Why Are Stabilization Circuits Needed?

The DC from a battery or converted from commercial AC using an adapter still has unstable variations in voltage. Changes in voltage can cause sensitive electronic devices to malfunction, so stabilization circuits are used to create DC with stable voltage. Two methods of doing this are the linear method (also called the series method and dropper method) and switching method.

The principle of the linear method is simple, but it is inefficient and has high thermal losses.

Linear Method (Series Method)

- **Key Point**
  - The linear method cuts the unevenness (variation in voltage) to make the voltage smooth.

Switching Method

- The switching method achieves stable power supply with compact, lightweight, and high-efficiency devices.

The switching method uses a cut-and-paste like method to produce stable current without losses, making it extremely efficient.

AC-DC Converter

- **Key Point**
  - The main weakness of switching power supplies is the generation of switching noise in conjunction with the high-speed switching of the semiconductor elements. As a result, EMC countermeasures (noise countermeasures) such as noise filters are essential.

Power Supply Devices Play a Variety of Different Roles

Most electronic devices operate on direct current. After commercial AC is rectified (the DC is still unstable), a DC-DC converter is used to change the power (change the voltage or current) and stabilization circuits are used to produce extremely stable DC.