

Perfect Audio Chain Configuration - Ghetto Blaster

Complete, Precise Configuration Reference

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

■ 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
```

■ 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', 'camilladsp', 'cdsp_fix_playback', 'hdmi_scn_orient', 'local_display')"
```

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
```

■ 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

■■ 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

■ 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

■ 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
```

■ 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`

■ 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

■ 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.