary

## **Reference Materials**

### **Ambisonic Channel Conventions**

E4L uses the AmbiX standard:

- Channel 1: W (omnidirectional)
- Channel 2: Y (front-back)
- Channel 3: Z (up-down)
- Channel 4: X (left-right)

## **Speaker Configuration Guidelines**

### **Quadraphonic (4.0):**



- Speakers at 45°, 135°, 225°, 315° (relative to listener)
- Equal distance from listening position
- Ear-level placement

### **Octophonic (8.0):**

- 8 speakers evenly distributed in circle
- 45° spacing between adjacent speakers
- Consistent distance and height

### **Dome Systems:**

- Combination of horizontal and elevated speakers
- Specific configuration varies by installation
- Requires custom decoder setup

## **Keyboard Shortcuts**

### **Live + E4L Workflow:**

- **Cmd/Ctrl + M**: MIDI Map spatial parameters
- **Cmd/Ctrl + G**: Group spatial sources
- **Cmd/Ctrl + R**: Record automation
- **Tab**: Toggle device view

### **Navigation:**

- **Cmd/Ctrl + L**: Locator set
- **Space**: Play/Stop
- **F9**: Session view
- **F10**: Arrangement view

## **Recommended Control Surfaces**

### **Budget Options:**

- Novation Launch Control XL
- Behringer BCF2000
- Arturia BeatStep Pro

### **Professional Options:**

- Ableton Push 2/3

- Native Instruments Maschine
- Monome Grid

## Export Formats and Standards

### Ambisonic Exports:

- .wav files with proper channel ordering
- Include metadata for spatial information
- Consider multiple format versions (1st/2nd/3rd order)

### Binaural Conversion:

- Use E4L Binaural device for headphone mixes
- Export binaural versions for general listening
- Maintain spatial mix as master version

## Community Resources

- **Envelop4Live Wiki:** Official documentation and updates
- **E4L User Community:** Facebook group for support and tips
- **Spatial Audio Forums:** General spatial audio discussions
- **GitHub Repository:** Latest downloads and bug reports

## Final Notes for Students

Remember that spatial audio is both a technical and artistic discipline. While understanding the tools is important, developing your spatial aesthetic through experimentation and practice is equally crucial. Don't be afraid to make mistakes—spatial audio is a relatively new field, and innovative approaches often come from breaking conventional rules.

Use this manual as a reference guide, but always trust your ears and artistic instincts. The goal is to create meaningful, immersive experiences that serve your creative vision.

Start simple, build complexity gradually, and always consider how spatial elements support the overall musical or sonic narrative of your work.

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*This manual is designed to be a living document. Make notes, additions, and modifications based on your experience and the evolving capabilities of Envelop4Live.*