

Smart Audio for Automotive

Adaptive Multichannel Loudness Control in Car Environment

10 quick questions before and after other presentations

Presentation
at AES Automotive Conference, Burlingame,
September 2017

10 quick questions before and after other presentations

Presented by
Peter Pörs
Manager Business Development

with Jünger Audio since 1995

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Why I'm here?



Why I'm here?

- _ Jünger Audio is specialized in loudness control solutions
- _ Offering uncompromised real time audio control solutions



Why I'm here?

_ Jünger Audio has installed more than 13,000 professional processors on air and more than 15,000 pro licenses on air world wide!



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What is the problem with loudness?

The TV Broadcast View



What is the problem with loudness?

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We are still sitting in the
“loudness rollercoaster”!

_ Basically we are talking about
controlling the different loudness
existing in the various program
contents broadcasted daily.
This provides a enormous series of
problems
...and can get sometimes really scary !



What is the problem with loudness?

What is the problem with loudness?

_ User complain to the broadcaster or network operator!



What is the problem with loudness?

What is the problem with loudness?

_ Is there a chance to watch TV without changing the volume setting all the time?

_ Yes!

- Level Magic™
 - EBU R128
 - ATSC A/85



What is the problem with loudness?



What is the problem with loudness?

_ Is there a chance to drive car without changing the volume setting all the time?

_ Yes!

- Level Magic™
 - EBU R128
 - ATSC A/85



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How do we perceive loudness?

Psychoacoustics...



Differences in loudness perception

_ Sensory loudness

directly related to the neural activity of the inner human ear

modelling is possible
and therefore a sensory
loudness meter can be built



Differences in loudness perception

_ Perceptual loudness

related to the interest of
the listener in the sound

no really modelling possible



Differences in loudness perception

_ Perceptual loudness

A learned response and varies according to the personal involvement of the listener

No meter can determine which content is commanding the attention of the listener



Differences in loudness perception

_ Perceptual loudness

People are very different in use their senses. There is an enormous difference in the information needed to form the perceived reality.



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Technically - what is "loudness"?

The ITU View



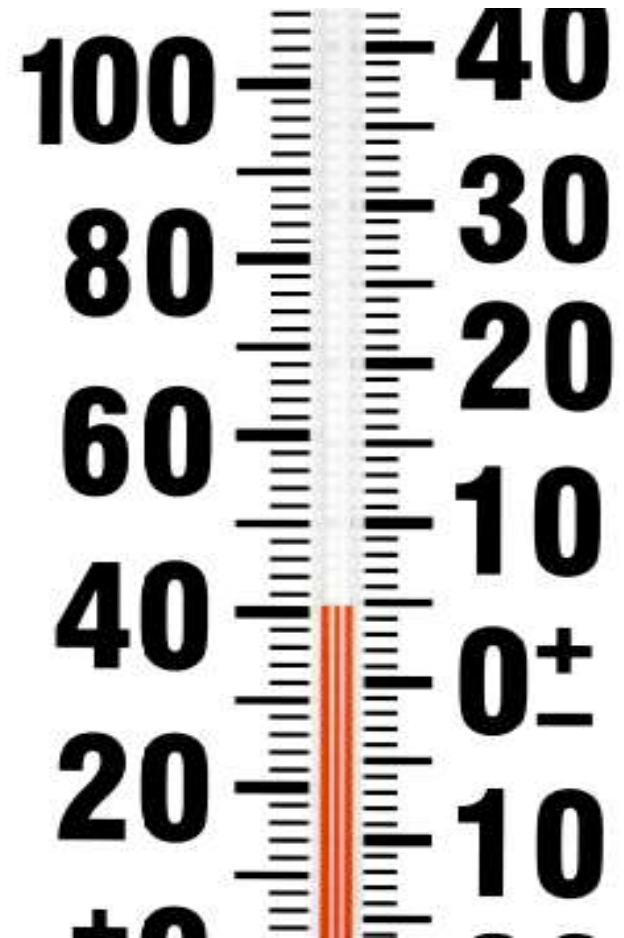
Important:

Audio level and loudness level are two different measurements! Even if we are using the same digital level scale!

Recommendation:

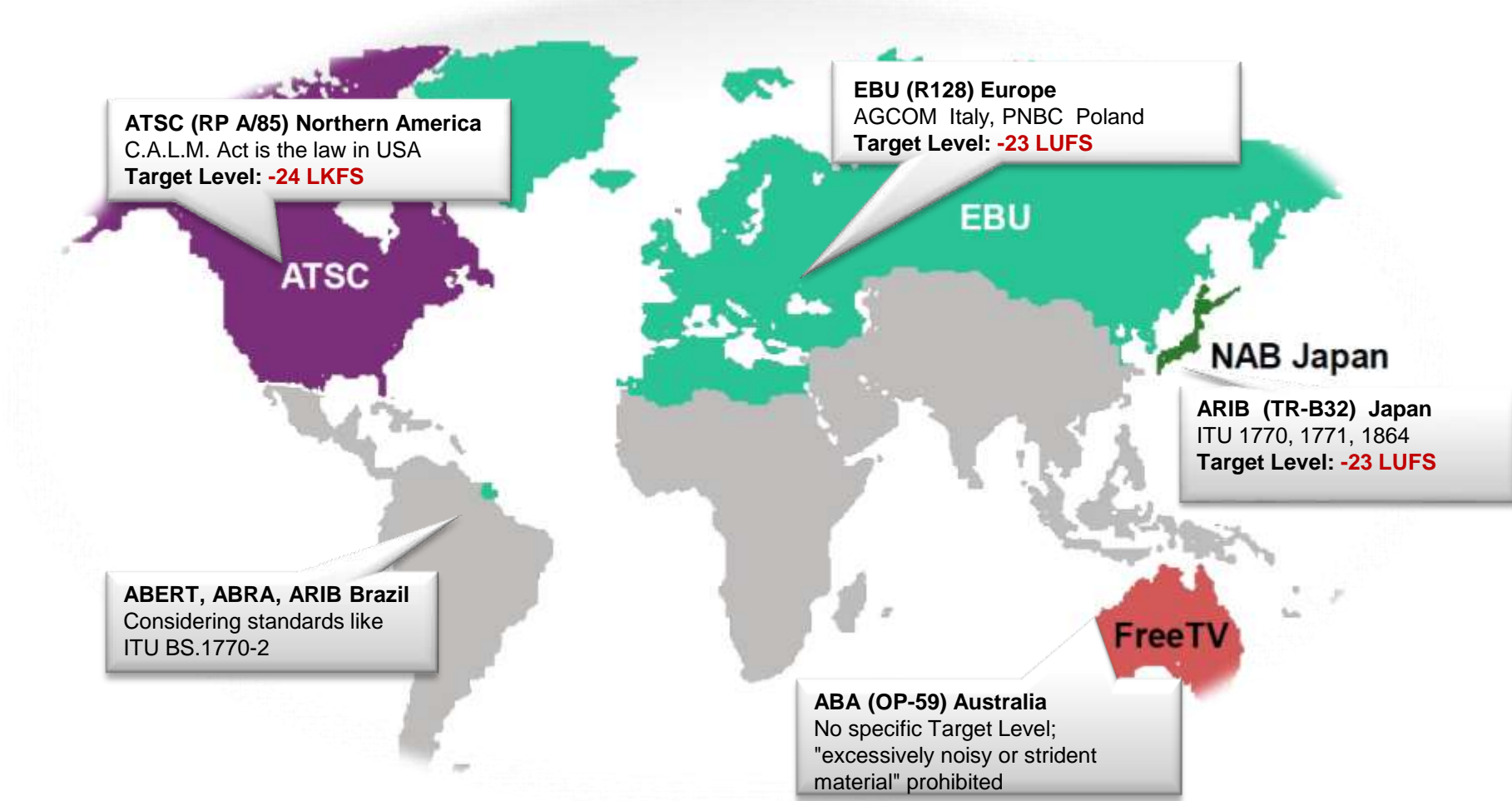
Let's talk about loudness in LUFS or LU (Loudness Units), in difference to audio level in dBFS.

It's all defined in ITU standard!



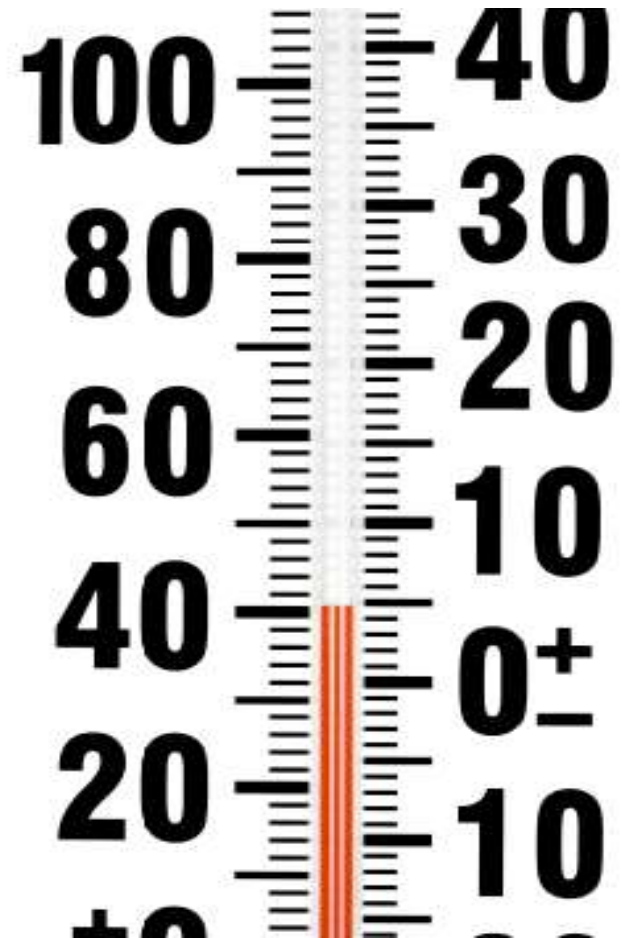
Technically - What is "loudness"?

Broadcast Loudness Control – Around the world:



A number of professional references are given (globally or for certain regions):

TV broadcast	-23/-24 LUFS
Music streaming	-16 LUFS
OTT/streaming	-24...-16 LUFS
Radio podcast	-18...-16 LUFS
YouTube	max -13 LUFS
... Apple	max -16 LUFS



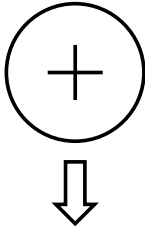
Why shouldn't audio (sources and destinations) in the car being referenced to the common (ITU based) loudness standards and references?

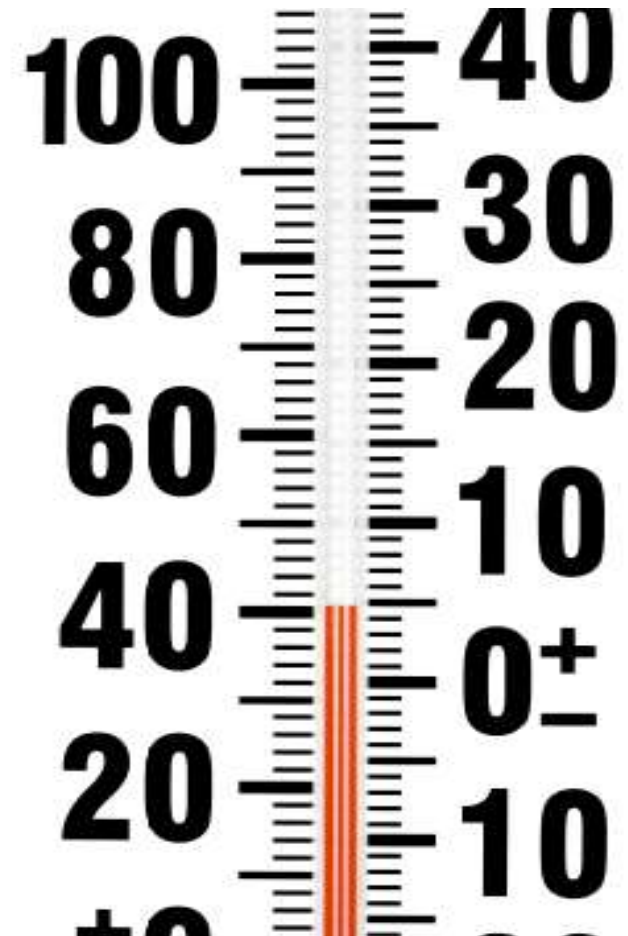
-23/-24 LUFS?



Technically - What is "loudness"?

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Audio Sources		<i>pre-leveling targets</i> (QP)
CD/DVD/BR		-16 dBFS
FM/DAB		-18 dBFS
TV		-18 dBFS
USB (MP3, AAC,...)		-18 dBFS
System		-16 dBFS
Phone		-13 dBFS
...		
		
Mix Output		<i>loudness</i> <i>target</i>
		-23 LUFS



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What are the expectations for loudness control?

in professional media industry



What are the expectations for loudness control?



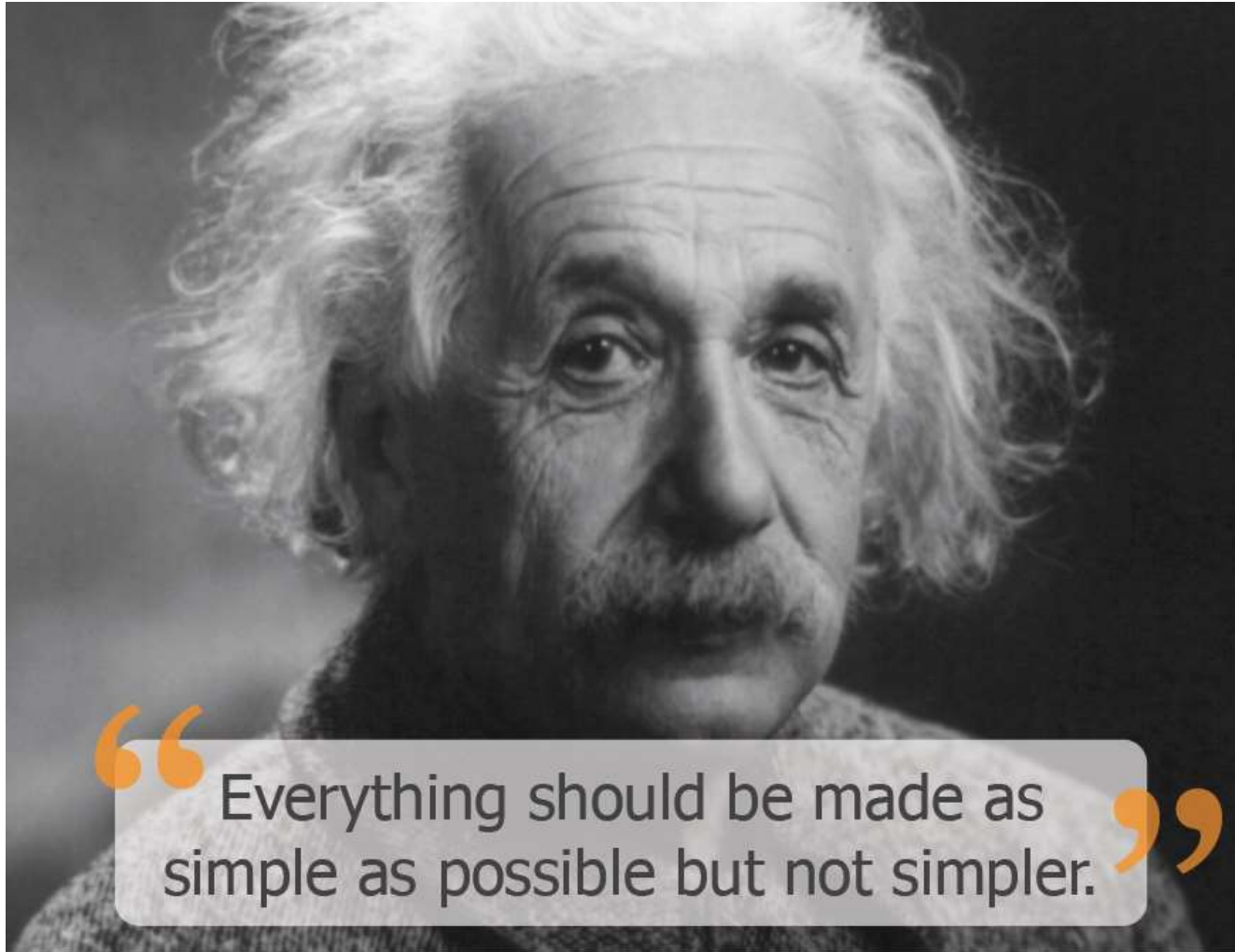
What are the expectations?

- _ easy to use continuous real time audio control, regardless of the source
- _ without touching the sound of the audio material
- _ No breathing, no pumping, no spectral changes. Just well controlled loudness!



What are the expectations for loudness control?

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What are the expectations?

What are the expectations for loudness control?



What are the expectations for loudness control?

gain

ADAPTS

to the

input

loudness

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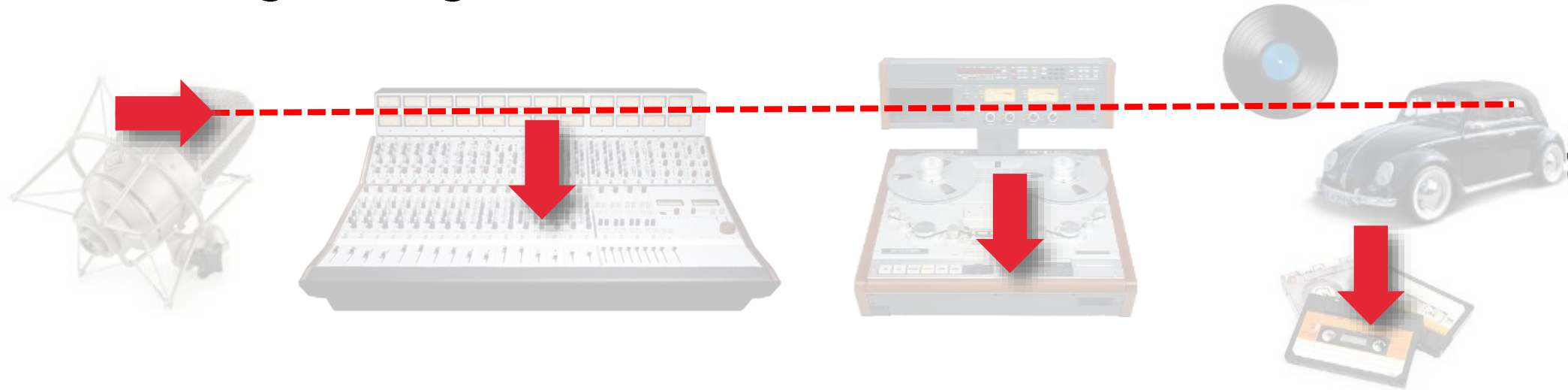
Professional Solutions for the Consumer Experience?

From Broadcast to Automotive



Source Quality Role Analogue Production

Continuous reduction of quality with each step of mastering, storage and distribution



Source Quality Role Digital Production

Source quality can reach the consumer!





Professional Solutions

How well performs
Smart Audio?







German Public First Television Network ARD

Prime time news production studio with fully automated audio production.

Jünger Audio Level Magic™ technology is controlling:

- _ microphone inputs
- _ line inputs from playout server and incoming feeds
- _ background audio for voice over.

And final mix loudness output.

The principle.

Audio sources

Mic recording
(voice, sound)

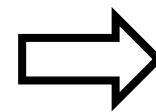
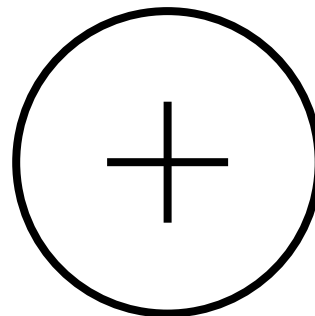
auto-levelling

-13...-16...-34

Other prerecorded

Elements

dBFS



Mix output

auto-loudness

-23LUFS

German Public First Television Network ARD

ARD Tagesschau Live Show Production Studio:

- _ on air since April 15th, 2014
- _ average output loudness live show
-23 LUFS +/- 0,2 LU
- _ in fully auto-mode

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Smart Audio for Automotive

What are the requirements and challenges?



In modern in-vehicle-infotainment [IVI] systems, a number of audio sources have to be managed.

The Audio Control Solution should solve this problem and let your customers concentrate on the real important things while driving.

Challenges for car audio

Always optimum loudness and sound

Optimized reproduction for low dynamic and low quality content

No need for manual volume control

Optimized speech intelligibility

Best perception for speech based information

also for mixes with different loudness of audio bed (voice over)

Challenges for car audio

Optimized audio feeling

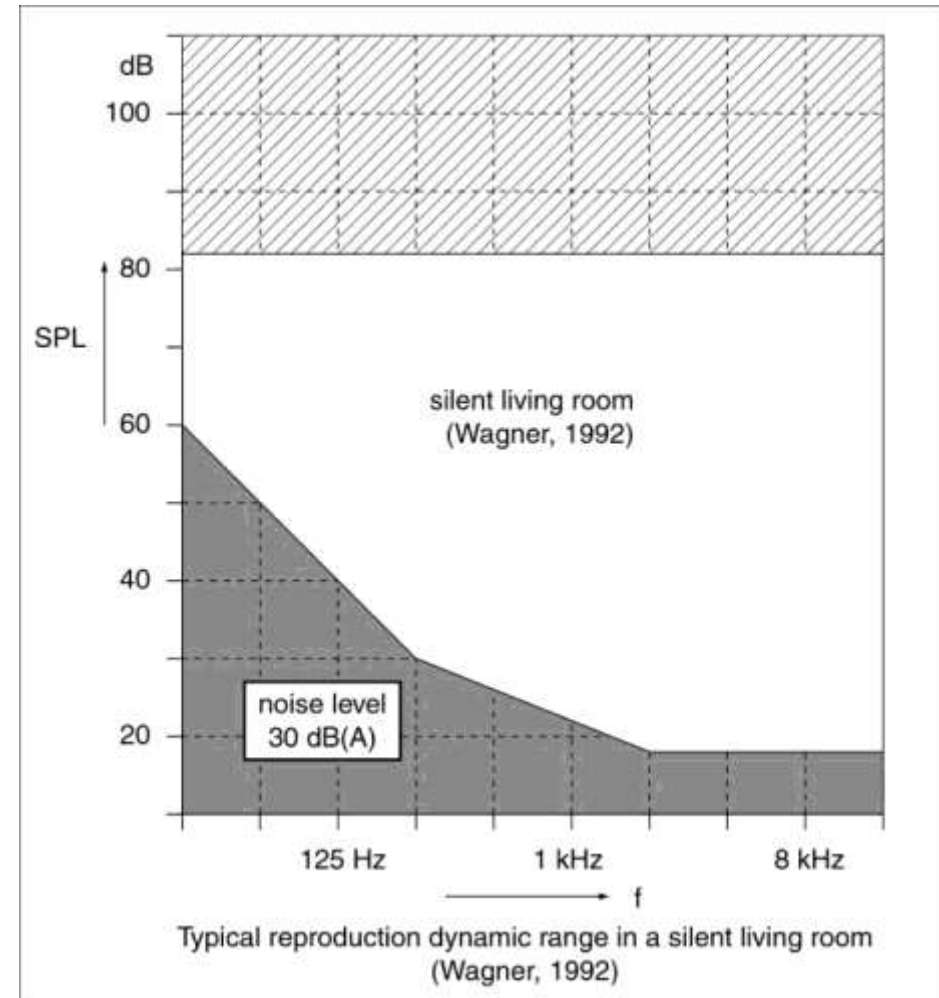
Dynamic audio control for best performance in every car model

Customized adaptation

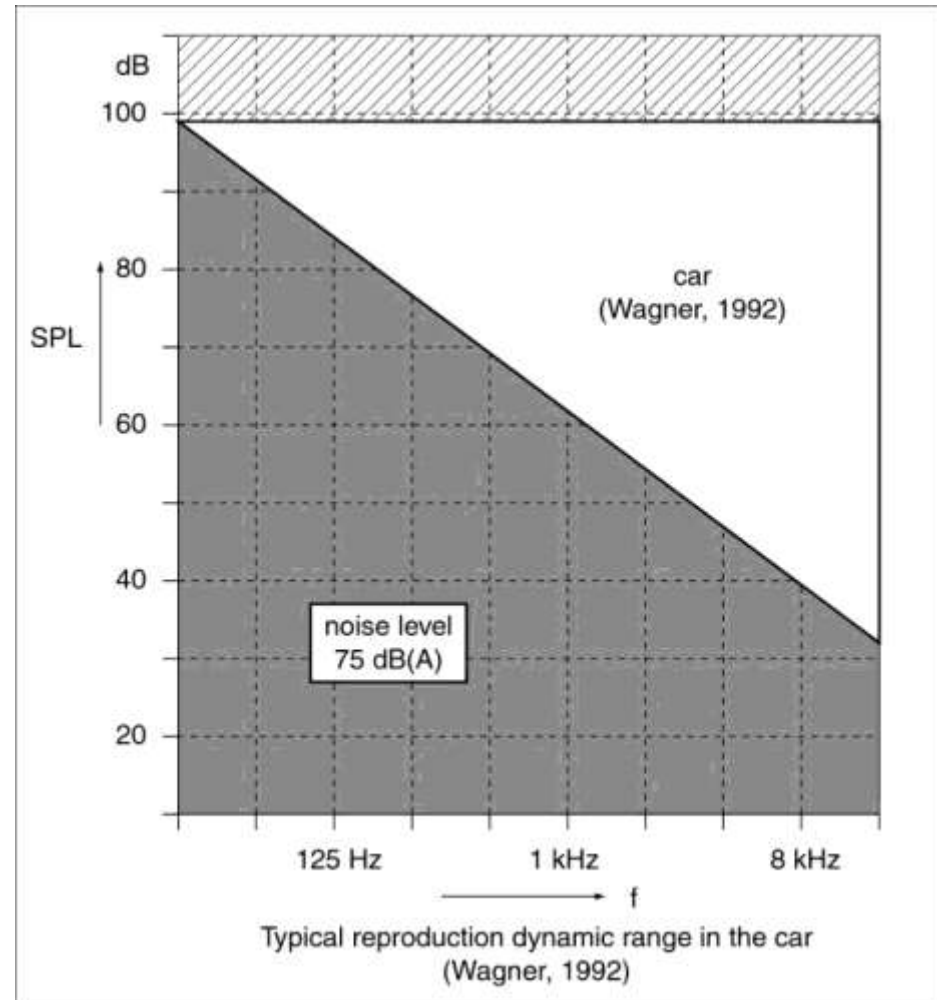
Smart audio processing configured in user profiles

(by using adaptive and autonomous audio processing algorithms as well as intelligent and self-learning procedures).

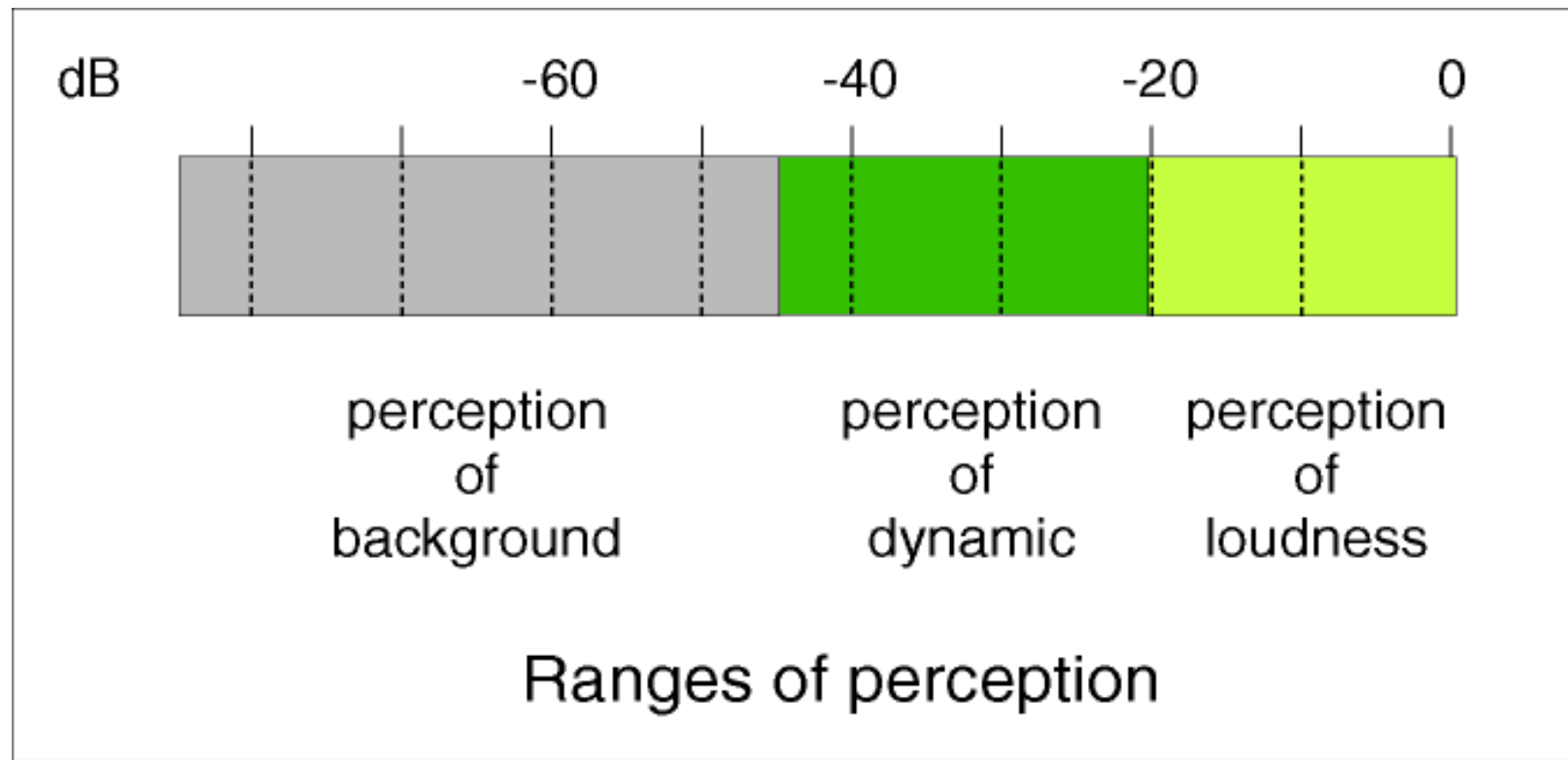
Loudness Perception.



Loudness Perception.



Ranges of Loudness Perception.



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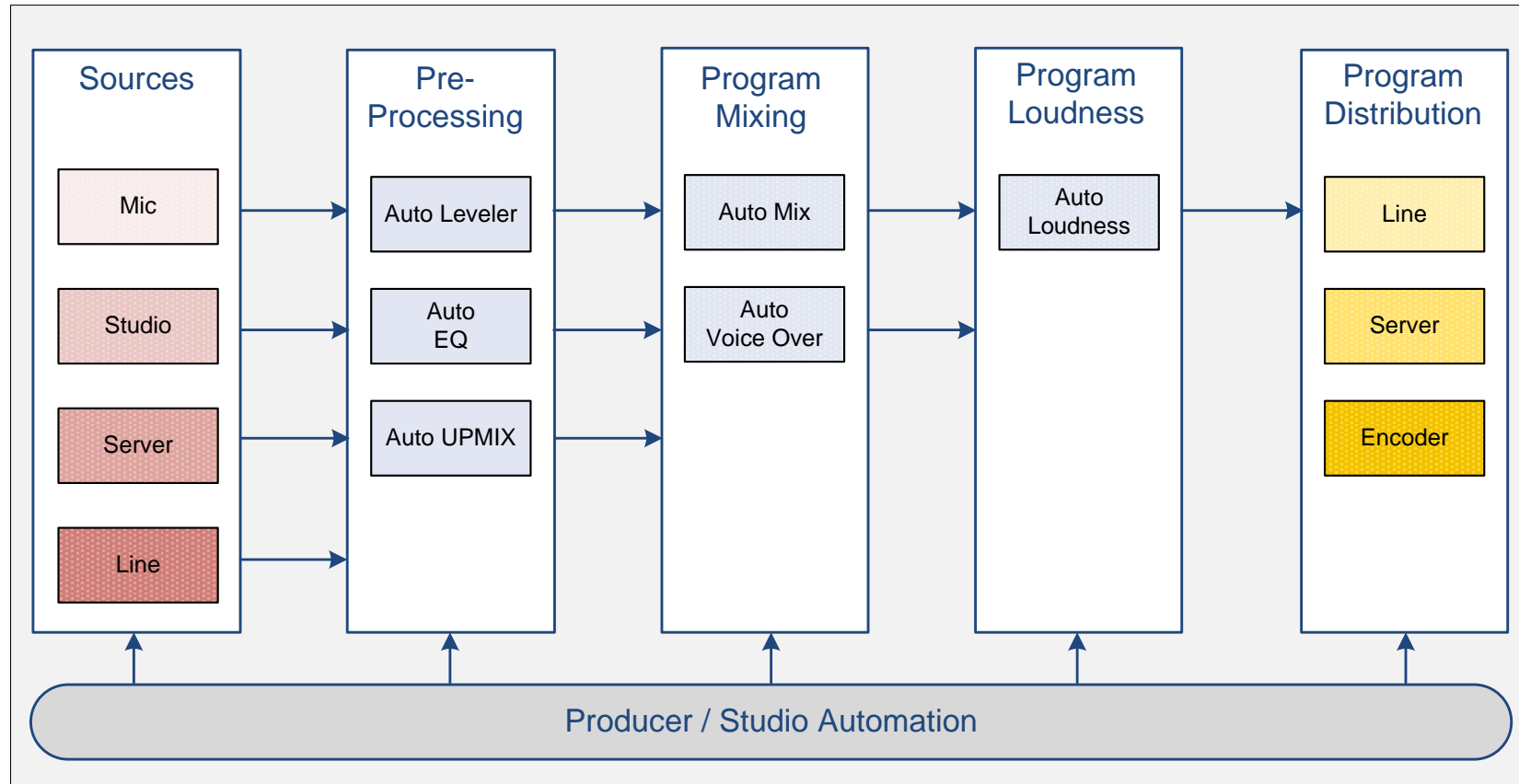


Smart Audio for Automotive

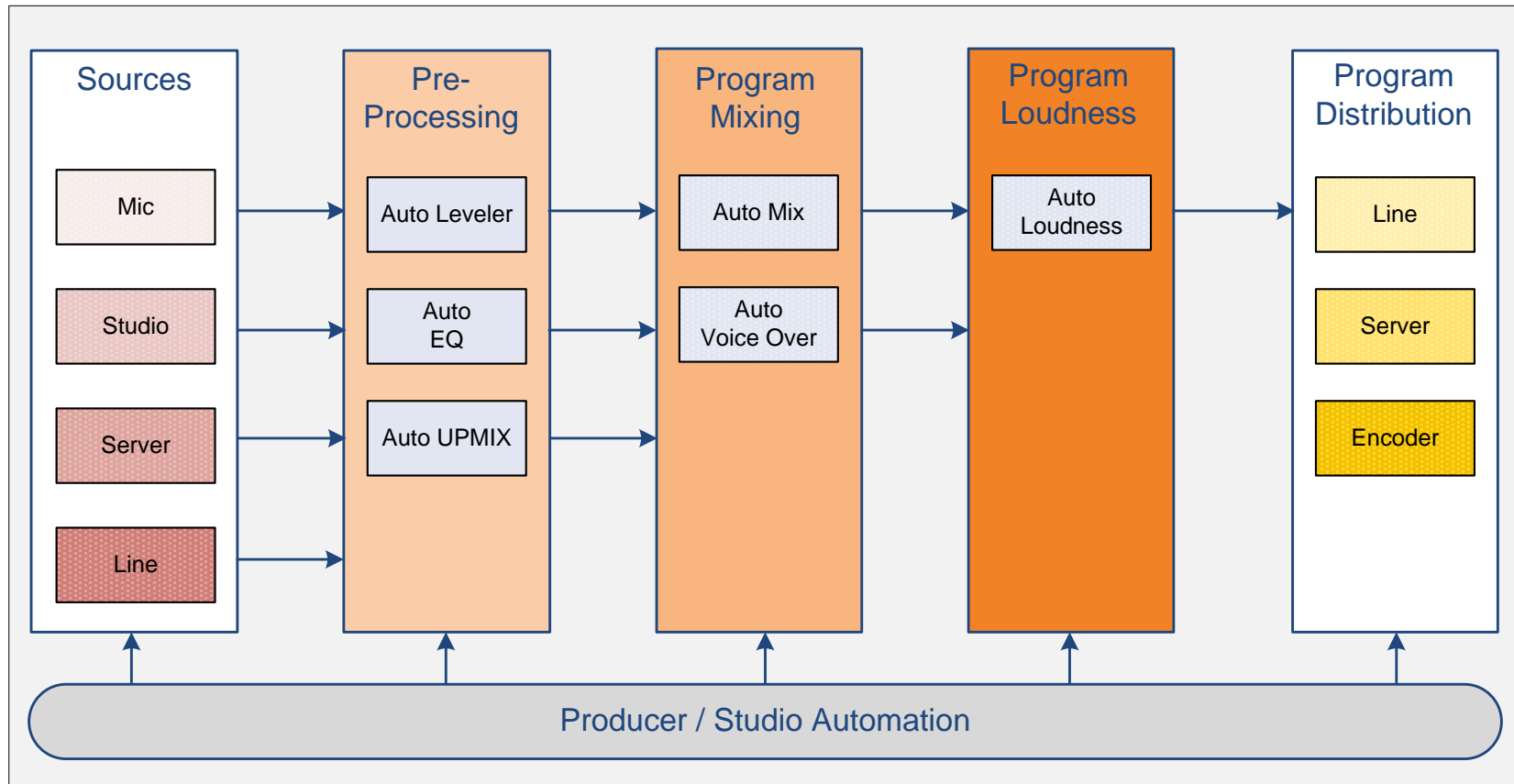
What should be done?



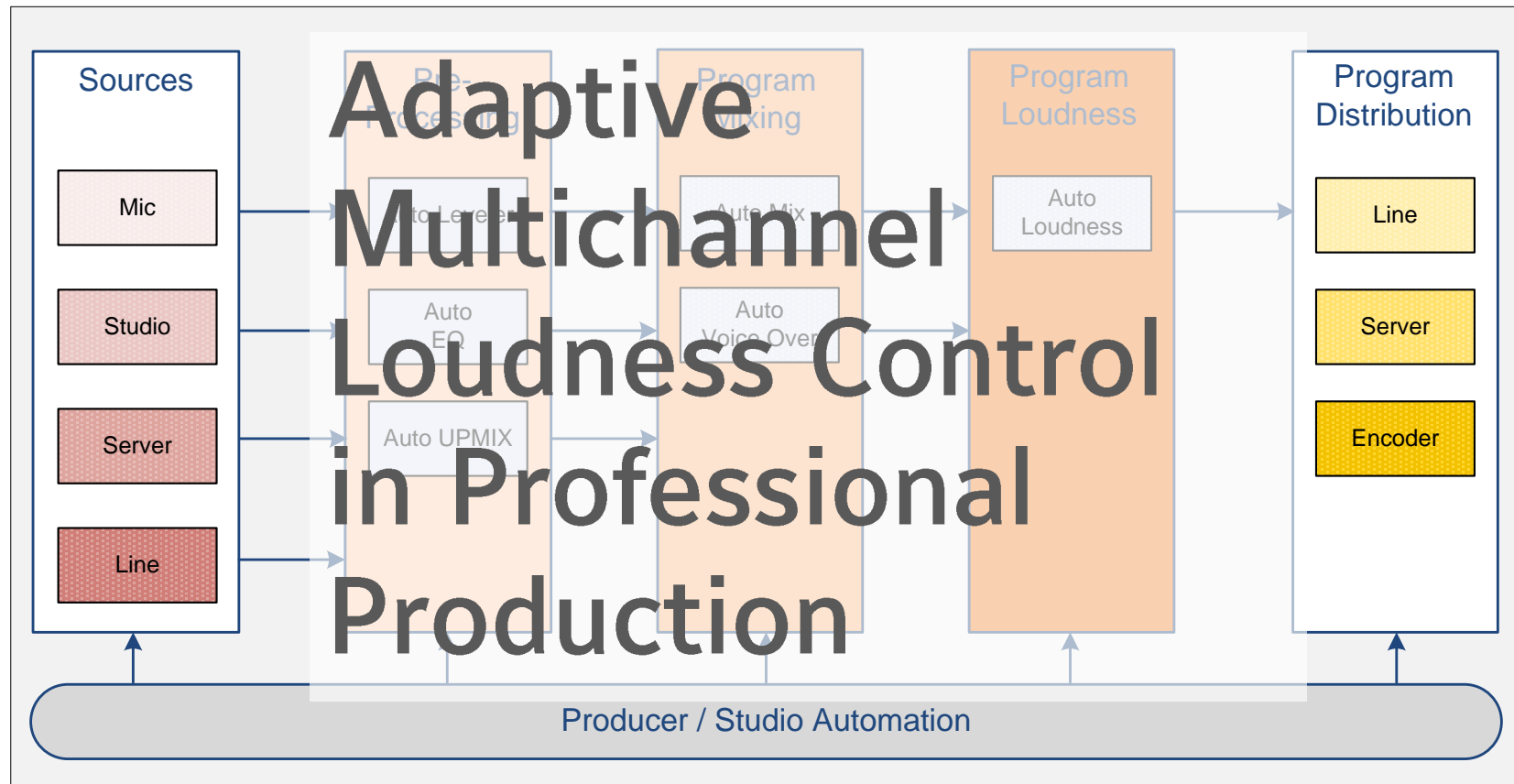
Smart Audio – Professional Solution



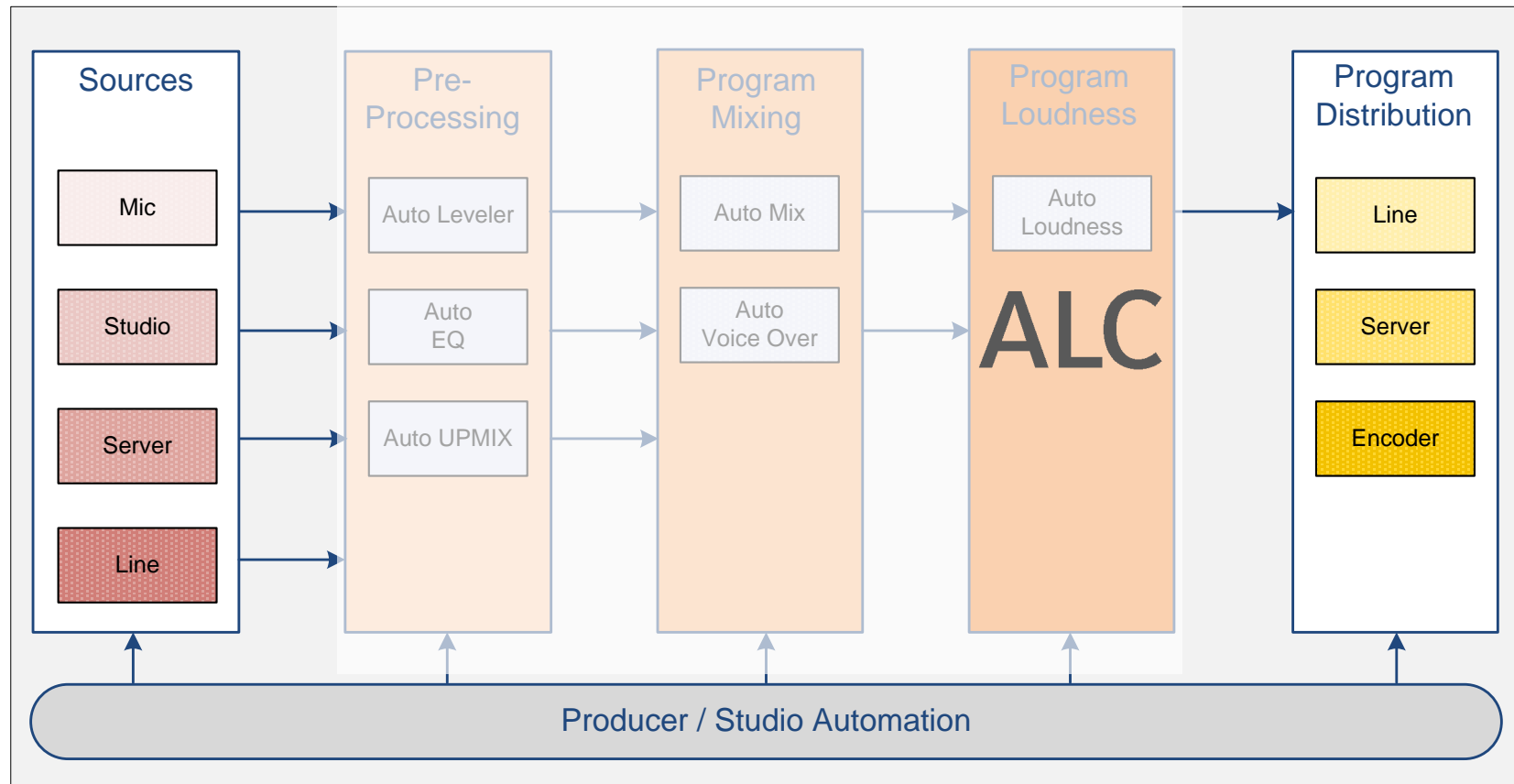
Smart Audio – Professional Solution



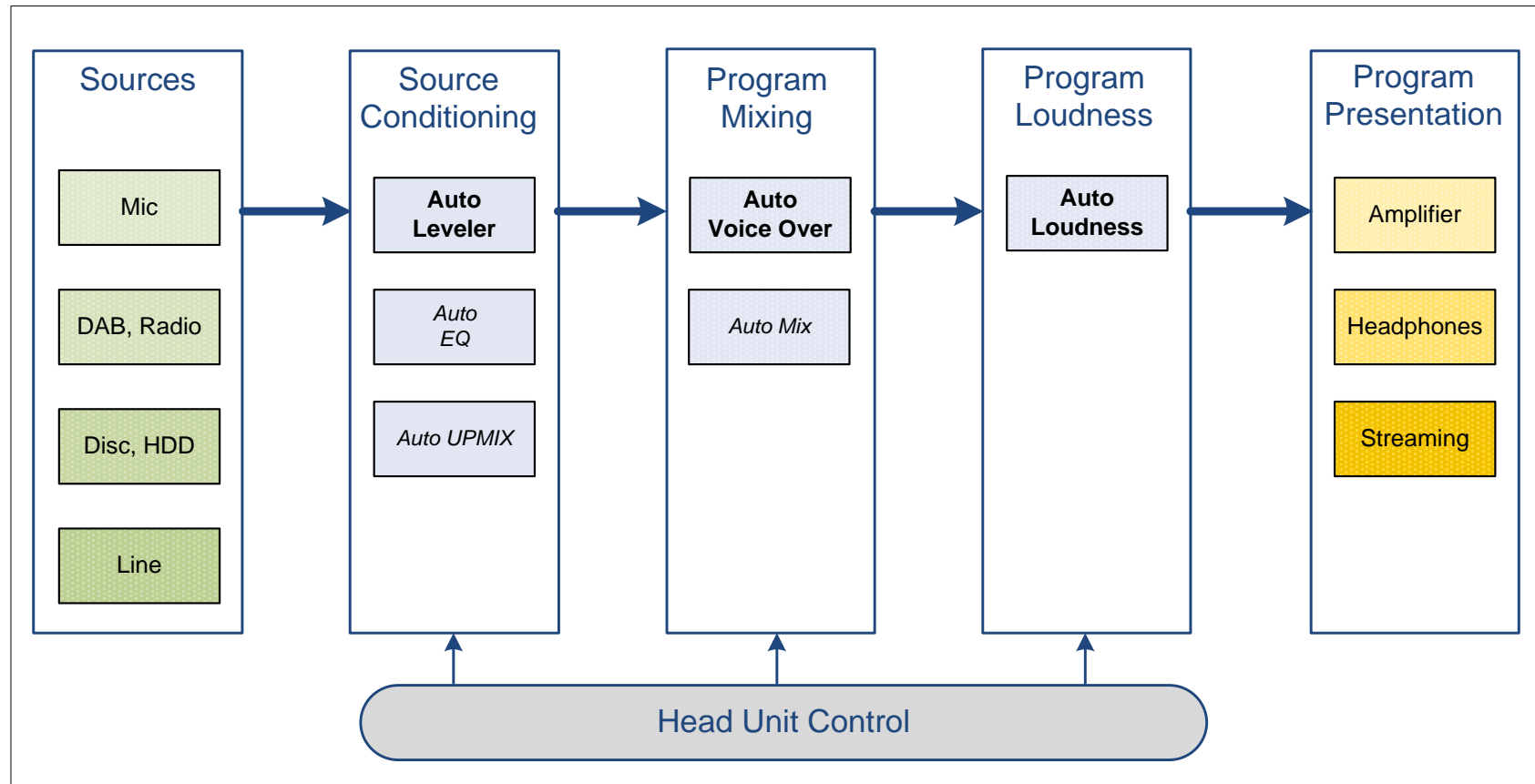
Smart Audio – Professional Solution



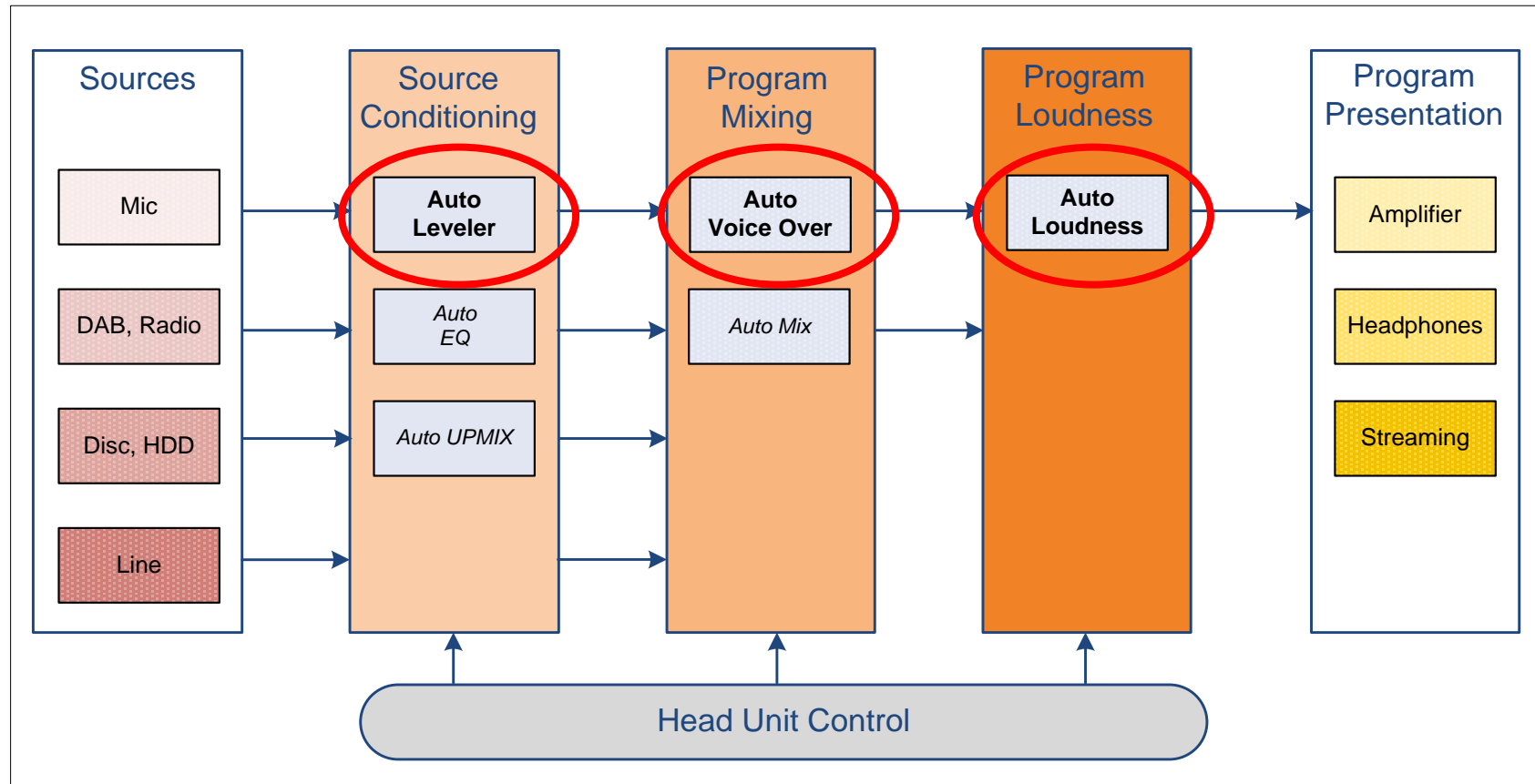
Smart Audio – Professional Solution



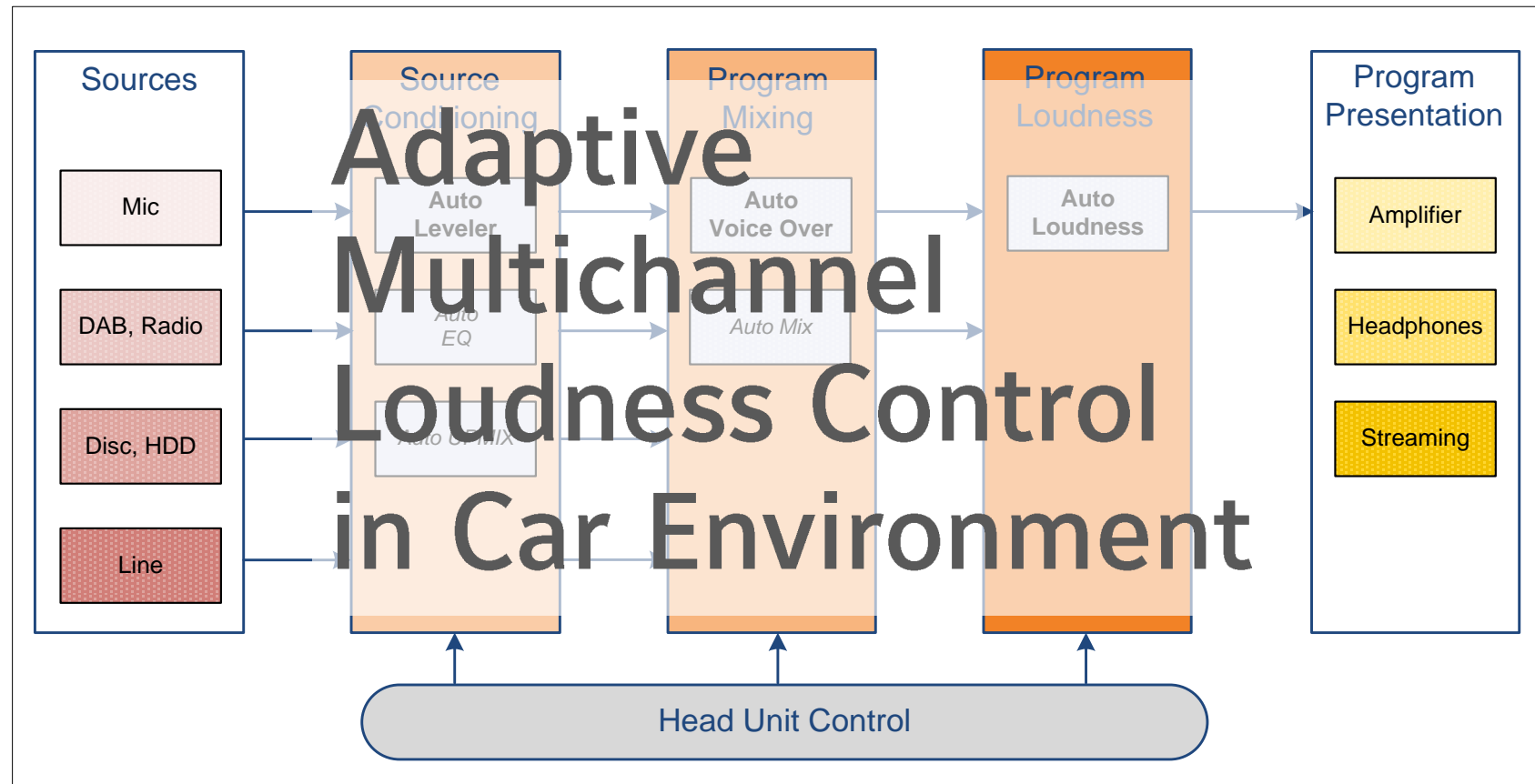
Smart Audio – Automotive Solution



Smart Audio – Automotive Solution



Smart Audio – Automotive Solution



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Smart Audio for Automotive

Conclusion?



With improved resources for audio computing in in-vehicle-infotainment [IVI] systems the platform is given to use sophisticated and proofed professional solutions for automotive applications.

Individual and dynamic source conditioning followed by continuous audio loudness control in combination with consistent voice over mixing will improve head unit audio performance.

The loudness control should use ITU based measurement standards and the loudness target should be -23 LUFS compliant to the professional media production.



A few last words...

More Questions?

Pls. ask!

Thank you for attention!

peter.poers@jungeraudio.com

