

Linear Acoustic Application Note

Automatic Program Replacement in AERO.100/1000/2000

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There are several cases where a user may want to have one audio program automatically replace another program. If the program of interest fails or is missing then the loss of audio causes another audio program to take its place. The technical considerations for automatic replacement will be outlined here along with configurations of the AERO.100/1000/2000 that provide the desired functionality.

Case 1: SAP (secondary audio program)

One case is the broadcast of a SAP channel along with the main audio program. This is common in many countries where a second language is broadcast along with the primary language of the program. There is also increasing use of SAP for descriptive audio. This is an audio track that includes spoken descriptions of the scene for the benefit of sight impaired persons.

Not all content includes an audio track with a second language or descriptive audio. If main program audio can automatically replace the SAP audio then the viewers that use SAP programming do not have to constantly switch back and forth between the SAP and main audio programs. In addition station promos and commercials as well as programs that do not have SAP audio will all be broadcast on the SAP channel. Viewers will not have to guess about the presence of programming even if their preferred audio service is not available.

Main channel audio may be stereo or 5.1 channels. SAP and descriptive is usually single channel mono but may be stereo. In some cases the SAP channel is delivered with a second language on L channel and descriptive audio on the R channel. The changing nature of program delivery makes handling the cases automatically difficult.

A solution to automated handling of the various SAP requirements is to have the flexible and intelligent signal handling of the AERO.100/1000/2000 for SAP audio. The AERO.100/1000/2000 offers the following solutions:

A SAP audio pair is routed to the 7/8 or 9/10 processor inputs of a processing instance: The processor can be configured as:

- Take Left channel only, make it dual channel mono
- Take Right channel only, make it dual mono
- Take Left + Right and make this dual channel mono
- Left priority- Take Right channel if Left is not available
- Right priority-Take Left channel if Right is not available
- The selected audio is sent to a loudness controller and then to an intelligent switch.
- If Auto Downmix is chosen then when the SAP program is absent it is replaced by a downmix of the primary audio channel.

The primary audio is connected to processor inputs 1/2, or 1 to 6 for multi-channel sources. Either the loudness controlled stereo output or a downmix of 5.1 content is provided as the 2 channel replacement source.

- To prevent unwanted switching between SAP audio and main channel replacement audio there is a user settable hold off that delays the switch from SAP audio to replacement audio.
- The change between SAP and main audio sources is a crossfade and the speed of the cross fade is user controllable.
- There is a level control for the main channel down mix into the SAP channel to allow the SAP loudness controlled audio levels and the downmix levels to be matched.
- There are GPI controls to allow remote control of the downmix to SAP channel function. Downmix can be forced on, set to Auto Downmix or be forced switched off.

These SAP handling features provide the benefit of a comprehensive solution to the broadcast of a SAP channel. These features exist for processor inputs 9/10 in all AERO.100/1000/2000 software versions. In version 3.14.24 these features exist and can be used simultaneously on processor inputs 7/8 and 9/10.

In the example below the SAP audio is routed to the 7/8 Input source and the desired SAP audio is on Channel 7 only.



Case 2: Main Program Backup

Another use case is simply being able to automatically replace one audio program with another audio program in the event that the first program is lost. The latest version of AERO.100/1000/2000 software allows two stereo programs to each be replaced by the same backup program. Earlier versions could replace one program with another.

- Auto Downmix, described above, can be used to automatically and independently replace 1 or 2 stereo programs if they should fail.
- The main audio program(s) can be connected to processor input 7/8 or 9/10 (or both).
- The replacement audio program is connected to processor input 1/2. A surround sound source can be used as a secondary source and connected to processor inputs 1 to 6.
- Auto Downmix is selected on processor 7/8, (and/or 9/10)
- The hold-off time and crossfade speeds are chosen. The hold-off time should be set longer than the pauses expected in normal programming. The threshold for detecting audio on the 7/8 and 9/10 inputs is approximately -64 dBFS.
- The Downmix Gain control should be adjusted to match the replacement audio levels to the 7/8 (and 9/10) program source output levels.
- If the 7/8 (or 9/10) program should fail the audio on the 1/2 input will replace the 7/8 audio (or 9/10 audio) output.
- If the missing program should return it will automatically replace the 1/2 program audio (downmix).

In the example below the main program is stereo and routed to 9/10 Input.



The audio sources for the programs can be embedded in an SDI video source or AES digital audio or any combination of those. The program outputs are available simultaneously as AES digital audio outputs and as audio embedded in the SDI output of the AERO.

Please note that the AERO.100 has 4 AES digital audio pairs in and out and the AERO.2000 is capable of 8 AES digital audio pairs in and out. All units can de-embed and re-embed 8 audio pairs.