

---

---

## Smart SDI/AES Audio Automatic Change Over

### **7760AVM/X-9504 Configured as an ACO**

#### **BRIEF**

The 7760AVM Vistalink™ processing can be used to control a routing switcher (X-9504) to provide "Automatic Change Over" (ACO) switching of video/audio signals. The Vistalink™ monitoring can be customized by the user to detect and filter a number of problems with video and/or audio. The detection and filtering can be very sensitive or very conservative to problems, thus configuring the "change over" to the users application requirements.

#### **BACKGROUND**

An ACO is a valuable tool to any application where fault monitoring with automatic switching to a second signal is required.

Typically, this type of function is used when there are two separate feeds with the same (or similar) content, one used as a back up of the other. If one feed, the "program" signal, has a problem, a switch to the backup or "protect" signal is performed without human intervention.

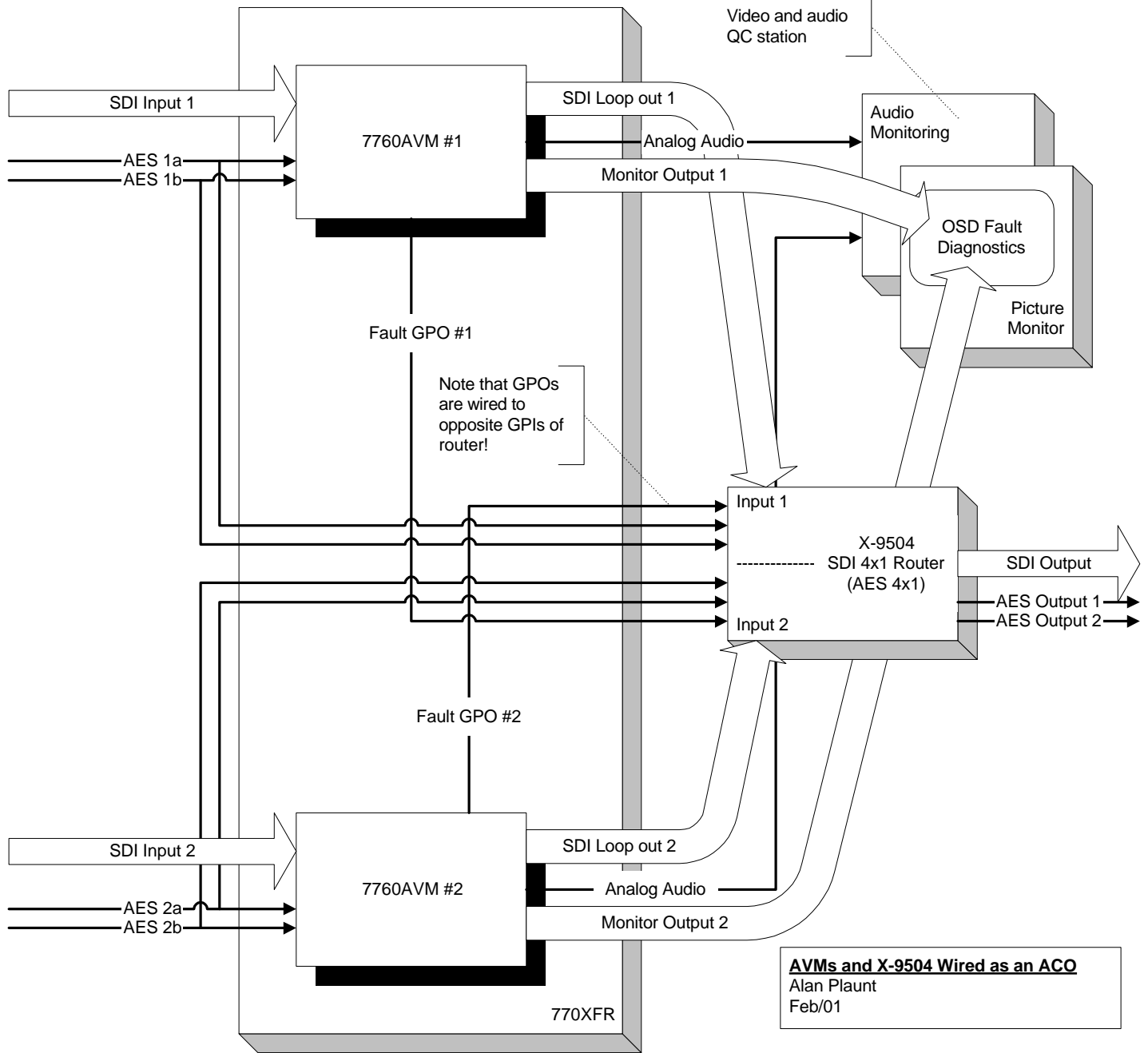
Another use of an ACO is to provide an automatic switch to a trouble slide in the event that there is a problem with the program feed.

However, there are problems with the concept of automatically switching valuable on-air programming! What stimulus should cause the switch? Traditionally, "loss of sync" was enough to indicate video problems, but now in the digital, MPEG, and file server world "loss of carrier" is insufficient. The audio and data services are also important parts of the media stream. The Vistalink™ processing features of some of the Evertz products, like the 7760AVM, provides analysis of the active video content to determine problems like frozen or black video. It will also monitor the VBI for missing pieces like V-Chip rating, Closed Captioning, VITC, etc. Please refer to the 7760AVM manual for a complete description of Vistalink™ processing.

How sensitive should the detection of an error be, and how long should the problem exist before switching and how long should it be OK before removing the fault stimulus? Vistalink™ allows the user to configure these parameters.

#### **DESCRIPTION**

Figure 1 illustrates how a pair of 7760AVMs and a X-9504 router can be configured to create a flexible/programmable ACO. If so desired, it will also facilitate quality control functions if the AVM monitoring outputs are used.



**Figure 1: ACO Block Diagram**

The two video and, optionally, audio signals are feed into a pair of 7760AVMs where the content is analyzed for content problems. The video loop outputs (or separate copies of these signals) are fed into two channels of the X-9504 4x1 router. When a problem is detected by one of the AVMs, the fault GPO goes active, indicating to the router to select the opposite input (note how the GPOs are connected to the opposite router control GPI). If the audio is embedded or not present, ignore the AES signals.

When the signal fault recovers, one of two possible user definable actions can take place:

1. The router switches back to input #1, the "primary" or "master" source, or
2. The router stays on the last "known good" signal. This is used when the both signals are equally usable.

## DETAILS

The following lists contains the steps of how to configure the AVMs and the X-9504 router.

AVMs (refer to the manual for the specifics):

- Program fault(s) to properly detect error conditions appropriate for the video/audio/data going to the monitoring AVMs.
- THOROUGHLY test the behavior of all of the possible conditions that can create a fault.
- Assign the fault(s) to the GPO.
- Make the GPO output low when active.
- Wire the GPO from AVM #1 to GPI2 of the X-9504 and the GPO from AVM #2 to GPI1 of the X-9504.

X-9504 (refer to the manual for the specifics):

- Make sure the firmware is version 1.32 or greater.
- Apply reference video (if needed) and configure the switch line accordingly
- Select which mode of signal recovery is desired. Set "GPI Mode" to "Default Input 1" if you want to switch back to the program channel when it recovers or to "Hold Selection" when you want to stay on the last known good channel.
- Make sure that audio break away mode is not enabled if you are switching audio based on fault conditions.
- Connect the internal +5V supply (GP+5V) to the external supply pin (Vext). This is needed to power the GPI circuitry.
- Lock the front panel from in-advertent button pressing if desired.

Here is how to connect the two AVM Aux I/O connectors with X-9504 COM2/GPI connector (all connectors for the interconnections are male high density DB-15s):

Connector Name	Signal Name	Desc.	Pin#	to	Connector Name	Signal Name	Desc.	Pin#
AVM #1 Aux I/O	GPO1	General purpose output	3	→	X-9504 Com2/GPI	GPI2	GPI to select input 2	14
AVM #1 Aux I/O	shell	chassis ground	shell	→	X-9504 Com2/GPI	GND	chassis ground	1
AVM #2 Aux I/O	GPO1	General purpose output	3	→	X-9504 Com2/GPI	GPI1	GPI to select input 1	8
AVM #2 Aux I/O	shell	chassis ground	shell	→	X-9504 Com2/GPI	GND	chassis ground	1
X-9504	GP+5V	+5V from	10	→	X-9504	Vext	external	15

Com2/GPI		frame			Com2/GPI		supply for GPI/Os	
----------	--	-------	--	--	----------	--	-------------------	--

The AVM can monitor any of the following list of problems (refer to the AVM manual for the specifics of how to configure and calibrate these detectors):

<i>Loss of video</i>	Video absent
<i>Loss of audio</i>	Audio carrier absent (ANC data or AES input)
<i>AP EDH errors</i>	Active picture EDH errors present
<i>FF EDH errors</i>	Full Frame EDH errors present
<i>Audio format error</i>	Audio Format Errors
<i>Phase reversal 1/2</i>	Audio 1 and 2 out of phase
<i>Phase reversal 3/4</i>	Audio 3 and 4 out of phase
<i>Audio over 1/2</i>	Audio 1 or 2 over level
<i>Audio over 3/4</i>	Audio 3 or 4 over level
<i>Audio silence 1/2</i>	Audio 1 and 2 silent
<i>Audio silence 3/4</i>	Audio 3 and 4 silent
<i>Audio mono 1/2</i>	Audio 1 and 2 mono
<i>Audio mono 3/4</i>	Audio 3 and 4 mono
<i>Loss of VITC</i>	VITC absent
<i>Loss of SID</i>	SID absent
<i>Loss of program rating</i>	Program rating absent
<i>Loss of CC</i>	Primary CC1 Closed captioning absent
<i>GPI1</i>	General Purpose Input 1 closed to ground
<i>GPI2</i>	General Purpose Input 2 closed to ground
<i>Picture Freeze</i>	No activity above preset noise level in active picture
<i>Picture Black</i>	No active picture above 7 IRE

**REVISION HISTORY**

<b><u>REVISION</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>DATE</u></b>
1.0	Original Version	Feb 01