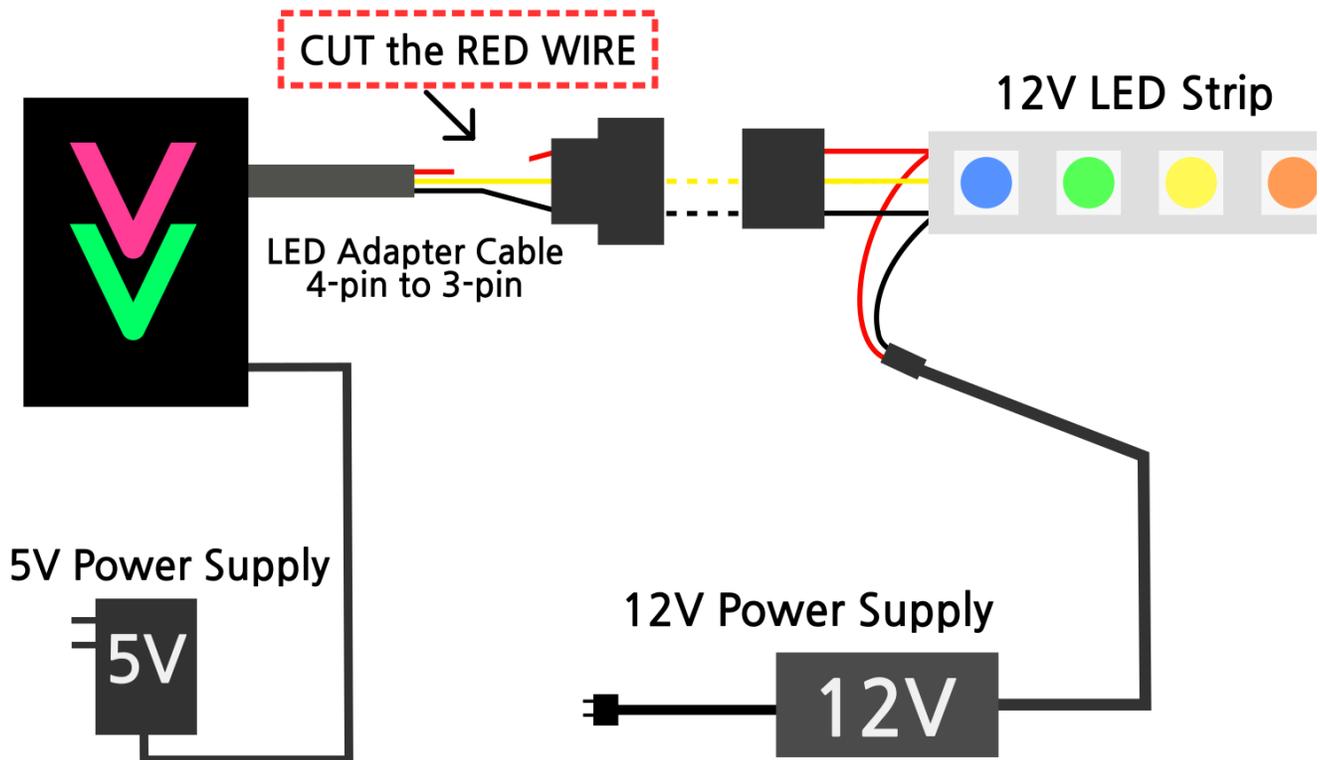


How to Use 12V Lights without DESTROYING your ViVi

ViVi only works with 5V and will be damaged if 12V is attached to it.

But ViVi can be used to control 12V strips because the data signal is still 5V. To avoid damaging ViVi you need to **cut the red wire** on the LED strip adapter cable so that the 12V from the strips does not feed back into ViVi, leave the Data and GND wires intact and connect both to the LED strips. You then run 12V power directly to the strips and use a small 5V power supply for ViVi (300mA or greater). If you are doing more custom wiring make sure to check all 12V paths to ensure it can not get back to ViVi.

12 Volt LED Strip Connection



Almost all compatible light strips are only 5V, and 12V will damage them, unless the product explicitly states that it is a 12V version. The most common 12V versions are WS811 because the chip is external to the LEDs, we have recently seen some of the other varieties appearing with 12V versions, but we have not tested any besides WS811. Remember WS2811 also comes in 5V versions, if it doesn't say it's 12V, it's not.

Reminder: ViVi is only compatible with WS2811, WS2812, WS2812B, and WS2813 LED products.

Why Use 12V Strips for Large Setups

What is a large setup?

A setup in which a single continuous strip is planned to be greater than 7 meters (23 feet).

Data Point: A single digital address that can have the RGB values adjusted. On 5V strips this is a single LED, on 12V strips this is a group of 3 LEDs that all change together.

Use less memory per meter of lights

12V strips address LEDs in groups of 3, so only one data point is used for every 3 LEDs, rather than one data point for every one led on 5V strips. ViVi has a memory limit of 500 data points per output (only 300 max for animations to keep a high frame rate), so this allows for more total LEDs in a continuous strip.

Note: If one output's signal is split to multiple strips, the additional strips are using the same data and not using additional memory.

Animations appear to move faster

Which is good for big displays that cover a large distance. When ViVi changes one LED from lit to off and lights up the next one to create the appearance of motion it does this at a fixed rate, so the further apart the LEDs are, the faster the "object" appears to be moving. Using 30 LED/m density and 12V strips makes the data points (group of 3 LEDs) the furthest apart for any strip type and provides the fastest perceived animation speed.

If using string lights you may be able to order custom distances between each LED or modify them yourself.

Better power distribution

Higher voltages travel better over long distances which helps with maintaining voltage on distribution wires. The voltage on the strip itself is also maintained better, and because the LEDs are the same as on 5V strips and operate at the same low voltages (they are just grouped in 3's and have resistors to be able to be powered by 12V) the effects of voltage drop don't show up for nearly twice the distance.

Animations actually move faster when less data points are used

We are working on a custom protocol that transmits data faster than the standard specifications and it will reduce the following effects and allow more data points with a higher frame rate, but it is not yet complete, so the following is still relevant:

Different from the perceived speed, the actual time required to display each frame is increased when there are more data points. The time to change frames (update all LEDs on the strip) is most significantly limited by the communication protocol for the LEDs, there are strict timing requirements and each data point requires 30 microseconds to send data for, so the more LEDs you have the more time is required to send the string of data to update the strip.

The data protocol has the largest effect, but the math to generate each frame also takes time, and as more data points are added the time to compute each frame also increases and adds more delay to the time between frames.

ViVi has a target frame rate and once a single output exceeds approximately 300 LEDs the timing limitations add up enough to have a noticeable effect slowing down the frame rate, and it gets worse as more data points are added. With three outputs the timing on one output can affect another, but because calculations for each output are done separately and the data for each is sent separately the total data points across all outputs has a lesser effect than the total on a single output.

12V Setup Tips and Troubleshooting

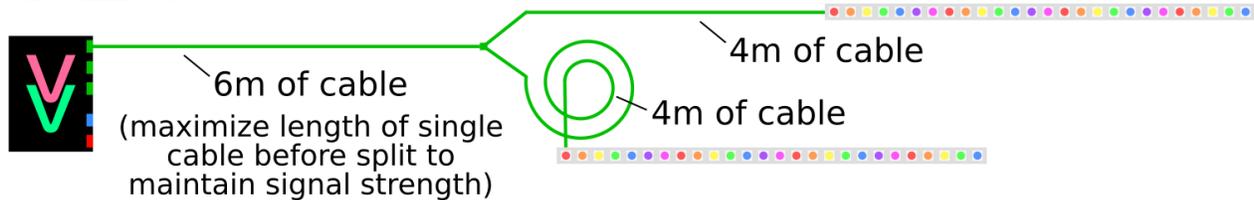
Run all DATA wires in pairs with a GND wire, as if a single cable.

The data circuit uses a negligible amount of power, but it still needs a return path to work. Having GND connected at the same point also ensures the 0V level will be the same on the data wire and the strip, if GND is only connected at the far end of the strip away from the DATA connection then data reading errors can occur.

Make any splits of the Data signal have symmetrical wiring.

The length of cable from the split point to the start of the LED strip should be the same for all cables after the split point. Also make the splits as close to the LED strips as possible, so you have the maximum length of a single cable before splitting to multiple cables.

YES



NO



Connect 12V power (+12V and GND) at the start of the strip, where the initial data connection is.

This reduces the chance of having data reading errors. We have tested connecting just DATA and GND at the start of a series of strips and then connecting +12V and GND at the far end of the three 5 meter strips connected in series and had it work. In other cases there were data errors and connecting 12V power at the start of the first strip fixed the errors.

If you are unable to make symmetrical splits, or you did and there are still data errors, then you can use a signal amplifier.

Signal amplifiers/splitters are available that take DATA and GND as an input and output the same signal on eight outputs, but these 8 outputs are now isolated so the wire lengths can all be different, unlike doing a passive split with just wiring.