

Adjustable LNB Power Supply Is DiSEqC Compatible

The circuit of **Figure 1** provides a digitally switchable 13V or 17V for the low-noise block (LNB) typically found in satellite receivers at the antenna feedhorn. This variation of supply voltage "tells" the remotely located LNB electronics whether it should set the antenna polarization clockwise or counterclockwise, which thereby eliminates the need for an interface and cable connection to the antenna.

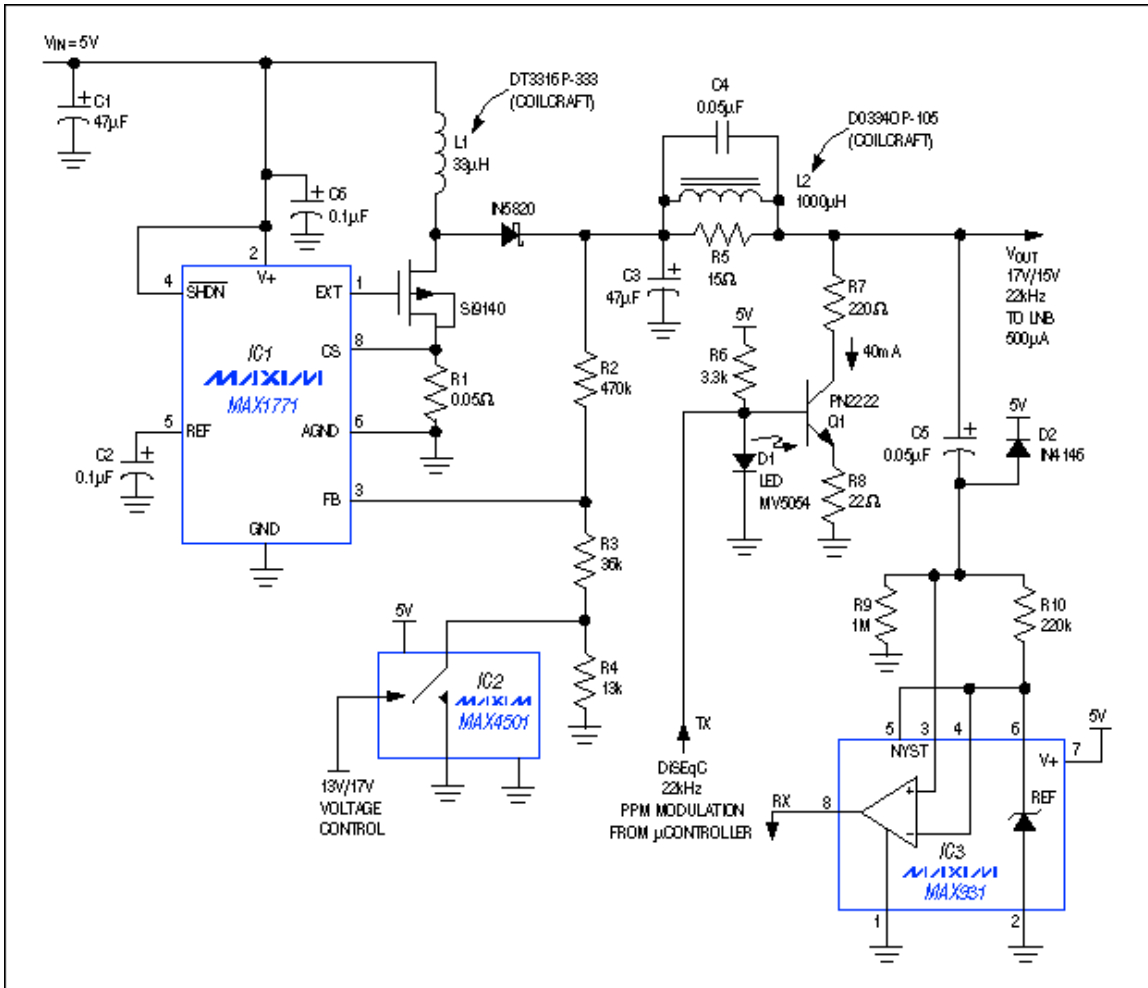


Figure 1. Designed for the low-noise block in a satellite receiver, this DiSEqC-compatible power supply communicates data by toggling its supply voltage between 13V and 17V.

The circuit shown also supports an emerging and more sophisticated communications bus called the DiSEqC standard (for Digital Satellite Equipment Control). Developed by the European Telecommunications Satellite Organization, the open DiSEqC standard promises to become a de facto world standard for communications between satellite receivers and satellite peripheral equipment. More details and circuits are available at the DiSEqC web site: <http://www.eutelsat.org>.

DiSEqC provides a 22kHz pulse-position-modulated signal of about 0.6V amplitude, superimposed on the LNB's DC power rail. Its coding scheme allows the remote electronics to perform more complex functions—like varying the downconversion frequency or physically rotating the antenna assembly. IC1 is a PFM

boost-converter controller that controls an external FET to provide the step-up conversion from 5V to either 13V or 17V. The digital-input Voltage Control sets the position of an analog switch that determines the amount of feedback to IC1, and hence the output voltage level. Thus, an input logic low selects 13V and a logic high selects 17V. IC2, a single switch in a tiny SOT23-5 package, is ideal for this simple switching task.

Components on the right side of the schematic provide compatibility with the DiSEqC standard. The comparator in IC3 forms a receiver that detects data transmitted from a slave LNB assembly (the DiSEqC standard specifies bidirectional data flow). This output connects to the IRQ or port pin of a microcontroller (not shown) for decoding.

The DiSEqC transmitter consists of transistor Q1 and an LED (D1), which acts as a transmit indicator and also as a constant-voltage source that forces a relatively constant current of about 40mA through Q1. During encoded bursts of 22kHz from the microcontroller, the low portions turn off the LED by sinking its drive current, which forces Q1 off as well. The 40mA switched current flows through R5, providing 600mV output swings as required by the specification.

C4, L2, and R5 form a resonant circuit whose impedance at 22kHz is 15 Ω , as required by the specification. The inductor's DC resistance must be 0.5 Ω or lower to accommodate the 0.5A maximum load currents. The circuit also operates on 12V, and does so with greater efficiency. When operating at 12V, consult the MAX1771 data sheet for suitable values of L1 and R1.

A similar idea appeared in the 4/20/98 issue of Electronic Design.

MORE INFORMATION

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