

Linear Acoustic Application Note

Commands, Scripts and Schedules in AERO Processors

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Background

As the capabilities of the AERO processor have grown, user requests for more signal routing options and automation possibilities have also increased. We believe that direct control of AERO processors using commands sent via Ethernet is the most flexible approach but we recognize that many of our users exclusively utilize GPI for control, so we have made that functionality more flexible as well.

We have approached remote control of the AERO processors in three ways. First is a comprehensive command interface available via AERO's built-in http server over the network connection. Second is the ability to create task scripts, a list of commands that can include any command available in the NfRemote interface and triggered by one of the 8 available GPIs. This makes GPI control far more flexible and powerful than before. The third approach is a scheduling application that allows a script to be executed on one or more days of the week and at a specific time of day. A total of 26 events can be scheduled.

Use Cases

Several important uses come to mind for these features.

EAS, local emergency audio alert tones, and local emergency audio can all be connected to AES inputs on AERO hardware processors. Using GPI any of these sources can be routed to the DRC Local processor to replace main program, SAP programming, or both, as needed.

Regularly scheduled programs that are received and broadcast in real time can have the correct audio pairs routed into the AERO processors according to a day of the week schedule.

Not all sources are required to have standard embedded audio mapping. If a program follows a regular schedule source routing can be changed by the day-of-the-week, time-of-day schedule.

Automation can change not only the loudness control preset but the input routing of sources.

A single GPI closure can control complex changes in the AERO routing and processing.

Any third party system capable of sending HTTP commands can make complex changes in the AERO routing and processing.

Below are excerpts from the new AERO.2000 and AERO.100 manuals that introduce users to these features. A software update which contains all of these features will be available for AERO.10, AERO.100, AERO.1000 and AERO.2000 in the near future.

Commands over Ethernet

Any configuration command found in NfRemote has an equivalent command that can be sent to an AERO, over the Ethernet connection, as an HTTP command. The IP address of the PC, server, or automation system sending the command must appear in the AERO's HTTP white list for the command to have access to the built in HTTP server. The HTTP white list can be found using NfRemote in the System > Network > HTTP Access menu.

Enter the IP address of the device sending the commands or the network that the commands will be received from. Wildcards and subnet masks can be used as necessary. The PC sending commands to the AERO must be in the same subnet as the AERO processor or AERO.soft server.

To access the AERO HTTP server, use any browser and enter the AERO's IP address and the HTTP server port (7380) in the following format, substituting your AERO's IP address: `http://192.168.1.12:7380`. The `http://` prefix may or may not be necessary depending on your browser. Also note that, for security, the AERO processors do NOT respond to a "ping" request.

The HTTP server page that will open is shown in Figure 1

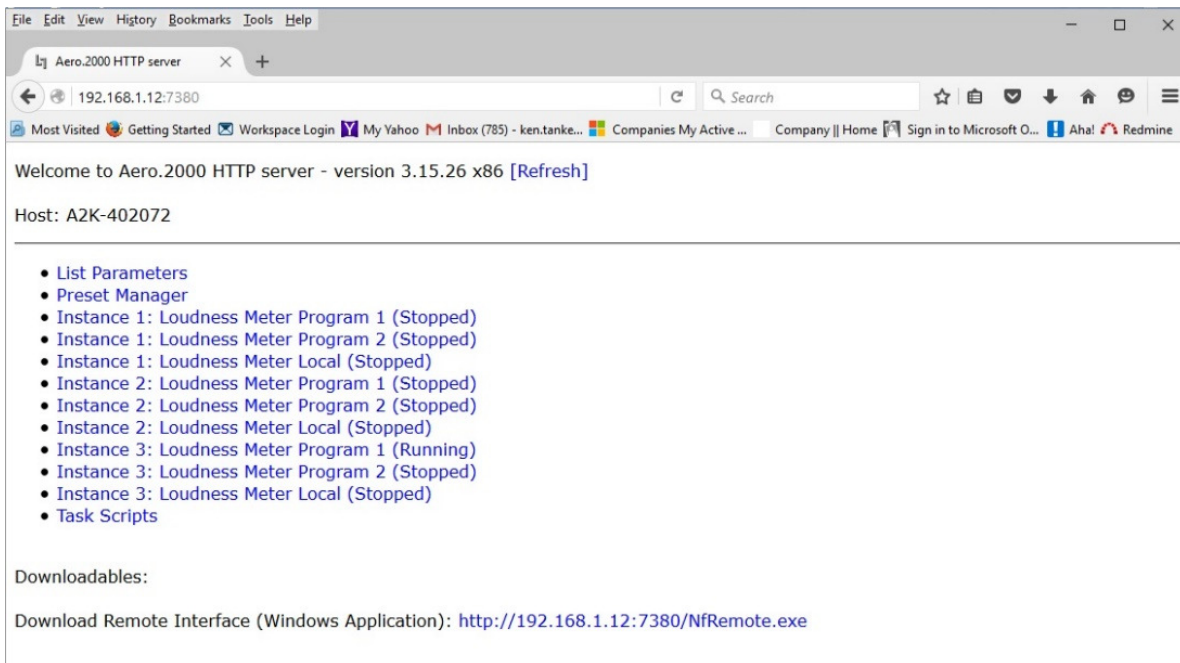


Figure 1: HTTP Server Home Page

HTTP List Parameters

List Parameters shows every parameter in the AERO that can be controlled via the HTTP server and a network command. Figure 2 is the screen you'll see after clicking List Parameters. Scroll up and down

to move through the parameters. You can also use the Edit menu in your browser to open the “Find” dialogue box to search for parameters.

ID	Path	Value	VisListIdx	CtrlType	DataType	Display
I0: Instance C0: Input 1						
Category: Input						
0	/inst_1/input/status_cpu_link	11	-1	nftext	nfint	CPU I
1	/inst_1/input/placeholder_localoutvolume	0	-1	ct unknown	nfint	
2	/inst_1/input/hp_volume_link	100	-1	nfslider	nfint	HP Vc
I0: Instance C0: Input 1						
Category: Source						
3	/inst_1/input/in_1_2	9	0	nfmultistring	nfint	Input
4	/inst_1/input/in_3_4	10	0	nfmultistring	nfint	Input
5	/inst_1/input/in_5_6	11	0	nfmultistring	nfint	Input
6	/inst_1/input/in_7_8	0	0	nfmultistring	nfint	Input

Figure 2: HTTP List Parameters

Under “Category: Source” the first command is `/inst_1/input/in_1_2`

The next column shows the current value and it is 9.

1. Click on: `/inst_1/input/in_1_2`
2. In the screen that opens you see the command in the browser address line.
3. The first line on the browser page shows the current value of the parameter.
4. Below this is the command name followed by all of the possible parameter selections, and the command syntax.
5. Value 9 = SDI 1/2. This means that the value 9 for routes SDI 1/2 to Instance 1, Input 1/2.
6. See Figure 3.

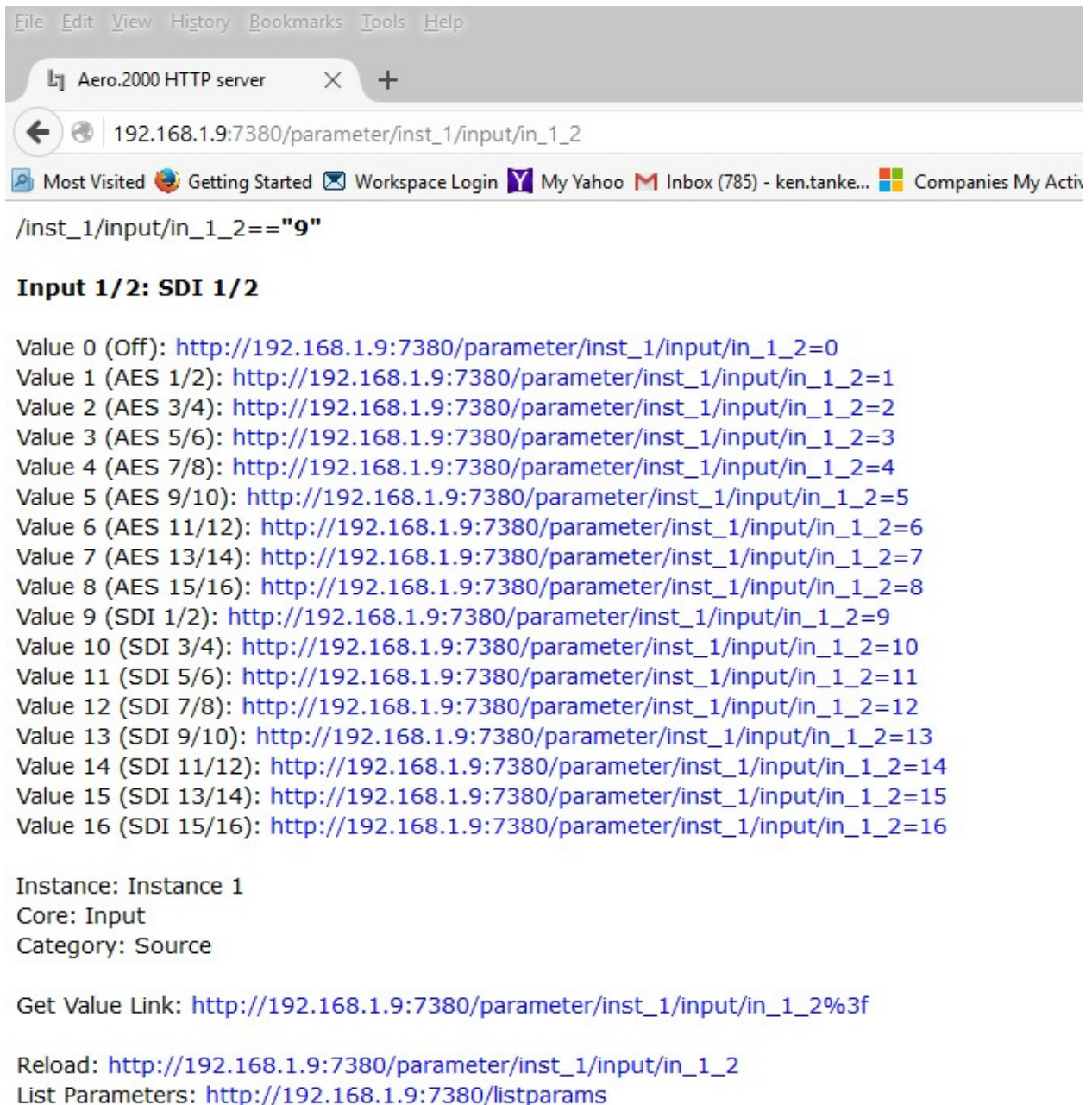
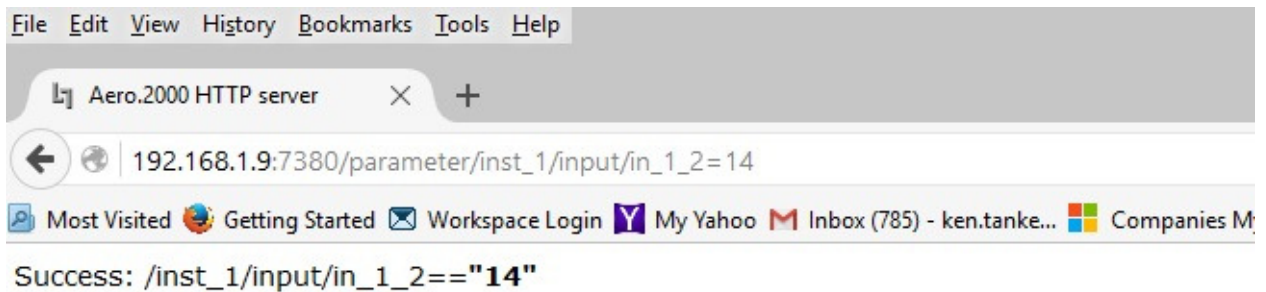


Figure 3: Input 1/2 Source HTTP command

The source for Instance 1, Input 1/2 can be changed by sending a command from the browser.

1. Find the Parameter Value for SDI 11/12 in the list of commands.
2. The parameter value is 14
3. Click on the command 192.168.1.12/parameters/inst_1/input/in_1_2=14
4. The source routed to Instance 1, Input 1/2 is changed instantly.
5. The command now appears in the browser address line.
6. See Figure 4



Input 1/2: SDI 11/12

Value 0 (Off): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=0
Value 1 (AES 1/2): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=1
Value 2 (AES 3/4): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=2
Value 3 (AES 5/6): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=3
Value 4 (AES 7/8): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=4
Value 5 (AES 9/10): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=5
Value 6 (AES 11/12): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=6
Value 7 (AES 13/14): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=7
Value 8 (AES 15/16): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=8
Value 9 (SDI 1/2): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=9
Value 10 (SDI 3/4): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=10
Value 11 (SDI 5/6): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=11
Value 12 (SDI 7/8): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=12
Value 13 (SDI 9/10): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=13
Value 14 (SDI 11/12): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=14
Value 15 (SDI 13/14): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=15
Value 16 (SDI 15/16): http://192.168.1.9:7380/parameter/inst_1/input/in_1_2=16

Figure 4: Command to route source SDI 11/12 to Instance 1, Input 1/2

A traffic or facility automation system can send multiple commands, one after the other, in order to accomplish any desired set of changes. Task scripts (covered in the next section) can also be used to execute multiple commands simultaneously.

If there are multiple AMX instances in an AERO.100/1000/2000 or AERO.soft Processing Engine the command is instance-specific. For example:

```
Http://192.168.1.9:7380/parameter /Inst_2/input/in_1_2=12
```

The IP address is unique to a particular AERO unit. The parameter change command is specific to an AMX Instance, Instance 2 in this example. The parameter change is to route SDI source pair 7/8 to Instance 2 processor input 1/2.

Any number of AERO units or AERO.soft processing engines and any number of AMX Instances in a unit can be individually addressed. Any number of commands can be sent and they will be executed in order.

Building Scripts to Create Tasks

The script feature was first introduced in AERO.10 and is new to AERO.100/.1000/.2000 and AERO.soft as of version 3.15.26. A script consists of a series of parameter change commands that can be named and saved as a Task. These Tasks appear in the GPI menu and can be assigned to any of the available GPIs. Tasks can also be executed via HTTP. Any command that is available through the AERO.100 HTTP server as an IP based command can be placed in a script and saved as a Task.

This allows a single GPI to be used to change any parameter or any number of parameters in any combination. The possibilities are nearly infinite.

For Example:

- Go to the HTTP main page and click Task Scripts.
- See Figure 5
- Click on Create

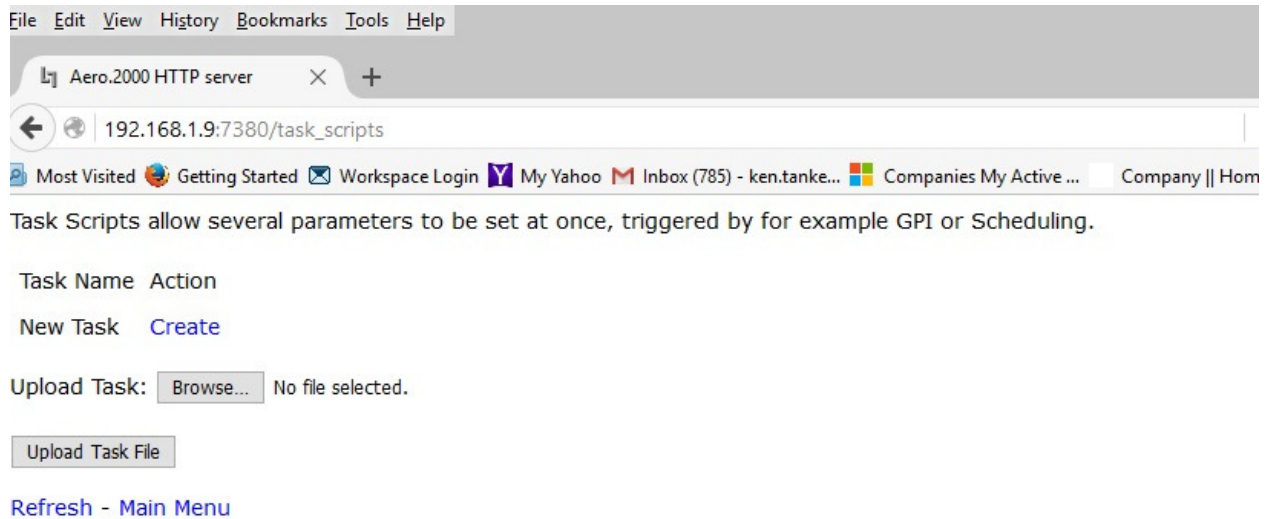


Figure 5: Creating Scripts

A new screen opens with a sample script.

See Figure 6, below.

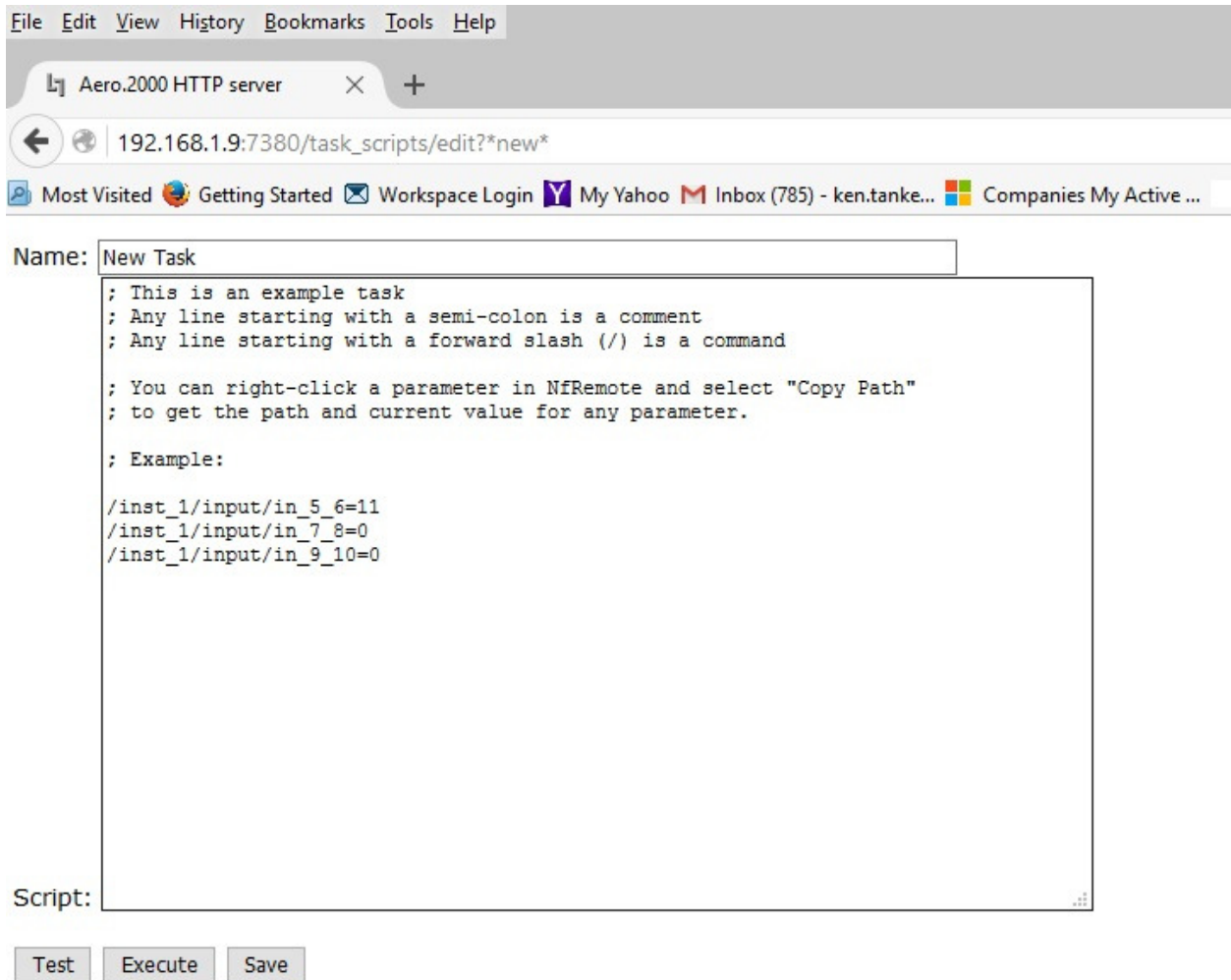


Figure 6: Sample script

Type a name for the script. Choose a name that is descriptive to make finding it in the list of saved scripts easier.

Below two scripts will be described.

1. Inst1-SDI-1-2-to-In-1-2-Stereo
 - a. Route SDI audio source pair 1/2 to Instance 1, Input 1/2
 - b. Mute 3-6 will mute Instance 1, Inputs 3, 4, 5 and 6
 - c. set the Dolby AC3 encoder to 2.0 mode

2. Inst1-SDI-5-10-to -In-1-6-Surround
 - a. Route SDI audio source pairs 3, 4, 5 to Instance 1, Input 1/2, 3/4, 5/6.
 - b. Unmute channels 3-6
 - c. Set Dolby AC3 encoder to 5.1 mode

The first script, for a stereo program on SDI 1/2 is shown in Figure 7.

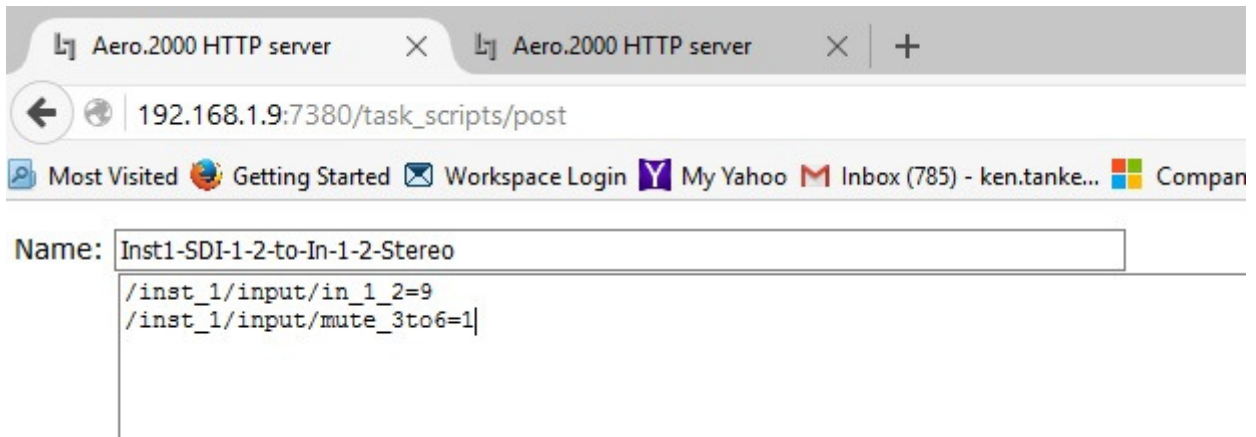


Figure 7: Script for stereo source with stereo Dolby AC3 encoding

The second script, for 5.1 surround on SDI 5/6, 7/8 and 9/10 is shown in Figure 8-7

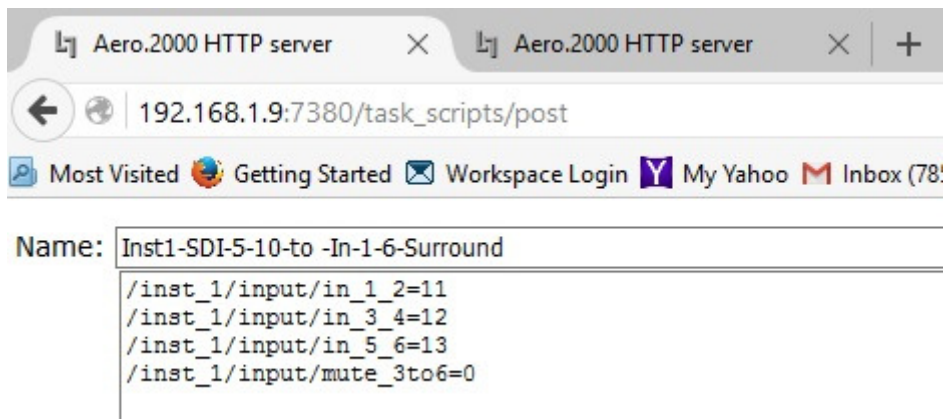


Figure 7: Script for surround source and surround Dolby AC3 encoding

Please note that a second HTTP tab is also open in the browser in Figure 7. This will allow the parameters to be searched and the needed commands cut and pasted into the open script on the first browser tab.

If NfRemote is open, Right-Click on any control to open a copy dialog box. Click “Copy Path” and then right-click/paste it into the script. The result will look like this:

```
/inst_1/input/mute_3to6=1
```

This is the command to mute Inputs 3-6 and change the Dolby AC3 encoder to 2.0 mode.

See Figure 8: below.



Figure 8: Copying the script command for Mute Input 3-6

After creating and saving a script, it becomes a Task. To assign Tasks to a GPI:

1. If necessary, disable GPIs in System > GPI > GPI to allow editing.
2. Navigate to System > GPI > GPI Function A-D (or E-H).
3. Click on GPI Function A and select Task from the drop down box.
4. Click Lo and select a script to run when GPI A is pulled low.
5. Click Hi and select Do Nothing.
6. Click on GPI Function B and select Task from the drop down box.
7. Function Click Lo and select a script to run when GPI A is pulled low.
8. Click Hi and select Do Nothing.
9. Remember to Enable GPIs for the GPIs to work.

See Figure 9. You may also choose one task for “LO” and a second for “HI” if the function is controlled by a sustained GPI closure and needs a second task to “return to normal” when the GPI is released.

1. GPI A will run the script: Inst1-SDI-1-2-to-In-1-2-Stereo
2. GPI B will run the script: Inst1-SDI-5-10-to -In-1-6-Surround



Figure 9: Assign tasks to GPIs

In this example a momentary pull to ground on GPI A will switch the stereo source and switch the Dolby Encoder to Stereo mode. A momentary pull to ground on GPI B will switch to the 5.1 surround source and switch the Dolby encoder to 5.1 mode.

AERO Scheduling

The third new feature in is a time based automation system for AERO processors. Any command in the GPI menu and any scripted Task can be run according to a day-of-the-week, hour-of-the-day, internal scheduling application. The scheduling is part of the NfRemote GUI and can be found by navigating to the System > Scheduling > Event A-B through Event X-Y menu.

Syncing to an NTP time server is recommended when using the scheduling feature as the internal system clock may not be accurate enough for precise switching. NTP time server settings can be found in the System > Time > NTP menu.

See Figure 10.



Figure 10: Event Scheduler

Two events are shown on each of the 13 screens named Event A-B to Event Y-Z.

1. Each event can be scheduled to the hour/minute/second and the day of the week.
2. An event can be scheduled to occur at the assigned time on multiple days.
3. Assignment of the event is done in the same way as a GPI is assigned.

The stereo and 5.1 surround switching Tasks, created in section 8.3, are used in the next example.

Figure 11 shows the change to stereo occurring every weekday at 11:29:59 PM. The scheduler works in 24-hour time to avoid errors. The time is shown as 23:59:59. The scheduled event is not enabled yet and can still be modified. All selections are available.

In the next example, shown in Figure 12, the AERO is switched to 5.1 surround mode every weekday at 5:59:59 AM. In this figure the event is enabled and all selections are grayed out because they cannot be modified while the event is enabled.



Figure 11: Internal Scheduler, Event A

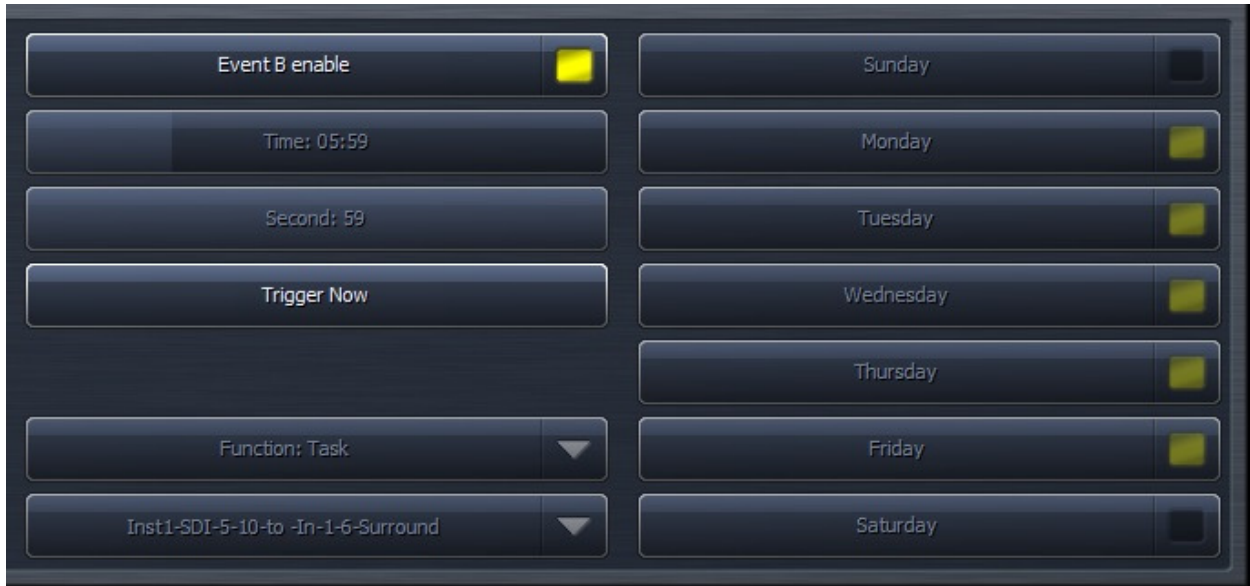


Figure 12 Internal Scheduler, Event B, enabled

Please note that the AERO should be referencing an NTP clock source for day/time scheduling to be accurate.

Closing

Please let us know if you are doing something you think is interesting with these AERO features as many past product improvements are a direct result of customer feedback.