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Application Note

No. F-112

EAS Audio Routing with Program Level Ducking Using Fusion3G® Audio Routing and GPI Controls

The example here shows how to use Fusion3G® Routing controls, Audio DSP controls, and GPI controls to:

- Route embedded main program 5.1-channel audio through the card (Emb Ch 1 thru Ch 6), but conditionally provide upmixing if the 5.1-channel complement is stereo audio only. Also, apply loudness processing before re-embedding it into the SDI output.
- Route embedded SAP and DVS channels to the card SDI output.
- Provide setup to replace the main program audio, SAP audio, and DVS audio with ducked program audio levels mixed with audio from an EAS receiver on AES pair 1. Go to this setup using a preset invoked by an EAS receiver ground closure trigger which is in turn fed to a GPI input on the Fusion3G card.

Figure 1 shows a diagram of the basic routing of these signals to the card audio inputs, Audio DSP upmix and loudness processing, and card output.

Figure 2 correspondingly shows the card settings to accomplish the basic routing.

Figure 3 shows a mixing setup using the Fusion3G Input Flex Mix feature that provides ducked program levels mixed with the EAS audio. (Flex Mix provides customizable mixing of embedded or discrete audio channels.)

Figure 4 shows how a GPI from the EAS receiver can invoke the ducked program/EAS mix, and revert to normal routing at cessation of EAS.

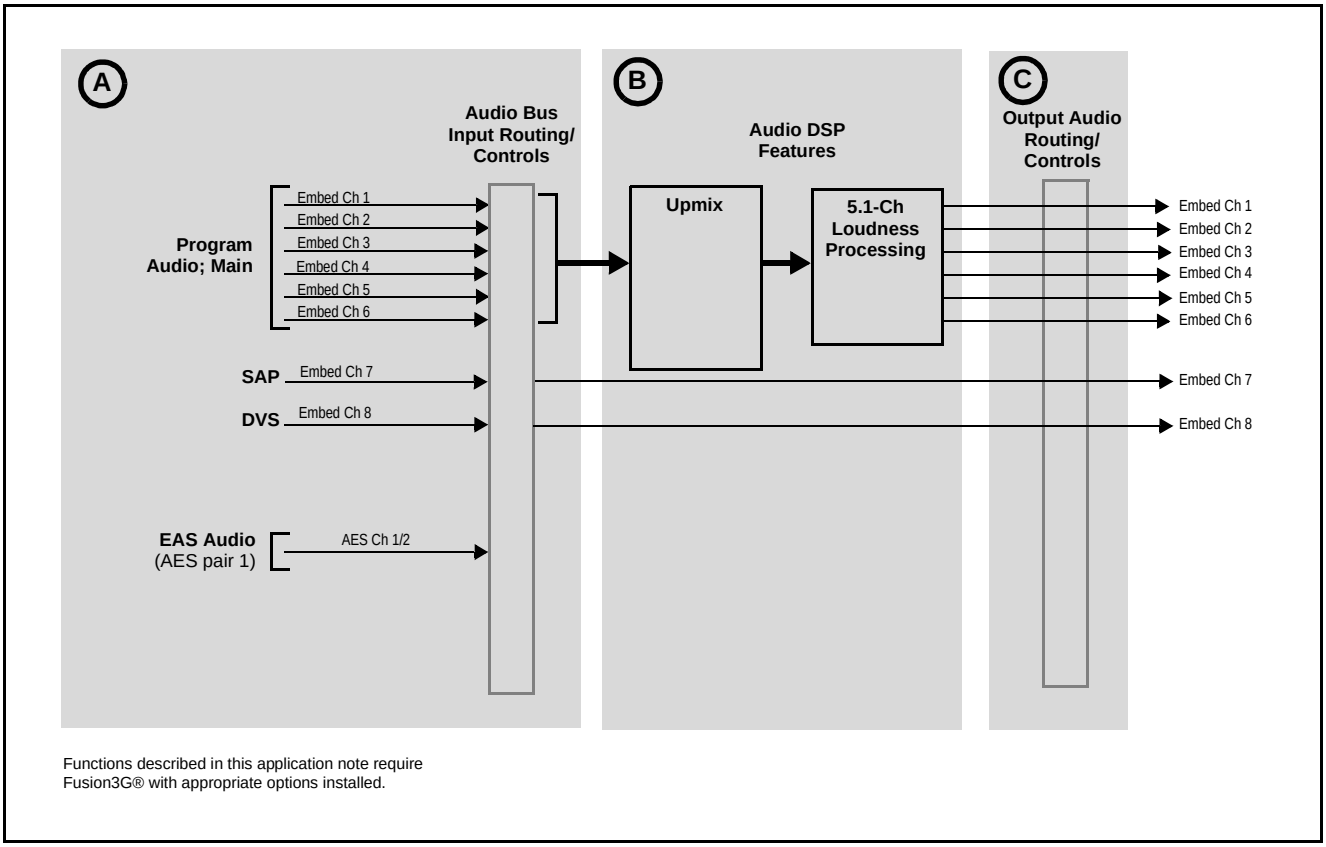
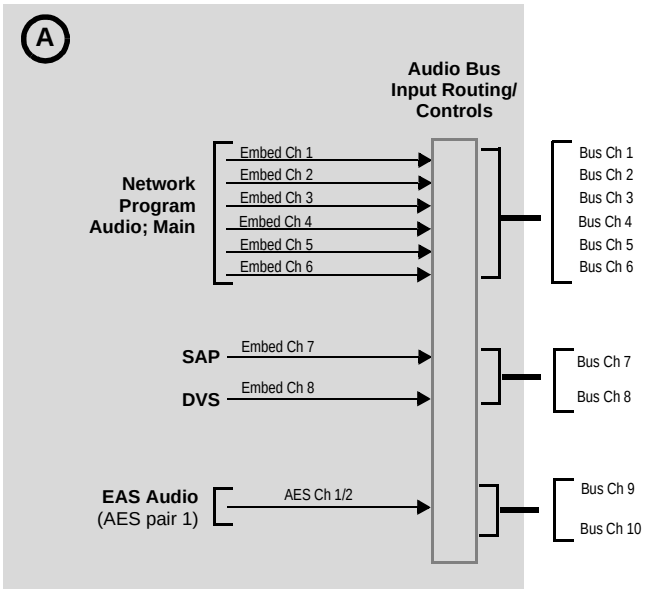
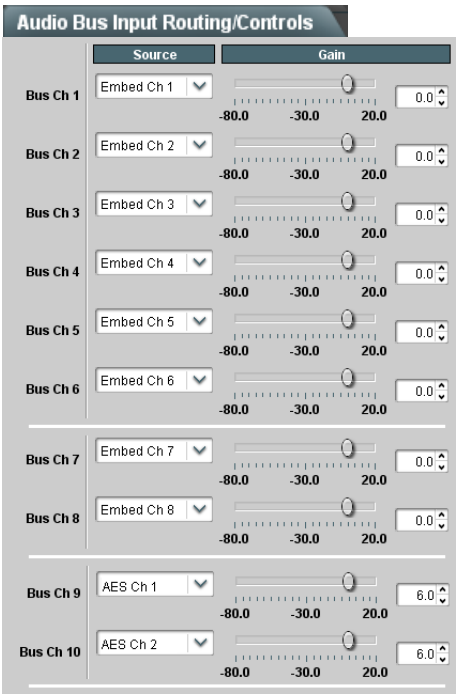


Figure 1 Example Program and EAS Input Routing to Card

The routing required to get all channels shown in **A** into the card processing is done using the **Audio Bus Input Routing/Controls** tab (as shown to the right for this example). All signals coming into the card must first be placed on the card bus to be accessed by card DSP functions, or to be outputed.





Because AES pair 1 (EAS Audio) is to be used as an **input** for the routing in this example, **AES Ch 1** and **AES Ch 2** must be set as **AES Input** on the **Output Audio Routing/Controls > AES Audio Out** tabs as shown.

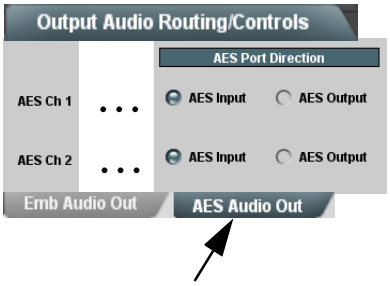
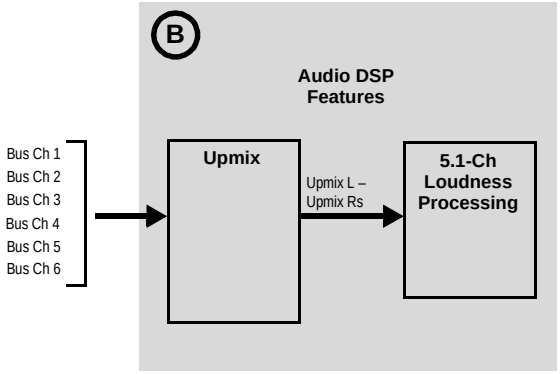
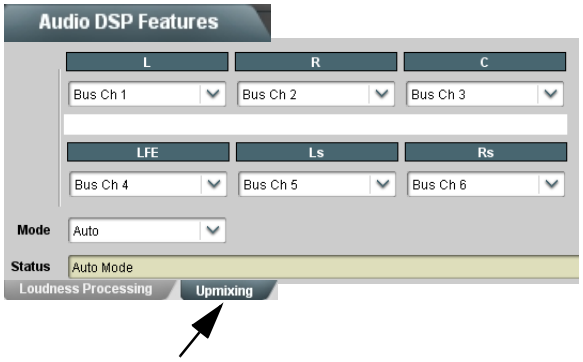


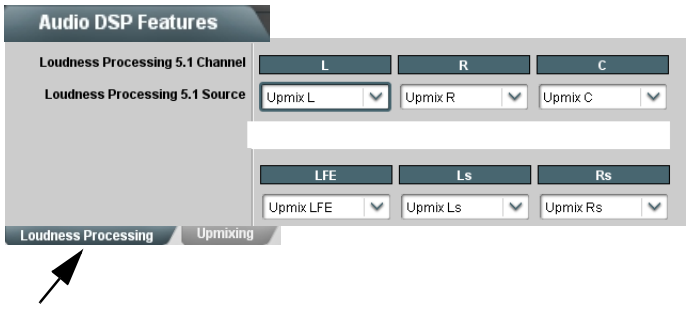
Figure 2 Program and EAS Input Routing Using Card DashBoard Controls



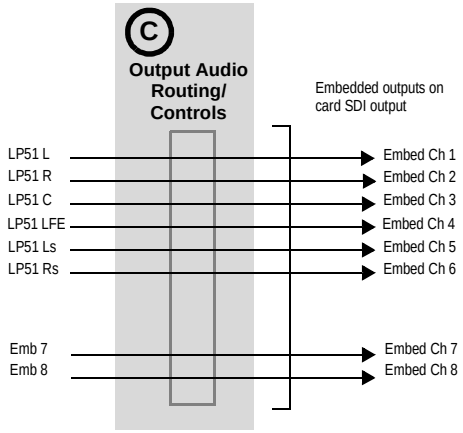


Main program audio (Emb Ch 1 - Ch 6, now on Bus Ch 1 - Bus Ch 6) is fed to **Audio DSP Features > Upmixing**, with the six bus channels routed to upmixing inputs **L** thru **Rs**, respectively. With upmix Mode set to **Auto**, these channels will pass unaffected if they contain 5.1 audio, or automatically be upmixed to 5.1 audio if they don't.

The auto/bypass upmixed main program audio (now as channels **Upmix L** thru **Upmix Rs**) is then fed to the 5.1-channel inputs of the **Audio DSP Features > Loudness Processing** inputs.



The main program 5.1 audio (now conditionally upmixed and then loudness processed and now on channels **LP51 L** thru **LP51 Rs**), and SAP/DVS audio are then routed from the card processing to output embedded audio Ch 1 thru Ch 8 using the **Output Audio Routing Controls > Emb Aud Out** tab.



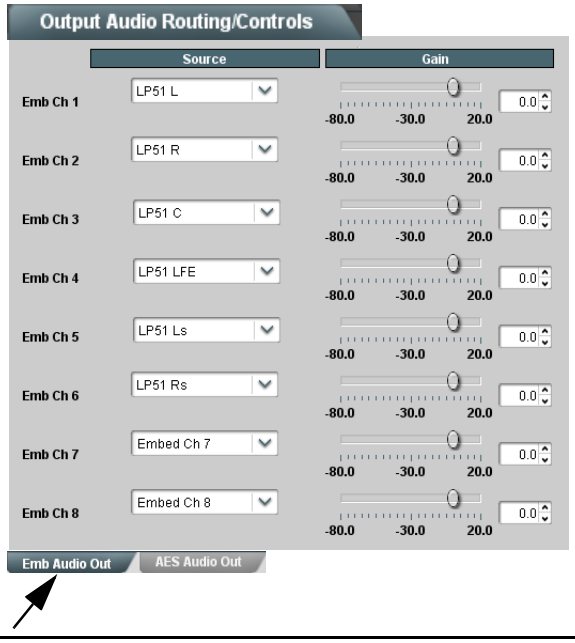


Figure 2 Program and EAS Processing Routing Using Card DashBoard Controls (cont.)

The card **Input Flex Mix** controls provides customizable mixing where any of 16 inputs can be mixed as desired onto 1 to 16 buses. In the application here, these mix controls can be set up to provide mixing between individual program audio channels and EAS audio.

To have a ducked mix ready for when EAS is activated, the Input Flex Mix controls can be used to provide mixing of the L/R/C program audio, SAP, and DVS channels with that from EAS audio on AES Ch1/2 such that normal audio is ducked 15 dB under the EAS audio as shown below. Note that all program, SAP, and DVS channels are attenuated 15 dB. Where the EAS pair is mixed with mono channels (such as program C, SAP, and DVS) the two EAS channels are each attenuated 3 dB to account for mono summing of the pair. Surround and LFE (which are **not** to carry the EAS audio) are simply attenuated 15 dB and not mixed with EAS audio.

These mixed outputs “lay in wait” and can **replace** the normal input routing when invoked by an EAS trigger (as shown later).

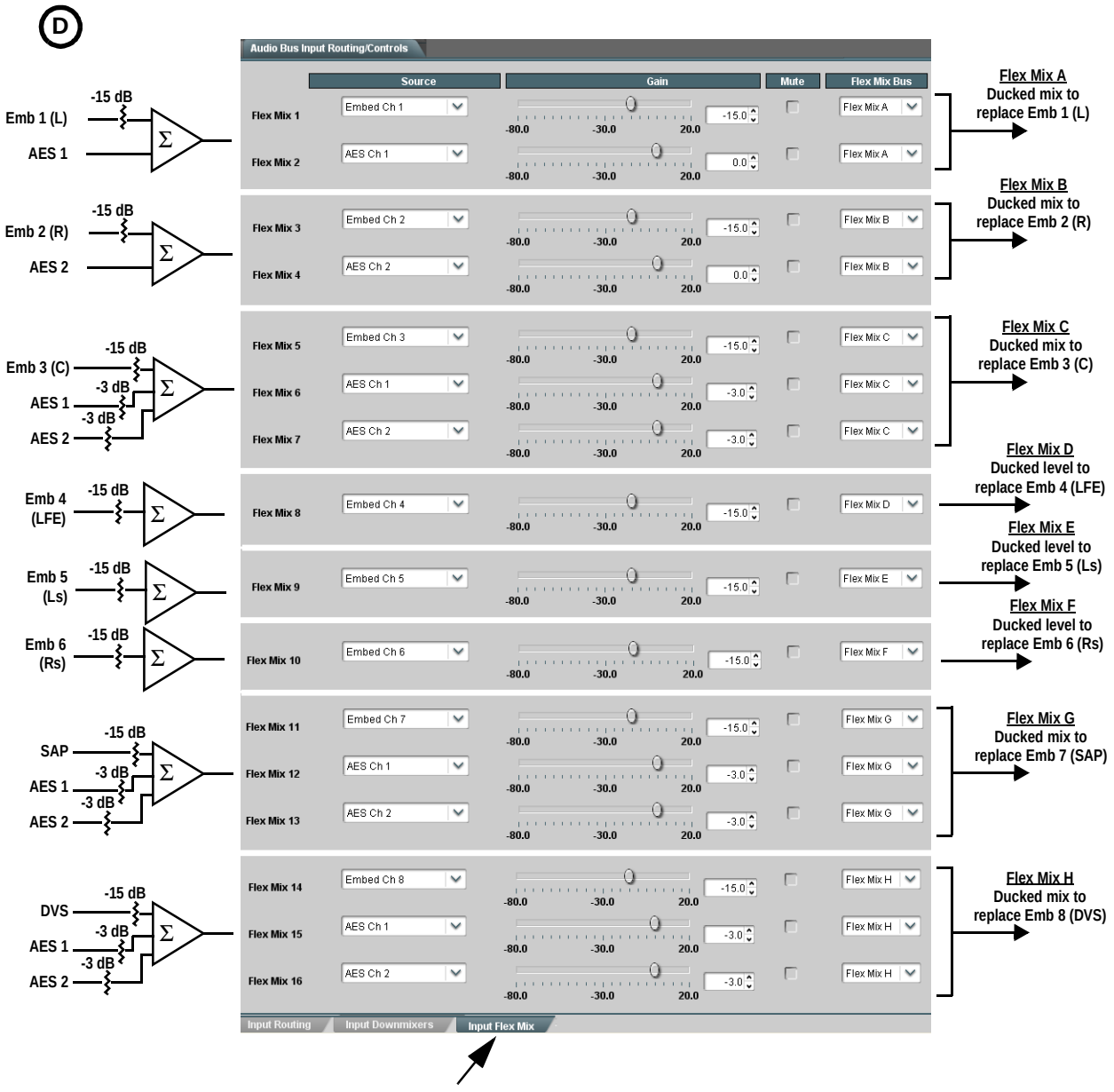
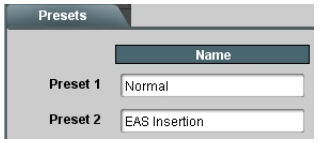


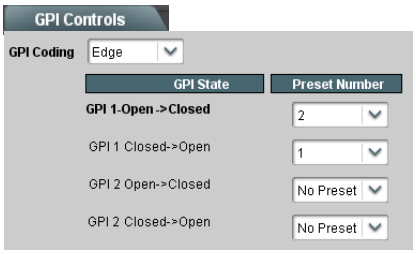
Figure 3 Ducking Setup Using Card Flex Mix Controls

Using the **Presets** and **GPI Controls** tabs, normal setup (shown in **A** thru **C** on the previous sheets), and ducked mix/EAS insertion (shown in **D** on the previous sheet) can be invoked using GPI 1 card input as described here. (GPI 2 controls are set to "No Preset" in this example since this GPI 2 is not needed here.)

- Normal setup routing (**A** thru **C**) can be saved into Preset 1 ("norm"). This preset can be invoked to recall normal embedded routing following any GPI-invoked routing. The ducked mix setup (shown in **D**) can also be saved in this preset.
- EAS Insertion routing changes (**E**) can be saved into Preset 2 ("EAS insertion").

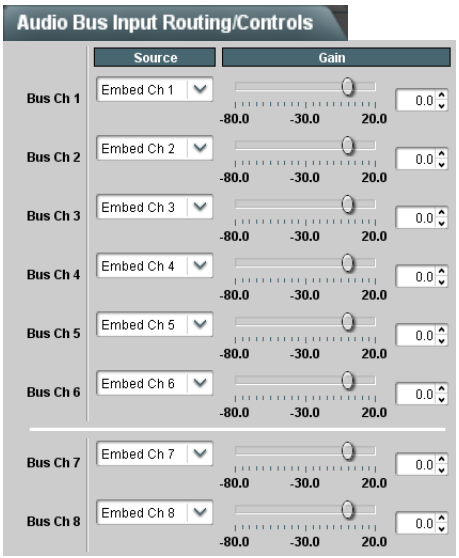


The **GPI Controls** tab can then be set to invoke Preset 2 ("EAS insertion") upon a GPI 1 closure, and revert to normal routing when GPI 2 opens again by invoking Preset 1 ("norm") as shown to the right.

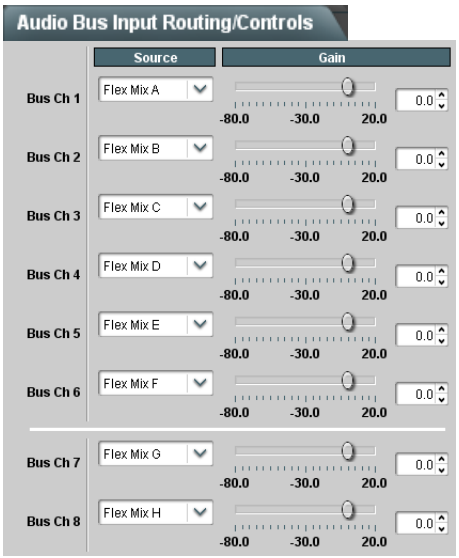


When GPI 1 closes (as set by the **GPI Controls** settings shown above), Preset 2 ("EAS insertion") is invoked resulting in the routing changes (saved as Preset 1 and Preset 2 shown below). The Preset 2 routing changes replace the normal embedded channel routing with the ducked-mix/EAS insertion pair provided by the Input Flex Mix feature.

Preset 1 ("Normal")



Preset 2 ("EAS Insertion")



E

Figure 4 Duck Mix/EAS Insertion Using Card Presets and GPI