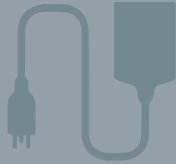


# POWERING AV EDUCATION



WAIT.  
WHAT'S A  
WALL WART?



Most "wall warts" are called transformers because a long, long time ago large "step down" transformers were used to transform AC into a DC voltage.

Today most "wallwarts" are true switch-mode power supplies. The heat is the biproduct of this conversion of energy. The higher the wattage the higher the heat generated becomes. Things like efficiency and size can play a part in this as well. Shrinking a high wattage power supply down to fit into a small plastic enclosure is a great way to create a heater.

**WALL WARTS:  
THE USUAL  
SUSPECTS**



See pg. 2 for the full line up of *Usual Suspects*.



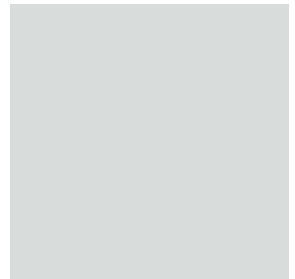
## THE DC POWER DILEMMA: Three Ways Wall Warts Are Killing an AV System

Without a doubt, direct current (DC) power transformers serve one of the most vital roles in electronics. Lovingly known in the industry as a "wall wart" or "power brick", they are responsible for converting alternating current (AC) power from the wall into DC power for almost every small, low-voltage device today.

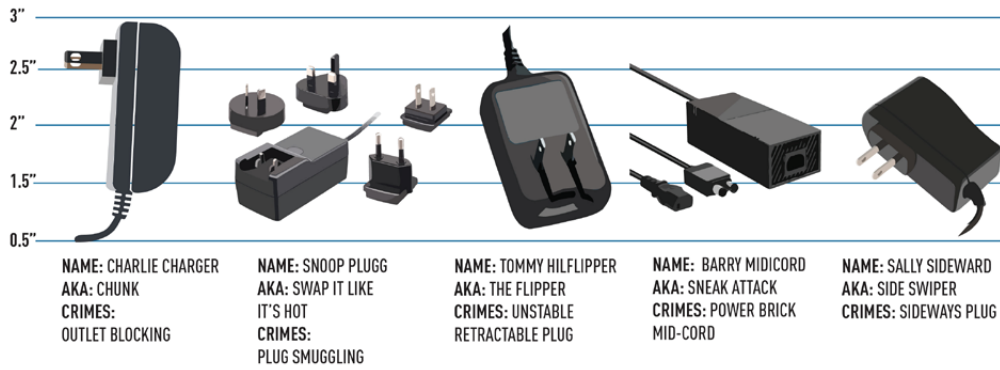
In the AV industry, they have become more and more prevalent as components shrink

in size. While they may be effective in delivering the power that devices need to operate, they are also a growing source of AV system failures — for more than one reason.

- ONE** PG. 2  
**Design**
- TWO** PG. 3  
**Heat**
- THREE** PG. 4  
**Reliability**



# WALL WARTS: THE USUAL SUSPECTS



You've done your part designing and installing the ultimate AV System yet you're still having reliability issues? Check out this line up of *Usual Suspects*. DC Power supplies aren't just a nuisance- they're a real problem.

## 1 PROBLEM: Design

One of the most obvious drawbacks of DC power transformers is their size. They're big, bulky, and unattractive. They block outlets on a wall or on a power distribution unit (PDU) — hence the moniker wall wart.

Believe it or not, this design approach does serve an actual purpose. It keeps equipment more compact and removes power as point of failure internally. Otherwise electronic components would need to feature built-in power conversion, making them much bigger, and taking up more rack space, and threatening the life of the device itself if the converter were to fail. For one or two components, wall warts aren't the worst way to get power.

However, as more and more digital devices are relying on DC power, integrators now have to devote a considerable amount of space in the AV enclosure for a half dozen bricks in an array of sizes.

Aside from the size of the brick, the cord lengths can pose additional installation and on-going system reliability challenges. The physical cord is hard wired to the transformer at a predetermined length. This leave installers left to solve for cords that are too short by repositioning gear within the rack, or too long and trying to manage the extra slack of cable horizontally or vertically in the rear or side channel of the rack.

All this cable management takes time-labor cost incurred by the integrator- and as the extra cable bundles pile up, they begin to block airflow - causing thermal management constraints.

## LET'S DO THE MATH. SPOILER ALERT: HEAT HURTS.

For every 50°F(10°C) that you are able to keep the power supply's environment lower than 104°F(40°C), you double the mean time between failures (MTBF). Conversely, for every 50°F(10°C), your power supply's ambient temperature increases, your MTBF cuts in half (that is, your power supply is half as reliable). Most power supply failure mechanisms are related to temperature. This is due in part to the break-down of the materials used.

Most electrolytic capacitors have a set lifespan and the higher the temperatures the shorter that lifespan gets. This is why you can expect to see a 'minimalist approach' to using electrolytic capacitors in Middle Atlantic's product design. Take Middle Atlantic's Series Surge Protection for example, one of the biggest improvements that we made in designing our circuitry vs. existing industry solutions is that our electrolytic capacitors are only in-circuit during a surge event.

## 2 PROBLEM: Heat



Even when a device isn't in operation, those bricks are still consuming power. This is called "no-load" power consumption. New standards were introduced in 2004 after experts in the 90s calculated that external power supplies would account for as much as 30 percent of total energy consumption in less than 20 years.

New standards were introduced as a result of that eye-opening statistic to significantly reduce no-load power consumption. Although the new standards are helping drive efficiencies with the external power supply consumption, approaching 90 percent, they are still putting out heat.

The more transformers stuffed into an enclosure, the more heat is being generated. This heat has nowhere to go as these units are not designed to provide passive or active heat exhaustion.

### Popular Commercial Devices with DC Power Supplies



HDMI Extenders



Cable boxes /  
Satellite Receivers



Small AV devices like  
Apple TV and other  
content streamers



Control systems



LCD screens used for  
menu-boards/  
digital displays



### 3 PROBLEM: Reliability

Mass produced by multiple manufacturers, wall warts are cheap and replaceable, which make them a convenient and ubiquitous commodity for almost any electronic device. Electronic manufacturers simply select the most affordable and appropriate transformer for the country and their device. While there are standards in place to meet safety and efficiencies, there is no testing standard for quality. That means the voltage range of transformers can be all over the spectrum. Most AV components can only operate in specific voltage range before they are fried from over-voltage, or conversely, lock up from under-voltage.

Reliability goes beyond their internal capabilities as their unwieldy size and substantial weight makes wall warts susceptible to falling out of the outlet they are plugged into, especially in countries with larger plug sizes, such as the U.K. Any rack vibration or work inside the rack can loosen things over time. Even worse when they're located in a hard to reach place in the rack, plugging it back in or replacing a burned-out unit with a new one may require considerable time and money.



# SOLUTION:

## Cut the Cord

Solving these fatal problems isn't about simply redesigning the DC power transformer, instead, reimagine DC power from the ground up. Middle Atlantic's engineering and product development team took years in research, development, and testing to create the DC Power Distribution Series. It's the only solution designed to address all the areas where DC power transformers threaten AV components. Truly universal, the DC Power Distribution series completely eliminates wall warts and other power clutter such as power strips from AV enclosures while providing maximum power to support a multitude of devices, including extenders, scalars, converters, and media players.

Providing the most comprehensive solution from the enclosure, application, and voltage requirements, the series is available in a multi-voltage 45W DC compact and 125W DC 1RU systems and in four high-voltage models that are designed to fit anywhere — including typical rack units, small enclosures, and wall boxes. The High-Power series includes 200W and 300W options, offering high-current capacity to an industry-leading quantity of outputs — up to 24 devices. All models offer a flexible approach to component voltage needs in a single unit: 5V, 12V, or 24V, or splitting between 12/24V while keeping voltage in check with LED indicator



Middle Atlantic's DC Power Distribution powers up to 27 DC devices

lights show activity on each output and alert users to maximum capacity on each voltage bank. Its color-coded screw terminal connector platform and polarity labeling make installation intuitive. Integrators simply trim leads to length for efficient cable management. The robust solutions deliver reliable multilevel protection on both AC input and DC outputs with individual redundancy built-in to ensure maximum reliability. With options that support an input voltage range of 100-240VAC, 50/60 Hz, even global applications can be supported without bulky barrel plugs consuming outlet real estate and blocking airflow.

Every decision in the design of a system impacts its cost, performance, and reliability. That now includes DC power. It is no longer necessary to leave the decision of managing DC power challenges to the end of the installation and risk system reliability. Designed around industry best practices for widespread safe, efficient, and dependable power, DC Power Distribution remove multiple points of potential failure, so every component operates efficiently each and every time and delivers the best user experience.

### Choose the Right DC Power Distribution for the Job

PART #	WATTS	VOLTAGE MIX	TOTAL TERMINALS
PD-DC-300-24V	300W	24V	24
PD-DC-300-12-24V	300W	12V, 24V	24
PD-DC-300-12V	300W	12V	24
PD-DC-200-5V	200W	5	24
PD-DC-45	45W	5V, 12V	12
PD-DC-125R	125W	5V, 12V, 18V, 24V	24





**Middle Atlantic Products**

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