Duplex Issues on XAP units

Introduction
This document will examine different causes of poor duplex communication in the XAP units and explain how to resolve this issue.

Description

- Half-duplex communication occurs when only one side of a conversation can be sent or received at a time, such as talking on a CB Radio.

- Full-duplex communication occurs when both sides of a conversation can be sent and received at the same time, such as talking on a telephone handset.

Causes of Poor Duplex Communications
All XAP units provide full-duplex communication. However, certain system settings as well as reflective rooms can cause poor duplex communication.

Non-Linear Processing (NLP) setting
The purpose of Non-Linear Processing (NLP) is to suppress any residual echo the Acoustic Echo Canceller is unable to phase out. When NLP is configured properly, it will suppress the microphone audio that can cause duplex issues. The recommended setting for NLP in most installations is Soft or Off.

If NLP is set to Medium or Aggressive, the microphone audio will be significantly suppressed, which increases the possibility of causing poor duplex communication. The Acoustic Echo Canceller will typically phase out any unwanted echo in normal room conditions. Do not set the NLP to aggressive or medium unless absolutely necessary.
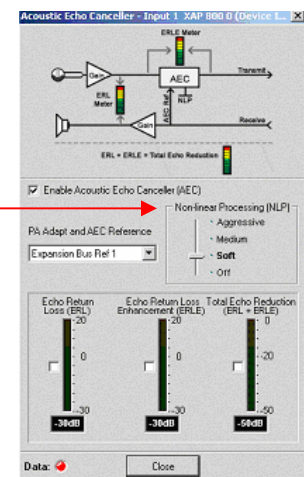
Room Acoustics
If your room is very reflective (a lot of hard surfaces or glass), the Acoustic Echo Canceller is going to has to work harder and will have more residual echo passing through. To compensate, NLP might need to be set at a higher level, which will cause duplex issues. The best solution for reflective rooms is to look into acoustic treatments such as curtains on windows, acoustic panels and carpeting.

PA Adaptive Mode
The PA Adaptive Mode setting can also cause poor duplex communication. PA Adaptive Mode uses loudspeaker audio level on a specified output as the new ambient level when audio is present at the output. This prevents loudspeaker audio from gating on the microphone but still allows people in the room to gate on a microphone—as long as their voices are louder than the loudspeaker audio. If the volume coming from the loudspeakers is high, people will have to raise their voices in order to gate on the microphones. PA Adaptive Mode does not always have to be used.

Speaker to Microphone Distance
When you have greater distances between the loudspeakers and microphones, the amount of loudspeaker audio present at the microphones is reduced. If the loudspeaker audio is less than the set gate ratio, it will not gate on the microphone. This distance will also improve the performance of the echo canceller. The audio level coming from the loudspeaker should be much lower than the audio from the

person speaking into the microphone. The echo canceller will be able to phase out this lower level audio better, consequently the non-linear processor will not have to work as hard. This will help improve duplex communication.

Gain Structure
Gain structure is a very important aspect of audio conferencing. When your system has good gain structure, it will be much easier to configure your audio conferencing system. See the Technical Note titled XAP_GWARE 104 Setting the initial gain structure of a XAP system.