Introduction

The DSPro StageGrid 4000 is an I/O interface designed for eMotion LV1 live mixing systems. It features 32 analog mic/line inputs and 16 analog outputs, plus four channels of AES/EBU digital I/O. All channels are digitally controlled. Its two headphone outs have independent volume controls. All components are carefully selected and tested to ensure continuous system stability and maximum dependability, and there is a redundant power supply. Built in a robust 4U rack-mountable chassis, DSPro StageGrid 4000 provides a seamless solution for live sound applications, coupled with the modularity and power of SoundGrid technology.

SoundGrid is the Waves high-speed networking protocol for moving audio, clock, and other information between a host system and I/O devices—and between I/O devices themselves. A SoundGrid host manages the network and assigns servers and I/O devices to mix, process, and record, depending on the host. All SoundGrid devices connect to the host with standard Ethernet cable.

SoundGrid is scalable. Connect one I/O device to a DAW and you have a high-quality sound card. Add more I/Os and your system becomes more flexible and powerful. Depending on the host application, a SoundGrid host can assign up to sixteen I/O devices. Complete SoundGrid systems can be networked together to share devices.

Add a server to a SoundGrid system to offload plugin processing from the host CPU to a SoundGrid DSP server. This dramatically increases processing power and enables greater plugin counts, as well as providing very low system latency.
Hardware and Connections

StageGrid 4000 has one Ethernet port and can connect directly to the SoundGrid host computer. Additional devices require an Ethernet switch.

**FRONT PANEL**

1. 32 Mic/Line inputs
2. 16 Line outputs
3. 4 AES/EBU stereo inputs
4. 4 AES/EBU stereo outputs
5. 2 Headphone outputs
6. Word clock I/O
7. Reset button
8. SoundGrid Gigabit Ethernet port
9. Power status LEDs - Power A and Power B
   - Green: Power OK
   - Red: Power fail
10. Network LEDs:
    - Net – SoundGrid network status:
      - Blue: synchronized with a SoundGrid host application
      - Red: no SoundGrid sync
      - Yellow: firmware updating
      - White: unit malfunction
      - Cycling colors: used to identify the equipment
    - Link – Ethernet status
      - Green: link up
      - Blink: link up and network activity
      - Off: link down
BACK PANEL

1. Device fan. Air flows from the back to the front and sides.
2. Power A On/Off switch
3. Power A connector
4. Power B connector
5. Power B On/Off switch
Getting Started

Configure SoundGrid and assign your devices as follows, however large or small your system.

1. Connect the hardware
2. Install the software
3. Configure your system

A Connect the Hardware

Systems can range from small and simple, to huge and complex.

One I/O

In this example, one DSPro StageGrid 4000 is connected directly to the SoundGrid host computer using a Cat 5e Ethernet cable or better. This provides plugin processing and/or DAW playback/recording via the SoundGrid ASIO/Core Audio driver.

The host computer's LAN port that's connected to the SoundGrid network should be used for SoundGrid only. Do not share this port with the internet or other networks.

In this configuration, all plugin processing is carried out on the host computer. The speed and power of the host defines overall latency.
Add I/Os

Adding I/O devices not only increases the number of I/O channels, but lets you have separate devices for stage and FOH, or live room and control room. When you have more than one device in the SoundGrid network, use a "star" network configuration with a 1GB Ethernet switch. Only use switches tested and approved by Waves.

You can connect and assign up to 16 SoundGrid I/O devices to the network, depending on the SoundGrid Host Application. All SoundGrid I/O devices, hosts, and servers are connected through the Ethernet switch. You can also add more computers to enable audio streaming among hosts.

**ADD A SERVER**

To add a server to your SoundGrid system, just connect it to the Ethernet switch and configure it in your host application. This moves all DSP processing from the host computer to the server, which provides a higher plugin count and enables the eMotion LV1 and ST mixers. Visit the waves.com hardware pages to learn more about SoundGrid servers. Consult your SoundGrid host application’s user guide to learn about using servers.
**Download and Install Software**

**INSTALLING A NEW SOUNDGRID HOST SYSTEM**
Installing the Waves SoundGrid host application will also install the SoundGrid ASIO/Core Audio driver and applicable device drivers. Your devices will appear in the Inventory of your host system. If a device is not visible in the Inventory, you may need to install a specific driver from Waves Central—please see below. First, however, check the device’s connections and power.

**ADDING AN I/O DEVICE TO AN EXISTING SOUNDGRID HOST SYSTEM**
If you are already using a Waves SoundGrid host application and your device does not appear in the Network Devices list, use Waves Central to update the host application, which also updates the device drivers—or install just the missing device driver from Waves Central.¹

**Waves Central**
All Waves software is downloaded and installed via the Waves Central application. To install a specific device driver, launch Waves Central and follow these steps:

1. Choose **All Products**.
2. Search for the driver by name.
3. Choose the driver and click **Install**.

If you are new to Waves products, begin by downloading the Waves Central installer from the Waves Download Page. See the Waves Central User Guide for instructions on how to install drivers, plugins, and applications.

**LICENSES**
You do not need a license to use this device. However, many hosts or specific host configurations do require a license. Refer to your host’s product page for details.

¹ The SoundGrid QRec host is installed with any I/O.
Configure the System

A SoundGrid network is configured and devices are assigned in a host’s Setup window. At the heart of this window are racks where devices are assigned. Any compatible device that's part of the host’s SoundGrid network will be available for assignment. This collection of devices is called the Inventory. Setup is similar with all hosts: identify the host’s LAN port, select a device slot, and use the drop-down menu to choose an available device.

Please consult the user guide of your host application for specific instructions.

![SoundGrid QRec](image1)

![SoundGrid Studio Setup Window](image2)

All SoundGrid devices are configured in a similar manner. Throughout this section, we show DiGiGrid IOS as an example.
Manual Device Configuration

You can assign, remove, and manage a device manually. Click on the plus or arrow symbol in a device slot to open the Device Menu, then select a device.

Any device not already used will be available for assignment. If no other devices are assigned, the current device will become your clock master. Drivers and servers are assigned in the same manner.

See the user guide of your host system for specific instructions on device assignment and I/O channel patching.

Automatic Device Configuration

Certain SoundGrid hosts—including SoundGrid Studio, eMotion LV1 or SuperRack SoundGrid—offer an Auto-Config tool. Once your devices are connected and powered up, click Auto Config to start the configuration.

Auto-Config chooses the correct LAN port on the host computer and scans the SoundGrid network for devices. It then patches the devices to the host. We recommend that you let Auto-Config take care of things, at least when you are getting started. If later you add, remove, or swap a device, Auto-Config will reconfigure your inventory and re-patch.

Note that SoundGrid Studio assigns the SoundGrid driver automatically. SuperRack SoundGrid and eMotion LV1 require that the SoundGrid ASIO/Core Audio driver is assigned manually.
Device Firmware

An I/O that is using outdated or incompatible firmware will not work properly in a SoundGrid network until its firmware is updated. The color of the FW button in a device slot indicates the current firmware status.

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey</td>
<td>Compatible firmware</td>
</tr>
<tr>
<td>Blue</td>
<td>Compatible firmware, but a newer version exists</td>
</tr>
<tr>
<td>Red</td>
<td>Firmware not compatible and must be updated in order to use</td>
</tr>
</tbody>
</table>

If a device requires updated firmware, click on the FW button to start a hardware scan. Do not disconnect the device or turn off the computer before Done appears. Once the update is ready, turn the device off and on to reset.

Identify a Device on the SoundGrid Network

Click on the ID button to activate a hard-to-miss LED on the panel of the corresponding hardware device. You can also activate the LED from the top bar of the device’s control panel.
StageGrid 4000 Control Panel

There are two ways to open the device control panel:

**FROM THE DEVICE RACK**

Click the **Gear** button on a device in the rack slot.

**FROM THE DRIVER CONTROL PANEL**

You can also access the control panels of all assigned I/O devices from Driver Control Panel application, which is located here:

- **PC**: C:\Program Files (x86)\Waves\SoundGrid\Driver Control Panel
- **Mac**: System HD/Applications/Waves/SoundGrid

**CONTROL PANEL PAGES**

The **About** and **System** pages provide information about the unit, such as MAC address, SOE master MAC Address, firmware version, and more. The **Clock** and **Input** and **Output** pages are used to set up and manage the StageGrid 4000.
**Input Page**

This is where you configure the inputs and outputs of the StageGrid 4000, including: mic preamps, line inputs and outputs, digital I/O.

**ANALOG INPUTS**

1. Selected channel group
2. Navigation arrows between channel groups
3. Detailed output VU meter
4. Preamp gain control fader -4 dB to 60 dB
5. Channel phantom power on/off buttons
AES Inputs

1 SYNC: AES/EBU operation status display:
   - Green: synchronized
   - Orange: clock slip (same sample rate but non-identical clock)
   - Red: different sample rate
   - Grey: no signal
Output Page

1. Selected channel group
2. Navigation arrows to move between channel groups
3. Output VU meter
**Clock Page**

Use the Clock page to set the clock source and sample rate for the device and to assess clock status.

1. **SOURCE** sets the requested clock source. When the device is the SOE Master, these options are available:

<table>
<thead>
<tr>
<th>Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>The device itself provides the SEO clock.</td>
</tr>
<tr>
<td>WC External</td>
<td>Clock is provided by an external device via the Word Clock Input connector.</td>
</tr>
<tr>
<td>Digital</td>
<td>Clock is synchronized to AES/EBU input. A second drop-down menu selects the port.</td>
</tr>
</tbody>
</table>

When the device is SOE Slave, no options are available.
**SAMPLE RATE** sets the sample rate when Clock Source is set to Internal. Range: 44.1 / 48 / 88.2 / 96 kHz.

If the device is the network (SOE) clock master, as determined in the Device Racks of the SoundGrid host, then this setting determines the sample rate of the SoundGrid network.

If Clock Source is set to an external clock source, you cannot change the sample rate from the host. The Sample Rate menu is grayed out and inoperative.

**CLOCK STATUS INDICATORS**

Three windows on the right side of the Clock control panel help you to quickly assess the network status of the device.

<table>
<thead>
<tr>
<th>Status</th>
<th>Reports the presence or absence of sync between the StageGrid 4000 and the SoundGrid network.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Clock Status</td>
<td>Displays the current sync method. This may differ from the choice made in the Source menu.</td>
</tr>
<tr>
<td>SOE</td>
<td>Indicates whether this StageGrid 4000 is the master or a slave in the SoundGrid network. This mirrors the status information in the SoundGrid Studio Device Rack</td>
</tr>
</tbody>
</table>

When the device is a slave in the SoundGrid network, you will likely sync it to the SoundGrid network clock (via SOE).

Even when the device is an SOE slave, you can lock it to an external clock source. For example, if another SoundGrid I/O device is the SOE master and is locked to a word clock device, you may choose to receive clock from the same external device over word clock from the master device rather than via network SOE.

In the event that the selected clock source fails, StageGrid 4000 has a series of clock fallback layers, in this order: WC, Digital, SOE, Internal. If a StageGrid 4000 unit is clocked to WC and this external source fails, it will first try to clock to Digital then SOE. If that not successful, it will fall back to Internal.
System Info Page and About Page

The **About** page contains a description of the device. The **System Info** page contains technical details about the device, including MAC address, Firmware version, and Module version. This information is useful for troubleshooting. Please have this information handy if you contact Waves technical support concerning the device.
**Presets**

You can save and load presets of device settings. A saved preset includes all Clock and Control panels parameters. Save StageGrid 4000 presets to use on future sessions or copy them to another computer to duplicate a configuration.

Click the **ID** button to indicate which StageGrid 4000 hardware device belongs to this Control Panel. Clicking the button causes the Network LED on the front panel of the StageGrid 4000 to flash in a rather psychedelic manner.
Using an I/O Device with a DAW

Setting up SoundGrid devices with a DAW involves these steps:

*Patch the I/O device and the SoundGrid ASIO/Core Audio driver*

When using a DAW on a SoundGrid network, the SoundGrid ASIO/Core Audio driver serves as a bridge between the I/O device and the DAW. It enables the I/O to communicate with the DAW and it provides patches. Patching an I/O to the SoundGrid ASIO/Core Audio driver differs slightly among hosts. When you use a host’s Auto-Config tool, the host input channels are patched automatically in an order based on rack. The order of the devices in the Device Rack determines the default patching order. Please refer to your SoundGrid host’s user guide for details.

*Configure the DAW for SoundGrid*

1. Set the DAW playback engine to “Waves SoundGrid.” The SoundGrid driver channels will now appear in the DAW I/O preferences and in the Input/Output selector in each DAW channel.
2. Route the DAW inputs and outputs to SoundGrid.
Specifications

**GENERAL**
- 32 Analog mic/line Inputs
- 16 Analog line outputs
- 4 Stereo AES/EBU digital inputs
- 4 Stereo AES/EBU digital outputs
- Configurable Sample Rates of 44.1 kHz, 48 kHz, 88.2 kHz and 96 kHz
- Two headphone outputs
- Word clock IN/OUT
- A SoundGrid Ethernet port
- Redundant power supply

**ANALOG INPUTS**
- Impedance: 2.86 kiloohms
- Gain range: -4 dB to 60 dB
- Max input level: 28 dBU (-4 dB gain)
- Dynamic range: 115 dB (-60 dBFS, 20 dB gain, 1 kHz, A-weighted)
- THD: 0.002 % (-1 dBFS, 20 dB gain, 1 kHz, A-weighted)
- Equivalent input noise: -128 dBU (60 dB gain, A-weighted, 150 ohms)
- Frequency response: +/- 0.1 dB (20 Hz to 40 kHz at 96 kHz sampling rate)
- Phase shift: <10° at 20 kHz

**ANALOG OUTPUTS**
- Output impedance: 50 ohms
- Max output level (0 dBFS): 24 dBU
- Dynamic range: 115 dB (-60 dBFS, 1 kHz, A-weighted)
- THD: 0.002 % (-1 dBFS, 20 dB gain, 1 kHz, A-weighted)
- Frequency response: +/- 0.1 dB (20 kHz to 40 kHz at 96 kHz) Phase shift: <5° at 20 kHz
AES/EBU IN/OUT
- Standard: AES3 (2009)
- Sample rates: 44.1 kHz, 48 kHz, 88.2 kHz and 96 kHz
- Impedance: 110 ohms

HEADPHONES
- Output power: 150 mW per channel on 16 Ohms
- Dynamic range: 100 dB

SOUNDGRID
- Interface: Gigabit Ethernet
- Connector: Neutrik EtherCON

WORD CLOCK
- Connector: BNC
- Impedance: 75 ohms
- Voltage level: 5 V TTL

POWER SUPPLY
- Voltage: 110 VAC or 240 VAC
- Frequency: 50 Hz or 60 Hz Power: 60 W

ENVIRONMENTAL SPECIFICATIONS
- Operating temperature: 0°C to 40°C
- Relative humidity: Up to 90% non-condensing

DIMENSIONS
- Height: 176 mm / 6.92 inches (4RU)
- Width: 430 mm / 19.92 inches (for 19" rack)
- Depth: 300 mm / 11.81 inches (not including connectors)
- Weight: 7.89 Kg
Resetting the Unit

If an unsuccessful firmware update results in the device no longer being recognized by the host, follow these steps to reset the unit:

1. Turn off the unit.
2. Press and hold the Reset button.
3. Restart the unit while holding the button.
4. Release the Reset button once the device has fully booted.

The unit is now in “force update” mode, and a new firmware update can be performed.