

Three Milliseconds Diaphragm to Diaphragm

Nirbheek Chauhan

(*nirbheek* on GitLab / Matrix / Twitter / Hachyderm.io)

<https://nirbheek.in>



End to End Latency



Diaphragm to Diaphragm Latency



Mic → ADC → OS → GStreamer

Source ! Processing ! Sink

GStreamer → OS → DAC → Speaker



Audio Interface	Latency	Approx. Cost	Features
Motu M2	4ms*	USD\$180 Amazon Link	Offers two audio input ports that can accept either XLR or 1/4" TS connectors. Headphone jack on front plus L/R 1/4" and RCA audio outputs on rear. 48V phantom power for condenser mics. MIDI in/out on rear. * The 4ms latency number on this interface requires: (a) that your Mac have a Thunderbolt 3 port to which you can connect the interface; and (b) that you install the M2 software driver from Motu.
Focusrite Scarlett Solo	5ms*	USD\$110 Amazon Link	Offers two audio input ports - one that can accept an XLR connector, and one that can accept a 1/4" TS connector. Headphone jack on front plus L/R 1/4" audio outputs on rear. 48V phantom power for condenser mics. * The 5ms latency number on this interface requires: (a) that your Mac have a Thunderbolt 3 port to which you can connect the interface; and (b) that you install the software driver from Focusrite.
Focusrite Scarlett 2i2	5ms*	USD\$160 Amazon Link	Offers two audio input ports that can accept either XLR or 1/4" TS connectors. Headphone jack on front plus L/R 1/4" audio outputs on rear. 48V phantom power for condenser mics. * The 5ms latency number on this interface requires: (a) that your Mac have a Thunderbolt 3 port to which you can connect the interface; and (b) that you install the software driver from Focusrite.
Presonus Audiobox USB 96	7ms	USD\$100 Amazon Link	Offers two audio input ports that can accept either XLR or 1/4" TS connectors. Headphone jack on rear plus L/R 1/4" audio outputs on rear. 48V phantom power for condenser mics. MIDI in/out on rear.
Behringer UMC202HD	10ms	USD\$120 Amazon Link	Offers two audio input ports that can accept either XLR or 1/4" TS connectors. Headphone jack on front plus L/R 1/4" audio outputs on rear. 48V phantom power for condenser mics.
Behringer UMC204HD	9ms	USD\$150 Amazon Link	Similar to the UMC202HD above, but also adds MIDI in/out on rear and RCA outputs on rear.
Steinberg UR22C	7ms	USD\$190 Amazon Link	Offers two audio input ports that can accept either XLR or 1/4" TS connectors. Headphone jack on front plus L/R 1/4" audio outputs on rear. 48V phantom power for condenser mics. MIDI in/out on rear.

<https://jamkazam.freshdesk.com/support/solutions/articles/66000122513>



```
osxaudiosrc latency-time=500 buffer-time=1000 \  
! audioconvert ! audioresample \  
! audiolatency print-latency=true \  
! osxaudiosink latency-time=500 buffer-time=1000 \  
processing-deadline=100_000 drift-tolerance=500
```



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```



```
webrtcbin name=webrtc
```

```
osxaudiosrc latency-time=2500 buffer-time=5000 \  
! audioconvert ! video/x-raw,rate=48000 \  
! opusenc frame-size=2.5 audio-type=restricted-lowdelay \  
! rtpopuspay mtu=1200 ! webrtc.
```

```
webrtc. ! opusdec ! audioconvert ! video/x-raw,rate=48000 \  
! osxaudiosink latency-time=2500 buffer-time=5000 \  
processing-deadline=2_000_000 drift-tolerance=20_000
```



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```



rtpg722(de)pay

rtpL(24|16)(de)pay

- Audio sources should
 - Provide a clock, which avoids clock drift
 - Chain buffers as-is (no merging or splitting)
 - Drain on startup
- Audio sink ideally same device as capture
- Capture, process, render with high thread priority
- Add deadlines to minimize queuing

Thanks!

