1-2-2. Pulse-locked Power Supply

The power transfer capability of the core-type power transformers increase in proportion to the line frequency used. However, most of the conventional core-type power transfomers are used under the line frequency of 50Hz or 60Hz, and they are big in size and heavy in weight.

By utilizing the pulse-locked power supply technique, it is quite possible to make very-small, light-weight and large-capacity power supplies using built-in 20kHz generator.

a) Primary Rectifying Circuit

In ac operation, ac input of 90 to 130V or 220 to 240V is bridge-rectified and the output of 130 to 168V dc is obtained.

In dc operation, dc input of 110 to 140V or 240 to 300V is directly used regardless of the input polarities.

b) Chopper-type Voltage Regulator

The 20kHz control pulse drives the switching transistors and a constant output voltage of 110Vp-p is obtained.

c) Pulse-width Control Circuit

This circuit utilizes the square wave generated in the 20kHz power oscillator to make a triangle wave. The level of the triangle wave is compared with the internal reference voltage and a control pulse is made to maintain the output voltage of the chopper-type voltage regulator constant.

d) 20kHz Power Oscillator

This circuit generates a stable and high-power 20kHz pulse by using four high-power switching transistors in the full-bridge self-oscillating circuit configuration.

e) Ferrite-core Transformer

The ferrite-core transformer transfers the 20kHz pulse signal and this serves the functions of the conventional power transformer. This transformer features a low-loss, high-permeability and a high-saturation magnetic-flux density operation at the high frequency of 20kHz.

This transformer also has a doubled electrostatic shield in itself to reduce the radiation of the switching noise to a minimum possible value.

This transformer has a power-transfer capability of sixty times that of the conventional power transformers for 50Hz- or 60Hz-line use, and also has a superior voltage regulation between the primary and secondary windings by shortening the total length of wire of the windings.

f) Secondary Rectifying Circuit

This circuit provides several kinds of dc voltages needed for the respective stages of the power amplifier. These voltage are well regulated and very stable.