

# Single bipolar transistor inverts pulses on command

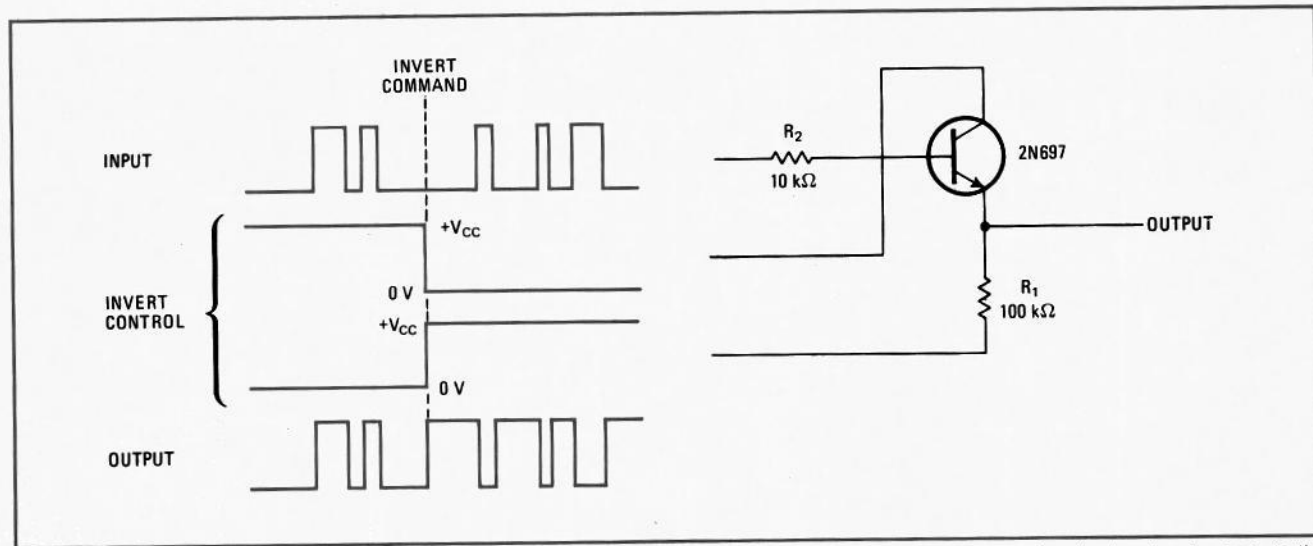
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An ordinary bipolar transistor can be made to function as a command inverter—that is, it will pass a pulse signal without modifying the pulse, but it can invert the

signal upon command. The command is a simple reversal of the polarity of the supply voltage.

To do this usually requires several gates, involving perhaps dozens of parts and interconnections. The command inverter shown here, however, requires only three parts: a single bipolar transistor and two ordinary resistors.

The key to this circuit's operation is that the role of a transistor's emitter and collector can be interchanged if the supply polarity is reversed. When the polarity of the invert control signal is normal, the transistor operates as an emitter-follower, so that the polarity of the output



**Command inverter.** With normal supply polarity, this bipolar transistor operates as an emitter-follower, passing the input pulse train to the output without modifying it. But when the supply polarity is reversed, the transistor's emitter acts as its collector, and the transistor's collector acts as its emitter. Now the polarity of the input pulse train will be inverted at the transistor's output.