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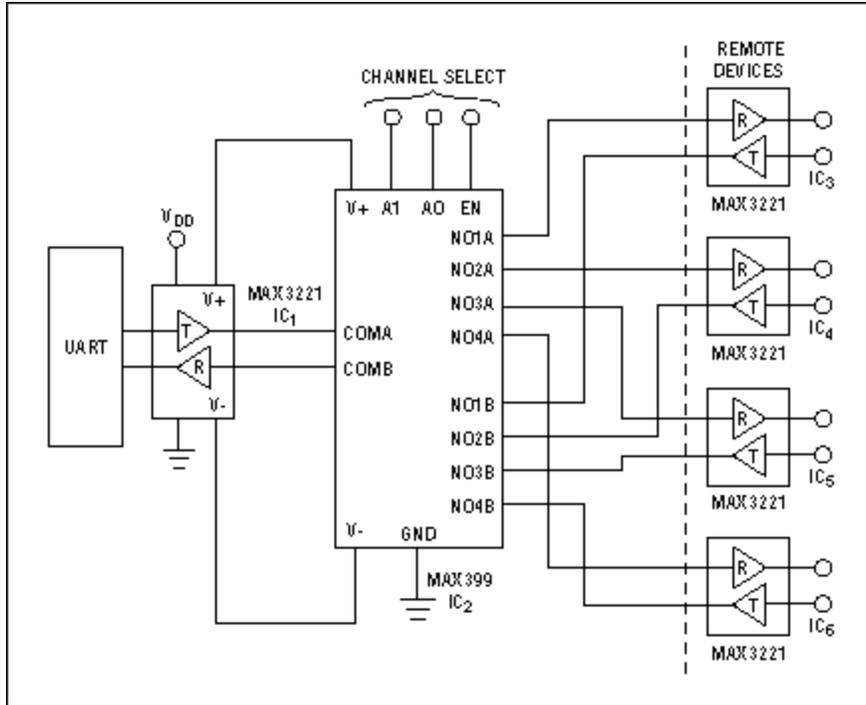
APPLICATION NOTE 588

Multiplexer Enables Pseudomultidrop RS-232 Transmission

Sep 18, 2002

Abstract: A circuit is described that allows four remote RS-232 transceivers to share a single UART. A dual four-to-one multiplexer permits transceiver IC₁ to form a network with the four remote transceivers.

RS-232 communications with one μC and more than one remote system can be problematic, because most μC s contain only one UART, which provides an interface between synchronous and asynchronous ports. The multiplexer in the figure below, IC₂, allows multiple channels (four, in this case) to share a single UART. The dual four-to-one multiplexer permits transceiver IC₁ to form a network with the four remote transceivers IC₃ to IC₆. The table that follows defines the channel-selection codes. Selecting Channel 1, for instance, enables IC₁ to communicate with IC₃ without being loaded by IC₄ to IC₆. Pulldown resistors inside the remote transceivers force the outputs of unselected receivers to a known state.



One UART and one multiplexer enable one RS-232 transceiver to communicate with four others.

Channel Selection Codes

Selected channel	A1	A0	EN
All channels disconnected	X	X	0
Channel 1 (IC ₃)	0	0	1
Channel 2 (IC ₄)	0	1	1
Channel 3 (IC ₅)	1	0	1
Channel 4 (IC ₆)	1	1	1

The circuit's supply-voltage range (3V to 5.5V) makes it compatible with 3V and 5V logic. IC₂ receives its power directly from the V+ and V- terminals of IC₁, whose ±5.5V outputs come from an internal charge pump. The multiplexer handles rail-to-rail signals, so obtaining its power from IC₁ ensures that RS-232 signals pass directly through, regardless of amplitude. Each transceiver's charge pump requires four small capacitors (not shown), whose values depend on the V_{DD} range but do not exceed 0.47μF. Note that pulling too much current from the charge-pump terminals of IC₁, V+ and V-, can cause these rails to droop and can pull the IC's RS-232 transmission levels out of specification.

A similar version of this article appeared in the September 28, 2000 issue of EDN.

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