

A Real-Time Rhythmic Analyzer and Equalizer

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Demo

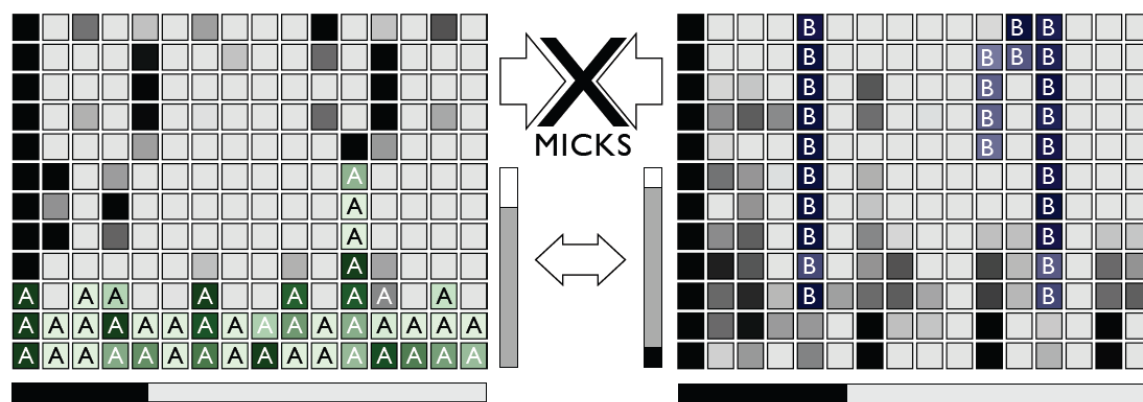
- Analysis
 - Levels
 - BPM vs. note values
- Control
 - Levels
 - Phases

Outline

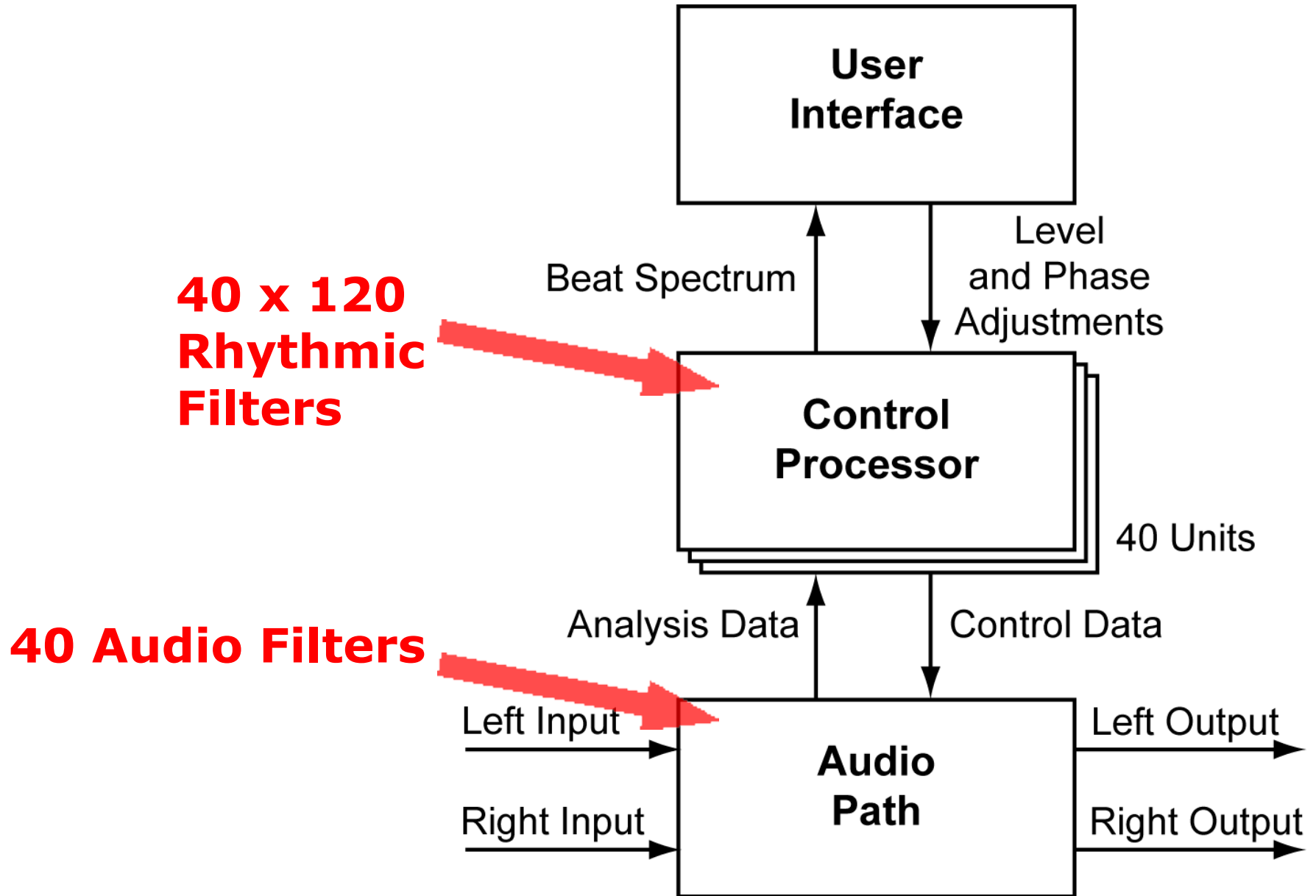
- Related Work
- Architecture
- Audio Path
- Control Processor
- User Interface
- Results
- Outlook

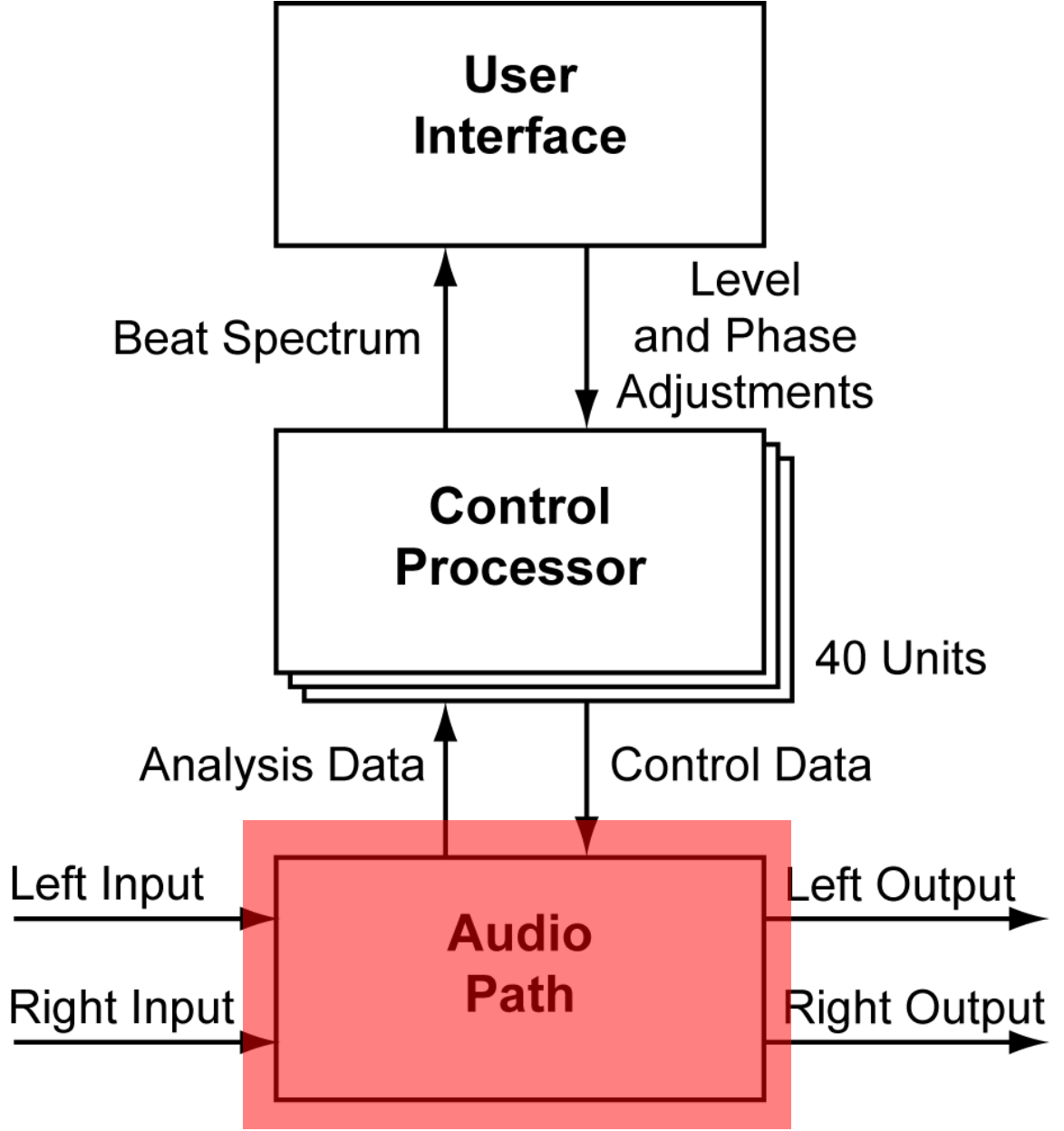
Related Work

- Amplitude modulation spectra: perception, MIR features, speaker recognition, etc.
- X-Micks (Schnell, Schwarz, Müller; DAFx Sept. 06)



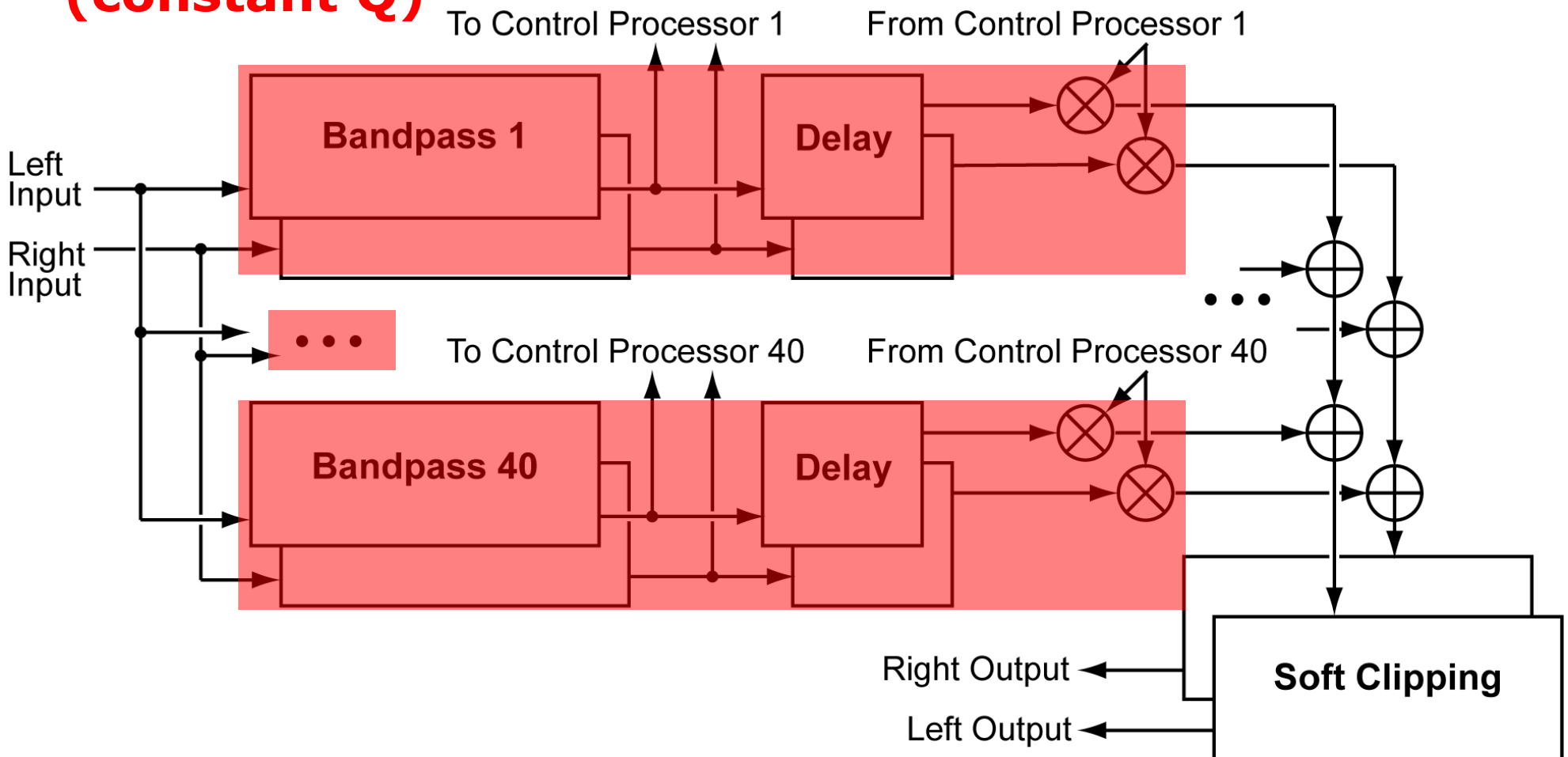
Architecture



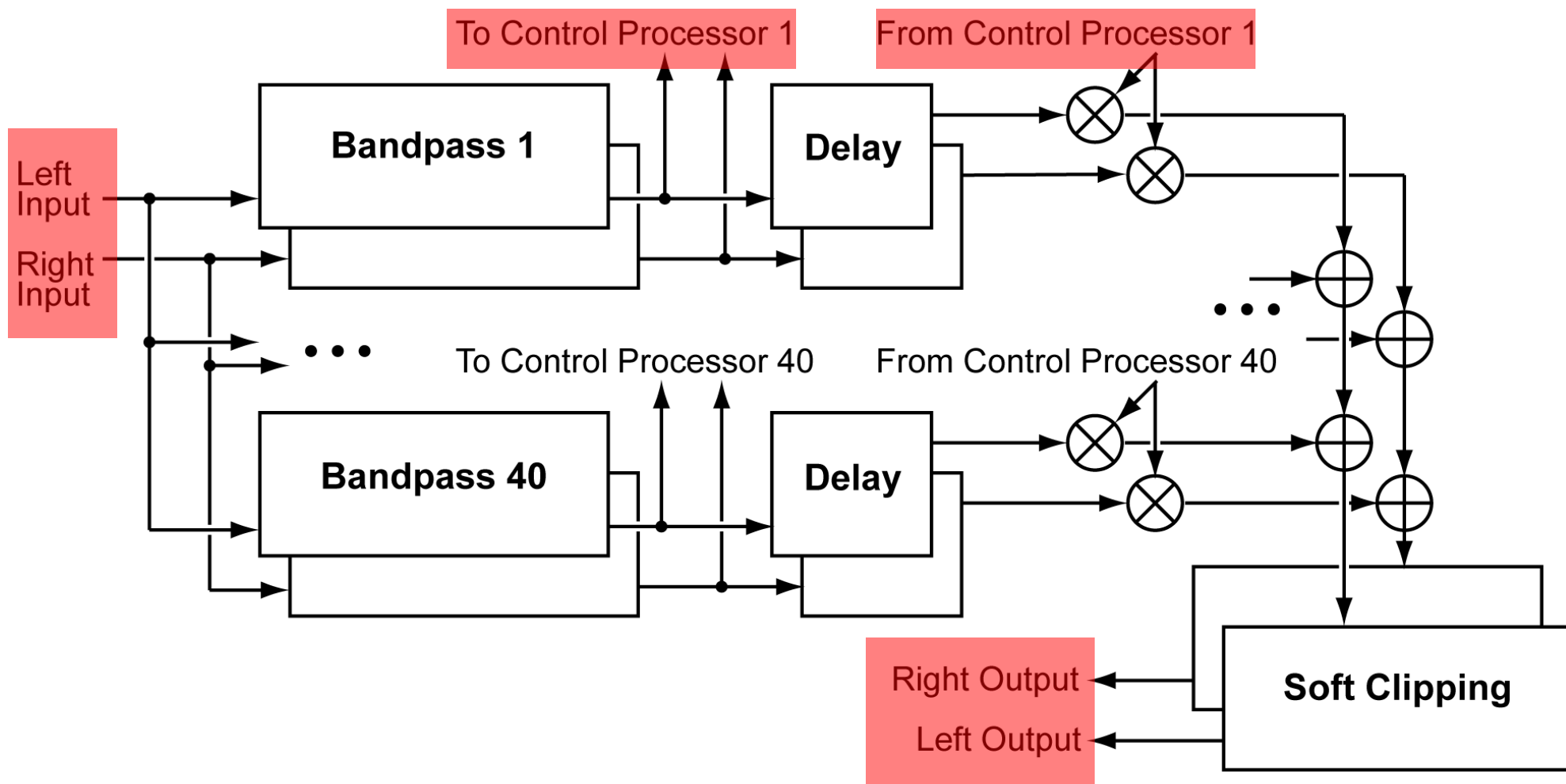


Audio Path (1)

40 Stereo Audio Filters (constant Q)

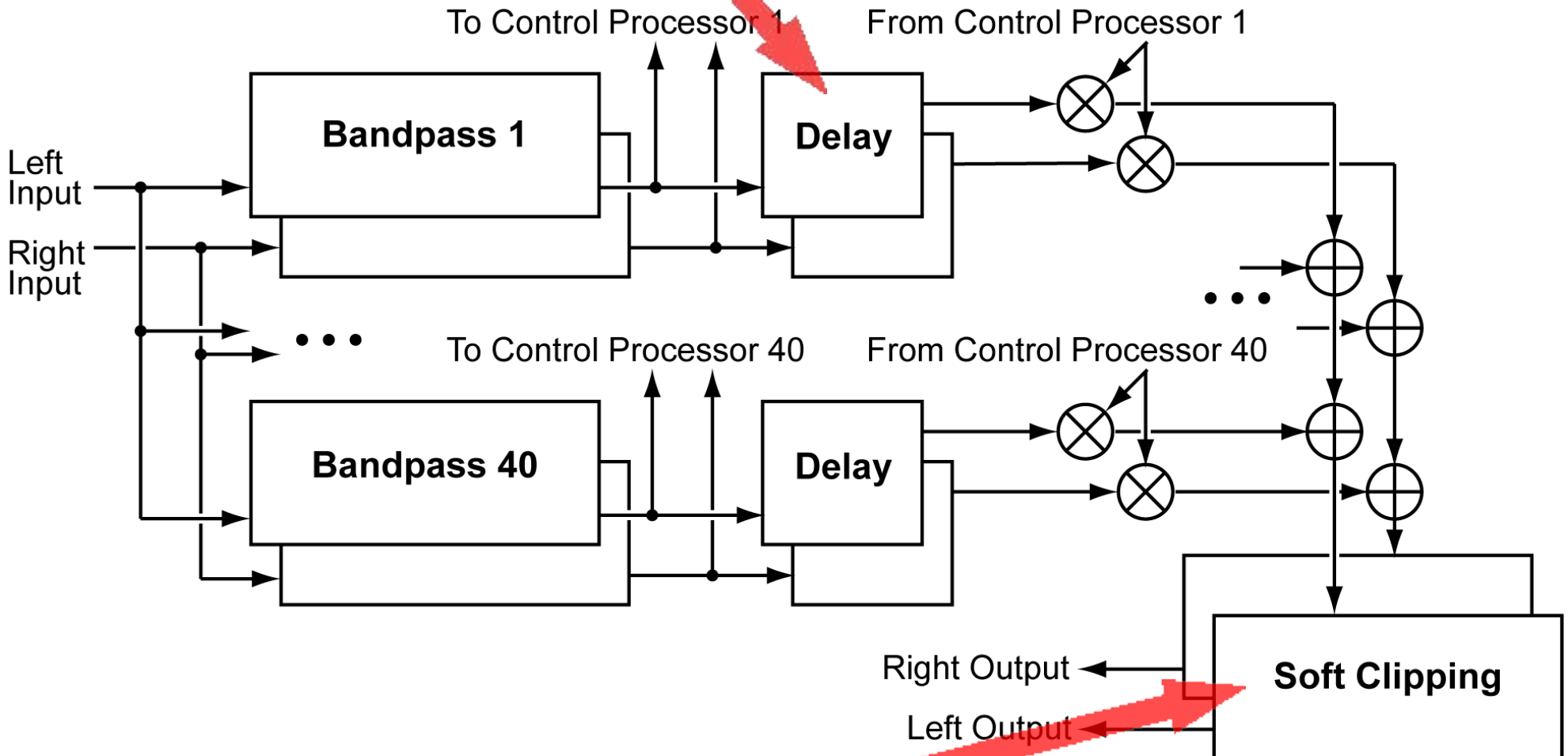


Audio Path (2)

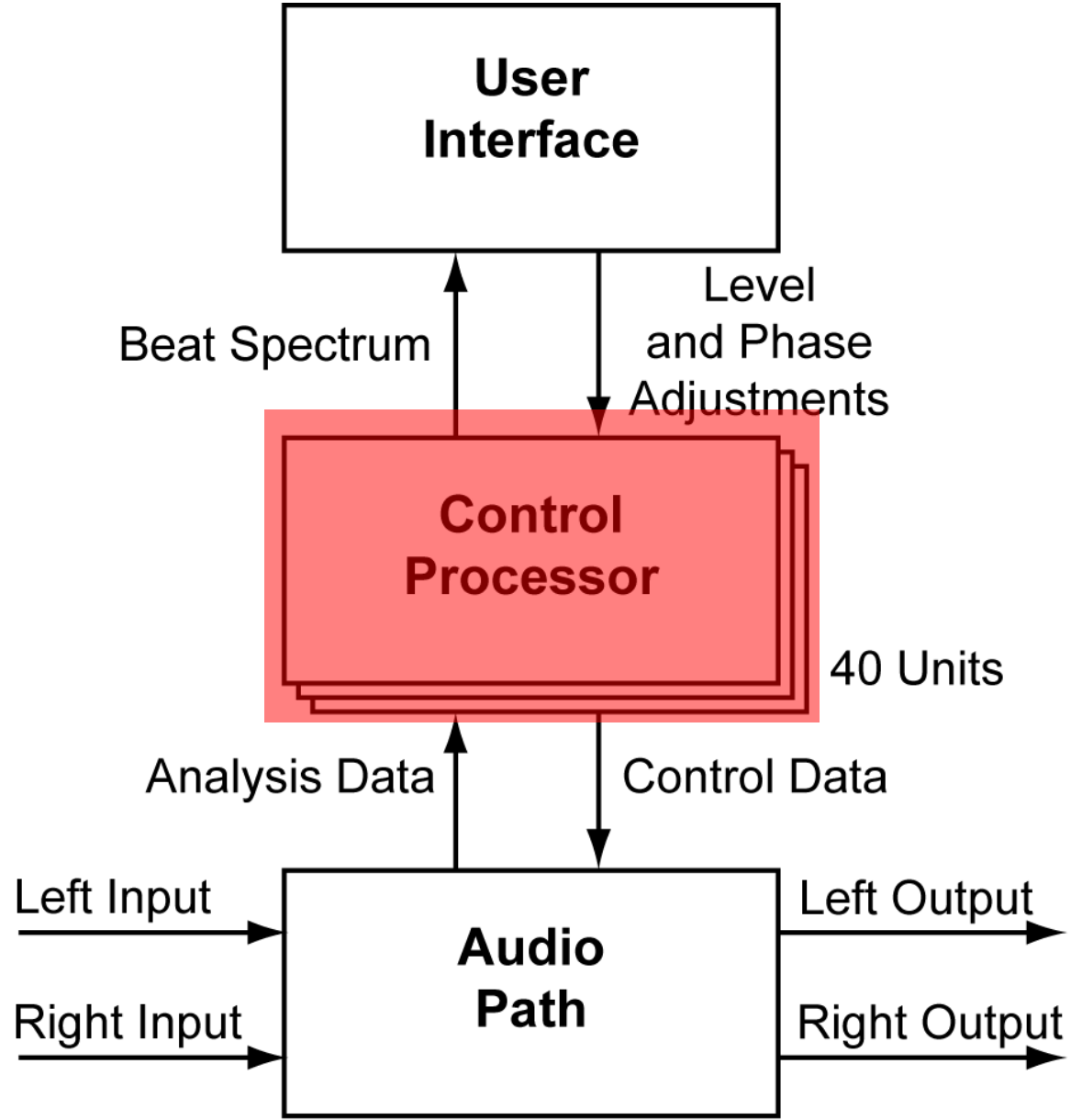


Audio Path (3)

Look-ahead

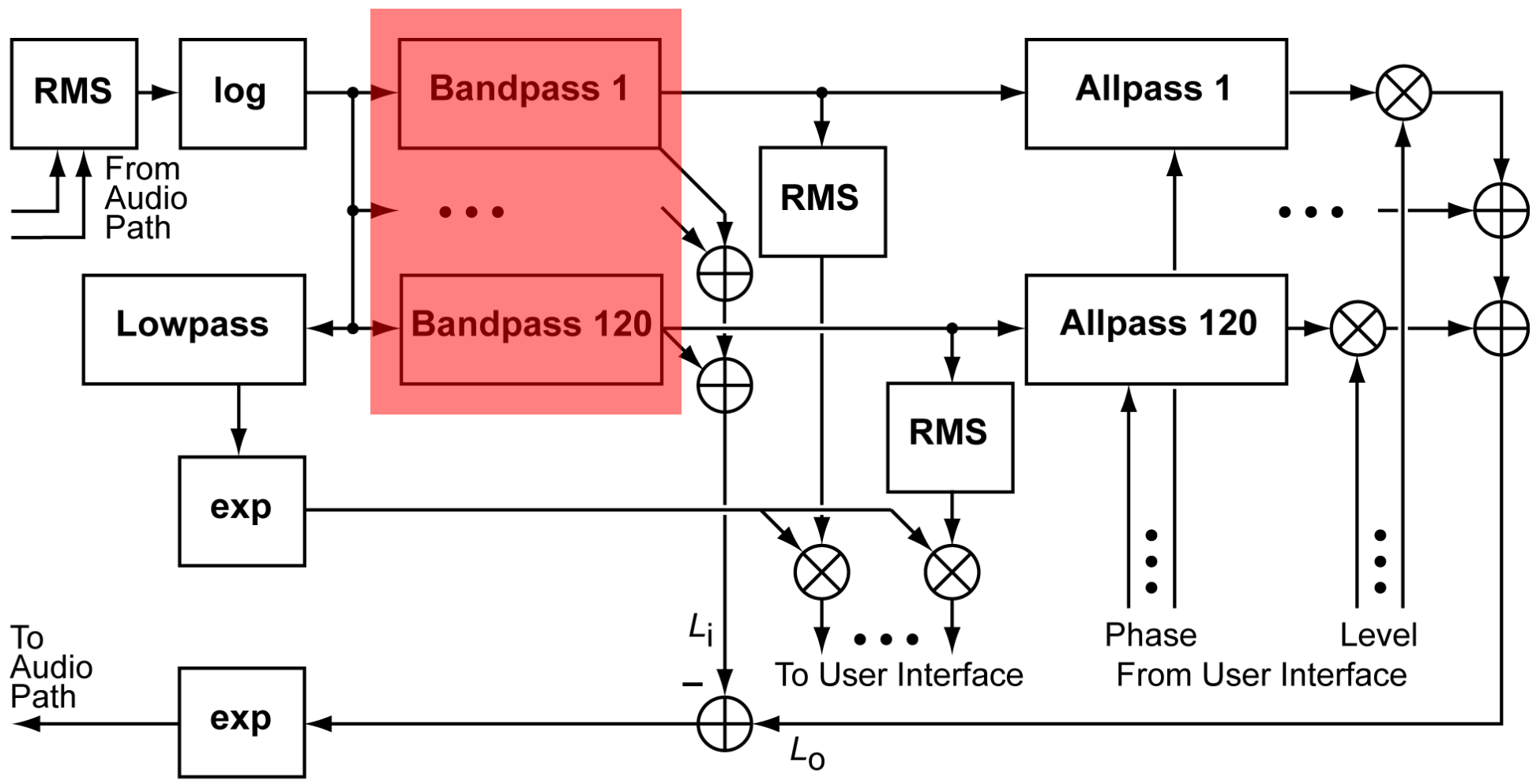


Ear protection ;-)

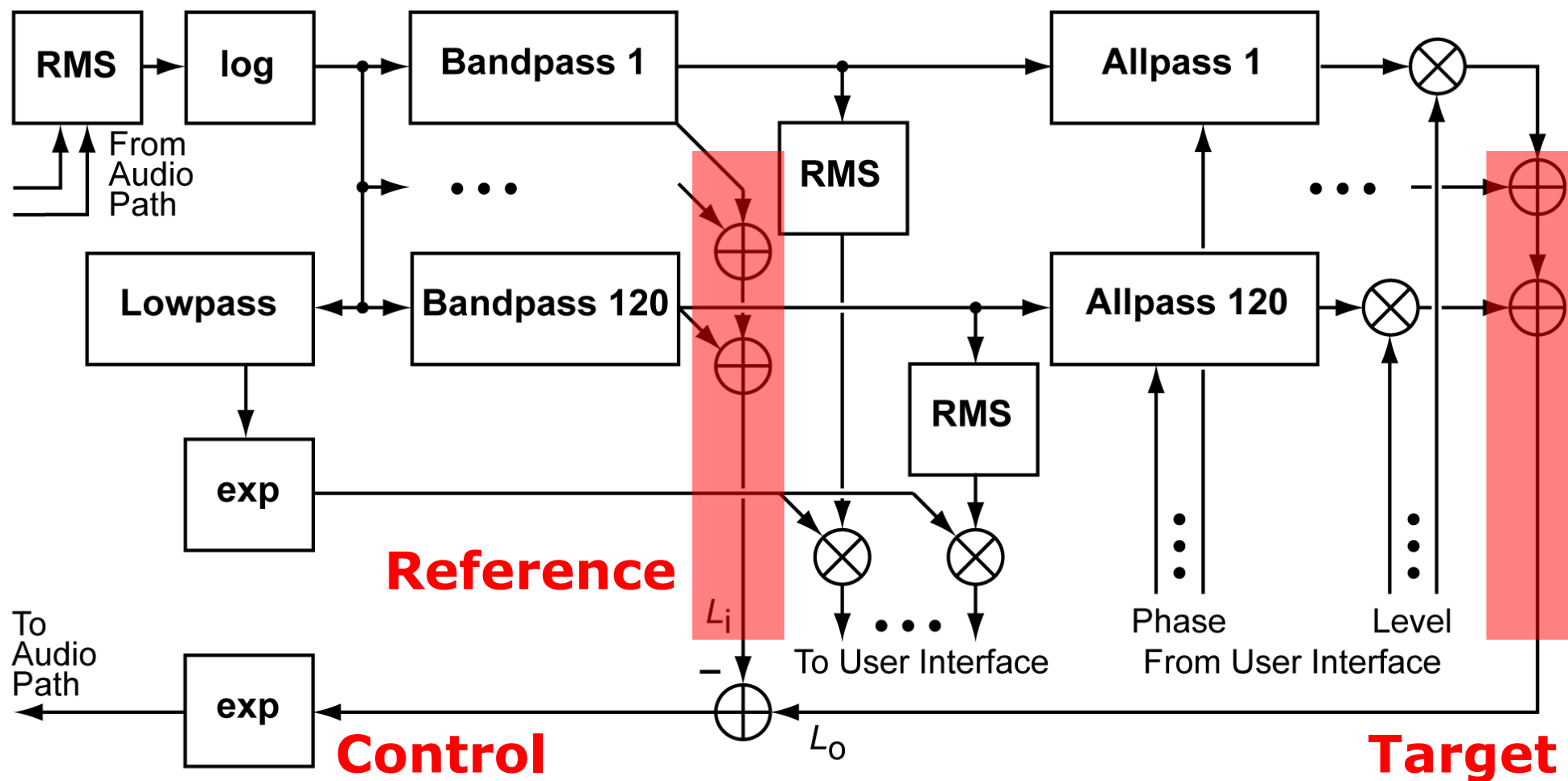


Control Processor (1)

**120 Filters in BPM Range
(constant Q)**

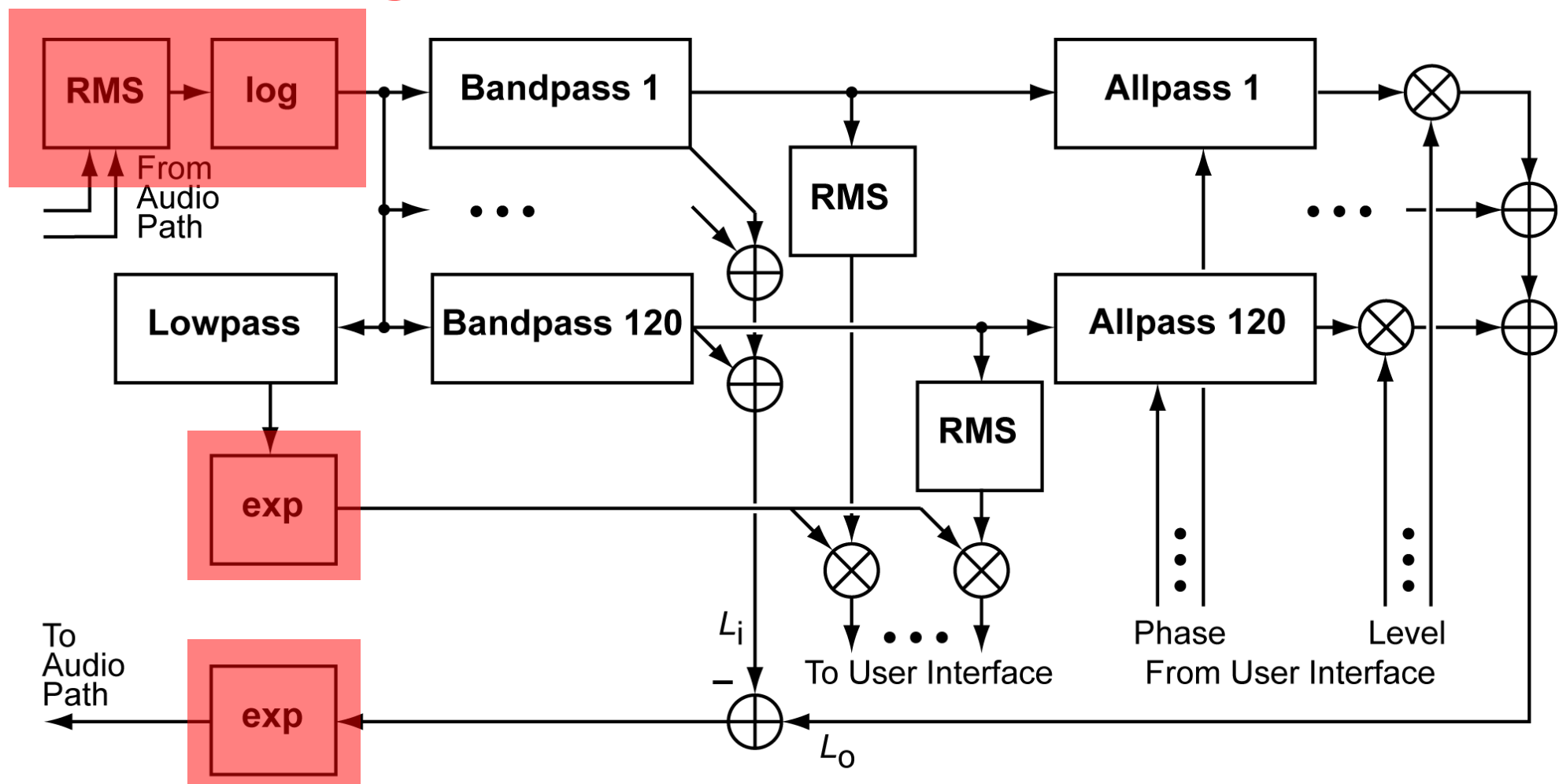


Control Processor (2)



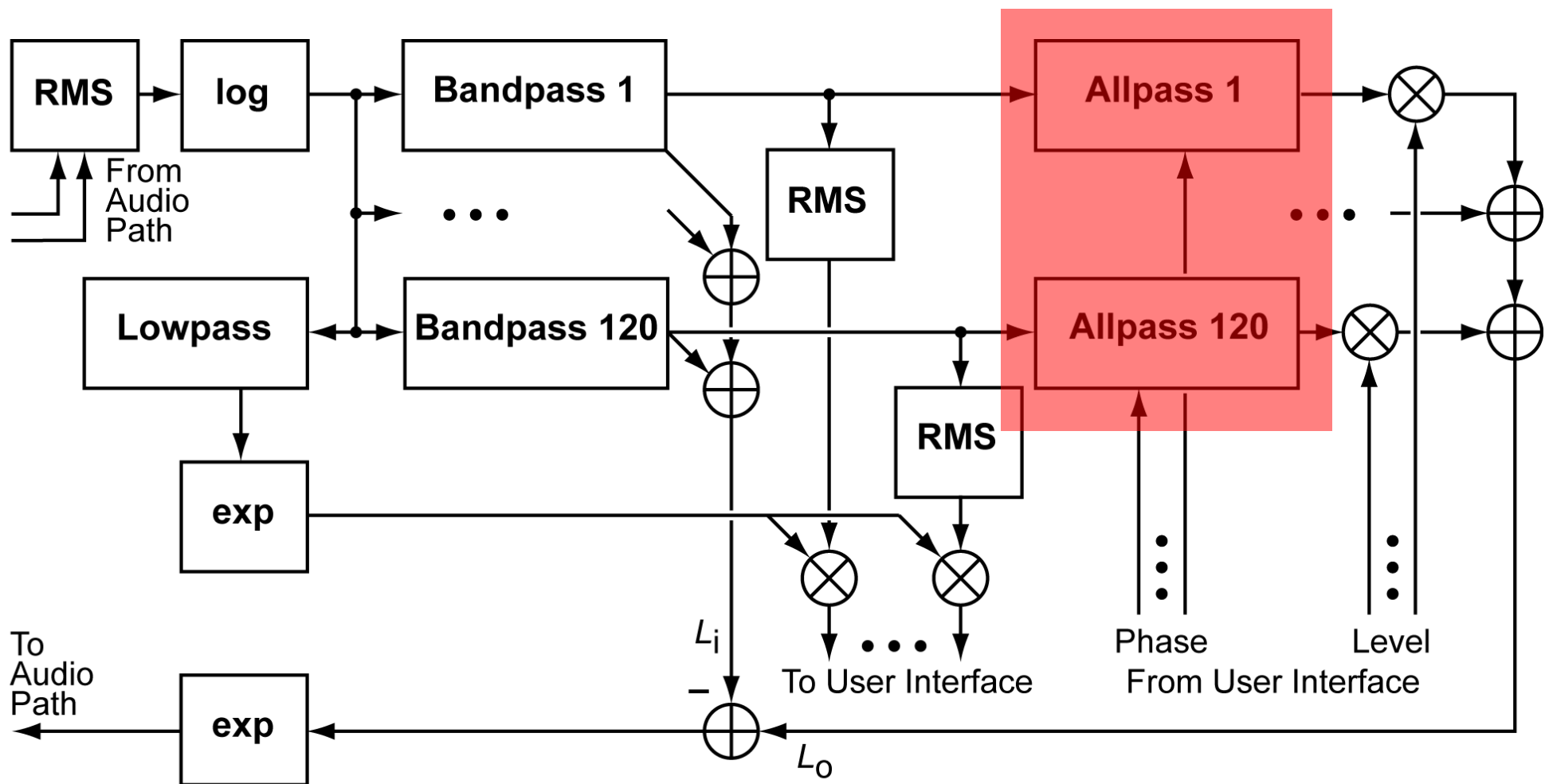
Control Processor (3)

Working in
log Domain

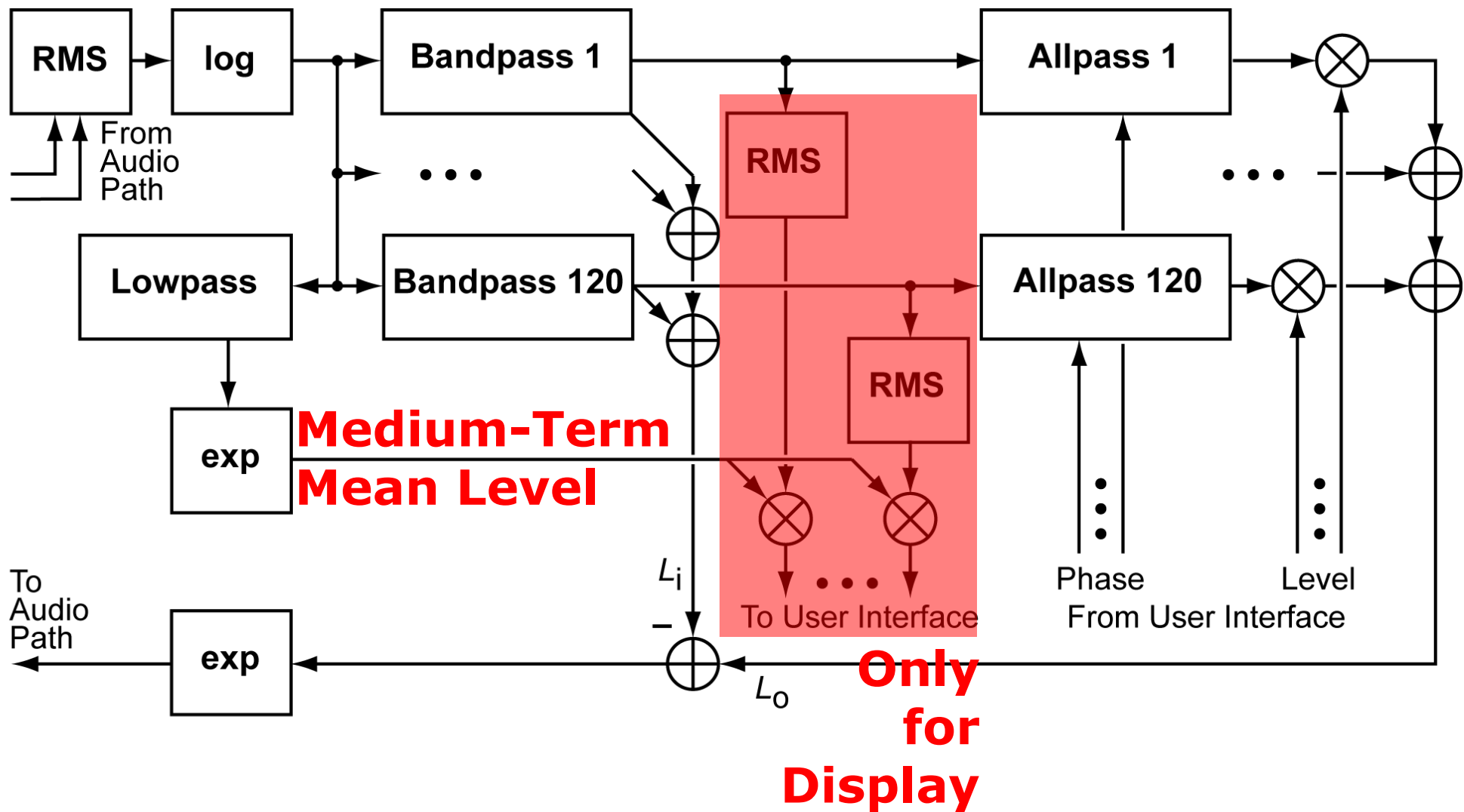


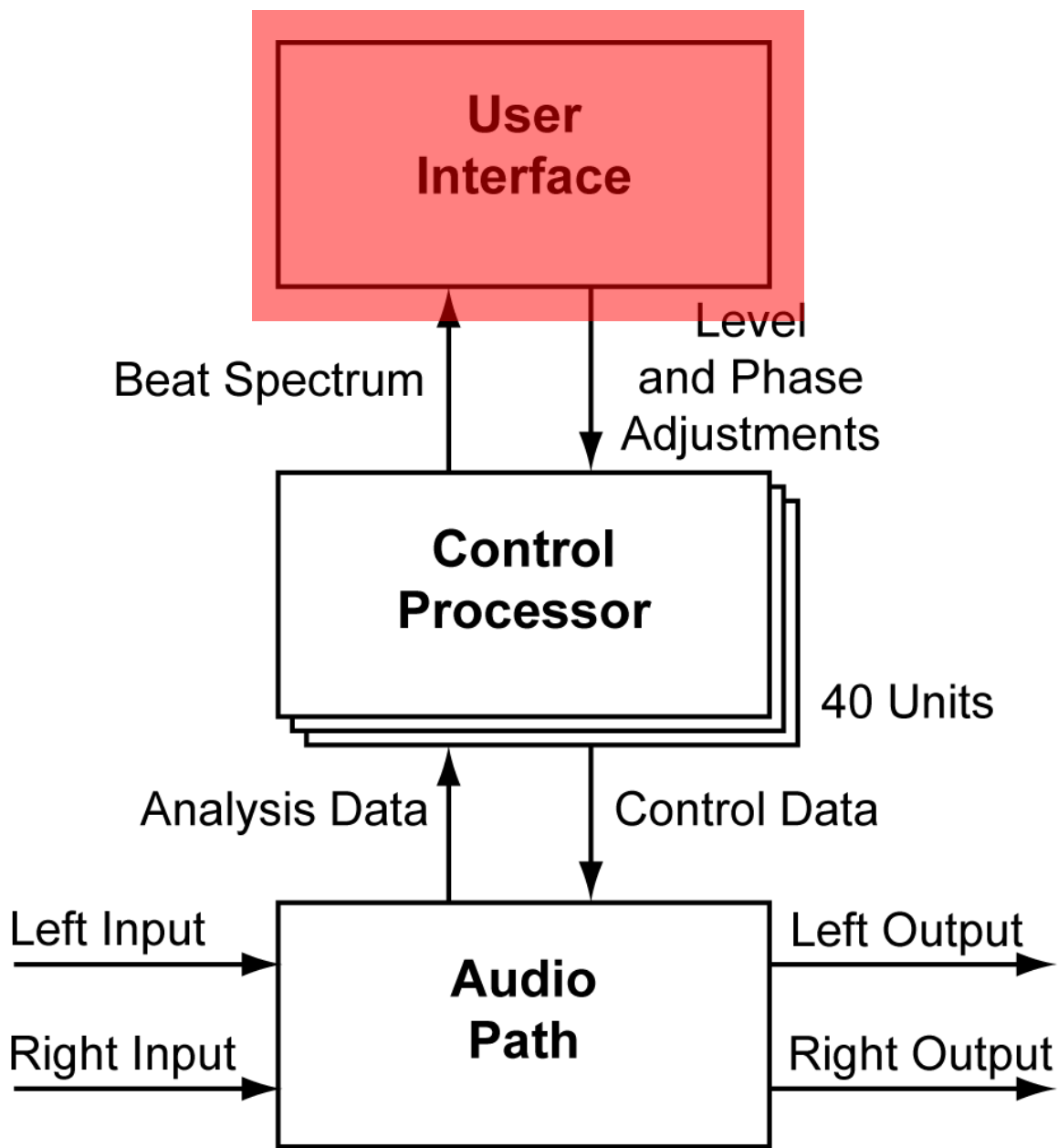
Control Processor (4)

BPM Phase Control



Control Processor (5)



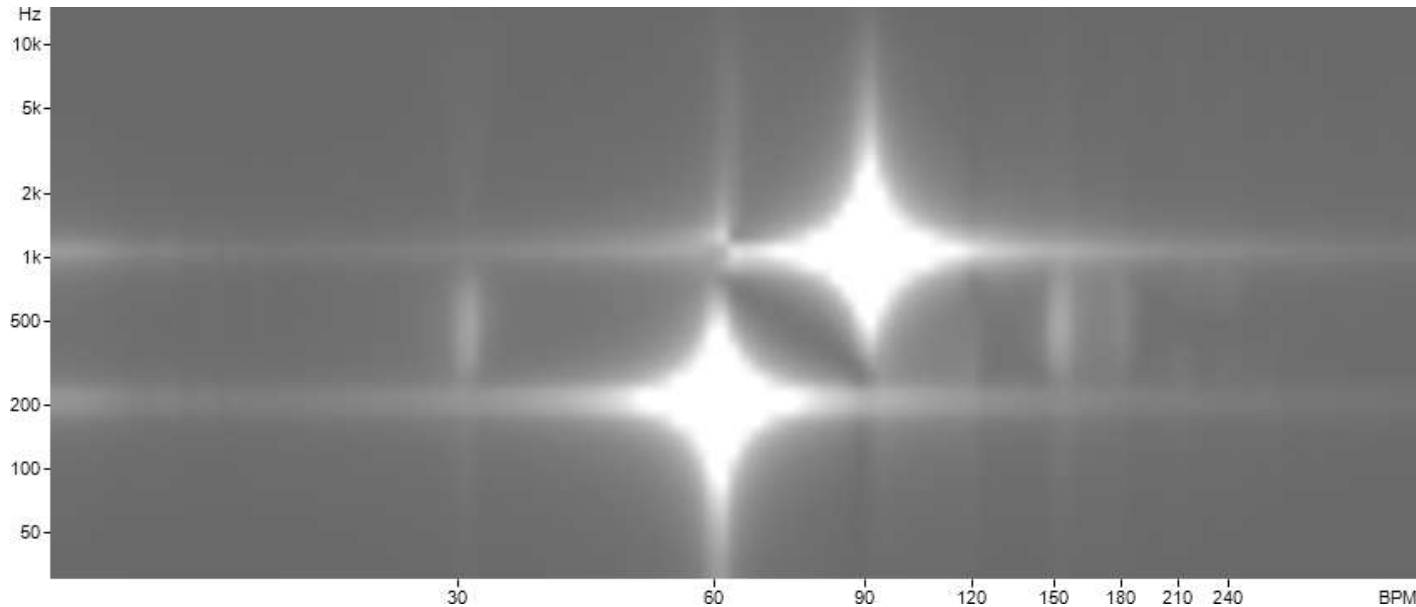


User Interface

- Low-priority thread
- Mainly on graphics card:
 - Build 120 x 40 texture image
 - Send to graphics card
 - Shader program: graphics chip applies bicubic interpolation to arbitrary screen size

Results (1)

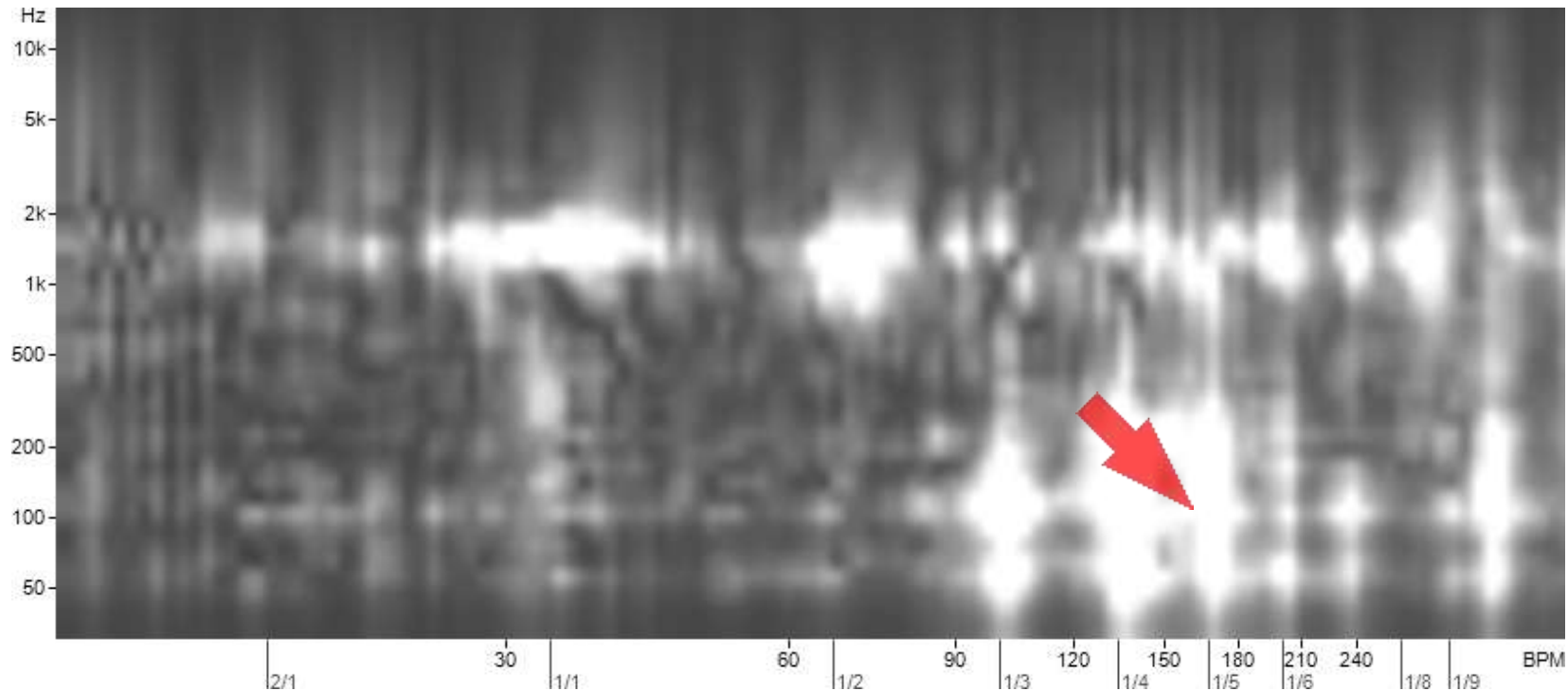
Synthetic test: two sine waves each modulated by exp of slow sine



Stars, no blobs!

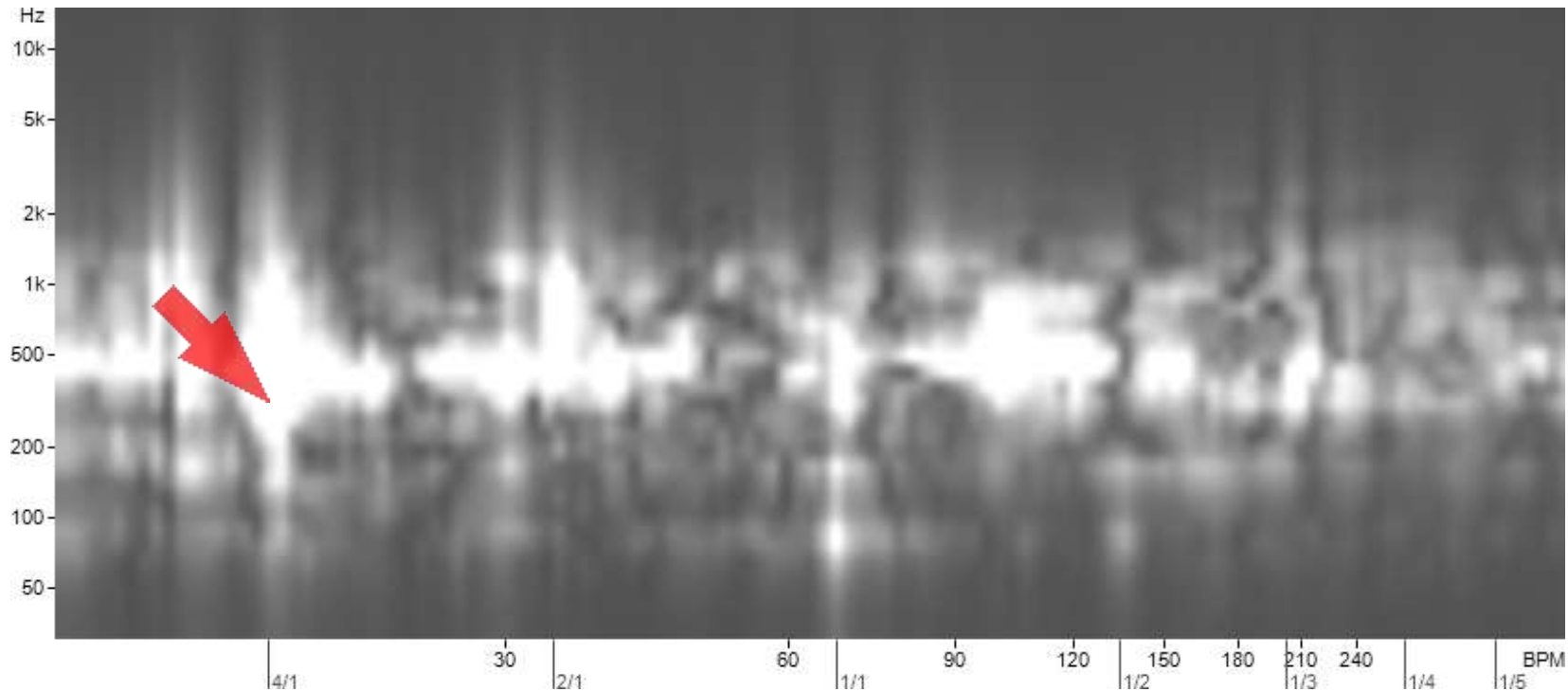
Results (2)

Music test:
OK for Rock/Pop/Latin



Results (3)

Music test:
Limited use for classics



Outlook

- Record and play back actual time of strokes
- Improve filters
 - Linear phase (Latency?)
 - Blobs instead of stars