



# ATEN HDBaseT Wall Plate Extender Series Installation Guide

Selecting Power Cables by Considering Maximum Resistance





**This document provides a guide to help you select the optimum power cable or adapter for installations with more than 2 meters of power extension to an ATEN HDBaseT Wall Plate Extender (VE1801UST, VE1801EUT, VE2812UST, VE2812EUT).**

In installations that require ATEN HDBaseT Wall Plate Extenders to be located at a distance away from a power source, ensuring stable power transmission within the extenders' operating range becomes a challenge. This is because the resistance of electric cabling is related to its length. That is, the longer the cable, the larger the resistance and the more likely a drop in voltage or an unstable power supply occurs.

To ensure that the voltage supply meets the minimum threshold required by the product (which is  $DC5V \pm 10\%$  (minimum  $\geq 4.5V$ ) for ATEN HDBaseT Wall Plate Extenders), we have to find out the maximum resistance allowed by the cable. By knowing the maximum resistance, we can:

1. Select a power cable that is below the maximum resistance, or;
2. Select a power adapter that can deliver enough power to the device while taking cable resistance into consideration.

Here, we will make use of the following equations and Ohm's Law:

$$\text{Voltage } (V) = \text{Current } (I) \times \text{Resistance } (R)$$

$$\text{Power } (W) = \text{Current } (I) \times \text{Voltage } (V)$$

With VE2812UST as an example, below we show you how to select a power cable or adapter using 2 cases.

### **Case 1: Using the Standard DC5V Power Adapter that comes with VE2812UST**

This is suitable for installations where you need to add extra length to the 2m power cable that comes with the standard DC5V power adapter in the VE2812UST package contents.



In this case, we know the following (refer to the Specifications table from the product page on [aten.com](http://aten.com)):

- VE2812UST has a standard DC5V power adapter
- VE2812UST has a minimum operating voltage of DC4.5V
- VE2812UST has a maximum power consumption of 3.04W

From this, we can derive the following parameters:

- The maximum allowance for voltage drop from the power source to device is 0.5V (DC5V – DC4.5V)
- The maximum operating current is 0.608A ( $3.04W \div 5V = 0.608A$ )

By substituting respective parameters into Ohm's Law, we get 0.82Ω as the maximum resistance allowed for the power cable.

$$\text{Voltage (V)} = \text{Current (I)} \times \text{Resistance (R)}$$

$$0.5V = 0.608A \times R$$

$$\therefore R = 0.82\Omega$$

This means that, power cables with a resistance of less than 0.82Ω are the best options to ensure at least DC4.5V stable power supply to VE2812UST using a DC5V power adapter.

### Case 2: Using Existing Power Cables in your Installation on VE2812UST

This is suitable for installations where you already have a power cable in place or plan your own power cabling design and need to find the suitable power supply capacity.

In this case, we know the following (Refer to the Specifications table from the product page on [aten.com](http://aten.com)):

- VE2812UST has a minimum operating voltage of DC4.5V
- VE2812UST has a maximum power consumption of 3.04W
- The maximum operating current is 0.608A ( $3.04W \div 5V = 0.608A$ )



In addition, you would already know the power cable’s resistance, and in this case it is 1.6Ω (for example).

By substituting respective parameters into Ohm’s Law, we get 1.0V as the maximum allowance for voltage drop from power source to the device.

$$\text{Voltage (V)} = \text{Current (I)} \times \text{Resistance (R)}$$

$$V = 0.608A \times 1.6\Omega$$

$$\therefore V = 1.0V$$

This means that, in order to maintain a minimum operating voltage of DC4.5V for VE2812UST, the power supply must deliver at least DC5.5V (4.5 + 1.0).

### Select Power Cables by Considering Maximum Resistance

Although power supply and how to implement cabling depends a great deal on your overall installation, here we provide power cable resistance calculations for your reference should you need to extend your power cabling to ATEN HDBaseT Wall Plate Extenders. Please note that these calculations are based on the standard power supply of DC5V.

Model	VE1801UST	VE1801EUT	VE2812UST	VE1812EUT
<b>Power Adapter</b>	DC5V	DC5V	DC5V	DC5V
<b>Min. Operating Voltage</b>	4.5V	4.5V	4.5V	4.5V
<b>Max. Power Consumption</b>	1.75W	1.75W	3.04W	3.14W
<b>Max. Operating Current</b>	0.35A	0.35A	0.608A	0.628A
<b>Max. Power Cable Resistance</b>	1.43Ω	1.43Ω	0.82Ω	0.80Ω