

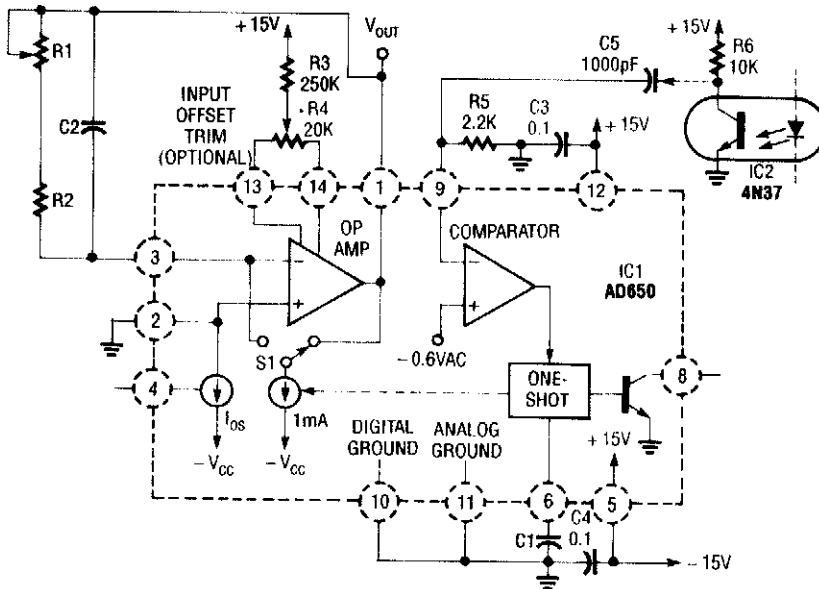
33

Frequency-to-Voltage Converters

The sources of the following circuits are contained in the Sources section, which begins on page 666. The figure number in the box of each circuit correlates to the entry in the Sources section.

Frequency/Voltage Converter
with Optocoupler Input
Frequency/Voltage Converter
with Sample And Hold
Frequency/Voltage Converter
Frequency/Voltage Converter
Single-Supply Frequency/Voltage Converter

FREQUENCY/VOLTAGE CONVERTER WITH OPTOCOUPLER INPUT



CIRCUIT VALUES

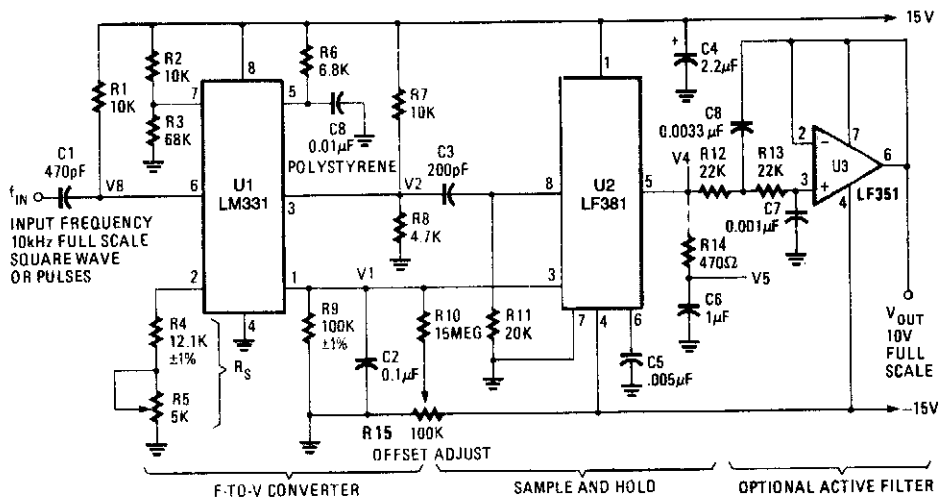
Full-Scale Frequency	Full-Scale Output	C1	C2	R1 (ohms)	R2 (ohms)
10 kHz	1 V	3300 pF	3.3 μ F	1K	3.8K
10 kHz	10 V	3300 pF	0.33 μ F	10K	38.3K
100 kHz	1 V	680 pF	0.33 μ F	500	1.82K
100 kHz	10 V	680 pF	3300 pF	5K	18.2K
1 MHz	1 V	47 pF	3300 pF	500	1.33K
1 MHz	10 V	47 pF	1000 pF	5K	13.3K

RADIO-ELECTRONICS

Fig. 33-1

In this circuit, the input from IC2 optocoupler is fed to the comparator input of the AD650 (Analog Devices or Maxim Electronics) V/F converter. This internally generates a pulse that is fed to the op amp, which outputs a dc voltage that is proportional to frequency. Component values are shown in the figure.

FREQUENCY/VOLTAGE CONVERTER WITH SAMPLE AND HOLD

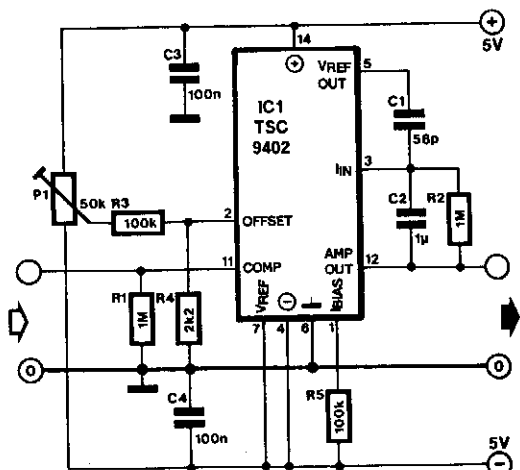


POPULAR ELECTRONICS

Fig. 33-2

U1 is a frequency/voltage converter, feeding sample-and-hold circuit using an LF381. An LF351 provides 10-V full-scale output. The circuit produces 1-V/kHz output.

FREQUENCY/VOLTAGE CONVERTER



ELEKTOR ELECTRONICS

Fig. 33-3

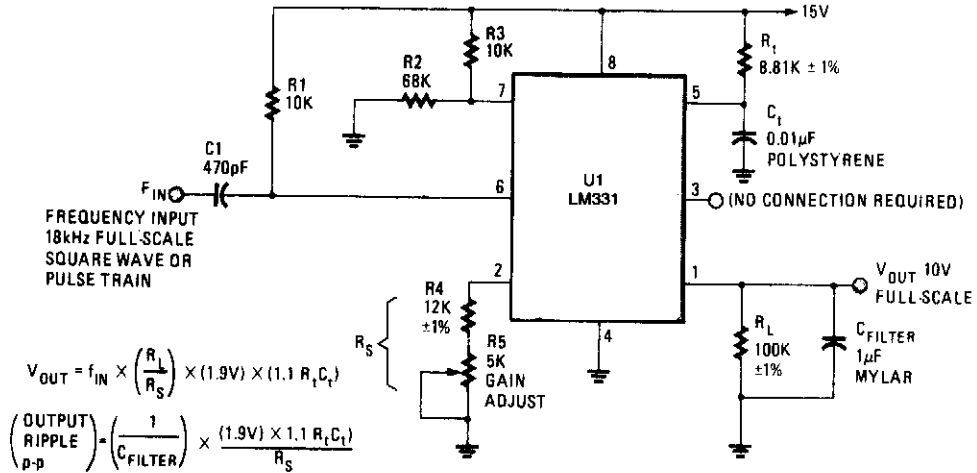
Teledyne Semiconductor's Type TSC9402 is a versatile IC. Not only can it convert voltage into frequency, but also frequency into voltage. It is thus eminently suitable for use in an add-on unit for measuring frequencies with a multimeter. Only a few additional components are required for this.

Just one calibration point sets the center of the measuring range (or of that part of the range that is used most frequently). The frequency-proportional direct voltage at the output (pin 12—AMP OUT) contains interference pulses at levels up to 0.7 V. If these have an adverse effect on the multimeter, they can be suppressed with the aid of a simple RC network. The output voltage, U_o , is calculated by:

$$U_o = U_{ref}(C_1 + 12 \text{ pF}) R_2 f_{in}$$

Because the internal capacitance often has a greater value than the 12 pF taken here, the formula does not yield an absolute value. The circuit has a frequency range of dc to 10 kHz. At 10 kHz, the formula gives a value of 3.4 V. The circuit draws a current of not more than 1 mA.

FREQUENCY/VOLTAGE CONVERTER

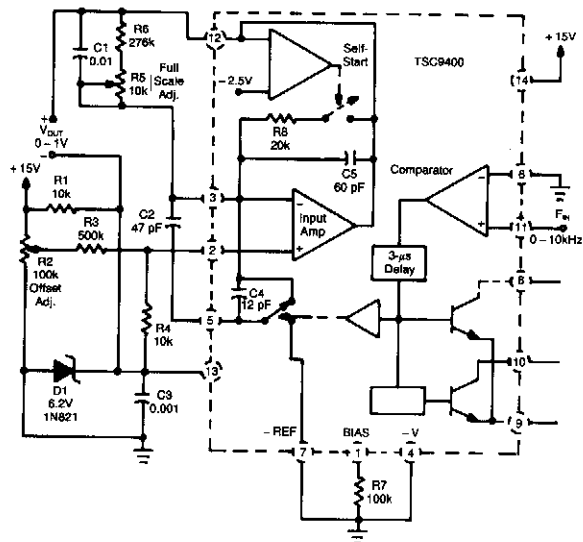


POPULAR ELECTRONICS

Fig. 33-4

A dc output that is proportional to frequency can be derived with this circuit. It is useful for analog frequency meter or tachometer applications.

SINGLE-SUPPLY FREQUENCY/VOLTAGE CONVERTER



RADIO-ELECTRONICS

Fig. 33-5

A Teledyne TSC9400 provides 0-to-1-V output from a 0-to-10-kHz input. A single +15-V supply is used. Linearity is 0.25% to 10 kHz.