

# Audio Chain Fix for HiFiBerry AMP100

## Problem

Audio was not playing despite AMP100 being configured. The audio chain was broken at multiple points.

## Solution

Created a comprehensive fix script that ensures:

1. AMP100 is detected correctly
2. moOde database has correct card number
3. ALSA `_audioout.conf` points to AMP100
4. MPD is configured to use the correct device
5. Volume is unmuted and set to safe level
6. MPD is restarted to pick up changes

## Files Created

### 1. Fix Script

**Location:** `scripts/audio/fix-audio-chain.sh`

**Also installed to:** `/usr/local/bin/fix-audio-chain.sh` (on Pi)

**What it does:**

- Detects AMP100 card number
- Updates moOde database (`cardnum``, `i2sdevice``, MPD `device``)
- Fixes ALSA `_audioout.conf` to point to `plughw:0,0`` (or correct card)
- Unmutes and sets safe volume (50%)
- Restarts MPD
- Verifies audio chain

**Usage:**

```
cd ~/moodeaudio-cursor && ./tools/fix.sh --audio
# or directly:
sudo /usr/local/bin/fix-audio-chain.sh
```

### 2. Systemd Service

**Location:** `moode-source/lib/systemd/system/fix-audio-chain.service`

**What it does:**

- Runs automatically on boot
- Runs after `sound.target`` and `mpd.service``
- Ensures audio chain is fixed before MPD starts playing

### 3. Validation Script

**Location:** `scripts/audio/validate-audio-chain.sh`

**Also installed to:** `/usr/local/bin/validate-audio-chain.sh` (on Pi)

**What it does:**

- Checks AMP100 detection

- Verifies moOde database configuration
- Checks ALSA config files
- Verifies MPD status
- Checks volume/mute state
- Provides diagnostic information

#### Usage:

```
/usr/local/bin/validate-audio-chain.sh
```

## Integration

### Deployment Methods

#### Method 1: After Flashing moOde Image (Current Method)

When using a downloaded moOde image and applying fixes after flashing:

1. **Flash moOde image to SD card**
2. **Mount SD card** (bootfs and rootfs)
3. **Run install script:**

```
cd ~/moodeaudio-cursor
sudo ./INSTALL_FIXES_AFTER_FLASH.sh
```

This will:

- Copy `fix-audio-chain.sh` to `/usr/local/bin/` on the SD card
  - Copy `fix-audio-chain.service` to `/lib/systemd/system/` on the SD card
  - Enable the service to run on boot
  - Copy validation script to `/usr/local/bin/`
4. **Eject SD card and boot Pi**
  5. **Audio chain will be fixed automatically on first boot**

#### Method 2: Custom Build

The fix script and service are automatically installed during custom image build via:

- `imgbuild/moode-cfg/stage3_03-ghettoblaster-custom_00-run-chroot.sh`
- Service is enabled automatically

#### Method 3: Manual Deployment (After Pi is Running)

If the Pi is already running and you need to fix audio:

##### Via SSH:

```
# Copy scripts to Pi
scp scripts/audio/fix-audio-chain.sh andre@192.168.10.2:/tmp/
scp scripts/audio/validate-audio-chain.sh andre@192.168.10.2:/tmp/
scp moode-source/lib/systemd/system/fix-audio-chain.service andre@192.168.10.2:/tmp/

# On Pi:
ssh andre@192.168.10.2
sudo mv /tmp/fix-audio-chain.sh /usr/local/bin/
sudo mv /tmp/validate-audio-chain.sh /usr/local/bin/
sudo mv /tmp/fix-audio-chain.service /lib/systemd/system/
sudo chmod +x /usr/local/bin/fix-audio-chain.sh
sudo chmod +x /usr/local/bin/validate-audio-chain.sh
sudo systemctl enable fix-audio-chain.service
sudo systemctl start fix-audio-chain.service
```

##### Or use toolbox (if already deployed):

```
cd ~/moodeaudio-cursor && ./tools/fix.sh --audio
```

## How It Works

## Audio Chain Flow

```
Music File
↓
MPD (Music Player Daemon)
↓
device "_audioout" (ALSA PCM device)
↓
/etc/alsa/conf.d/_audioout.conf
↓
slave.pcm "plughw:0,0" (or hw:0,0)
↓
HiFiBerry AMP100 (card 0, device 0)
↓
Speakers
```

## Key Components

### 1. **\*\*AMP100 Detection\*\***

- Checks `/proc/asound/cards` for `sndrpihiberry` or `HiFiBerry AMP100`
- Determines card number (usually 0)

### 2. **\*\*moOde Database\*\***

- Updates `cfg_system.cardnum` = AMP100 card number
- Updates `cfg_system.i2sdevice` = "HiFiBerry AMP100"
- Updates `cfg_mpd.device` = AMP100 card number

### 3. **\*\*ALSA Configuration\*\***

- Updates `/etc/alsa/conf.d/_audioout.conf`
- Sets `slave.pcm` to `plughw:CARD,0` where CARD is AMP100 card number
- Also fixes `_peppyout.conf` if PeppyMeter is enabled

### 4. **\*\*Volume Control\*\***

- Unmutes Master and PCM controls
- Sets volume to 50% (safe level)
- Sets MPD volume to 50%

### 5. **\*\*MPD Restart\*\***

- Restarts MPD service to pick up configuration changes
- Waits for MPD to be ready before continuing

## Troubleshooting

### ***If audio still doesn't work:***

#### 1. **\*\*Check AMP100 detection:\*\***

```
cat /proc/asound/cards
aplay -l
```

#### 2. **\*\*Check boot configuration:\*\***

```
grep hifiberry-amp100 /boot/firmware/config.txt
```

Should show: `dtoverlay=hifiberry-amp100,automute`

#### 3. **\*\*Check ALSA config:\*\***

```
cat /etc/alsa/conf.d/_audioout.conf
```

Should show: `slave.pcm "plughw:0,0" (or correct card number)`

#### 4. **\*\*Check MPD status:\*\***

```
systemctl status mpd
mpc outputs
mpc status
```

5. **\*\*Check volume:\*\***

```
amixer -c 0 sget Master
amixer -c 0 sget PCM
mpc volume
```

6. **Test audio directly:**

```
speaker-test -c 2 -t sine -f 1000 -D plughw:0,0
```

7. **Run validation:**

```
/usr/local/bin/validate-audio-chain.sh
```

8. **Run fix again:**

```
sudo /usr/local/bin/fix-audio-chain.sh
```

## Common Issues

### ***Issue: AMP100 not detected***

**Solution:**

- Check `dtoverlay=hifiberry-amp100` in `/boot/firmware/config.txt`
- Reboot required after overlay changes
- Check hardware connection

### ***Issue: Wrong card number***

**Solution:**

- Run fix script - it will detect correct card number
- Script updates database and ALSA config automatically

### ***Issue: MPD can't open device***

**Solution:**

- Check `\_audioout.conf` points to correct card
- Restart MPD: `sudo systemctl restart mpd`
- Check MPD logs: `journalctl -u mpd -n 50`

### ***Issue: Volume muted or too low***

**Solution:**

- Fix script unmutes and sets volume to 50%
- Check: `amixer -c 0 sget Master`
- Unmute: `amixer -c 0 sset Master unmute`

## Related Files

- `moode-source/boot/firmware/config.txt.override` - Boot config with AMP100 overlay
- `moode-source/etc/alsa/conf.d/\_audioout.conf` - ALSA output config template
- `moode-source/www/inc/audio.php` - moOde audio configuration functions
- `moode-source/www/inc/mpd.php` - MPD configuration functions
- `scripts/audio/check-audio-chain.sh` - Original diagnostic script (still useful)

## Notes

- The fix script is idempotent - safe to run multiple times
- Service runs on boot to ensure audio chain is always correct
- Validation script provides quick diagnostics
- All scripts work from home directory: ``cd ~/moodeaudio-cursor && ./tools/fix.sh --audio``