



## ***TECH NOTE***

### ***Super Edit™ Version 8.1D and later***

# **ESAM-4 AUDIO MIXER PROTOCOL**

This document covers Super Edit features and parameters pertaining to the D/ESAM IV protocol developed by Graham-Patten Systems and available for the GPS D/ESAM 230, 400, 820 and the 8000 Audio Mixers. The protocol is described in detail in GPS document “D/ESAM IV Audio Mixer Protocol” (Version 1.0, November 1995). This protocol is automatically selected in the mixer if Super Edit is configured with the ESAM-4 protocol driver.

---

Implemented advantages of the ESAM-4 protocol over the ESAM-2 protocol include:

- Virtual to Logical machine mapping
  - EMEM-type register transfer (AMEM)
  - Storage & Recall between the Mixer and Super Edit. Register data can be stored in the EDL. By invoking the Super Edit “Store EMEMs to Disk” feature, it can be stored to the Super Edit drive and therefore consume only one EDL line of RAM memory.
  - D/ESAM Configuration Saving/Recalling
- 

## **Virtual to Logical machine mapping (Assignability)**

Assignability is described in detail in the ESAM IV protocol description. The Mixer consists of Physical inputs that are assigned to Virtual Machines. Virtual Machines are in turn assigned to Logical Machines. Inputs are numbered, and are either Analog or Digital. Virtual Machines are numbered 1 through 255 with 0 being reserved for Silent. Logical Machines are the ones you see on the front panel of the mixer and are labeled “R”, “A”, “B”... “AUX”

### **The way it was...**

Super Edit has an audio crosspoint setup menu (the Assignment page). Entries in this menu have, in the past, been Logical Machines. As part of the manual Mixer setup, Virtual Machines were mapped to Logical Machines and the Logical Machine was assigned for each Super Edit source. Usually Super Edit’s “VTR-A” source would be assigned to Logical Machine “A” using the audio crosspoint menu (a “1” would be entered in the field). Super Edit “VTR-B” would be assigned to Mixer Logical machine “B” and so on, but not always! In addition, SWAP complicated this since a swap of the “R-VTR” and the “A-VTR” would result in the “A” source using the “R” Logical machine with the fader assigned to it.

...The way it is.

Super Edit's new implementation of the ESAM-4 driver uses unique ESAM IV protocol features to solve these issues. The audio crosspoint menu entries are now Virtual Machines. Thus, Super Edit source key "A-VTR" will always select Mixer Logical Machine "A", and with the desired Virtual Machine identified in the audio crosspoint field. Swap now also reacts correctly, as does Pre-read. Pre-read no longer needs the special Super Edit INIT to name the Pre-read crosspoint. During Pre-read, the correct Virtual machine is identified in the audio crosspoint field and is mapped to the R-VTR automatically.

## Interface

### Switcher-To-Editor Connections

The Editor controls the D/ESAM Mixer through a serial RS422 cable with a 9-pin D connector from the AUDIO CTL Port on the rear of the Editor. The Mixer should be set to the editor's default settings of 38.4 KBaud, 8 bits, 1 stop bit and ODD parity.

The Mixer's "Edit I/F" button on the front panel should be illuminated.

## Editor Setup for D/ESAM Mixer Control

### Crosspoint Mapping Enable/Disable

Super Edit INIT# 45, "A-MIX XPT MAP", defaults to ON and should be ON to enable Super Edit mapping of the Virtual to Logical Machines. It can be turned OFF if you do not want Super Edit to perform this mapping.

**NOTE: If you are upgrading from ESAM-2 to ESAM-4, and using your existing Configuration files, INIT# 45 will default to OFF. Please toggle it to ON and re-save your Config. file.**

If enabled, the Virtual to Logical map is sent to the Mixer after an Assign, after a SWAP, and after each press of [SHIFT][RESET].

### Other Editor Setups

**INIT# 108:** for ESAM-4 is "MIX EMEM BANK". A setting of "0" (the default) will enable EMEM-style learn, transfer and recall to all "effects" banks (as described later).

**NOTE: If you are upgrading from ESAM-2 to ESAM-4, the default setting of INIT # 108, formerly used for assign the Pre-read crosspoint, may be 10 or -1. Either of these values is treated as 0, but you should set the value you want and resave your Config. file.**

**INIT# 109:** “MIX MON PGM”. This can be set to ON or OFF. When OFF, whenever a Source is selected, only that Source is monitored through the monitor bus. When ON, whenever a source is selected, the Mixer Program Output is monitored, allowing you to hear any other currently open Sources.

**INIT# 91:** “STORE MEMS TO DISK” can be set to ON or OFF. When OFF, AMEM data is stored in the list as EDL lines, using EDL RAM. When turned ON, pointers to the data are stored in the list as EDL lines, and the AMEM data is stored in separate files on the drive selected in INIT# 30. It is not recommended that you use this feature unless your system has a hard disk drive, as a floppy disk will fill up in a short amount of time.

### **Switcher Enable/Disable**

Crosspoint control from the editor over the D/ESAM Mixer can be enabled or disabled by pressing [ALT][AUDIO] at the editor. While crosspoint control is disabled, PEGS and preview commands are still enabled. When crosspoint control is disabled, AMIX-OFF is displayed on the status line of the Super Edit screen.

## **Crosspoint Assignment**

The ESAM-4 Mixer crosspoint assignments are Virtual machines. Crosspoints numbered 1 through 126 can be used by Super Edit for Virtual machines. The value of 0 is used for silence. The value of 127 selects TONE and can be used only for the AUX source.

The Virtual machines can be displayed on the Mixer panel or maintenance terminal. Typically they will have names such as “VTR1”, “VTR2”... “DTR1”, “DTR2”... The crosspoint numbers associated with the Virtual machines is set by the Mixer setup. We have found that typically VTR1 is Virtual machine 1, VTR2 is Virtual machine 2... DTR1 is Virtual machine 9... but again this is entirely dependent on the Mixer’s setup.

### **Pre-read Crosspoint and Fader Assignment.**

When Pre-read is NOT active, selection of the R-VTR causes selection of SILENT (Virtual machine 0) in the mixer. When Pre-read IS active (The status line indicates “PRE-READ”), selection of the R-VTR selects the Virtual machine identified in the audio crosspoint field.

It is necessary to have a fader assigned to Logical Machine (R-VTR) when Pre-read is in use. Typically several Mixer configurations are created and saved in the mixer to assign the available faders to the required Logical Machine.

## Audio Preview under Editor Control

D/ESAM Audio Mixers are capable of providing Audio previews. A Super Edit program built with E-E Preview will have INIT# 44 enabled. INIT# 44 should be toggled to “MIXER AUD PVW” to enable audio previews through the mixer. Toggle INIT# 44 to “R-VTR AUD PVW” to have the E-E R-VTR switch preview audio.

A Super Edit program built for any video preview switcher will always switch the D/ESAM mixer for audio previewing.

## Learn/Transfer/Recall under Editor Control

The D/ESAM Mixers have a flexible register learn, transfer and recall facility. The Super Edit implementation of ESAM-4 protocol makes use of this facility.

Registers can affect the entire Mixer (except Logical / Virtual mapping and fader assignment) or certain subsets of the mixer. As mentioned under the description of INIT# 108, Super Edit controls which subsets (called “banks”) will be affected by the current setting of INIT# 108. These settings are:

- 0:** Enables EMEM-style (AMEM) learn, transfer and recall to **all “effects” banks** (default).
- 1:** Enables learn/transfer/recall for **only input selection, fader setting and transitions**.
- 2:** Enables learn/transfer/recall for **only the Audio Equalizer**.
- 3:** Enables learn/transfer/recall for **Audio Delay**.
- 4:** Enables learn/transfer/recall for **the Processing Loop**.
- 5:** Enables learn/transfer/recall for **Dynamic Processing**.

Learn/transfer/recall of Audio “AMEMs” is also modified by Super Edit INIT# 91 as mentioned earlier. Dependent upon the model of D/ESAM Mixer, from 40 to 800 registers are available. These may be identified as registers 1 through 4095. The mixer dynamically assigns its available registers until exhausted to the user-supplied register numbers.

Super Edit PEGS dialog supports the number range from 1 through 4095. INIT# 22 (STORE EMEM) and INIT# 23 (AUTO-EMEM ON/OFF) work in the same way as for video switchers. The Learn audio AMEM ([SHIFT] [SPLIT]) dialog only accepts number range of 1 through 255, so for register numbers greater than 255 the register must be learned from the mixer panel.

## PEGS Transitions under Editor Control

Audio PEGS 50xx will trigger an ESAM Mixer transition. The “xx” field is a bit-map for up to four audio channels. The value of 01 would be channel 1 only, 02 is channel 2 only, 03 would be channels 1 and 2, and 4 would be channel 4 only. So, to trigger a transition of channels 1,2 and 4, the audio PEGS command would be 5011 (See table below).

## AUTO-TRANS PEGS COMMANDS

AUDIO CH.	BIT PATTERN				PEGS COMMAND
	1	2	4	8	
ATrans CH1	X				5001
ATrans CH2		X			5002
ATrans CH12	X	X			5003
ATrans CH3			X		5004
ATrans CH13	X		X		5005
ATrans CH23		X	X		5006
ATrans CH123	X	X	X		5007
ATrans CH4				X	5008
ATrans CH14	X			X	5009
ATrans CH24		X		X	5010
ATrans CH124	X	X		X	5011
ATrans CH34			X	X	5012
ATrans CH134	X		X	X	5013
ATrans CH234		X	X	X	5014
ATrans CH1234	X	X	X	X	5015

### **Saving/Restoring Mixer Configurations under Editor Control**

D/ESAM mixers have five or more “configuration” registers that save the ENTIRE mixer state. This is good in that these configurations save the fader-to-Logical machine assignments but are difficult to use since they save everything else as well.

The problem created in their use is that the reason for a configuration recall might be for a major mixer reconfiguration, such as de-assigning a group of four faders from Logical machine “F-VTR” to Logical machine “R-VTR” in order to facilitate a Pre-read edit.

Since the configuration registers contain the entire mixer configuration, RECALLing them at the wrong time would cause confusion in the mixer state. For example, if a configuration register were to have a recall time of 0, then its recall would overwrite all the previously set-up sources, transition rates and preview settings applied during pre-roll for this particular edit or preview.

It is therefore necessary to suppress the sending of the RECALL command by the PEGS dialog for the configuration registers.

The only “safe” time to recall a configuration register is at the time an edit is recalled to the Mark Table (either manually with the Recall key or automatically during an Auto-Assemble). Therefore, the rules for using configuration registers for ESAM-4 under editor control are:

1. The configuration register must be saved (INIT# 22, “STORE EMEM”, or INIT# 23, “AUTO EMEM ON”) as part of the edit.
2. The configuration register will only be recalled (applied to the state of the Mixer) at the time the edit is recalled.
3. The Mixer Configuration registers have numbers starting at 9000. It is not recommended that 9000 be used, since this maps to configuration register 0, which is the Mixer’s default configuration.