



Integrator's Guide



**Vandenberg™ HDMI Video and
Digital Audio Matrix Switch**

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Introduction

Congratulations on your purchase of the NeoPro Vandenberg 8x8 HDMI video and digital audio matrix switch. The Vandenberg offers 8x8 HDMI plus an additional 16x4 digital audio, giving the integrator a powerful video and audio routing system to enable the fully integrated digital home.

The Vandenberg features:

- Low profile 1RU chassis (rack ears included)
- 8 HDMI inputs
- 8 HDMI outputs
- 8 SPDIF digital audio inputs
- 8 Toslink optical digital audio inputs
- 4 SPDIF digital audio outputs
- Up to 7.1 channels of digital audio
- 1080p 60Hz performance
- 36 bit Deep color and 3D support
- IR control
- RS-232 control
- TCP/IP socket layer control
- Full HDCP key management
- Full EDID management

System Installation

Rack Mounting

To ensure that your Vandenberg matrix ships arrives without shipping damage, the rack ears are not attached to the unit. The two screws per side to attach the rack ears are already installed in the side of the unit. If you intend to rack mount the Vandenberg, remove these screws, install the rack ears, and reinstall the screws.

Inputs and Outputs

To ensure stable system operation, always make changes to the input and output cabling with the system power cable unplugged, and plug it in once you have everything connected properly.

HDMI Cables

HDMI cables carry extremely high frequency signals, and are a very sensitive part of the system. To ensure a trouble free installation, be very cautious when choosing your cables. Generally cables with a rating of 6-10Gb/s should be fine. Cable lengths can be up to 45 ft (13m).

SPDIF Cables

The SPDIF connections can carry many types of digital audio up to 5.1 channels. The cable requirements are similar to video cable requirements, so most RG59/RG6 based 75 ohms cables will be suitable. Cable lengths can be up to 200 ft (61m).

Toslink Cables

Optical digital audio cables utilize a plastic optical fiber, so are immune to electrical issues such as interference or ground loops. Cable lengths can be up to 33 feet (10m).

Testing Cables Prior To Use

You can save yourself a lot of time and headaches by having known good cables prior to using them with a matrix switch. Frequently one will assume that a brand new cable is a good cable, but that is not always the case.

Control System Interfaces

IR Receiver

The IR receiver is located on the front panel of the Vandenberg. Although the Vandenberg does not ship with a remote control, one can be purchased separately. All of the IR codes for control are available in several formats at: <http://www.neoprointegrator.com/toolbox.php>

Details for the code sequence are given later in this guide.

RS-232 Connection Details

The serial port is wired as a DCE device, and should be connected to a host's RS-232 port with a straight through cable. The connector on the rear panel of the Vandenberg is a DE-9 female. For the command protocols, see the Serial Protocols section of this guide.

Ethernet (TCP/IP)

The Ethernet interface on the Vandenberg is located on the rear panel as an RJ45 jack. To control the switch, the control system will connect to a TCP/IP port and send packets, very similar to using RS-232. For the command protocols, see the Serial Protocols section of this guide.

Service Port

The service port is a micro USB connector located on the rear panel. This port can be used only for firmware upgrades, and cannot be used for any other purpose. Connecting a USB cable here and attaching to a computer will hold the Vandenberg in reset until it is removed. Any firmware upgrades will be available at:

http://www.neoprointegrator.com/firmware_upgrade.php

A standard USB type A to micro USB cable can be used to perform the upgrades. Refer to the upgrading instructions on the web page for further information.

Operation

Overview

Generally there are three ways to control the matrix switch:

- 1) IR remote
- 2) Serial commands via RS-232

3) Serial Commands via TCP/IP

IR Inputs

Located on the front panel is a small box labeled “IR sensor” where IR codes can be received. If your system makes use of IR emitters from a control system, this is the correct location to attach the emitter.



Via IR Remote

There are three power buttons on the IR remote.

Power Toggle – Changes power state from current state

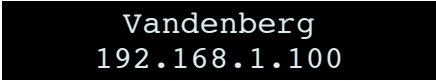
Power On – Always turns on, regardless of current state

Power Off – Always goes to standby, regardless of current state

Standby Mode

When in Standby Mode, all outputs are virtually disconnected. The HDMI ports are in standby mode and will consume less power.

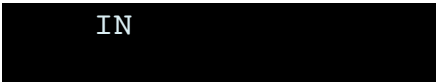
Front Panel Text Display



The product name and IP address will be displayed on the front text display as shown above.

Switching Using IR

When powered on, the IN button will start a switching command. The text on the display will guide you through the correct buttons, and should look like this:



As you enter keys on the remote, they will show up on the front display for confirmation.

The basic routing sequence is shown below, where XX represents the two digit input number and YY represents the two digit output number.

Routing Function	Key Sequence
Switch video and audio from input x to output y	IN, X, X, OUT, Y, Y
Switch input X X to all outputs	IN, X, X, OUT, 0, 0
Disable output Y Y	IN, 0, 0, OUT, Y, Y

Serial Protocol

Serial Port Settings

The serial port operates at 115.2k baud, no parity, 8 data, 1 stop. No hardware flow control is used.

Conventions In This Manual

In the examples given in this section of the manual, the serial strings to send are highlighted like this:

```
[VV, 1, 8]
```

Some examples may require you to ‘fill in the variables’ before they actually work. In these examples we will italicize the text like this:

```
[VV, XX, YY]
```

Commands Overview

Commands are structured so that a control program has two-way communication with the matrix. The control system can confirm and store the state of the matrix switch. These commands are also human readable ASCII text, which will help in troubleshooting and testing.

The matrix may also be controlled with one way serial communications.

Common Structures and Syntax

Commands are not case sensitive. Upper and lower case characters are used in this manual, but have the same effect.

Numbers are 1 or 2 digits, (leading zeroes are optional).

Spaces are not permitted within the square braces—they will generate an error.

A command is always wrapped in square braces:

```
[command]
```

It is not necessary to follow the command by any carriage returns or other special characters. The closing brace will trigger the switch to process the command.

The switch will only attempt to process a command between matching [] braces, so any characters before and after the braces is discarded. If there are invalid characters/values/command between the braces, they will be processed, and the switch will echo the bad command and return an error [E].

Within a command or response, there will be one or more fields, separated by commas:

```
[vv,1,2]
```

Group Commands

A group command is always wrapped in curly brackets:

```
{ [command1] [command2] [command3] }
```

Group commands are used if the user wants to see one response per command mode inside the group brackets. So if there are two commands in one group bracket, there will only be one response string.

Group commands are also used for memory edit function, this will be discussed later.

One-way Commands

One-way commands, (where there is no programming that depends on feedback) can be sent to the matrix at any time, regardless of the state of the matrix (e.g. in Standby mode).

Response to Commands

The serial port does not echo characters or ASCII codes sent, so the only characters sent back are the response to commands. When a valid command is received and executed, code indicating the status of the entire matrix is returned.

The response will be in curly brackets { }, like in a group command, and can be used as a command back to the matrix or be used as an input to memory edit function.

Errors

Any command with invalid parameters or a syntax error will result in a response of:

```
[E]
```

Switching Protocol

Switching commands use this structure:

```
[VV,ii,oo]
```

ii is the one or two digit source input number. If this number is 0, then the selected output will be disabled.

oo is the one or two digit output number. If the number is 0, then the selected input is routed to all outputs.

Serial Control Examples

Here are a few examples of serial control code:

```
[VV,1,2]
```

Routes video input 1 to output 2

```
[VA,17,8]
```

Route Toslink digital audio input 17 to HDMI output 8

```
{ [VV,1,0] [VA,3,6] [VX,5,8] }
```

Group command that first routes video input 1 to all, then routes HDMI audio input 3 to HDMI output 6, then routes input 5 (both video + audio) to HDMI output 8.

Setup Protocol

Setup commands have 3 parameters:

```
[S,x,n]
```

S invokes the Setup function

The table below lists values for *x* and *n*:

<i>x</i>	<i>n</i>	Setup function
L	0	Led OFF
L	1	Led ON
R	0	IR OFF
R	1	IR ON
V	0	Verbosity OFF
V	1	Verbosity ON
D	25	Display Brightness 25%

x	n	Setup function
D	50	Display Brightness 50%
D	75	Display Brightness 75%
D	100	Display Brightness 100%
A	0	On Power Up – STANDBY
A	1	On Power Up – ON
MODE	1	Audio mode 1 – SPDIF routing
MODE	2	Audio mode 2 – 7.1 routing
DHCP	0	Auto assign IP address OFF
DHCP	1	Auto assign IP address ON
IP	xx.xx.xx.xx	Manually assign IP address
GW	xx.xx.xx.xx	Manually assign gateway address
NM	xx.xx.xx.xx	Manually assign netmask

Power Control

The power ON command is:

[P, 1]

The power OFF command is:

[P, 0]

Query Commands

x is the first letter of model name. Responses are in { } brackets.

Command	Result
[?V]	Firmware version
[?P]	Power status
[?S]	Setup values
[?VX]	Switching matrix state. Responses can be re-used as input back to the matrix switch.

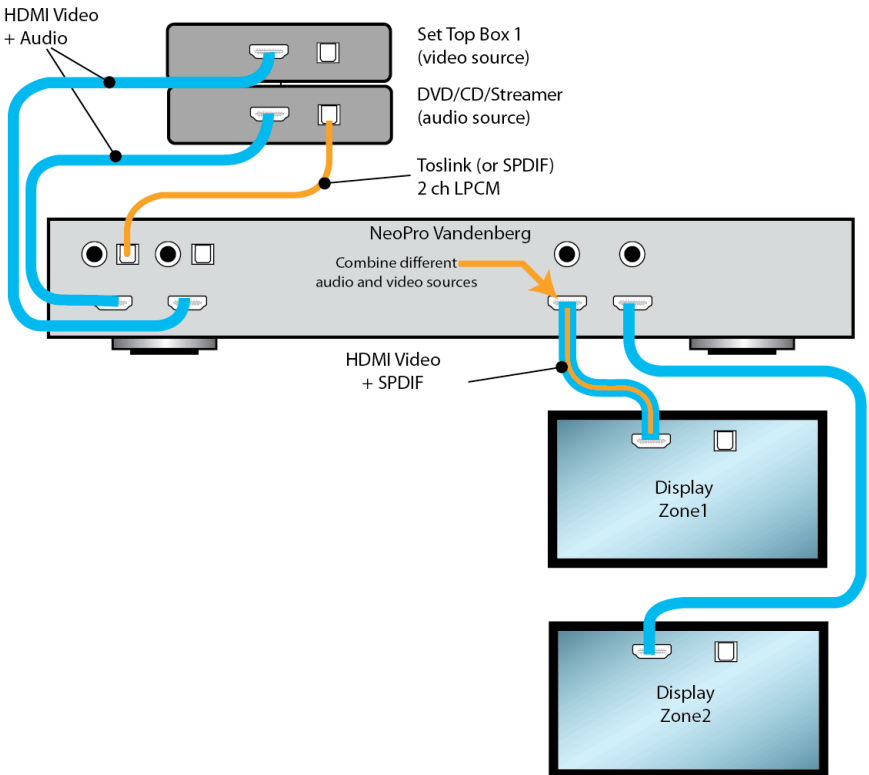
Understanding Audio Routing

Mode 1

The Vandenberg handles audio differently than many other HDMI matrix switches. Each HDMI input's audio source by default is carried as SPDIF digital audio. In addition, the 8 SPDIF audio inputs can carry the same or different audio, as well as the 8 Toslink digital audio inputs. All together there can be 24 unique digital audio sources going into the audio router.

On the output side, the Vandenberg can route any of these audio signals to the 8 HDMI outputs, or the 4 SPDIF outputs. This audio routing can be done completely independently from video switching.

For most applications, this will be your most flexible audio mode.



Mode 2

In this mode the Vandenberg will utilize the 7.1 channel uncompressed audio that may be available on some Blu-Ray Disc movies. This audio can only be routed to HDMI outputs, and not the SPDIF outputs. Also in this mode, the audio and video cannot be switched separately.

Care and Maintenance

The NeoPro matrix switch does not require any regular maintenance besides keeping it clean.

Never use harsh cleaners or solvents on the front panel. There are several dusting products for electronics, or standard glass cleaner may be used.

Spray any liquids onto a towel first, then wipe the front panel with the moist towel.

Should the NeoPro matrix switch fail to operate as expected, please contact NeoPro for service advice.

Specifications

Performance

HDMI Video

Video modes	480i, 480p, 540i, 540p, 576i, 576p, 720p, 1080i, 1080p
Video vertical rates	24, 25, 29.97, 30, 50, 59.97, 60
Deep Color Support	36 bit
3D support	All required modes
HDCP support	Yes

Audio

SPDIF	2ch LPCM, DD, DTS
HDMI audio	7.1 LPCM

Power

Input voltage	90-240V AC 50-60Hz autosensing
Input power	25W

Physical

Dimensions without rack ears	17"W x 1.75"H x 10.675"D
Weight	10 lbs

Notes:

2 Year Warranty

NeoPro warrants this product against defects in material and workmanship for a period of 2 years. This warranty applies to the original end-user purchaser and installation service provider. NeoPro will, solely at its option, repair or replace this product with a functionally equivalent new or factory-reconditioned product during the warranty period. The consumer should contact the installation service provider that resold the product, who will in turn deliver the product to NeoPro. All transportation risks and costs in connection with this warranty service are the responsibility of the consumer.

In order to keep this warranty in effect, the product must have been handled and used as prescribed in the instructions accompanying this warranty. This warranty does not cover any damage due to accident, misuse, abuse, or negligence. Repair or replacement, as provided under this warranty, is your exclusive remedy. NeoPro shall not be liable for any incidental or consequential damages. Implied warranties of merchantability and fitness for a particular purpose on this product are limited to the duration of this warranty.

Some states/countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. Some states/countries do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state and country to country.



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