

Voltage translator switches auxiliary voltages when needed

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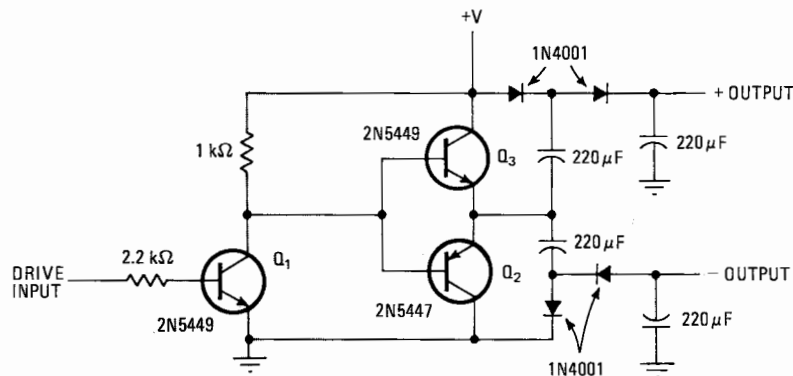
Low-drain auxiliary voltages, which are needed for short periods of time in many devices, can be supplied by dc-to-dc converters provided they are used continuously. If not, their presence constitutes an unnecessary and excessive power drain. However, this circuit allows these voltages to be switched on only when they are needed, thereby reducing power consumption and optimizing conversion efficiencies. In addition, the circuit's input drive is programmable, and the translator's operation may be controlled remotely.

Only the converter stage that is preceded by voltage

translator Q_1 is shown (see figure) because the circuit's input can be driven from many sources—the bit-per-second rate generator of a microcomputer board, a peripheral-interface adapter port, TTL, and the output of a free-running timer, to mention only a few.

However, the main power input to the converter is a separate voltage supply. For example, it could be that only a 5-volt bus is available, and then the doubler shown may have to be replaced with tripler or quadrupler circuitry. Assuming a 9-v source is available, +15V is possible using this circuit; +18V would require a tripler.

This circuit produces approximately +8 v and -8 v at 30 milliamperes each when powered with 5 v. The conversion efficiency is about 75% and depends upon the saturation voltages of transistors Q_2 and Q_3 and the voltage drop across the diode, as does the output voltage. To reduce the voltage drop across the rectifier, the silicon diodes should be replaced with Schottky rectifiers. This change improves both conversion efficiency and output voltage by about 8%. □



Part-time. When voltage translator Q_1 precedes the dc converter stage, the drive input can be generated by the logic signals regardless of the converter input voltage. The circuit allows the auxiliary voltages to be switched on when needed. Also, the circuit's operation can be controlled remotely.