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Technologies and solutions

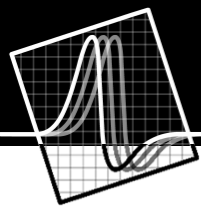
Revision 1.3
Dec 2016

Sound Reinforcement Package SRP

Alango software technologies for efficient intercom inside the car



Product introduction 2016



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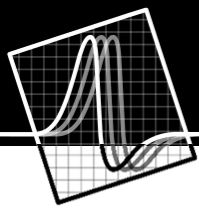
What is SRP?

SRP is a voice reinforcement system allowing people inside the same vehicle to communicate with each other conveniently and safely

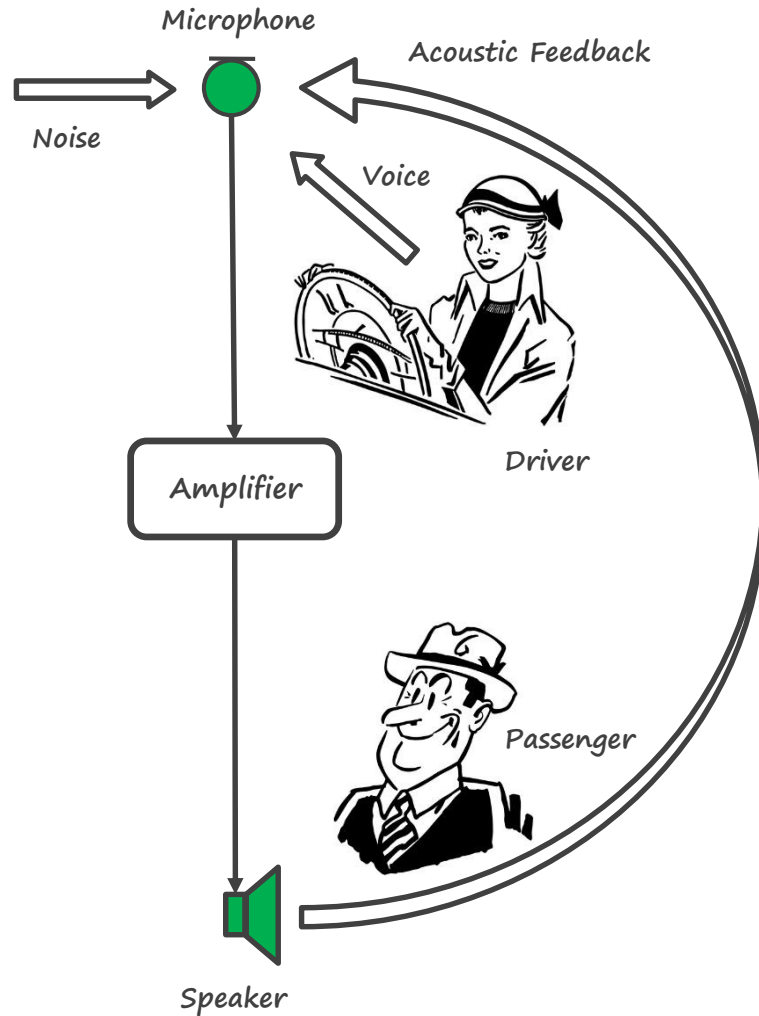
- ✓ No need to raise your voice
- ✓ No need to turn your head to rear passengers
- ✓ No need to ask to repeat



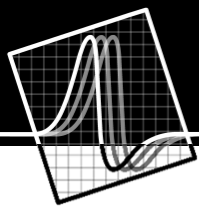
Product introduction 2016



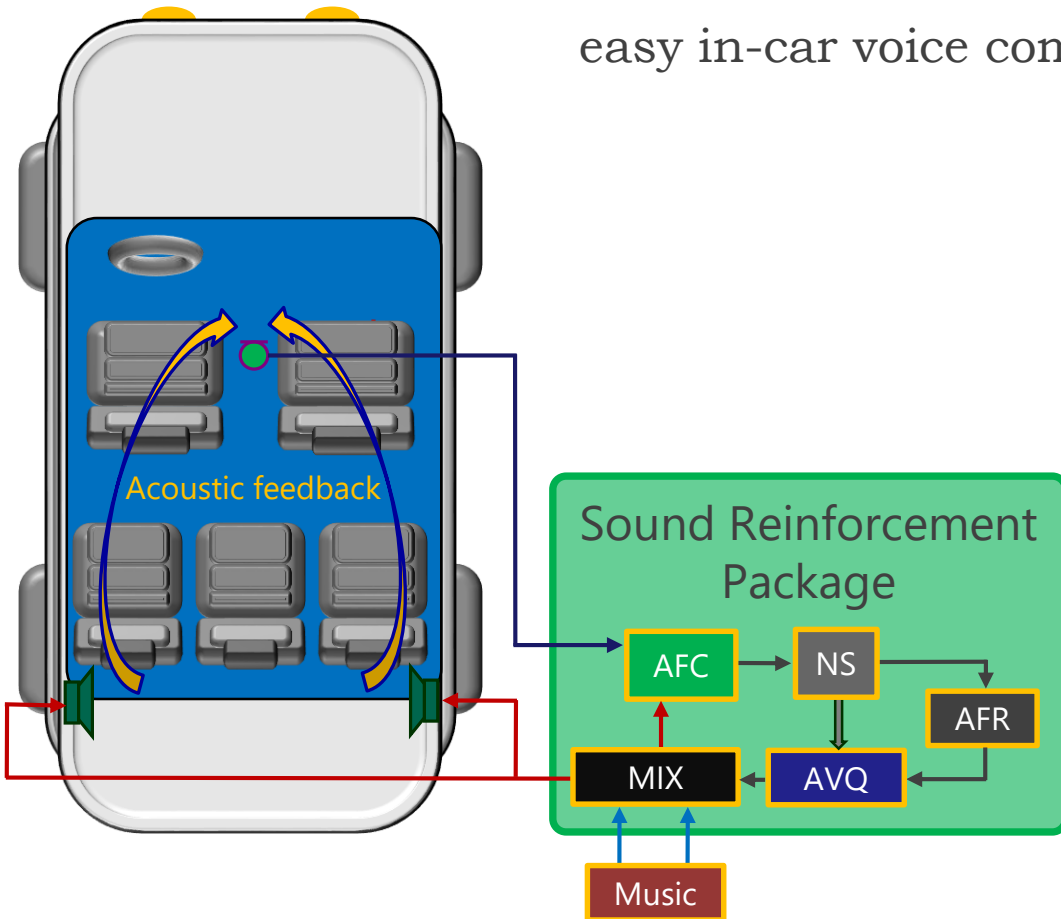
Car Intercom System challenges



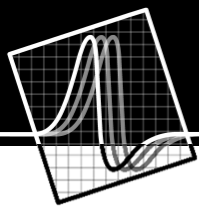
- **Acoustic feedback problem**
The problem is caused due to the close proximity of the loudspeaker to the high sensitivity microphone. The user's voice from the loudspeaker is picked up and amplified repeatedly, which creates a vicious acoustic loop.
- **Voice level problem**
People have different voices and speak from different distances to the microphone requiring variable sound amplification to be heard equally well. This is a problem unto itself but also exacerbates the acoustic feedback problem.
- **High ambient noises**
The purpose of the system is to amplify voices, not ambient noises. An efficient car intercom requires a high quality noise reduction system.
- **Very low maximal latency**
Maximal allowed latency of the system shall not exceed 20 milliseconds, preferably being below 15ms. Otherwise the user's voice is heard twice, as direct and amplified sound. This requirement significantly reduces the choice of possible algorithms and approaches to deal with latency.



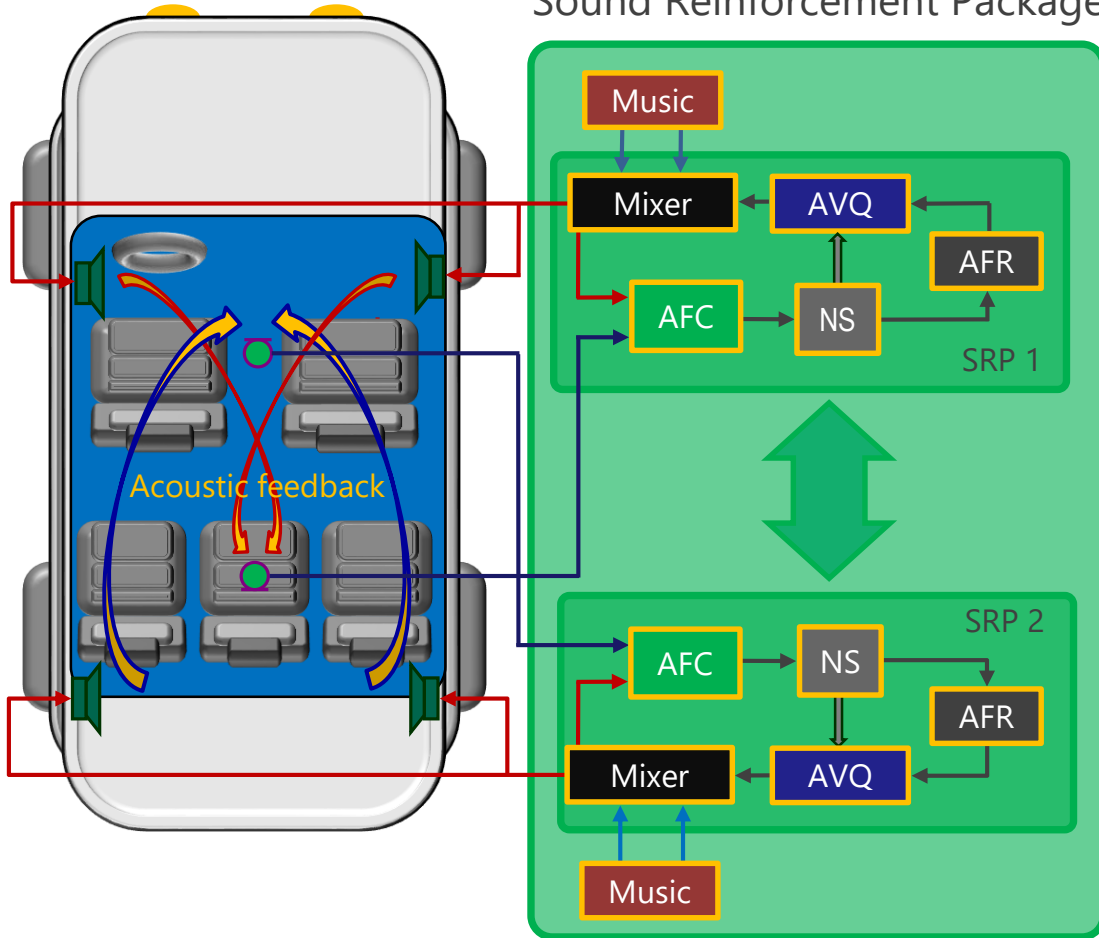
Sound Reinforcement Package (SRP) – a set of software technologies enabling easy in-car voice communication from the driver to the rear passengers



- ✓ AFC - Acoustic Feedback Cancellation
Acoustic feedback cancellation is based on Alango's advanced echo cancellation algorithm. The algorithm attempts to simulate the acoustic path between the speaker and microphone thus "predicting" the feedback signal and subtracting the prediction from the microphone signal.
- ✓ AFR – Acoustic Feedback Reduction
Acoustic Feedback Reduction helps to detect and additionally reduce the feedback. It also helps AFC to operate properly. It is based on frequency scaling as well as adaptive notch filtering.
- ✓ NR – Noise Reduction
Noise Reduction significantly attenuates ambient car noises so that they are not amplified by the intercom system.
- ✓ AVQ – Automatic Volume & Equalization
Automatically modifies the system amplification and frequency equalizer to compensate for changing ambient noise strength and spectrum.
- ✓ MIX – Mixer
Mixes and adjusts gains of music and voice intercom signal

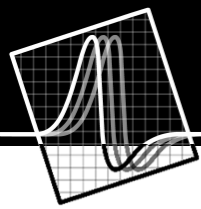


2-Way Sound Reinforcement Package



2-Way Sound Reinforcement Package (SRP-2W) is an extension of SRP software technologies enabling easy, two way in-car voice communication between the driver, front and rear seats

SRP-2W is composed of two Sound Reinforcement Packages with some control functionality to allow them to work seamlessly in full-duplex mode



SRP Applicability

Passenger cars, minivans and vans, taxis, small busses.

SRP Availability

Sound Reinforcement Package (SRP): 2017, Q1

2-Way Sound Reinforcement Package (SRP-2W): 2017, Q4

SRP Target DSP/MCU Platforms

ARM, CSR, CEVA-TL4, others upon request

SRP Parameters

Feedback reduction:

10-20dB (system dependent)

Noise suppression:

up to 20dB

Automatic Gain Control:

up to 20dB

Processing latency:

<20ms (DSP resources dependent)

DSP resources:

(target for Cortex A8)

MIPS:

<120MHz

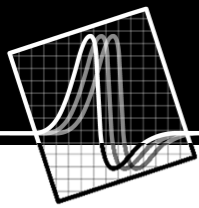
ROM:

<50KBytes

RAM:

<70KBytes





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Contact information

Don't hesitate to contact us if you are interested in SRP or if you have any comments. We are looking forward to hearing from you!

Please, send your questions, comments, proposals to Alango:

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Product introduction 2016