Switch-mode Technology

Power Supply & Charger Technology

Switch-mode Power Supply (SMPS)

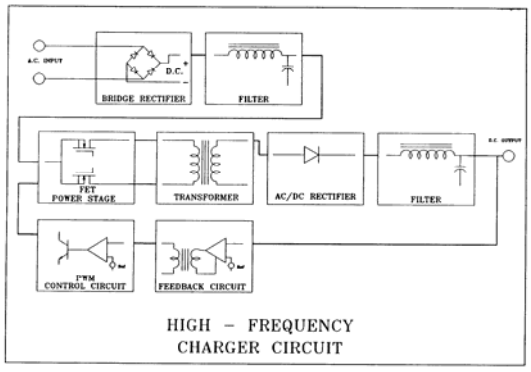
Switch-mode chargers are popular due to their compact size and very low weight. Much the same way as Switch-mode power supplies (SMPS), these chargers convert the input line frequency from 50/60Hz to a frequency typically higher than 100 KHz, which reduces the size of the transformers and chokes compared to those used in conventional chargers. For example, a 3KVA high frequency transformer typically weighs about 2 lbs and displaces 35 cubic inches, and the corresponding low frequency unit weights about 50 lbs and displaces 900 cubic inches. One of the advantages is that line input and output are effectively isolated, eliminating the effects of surges and spikes.

The AC line that operates at a low frequency (50/60Hz) is converted directly into DC by rectifiers before stepping it up or down. This DC voltage is used by a high frequency converter (or chopping circuit) to convert it back into high frequency AC. The resulting high frequency AC is then passed through a high frequency transformer for isolation and to step up or down to the required output. This voltage is then rectified back into DC.

The control for the SMPS/SMC typically varies the duty cycle of the converter stage to control the DC output of the unit. The DC output is proportional to the duty cycle, or width of the pulse. By the use of duty cycle control, voltage regulation and current limiting can be achieved. Because of the switching nature (transistors and diodes are either on or off), very high efficiencies (greater than 90%) and small unit size can be realized.

With the use of power factor control, the power factor and crest factor (ratio of peak AC current to RMS AC current) can be high with switch-mode technology. The addition of electronic power factor control circuitry will control the power factor to greater than 0.95 for any load or line condition. The AC input line regulation operates over a wide range, with a frequency range of 45-66Hz.

Shown: A96-80-130V-U1



HIGH – FREQUENCY
CHARGER CIRCUIT

The output ripple is typically lower than 100mVrms, and the telephone noise factor (dbrn) is less than 32 dbrn. Continued advancements in semiconductor devices and circuit integration have led to smaller size and weight.

Advancements have led to similar size and weight with the development of circuit integration and very large scale integration (VLSI). These circuits allow replacing discrete components with a single chip.

La Marche models that utilize Switch-mode technology are LMHF, TPM, A97, and A96. The sizes are available from a few amps to hundreds of amps in 12V to 130VDC outputs.