Regulated power supply wikipedia

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78xx (sometimes L78xx, LM78xx, MC78xx...) is a family of self-contained fixed linear voltage regulator integrated circuits. The 78xx family is commonly used in electronic circuits requiring a regulated power supply due to their ease-of-use and low cost.

For ICs within the 78xx family, the xx is replaced with two digits, indicating the output voltage (for example, the 7805 has a 5-volt output, while the 7812 produces 12 volts). The 78xx line are positive voltage regulators: they produce a voltage that is positive relative to a common ground. There is a related line of 79xx devices which are complementary negative voltage regulators. 78xx and 79xx ICs can be used in combination to provide positive and negative supply voltages in the same circuit.[1]

78xx ICs have three terminals and are commonly found in the TO-220 form factor, although they are also available in TO-92, TO-3 "through hole" and SOT-23 surface-mount packages. These devices support an input voltage anywhere from around 2.5 volts over the intended output voltage up to a maximum of 35 to 40 volts depending on the model, and typically provide 1 or 1.5 amperes of current (though smaller or larger packages may have a lower or higher current rating).[2]

There are common configurations for 78xx ICs, including 7805 (5 V), 7806 (6 V), 7808 (8 V), 7809 (9 V), 7810 (10 V), 7812 (12 V), 7815 (15 V), 7818 (18 V), and 7824 (24 V) versions. The 7805 is the most common, as its regulated 5-volt supply provides a convenient power source for most TTL components.

Less common are lower-power versions such as the LM78Mxx series (500 mA) and LM78Lxx series (100 mA) from National Semiconductor. Some devices provide slightly different voltages than usual, such as the LM78L62 (6.2 volts) and LM78L82 (8.2 volts) as well as the STMicroelectronics L78L33ACZ (3.3 volts).

The 7905 and/or 7912 were popular in many older ATX power supply designs,[4][5] and some newer ATX power supplies may have a 7912.[6]

The LM78S40 from Fairchild is not part of the 78xx family and does not use the same design. It is a component in switching regulator designs and is not a linear regulator like other 78xx devices. The 7803SR from Datel is a full switching power supply module (designed as a drop-in replacement for 78xx chips), and not a linear regulator like the 78xx ICs.

Understanding the difference between a regulated and unregulated power supply will give you the information you need to choose which best serves your purposes. To start, you need to fully understand why you need a power supply and what you require it to do. From there, your intended use will help you choose whether a

regulated or unregulated option will best serve your needs.

Power supplies adapt the type of power available, either direct current (DC) or alternating current (AC), to the needed form and voltage for a specific use. Some will convert AC to DC power, while others are DC-DC. AC-DC is the most common type because electrical devices use direct current, whereas the power supply from an outlet is in alternating current. DC-DC power supplies often convert power from a battery, such as a car battery, into the appropriate voltage for an electrical device.

In addition to converting the current type, power supplies must also change the voltage. AC voltage often must be reduced to a lower voltage for most electrical devices, though some applications may require different voltage levels. Converting the electricity to the required level is the task of the power supply’s transformer. All types of AC-DC power supplies include a transformer to make the electricity into a format the electrical device can use.

Power supplies have two main categories -- regulated or unregulated, depending on their output. If you select the wrong type, you could damage the device you need to power or pay too much for the power supply. Picking an unregulated power supply vs. regulated ranks as high as the voltage regarding importance in operation and safety.

When electricity enters a power supply, the output can fluctuate depending on the incoming voltage and the current the load draws unless the supply has a means of regulating the voltage. Unregulated power supplies have a design that delivers the expected output at a given current but does not always reflect the actual voltage output. These power supplies are simple, low-cost options with the major disadvantage of providing uneven voltage.