

# Perfect Audio Chain Configuration - Ghetto Blaster

## Complete, Precise Configuration Reference

**Date:** 2025-01-09

**System:** Raspberry Pi 5 + HiFiBerry AMP100 + PeppyMeter + CamillaDSP

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### ■ Complete Audio Chain (PeppyMeter ON + CamillaDSP ON)

```
Music File
↓
MPD (Music Player Daemon)
  ↓ device "_audioout"
  /etc/alsa/conf.d/_audioout.conf
  ↓ slave.pcm "camilladsp" (when CamillaDSP ON)
  pcm.camilladsp (ALSA device)
  ↓
CamillaDSP Process
  ↓ reads from stdin (pipe from MPD)
  ↓ applies filters/EQ (bose_wave_filters.yml)
  ↓ outputs to ALSA device "peppy" (when PeppyMeter ON)
  pcm.peppy (ALSA device)
  ↓
PeppyMeter Process
  ↓ reads from /tmp/peppymeter FIFO
  ↓ displays VU meters (blue skin)
  ↓ outputs to _peppyout
  /etc/alsa/conf.d/_peppyout.conf
  ↓ slave.pcm "plughw:0,0"
  plughw:0,0 (HiFiBerry AMP100 - card 0, device 0)
  ↓
HiFiBerry AMP100 Hardware
  ↓
Speakers
```

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### ■ Perfect Configuration Checklist

#### 1. Boot Configuration (`/boot/firmware/config.txt`)

##### Required Settings:

```
[pi5]
dtoverlay=vc4-kms-v3d-pi5,noaudio
hdmi_enable_4kp60=0

[all]
dtparam=i2s=on
dtparam=audio=off
dtoverlay=hifiberry-amp100,automute
force_eeprom_read=0
```

##### Verification:

```
grep "hifiberry-amp100\|audio=off\|i2s=on" /boot/firmware/config.txt
```

#### 2. moOde Database (`/var/local/www/db/moode-sqlite3.db`)

##### Required Values:

```

-- Audio device
cfg_system.cardnum = 0
cfg_system.i2sdevice = "HiFiBerry AMP100"
cfg_mpd.device = 0

-- PeppyMeter
cfg_system.peppy_display = 1          -- 1 = ON
cfg_system.peppy_display_type = "meter" -- "meter" or "spectrum"

-- CamillaDSP
cfg_system.camilladsp = "bose_wave_filters.yml" -- Config name or "off"
cfg_system.cdsp_fix_playback = "Yes"          -- CRITICAL: Enables PeppyMeter integration

-- Display
cfg_system.hdmi_scn_orient = "portrait"
cfg_system.local_display = 1

```

#### Verification:

```

sqlite3 /var/local/www/db/moode-sqlite3.db \
  "SELECT param, value FROM cfg_system WHERE param IN ('cardnum', 'i2sdevice', 'peppy_display', 'cam"

```

### 3. ALSA Configuration

***~/.etc/alsa/conf.d/\_audioout.conf***

#### Routing Logic (from updAudioOutAndBtOutConfs()):

```

Priority Order:
1. CamillaDSP ON → slave.pcm "camilladsp"
2. PeppyMeter ON (CamillaDSP OFF) → slave.pcm "peppy"
3. Both OFF → slave.pcm "plughw:0,0"

```

#### Perfect Config (PeppyMeter + CamillaDSP):

```

pcm._audioout {
    type copy
    slave.pcm "camilladsp"
}

```

#### Perfect Config (PeppyMeter only):

```

pcm._audioout {
    type copy
    slave.pcm "peppy"
}

```

#### Perfect Config (Direct):

```

pcm._audioout {
    type copy
    slave.pcm "plughw:0,0"
}

```

#### Verification:

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

***~/.etc/alsa/conf.d/\_peppyout.conf***

#### Perfect Config:

```

pcm._peppyout {
    type copy
    slave.pcm "plughw:0,0"
}

```

#### Verification:

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

### 4. MPD Configuration (~/.var/lib/mpd/mpd.conf)

#### Perfect Config:

```

audio_output {
    type "alsa"
    name "ALSA Default"
    device "_audioout"
}

```

```

    mixer_type "null"          # When CamillaDSP ON
    # mixer_type "hardware"    # When CamillaDSP OFF
    mixer_control "PCM"
    mixer_device "hw:0"
    mixer_index "0"
}

```

#### Mixer Type Logic:

- CamillaDSP ON → `mixer\_type "null"` (CamillaDSP handles volume)
- CamillaDSP OFF → `mixer\_type "hardware"` or `"software"`

#### Verification:

```
grep -A 10 "audio_output" /var/lib/mpd/mpd.conf | head -10
```

## 5. CamillaDSP Configuration

### Config File Location

- Active: `/usr/share/camilladsp/working\_config.yml`
- Configs: `/usr/share/camilladsp/configs/`

#### Perfect Config (PeppyMeter ON)

```

devices:
  capture:
    type: Stdin
    channels: 2
    format: S32LE
  playback:
    type: Alsa
    channels: 2
    device: "peppy"          # CRITICAL: Outputs to PeppyMeter
    format: S32LE

```

#### Perfect Config (PeppyMeter OFF)

```

devices:
  capture:
    type: Stdin
    channels: 2
    format: S32LE
  playback:
    type: Alsa
    channels: 2
    device: "plughw:0,0"    # Direct to hardware
    format: S32LE

```

#### Verification:

```
cat /usr/share/camilladsp/working_config.yml | grep -A 5 "playback"
```

## 6. PeppyMeter Configuration (`/etc/peppymeter/config.txt`)

#### Perfect Config:

```

[current]
meter = blue                # Always blue skin
random.meter.interval = 0  # No random switching
meter.folder = 1280x400    # Display resolution
screen.width = 1280
screen.height = 400

[data.source]
type = pipe
pipe.name = /tmp/peppymeter # FIFO from MPD

```

#### Verification:

```
grep "meter\|random\|pipe.name" /etc/peppymeter/config.txt
```

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## ■ Configuration Update Flow

### *When Settings Change in moOde:*

1. **\*\*User changes setting\*\*** (e.g., enables CamillaDSP)
2. **\*\*moOde calls `updMpdConf()`\*\***
3. **\*\*`updMpdConf()` calls:\*\***
  - ``updAudioOutAndBtOutConfs()`` → Updates ``_audioout.conf``
  - ``updPeppyConfs()`` → Updates ``_peppyout.conf``
  - ``updDspAndBtInConfs()`` → Updates CamillaDSP playback device
4. **\*\*MPD restarts\*\*** → Picks up new ``_audioout`` routing
5. **\*\*CamillaDSP reloads\*\*** → Picks up new playback device

### **Critical Functions:**

```
updAudioOutAndBtOutConfs($cardNum, $outputMode)
```

- Updates ``_audioout.conf`` routing
- Priority: CamillaDSP > PeppyMeter > Direct

```
updPeppyConfs($cardNum, $outputMode)
```

- Updates ``_peppyout.conf`` routing
- Always routes to ``plughw:CARD,0``

```
setPlaybackDevice($cardNum, $outputMode)
```

- Updates CamillaDSP YAML config
- Sets playback device based on PeppyMeter state

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## ■■ Safety Mechanisms

### **1. Audio Chain Fix Script**

**Location:** `/usr/local/bin/fix-audio-chain.sh`

#### **What it does:**

- Detects AMP100 card number
- Updates database (cardnum, i2sdevice, cdsp\_fix\_playback)
- Fixes ``_audioout.conf`` with correct routing logic
- Fixes ``_peppyout.conf`` to AMP100
- Verifies CamillaDSP config
- Verifies PeppyMeter config
- Unmutes and sets safe volume
- Restarts MPD

**Runs:** On boot (via systemd service)

### **2. PeppyMeter Blue Skin Script**

**Location:** `/usr/local/bin/set-peppymeter-blue.sh`

#### **What it does:**

- Sets ``meter = blue`` in PeppyMeter config
- Disables random meter switching

- Restarts PeppyMeter if running

**Runs:** On boot (via systemd service)

### 3. Validation Script

**Location:** /usr/local/bin/validate-audio-chain.sh

**What it does:**

- Checks all components
- Verifies configurations
- Reports issues

**Runs:** Manually or scheduled

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## ■ Configuration Matrix

PeppyMeter	CamillaDSP	audioout.conf	CamillaDSP Playback	peppyout.conf	MPD Mixer
ON	ON	camilladsp	peppy	plughw:0,0	null
ON	OFF	peppy	N/A	plughw:0,0	hardware
OFF	ON	camilladsp	plughw:0,0	N/A	null
OFF	OFF	plughw:0,0	N/A	N/A	hardware

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## ■ Verification Commands

### Complete Check

```
# Run validation script
sudo /usr/local/bin/validate-audio-chain.sh
```

### Manual Checks

```
# 1. AMP100 detected?
cat /proc/asound/cards | grep -i hifiberry

# 2. Database correct?
sqlite3 /var/local/www/db/moode-sqlite3.db \
    "SELECT param, value FROM cfg_system WHERE param IN ('cardnum', 'i2sdevice', 'peppy_display', 'cam"

# 3. ALSA routing correct?
echo "_audioout.conf:"
cat /etc/alsa/conf.d/_audioout.conf | grep slave.pcm
echo "_peppyout.conf:"
cat /etc/alsa/conf.d/_peppyout.conf | grep slave.pcm

# 4. CamillaDSP playback device?
cat /usr/share/camilladsp/working_config.yml | grep -A 3 "playback:" | grep device

# 5. PeppyMeter config?
grep "meter\|random" /etc/peppymeter/config.txt

# 6. Services running?
systemctl status mpd peppymeter camilladsp --no-pager | grep Active
```

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## ■ Common Issues & Solutions

### ***Issue: No Audio***

#### **Check:**

1. AMP100 detected? → ``cat /proc/asound/cards``
2. Database cardnum correct? → Check database
3. ``_audioout.conf`` routing correct? → Check ALSA config
4. MPD running? → ``systemctl status mpd``
5. Volume muted? → ``amixer -c 0 sget Master``

**Fix:** Run `sudo /usr/local/bin/fix-audio-chain.sh`

### ***Issue: PeppyMeter Shows No Activity***

#### **Check:**

1. PeppyMeter running? → ``systemctl status peppymeter``
2. FIFO exists? → ``ls -la /tmp/peppymeter``
3. ``_audioout.conf`` routes to ``peppy``? → Check ALSA config
4. MPD outputs to ``_audioout``? → Check MPD config

**Fix:** Ensure PeppyMeter is enabled in moOde, restart services

### ***Issue: CamillaDSP Filters Not Applied***

#### **Check:**

1. CamillaDSP running? → ``systemctl status camilladsp``
2. Config selected? → Check database ``camilladsp`` value
3. Config file exists? → ``ls /usr/share/camilladsp/configs/``
4. Playback device correct? → Check YAML config

**Fix:** Select config in moOde Audio Config, apply, restart

### ***Issue: Wrong Meter Skin***

#### **Check:**

1. ``meter = blue`` in config? → ``grep "meter =" /etc/peppymeter/config.txt``
2. Random switching disabled? → ``grep "random.meter.interval" /etc/peppymeter/config.txt``

**Fix:** Run `sudo /usr/local/bin/set-peppymeter-blue.sh`

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## ■ Files & Scripts

### ***Scripts***

- ``scripts/audio/fix-audio-chain.sh`` - Main audio chain fix
- ``scripts/audio/validate-audio-chain.sh`` - Validation
- ``scripts/wizard/set-peppymeter-blue.sh`` - PeppyMeter blue skin

### ***Services***

- ``moode-source/lib/systemd/system/fix-audio-chain.service`` - Auto-fix on boot

- ``moode-source/lib/systemd/system/set-peppymeter-blue.service`` - Auto-set blue skin

## ***Documentation***

- ``docs/COMPLETE_AUDIO_CHAIN_CONFIGURATION.md`` - Full documentation
- ``docs/AUDIO_CHAIN_QUICK_REFERENCE.md`` - Quick reference
- ``docs/AUDIO_CHAIN_PERFECT_CONFIG.md`` - This file

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## **■ Summary**

### **Complete Audio Chain:**

`MPD → _audioout → camilladsp → peppy → _peppyout → plughw:0,0 → AMP100`

### **Perfect Configuration:**

- ■ Boot: AMP100 overlay, audio disabled
- ■ Database: Correct cardnum, i2sdevice, peppy\_display, camilladsp, cdsp\_fix\_playback
- ■ ALSA: Correct routing based on enabled features
- ■ PeppyMeter: Blue skin, no random switching
- ■ CamillaDSP: Correct playback device, filters configured
- ■ MPD: Correct mixer type, device routing

### **Safety:**

- ■ Fix scripts ensure correct configuration
- ■ Services run on boot
- ■ Validation scripts check all components
- ■ Volume safety (unmute, safe level)

**This is the complete, precise configuration for Ghetto Blaster audio chain.**