

APPLICATION NOTE 4417

# Transceiver IC Generates $\pm 30V$

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*Abstract: This application note explains how an RS-232 transceiver and a few external components can be combined to generate supply rails up to  $\pm 30V$ . The MAX202 transceiver is featured in the design.*

This design idea appeared in the July 20, 2006 issue of *Electronic Design* magazine.

When applications require only a few millamps of supply current, an RS-232 transceiver IC (here, the [MAX202](#)) and a few external components can generate bipolar supply rails up to  $\pm 30V$ . This capability is useful in  $\pm 15V$  op-amp circuits that provide, for example, meter drive, LCD bias, and gas-detector bias.

In the standard application for which it was designed, the internal charge pump of the MAX202 generates  $\pm 10V$  for driving an RS-232 line. In **Figure 1** the IC's transmit section drives an external charge pump that generates up to  $\pm 30V$ . Modifications allow the circuit to generate other voltages, such as  $\pm 20V$ . With the addition of external linear regulators it can produce  $\pm 15V$  for bipolar op-amp circuits.

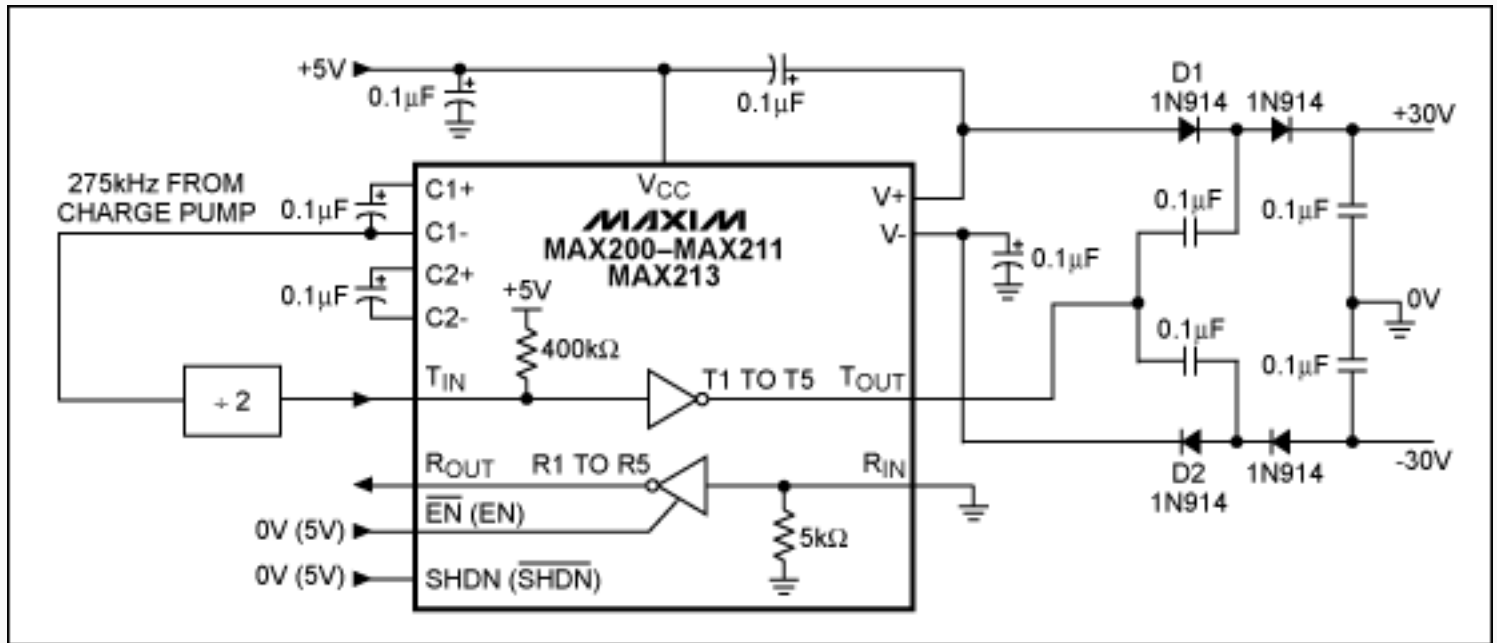


Figure 1. This RS-232 transceiver drives an external charge pump, which provides  $\pm 30V$  supply voltages at a few milliamperes.

The maximum operating frequency for the external charge pump is approximately 120kHz, so a JK flip-flop (or other divide-by-2 circuit connected between +5V and ground) is inserted in the oscillator line to lower the frequency applied to the pump. Lower voltages can be obtained ( $\pm 20V$ , for example) by connecting the anode of D1 and the cathode of D2 to ground instead of  $\pm 10V$ .

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