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## Frequency-To-Phase Controlled Power Supply

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The circuit shown in the diagram was initially designed to obtain a phase-controlled power supply to use with a  $\frac{1}{4}$  horsepower stepping motor. The phase angle can be varied over the complete cycle period and is dependent on the frequency of the input. Clearly the circuit can be used to control resistive loads such as lamps or motors.

The first stage of the circuit consists of a frequency-to-voltage converter C1, R1, and Q1 effectively differentiate and amplify the input signal waveform to provide triggering pulses for the 555 timer, which is used in the monostable mode. The output of the monostable is used to charge C3 by a constant amount of charge every time a pulse is received at the base of Q2. The voltage across C3 acts as an input to the common collector stage formed by Q3. The voltage across C3 is DC shifted by means of the zener diode ZD2 to a suitable value, providing the input to the trigger IC (the Mullard TCA280A). The TCA280A provides the phase control signal for the gate of the thyristor.

A triac may be used in place of the thyristor, if phase-controlled AC is required.

The component values shown are suitable for providing phase control using frequencies in the range 200 Hz to 8 kHz on the control input. The firing angle can be varied from  $0^\circ$  at 8 kHz to  $170^\circ$  at 200 Hz.