APPLICATION NOTE 3180

Standby Current for RS-422 Repeater Is Less Than 3µA

Jul 27, 2004

Abstract: The RS-422 interface is an excellent choice for communicating in noisy environments and over a distance. But, when the distance exceeds the RS-422 capability for reliable data transfer, you must add a repeater. The repeater circuit of Figure 1, which must operate from batteries when no power supply is available, draws less than 3µA of current from a 3V supply.

The RS-422 interface is an excellent choice for communicating in noisy environments and over a distance. However, when the distance exceeds the RS-422 capability for reliable data transfer, you must add a repeater. The repeater circuit in Figure 1, which must operate from batteries when no power supply is available, draws less than 3µA of current from a 3V supply.
Figure 1. This RS-422 repeater draws only 3µA of standby current.

Low standby power and true fail-safe operation are the key features in this application. U1 and U2 drive their receiver outputs (RO) high when the RS-422 inputs are open circuited or terminated and undriven. An incoming data byte on the differential inputs A1 and B1 forces a transition on RO of U1, and a state machine (right half of the Figure 1 schematic) is latched ON by the falling edge of RO. The state machine asserts a high level at U2's driver-enable pin, causing the incoming data byte to be retransmitted from U2 at full RS-422 levels.

The state machine watches for transitions on RO. When a data-byte transfer is complete (as indicated by no falling edges within a time delay internal to the state machine), the state machine resets itself in anticipation of the next data byte from either side of the interface.

An incoming data burst (Figure 2, top) is retransmitted as outputs A2 (bottom trace) and B2 (middle trace). U2 de-asserts those outputs 700µs after the final transition. Other delays can be implemented by adjusting R1/C1 and R2/C2 as shown in Figure 1.
Figure 2. An input data byte causes the repeater to transmit the byte, then go to standby. Vertical scale is 1V per division; horizontal scale is 400μs per division.

Related Parts

| MAX3471 | 1.6μA, RS-485/RS-422, Half Duplex, Differential Transceiver for Battery-Powered Systems | Free Samples |

More Information

For Technical Support: http://www.maximintegrated.com/support
For Samples: http://www.maximintegrated.com/samples
Other Questions and Comments: http://www.maximintegrated.com/contact

Application Note 3180: http://www.maximintegrated.com/an3180
APPLICATION NOTE 3180, AN3180, AN 3180, APP3180, Appnote3180, Appnote 3180
Copyright © by Maxim Integrated Products
Additional Legal Notices: http://www.maximintegrated.com/legal