

Audio Processing For Better Repeated Audio

APCO Wenatchee 2006

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What's the problem? Over

PLow repeated audio from field units

PInconsistent audio levels

- ▶ Dispatch
- ▶ Mobile
- ▶ Portable

PLevels often too high, even in clipping

PSimulcast requires better audio control and no clipping

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Possible Remedies

- P** Repeat through console using console audio processing
- P** Provide repeated audio advantage - 3 kHz in = 3.5 kHz out
- P** Adding a compressor amplifier or some other type of “AGC” circuit in the transmit audio path
- P** User training and better field unit maintenance

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Options Analysis

- P** Repeat through console using console audio processing
 - ▶ Requires console that supports this function
 - ▶ If console interface fails, repeat audio is lost
 - ▶ Requires audio being brought all the way to the console
 - ▶ Does not address varying levels of dispatch audio
 - ▶ Does not equalize dispatch audio to field audio

Options Analysis

- P** Provide repeated audio advantage - 3 kHz in
= 3.5 kHz out
- ▶ Amplifies both loud and weak audio
 - ▶ Can cause distorted audio if audio is clipped
 - ▶ Simple to implement
 - ▶ Does not address varying levels of dispatch audio
 - ▶ Does not equalize field audio to dispatch audio

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Options Analysis

- P** Adding a compressor amplifier or some other type of “AGC” circuit in the transmit audio path
- ▶ Must be done carefully or unnatural audio can result
 - ▶ Must be in the path with both the dispatch and field audio to address both problems
 - ▶ Represents a possible single point of failure
 - ▶ Modern equipment can level audio without clipping

Options Analysis

P User training and better field unit maintenance

- ▶ Ha!
- ▶ Difficult to administer with consistent results
- ▶ Should be done regardless but often infrastructure owner does not control field units

Compression/AGC Amp Option

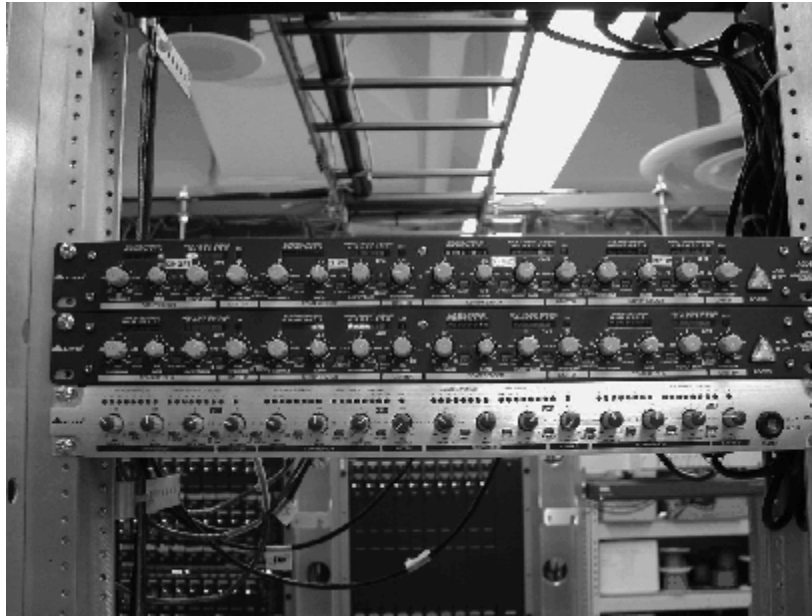
P Modern units provide advanced features

P Relatively in expensive

P Adjustments are critical for correct sounding audio

P Equipment selection must be done carefully

Example Installation



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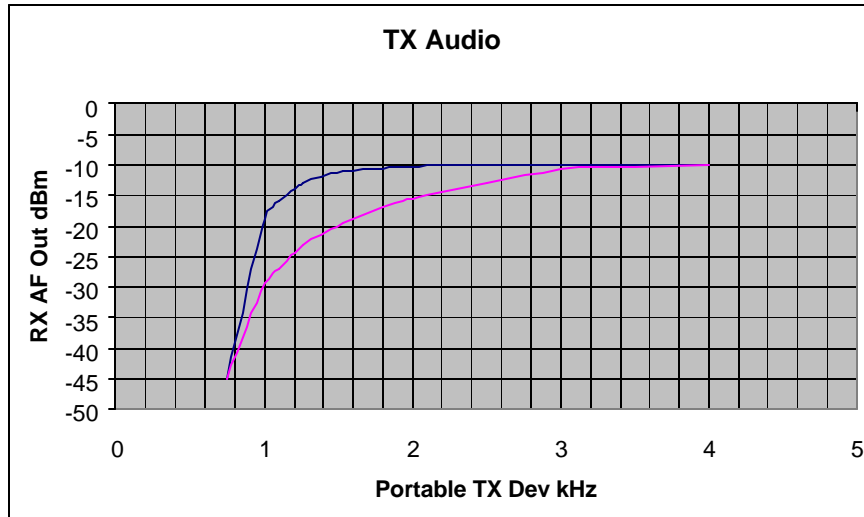
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Example System

- P** Alto ACL4 has four audio processors in one shelf.
- P** A compressor that provides gain for lower audio levels
- P** A limiter that limits the loud audio
- P** Threshold switch to reduce amplifying noise
- P** Limiter has a soft limit to reduce clipping
- P** Cool LED indicators

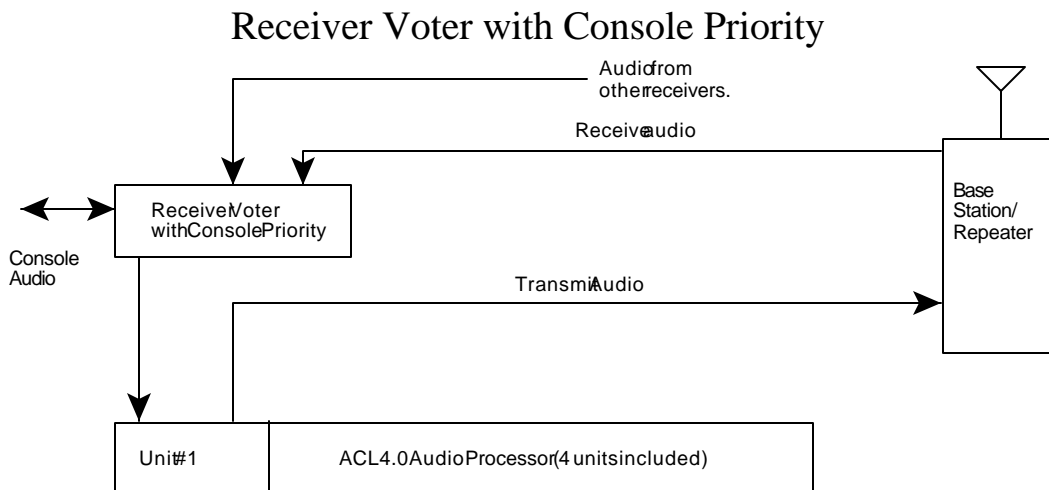
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Field Data



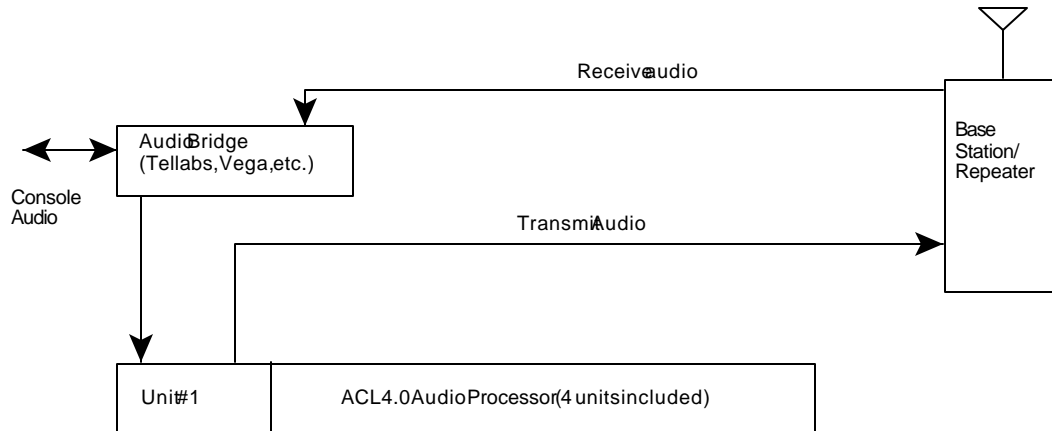
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Typical Block Diagram



Typical Block Diagram

Remote Site Installation



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Questions?

PA special thanks to Motorola's Larry Young for his initial work on this problem.

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