

ASIO ENHANCEMENTS TO E-MU APS

February 10, 1999

Introduction

The E-mu Audio Production Studio (APS) software version 1.5 update now includes support for the Audio Streaming Input and Output (ASIO) interface from Steinberg. ASIO supports low latency audio streaming from audio hardware to host memory and from host memory to audio hardware.

The APS, with V1.5 ASIO drivers and with an ASIO compliant audio sequencer (such as Steinberg Cubase VST), now allows users to do true sample-synchronous multi-track hard disk recording and playback. With E-Control 1.5, users may, in addition, route individual audio tracks to particular APS hardware accelerated effects and/or to particular APS physical outputs.

This document describes how to best use the ASIO accelerated APS 1.5 drivers and ASIO enabled E-Control software with Cubase VST.

Installation Recommendation

In order to get up and running with Cubase VST as quickly as possible, we recommend you follow the initialization procedure below.

1. Download and install E-mu APS 1.5 Drivers and E-Control. Also download the "Cubase Helper Files" package and expand the files onto your hard drive.
2. Reboot
3. Launch Cubase.
4. From the menu bar, select Audio/System
5. In the upper right hand corner, select "E-mu APS ASIO" as the ASIO device.
6. You may now see a message saying that says the sample rate has been changed to 48000. This is expected.
7. Exit Cubase immediately.
8. Copy the example E-mu DefStereo.all file into the Cubase folder AS DEF.ALL. This file is in the "Cubase Helper Files" package mentioned above. For example:

```
C:\> copy defstereo.all c:\progra~1\steinberg\cubase~1\def.all  
Overwrite def.all? (y)
```

9. Run Cubase again. You should not see any error message indicating a change in sample rate.
10. From the menu bar, select Audio/Inputs. You will now see 4 stereo ASIO inputs from the APS and they are all on.
11. From the menu bar, select Audio/Monitor. You will now see that 4 pairs of stereo tracks are each feeding unique busses. You will also see that the tracks are panned hard left and right.

12. From the menu bar, select Audio/Master. You will now see that you have 6 pairs of stereo ASIO bus outputs to the APS, and they are all active. These outputs are feeding the EMU10K1 effects engine and may have individual APS effects applied to them.

Since the Cubase VST mixer architecture is quite sophisticated, and therefore complex, we have provided a series of *.all files which sets up the Cubase VST environment specifically for APS under various use scenarios. We recommend that you use one of these as the starting point for configuring your own particular setup.

Similarly, since the E-Control architecture is sophisticated, and therefore complex, we have provided a series of *.ems files which sets up E-Control specifically for use with Cubase VST running our ASIO drivers under various use scenarios. We recommend that you use one of these as the starting point for configuring your own particular setup.

These files are provided as a "Cubase Helper Files" package, either on your main E-mu APS CD-ROM or on the E-mu APS User Pages website.

Multi-track Playback

We divide the discussion on multi-track playback into two parts: what needs to happen from within Cubase VST and what needs to happen from within E-Control.

In Cubase VST:

When you launch Cubase VST with APS ASIO drivers you will notice in the VST Master Window (menu Audio\Master) additional output pairs termed "Buses". If we count the original master strip, they are respectively titled APS1+2, 3+4, 5+6, 7+8, 9+10 and 11+12. This means that the APS ASIO drivers supports six separate stereo outputs, hence it can be considered either a 12 (mono) track multi-tracker, or a 6 (stereo) track multi-tracker.

The user is able to address these outputs individually in the Cubase VST Mixer window (menu Audio\Monitor) by selecting which output bus each strip is being routed to (see bottom of each strip). With this routing in place, audio can now be selectively sent to particular APS ASIO buses at which point we need to talk about the enhancements that have been added to APS E-Control.

In E-Control:

By default all the Cubase VST ASIO buses get routed to the stereo Wave output strip in E-Control. In order for you to selectively route individual buses to separate strips, the APS MIDI user strips have been extended to not only allow MIDI channels to be routed to them, but now also ASIO buses. When you create a MIDI user strip, you will notice that it is now simply called a "User" strip since it has been extended to also support ASIO buses. So in order to route a Cubase VST bus to a particular user strip, follow these steps:

1. Create a new user strip (either use the icon in the mixer or through menu Edit\Add Strip).
2. Select the source region of the new strip (typically titled "User1").
3. From the popup menu select the "ASIO Bus Pair" option.
4. Select which Cubase VST bus you wish to route to this strip.

Now you can apply APS accelerated effects to these buses. As before, you can create up to five user strips, so it is now possible to route each Cubase VST stereo bus to its own users strip (if we count the "Wave" strip as a bus destination).

You also get the added benefit of being able to route groups of buses to one particular user strip, in the same way that several MIDI channels can be routed to a particular user strip. In fact, it is possible to mix and match, i.e. you can route any combination of MIDI channel(s) AND Cubase VST bus(es) to individual user strips for optimum flexibility.

Note on new Multi Output Card:

E-mu will soon be releasing a daughter card to the APS which provides for three additional stereo outputs. You will be able to address these from within Econtrol and if you want to be able to send each ASIO bus to its own physical output, you will be able to do this by addressing the outputs through the Econtrol auxillary bus mechanism.

Multi-track Recording

The APS ASIO drivers also support multi-track recording within the Cubase VST environment. Again, the discussion is divided into two parts: what needs to happen from within Cubase VST and what needs to happen within E-control.

In Cubase VST:

When you want to perform multi-track recording within Cubase VST you need to activate the inputs from which to record. You do this by bringing up the VST Inputs window (menu item Audio\Inputs...). This window should display a total of eight discrete mono APS inputs that are mapped to four stereo input L+R pairs. These inputs correspond to the APS physical inputs in the following way:

ASIO Device Name	Default VST Label	E-Control Name
APS In 1	In 1 L	Analog In 1 (on Ecard)
APS In 2	In 1 R	Analog In 2 (on Ecard)
APS In 3	In 2 L	Digital In 1L (default on Ecard, could be Edrive)
APS In 4	In 2 R	Digital In 1R (default on Ecard, could be Edrive)
APS In 5	In 3 L	Digital In 2L (default on Edrive, could be Ecard or CD-ROM)
APS In 6	In 3 R	Digital In 2R (default on Edrive, could be Ecard or CD-ROM)
APS In 7	In 4 L	Analog In 3 (on Edrive)
APS In 8	In 4 R	Analog In 4 (on Edrive)

Selecting the green button besides each pair activates it for recording. When all 4 green buttons are lit up, Cubase can record audio from all 8 physical inputs to discrete Cubase tracks in one take! So now, plug in your gear to the correct physical inputs on APS, hit record in Cubase VST and start recording!

In E-Control:

The above-defined recording behavior is the default that you can always expect to function. However it is not possible, with the above approach alone, to be able to record in audio that also passes through some real-time APS effects. You might, for example, want to add some compression or EQ to a recorded part as it comes in. Or you might want to record a mix of MIDI and audio to a final stereo audio track. In order to allow for this, E-Control has had some new extensions that allow you to route incoming audio through effects before they reach Cubase VST.

These extensions are supported through the E-Control Record Selector (located below the MME Rec level pot). By default, it says "Mix" and this signal typically gets sent to MME Wave In. E-Control now lets you route the mix to an ASIO input instead in the following way:

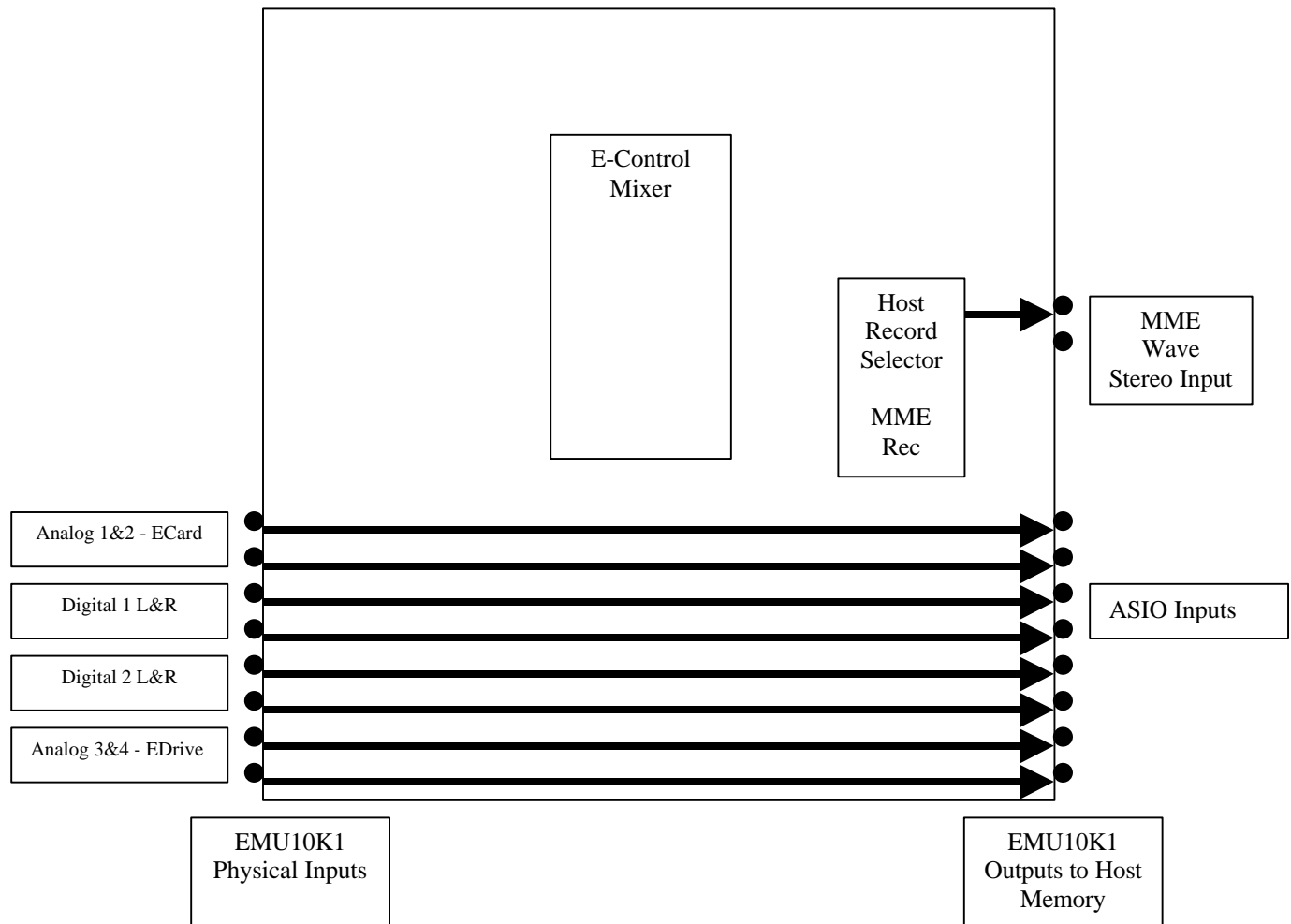
1. Select the source (i.e. "Mix") region that should bring up a popup menu.
2. A new menu option should appear called "Set Host Mode [Current: Windows MME]".
3. Select it and you should see two options " Windows MME" (default) and "ASIO".
4. Select "ASIO" and you should get four input pair options (1+2, 3+4, 5+6, 7+8).
5. Select Cubase VST ASIO input you want the Econtrol "Mix" to go to.

At this point you have designated that the E-Control mixer audio no longer goes to Windows MME Wave-In during record, but instead goes to a particular ASIO input pair. This allows you to lay effects onto 2 channels of incoming audio before it is recorded up to Cubase, while at the same time still allows you to record audio from the other 6 physical inputs, using the other 6 ASIO inputs. Pictures on the following pages show examples on how to do this.

As a warning, if you select a point in the effects engine as an ASIO input pair host record source, AND if you enable monitoring through Cubase VST, you may create a "virtual" feedback loop. Audio is coming from the effects engine to the ASIO input back to the ASIO output which in turn feeds the effects engine. It actually makes some really cool sounds, especially if you insert the pitch shifter and send to the flanger in the appropriate E-Control strip.

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MME Recording Mode

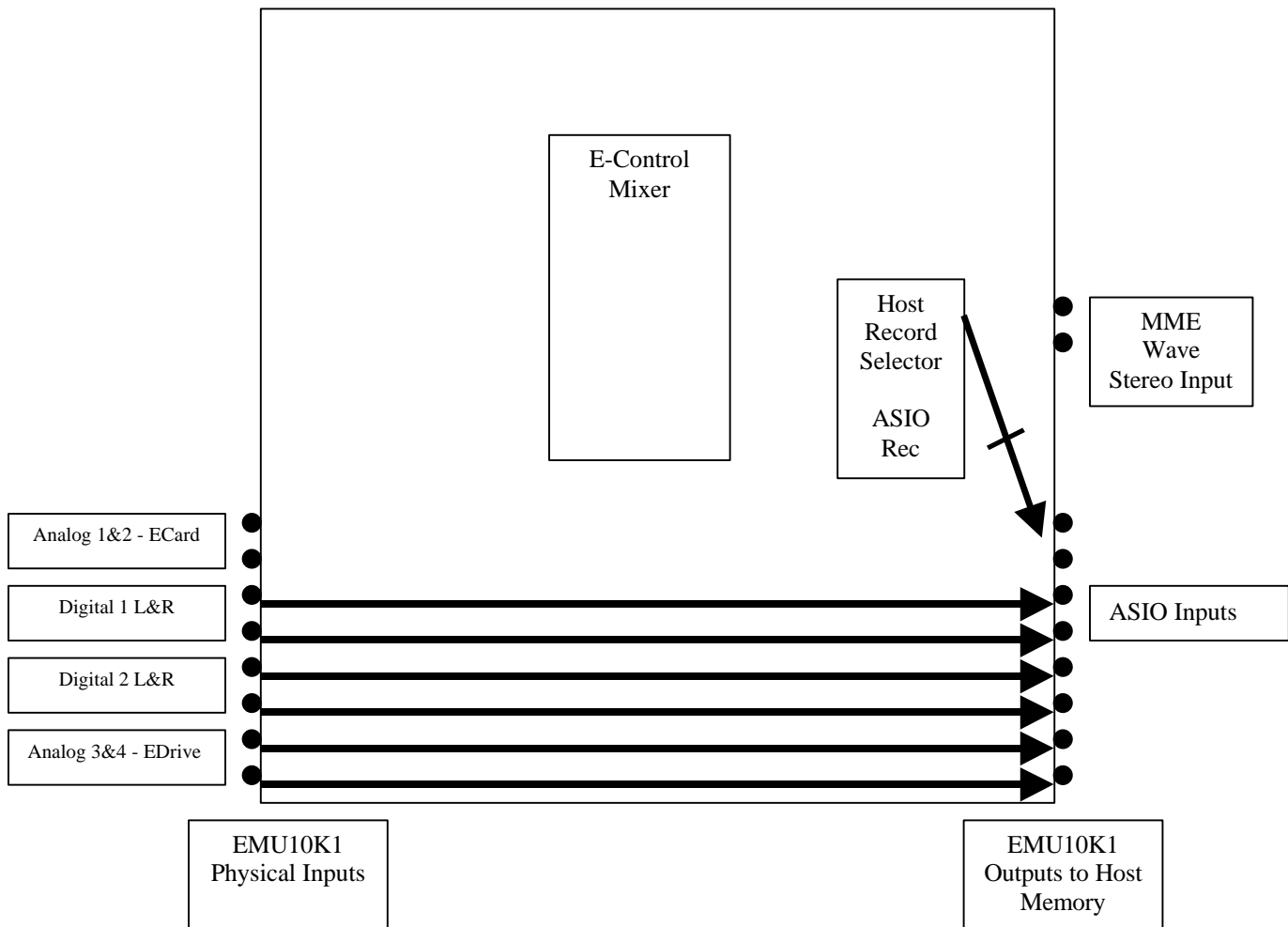


In the MME Recording mode of operation, the E-mu APS may record audio from Multimedia System Wave In and all 8 ASIO inputs simultaneously.

The audio going into the Wave In is determined by the 'Src' selection in the host record selector, which provides level adjustment.

The audio going into the ASIO inputs is hard-wired to the physical inputs, and level adjustments are not provided in hardware. Cubase VST provides level adjustments in software though.

ASIO Recording Mode



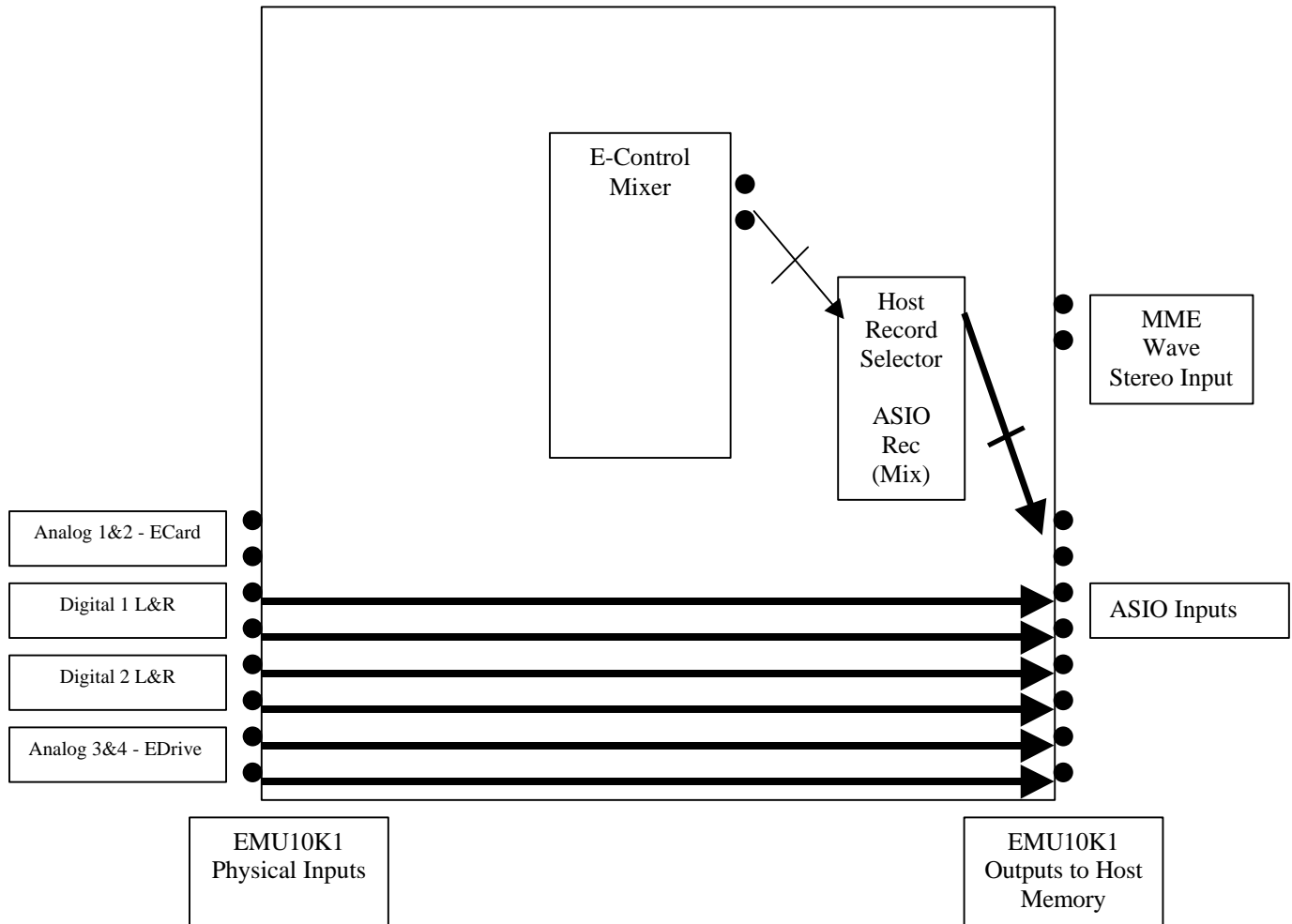
In the ASIO Recording mode of operation, the E-mu APS may only record the ASIO inputs. Although the Wave In device will still appear to be functional, it will not record any audio. However, any pair of ASIO inputs may be redirected to the plethora of points in the effects engine available with the host record selector.

The audio going into the selected ASIO input pair is determined by the 'Src' selection in the host record selector, which provides level adjustment.

The other 6 ASIO inputs are still hard-wired to the physical inputs, and level adjustments are not provided in hardware. Cubase VST provides level adjustments in software though.

ASIO Recording Mode

Example: Mixdown

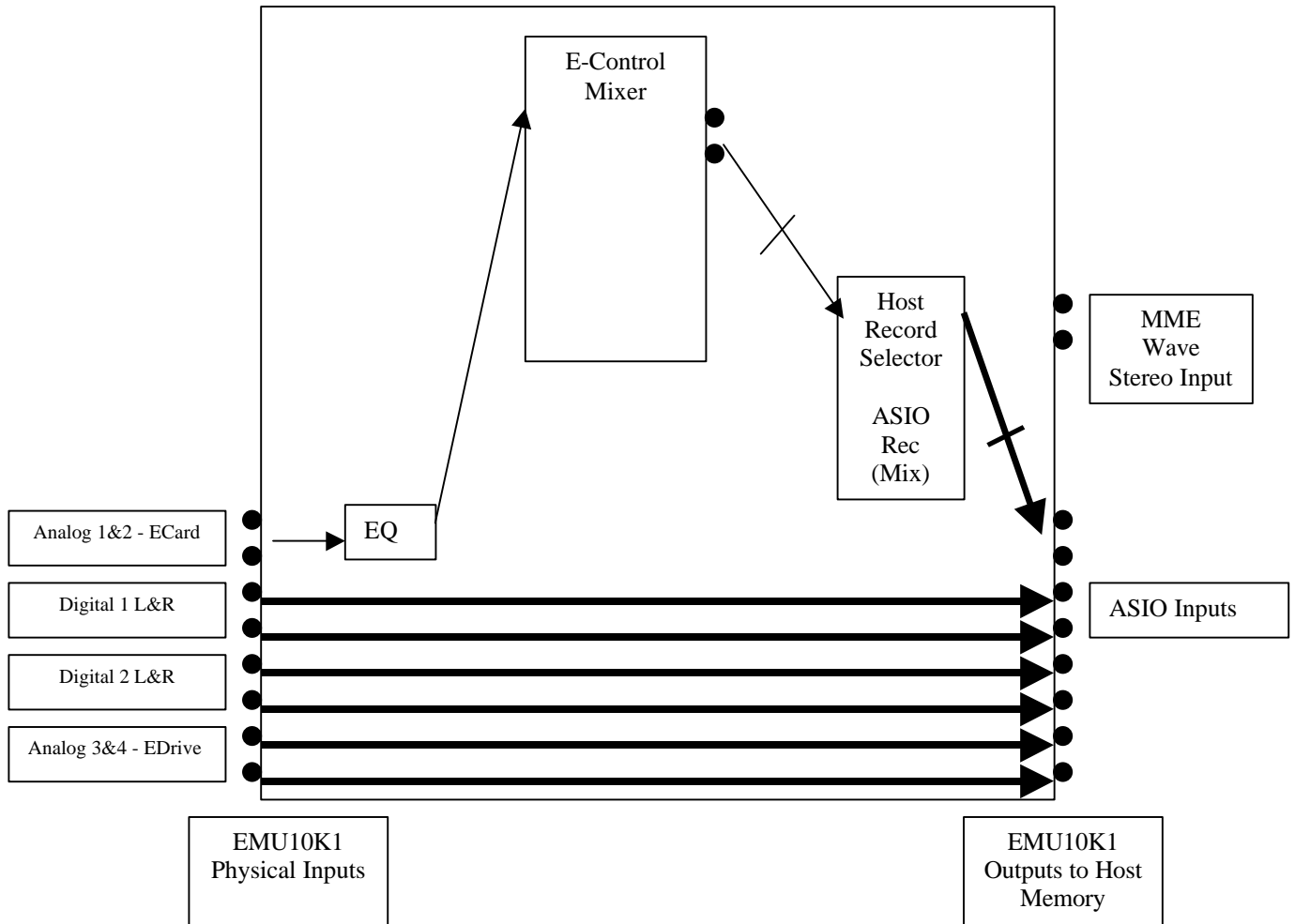


In this example, the user wants to record the final stereo mix of VST software processed audio COMBINED WITH E-mu APS processed audio and E-mu APS MIDI and onto an ASIO track.

ASIO inputs 1 and 2 are chosen to do the recording. The host record selector is programmed to ASIO Rec mode, using ASIO 1&2, with the 'Src' set to 'Mix.'

ASIO Recording Mode

Example: Input with APS Effects



In this example, the user wants to audio from the analog inputs on the E-Card with real-time APS effects included within the recording.

ASIO inputs 1 and 2 are chosen to do the recording. The host record selector is programmed to ASIO Rec mode, using ASIO 1&2, with the 'Src' set to 'Mix.' In E-Control, all strips except for A1 and A2 are muted.