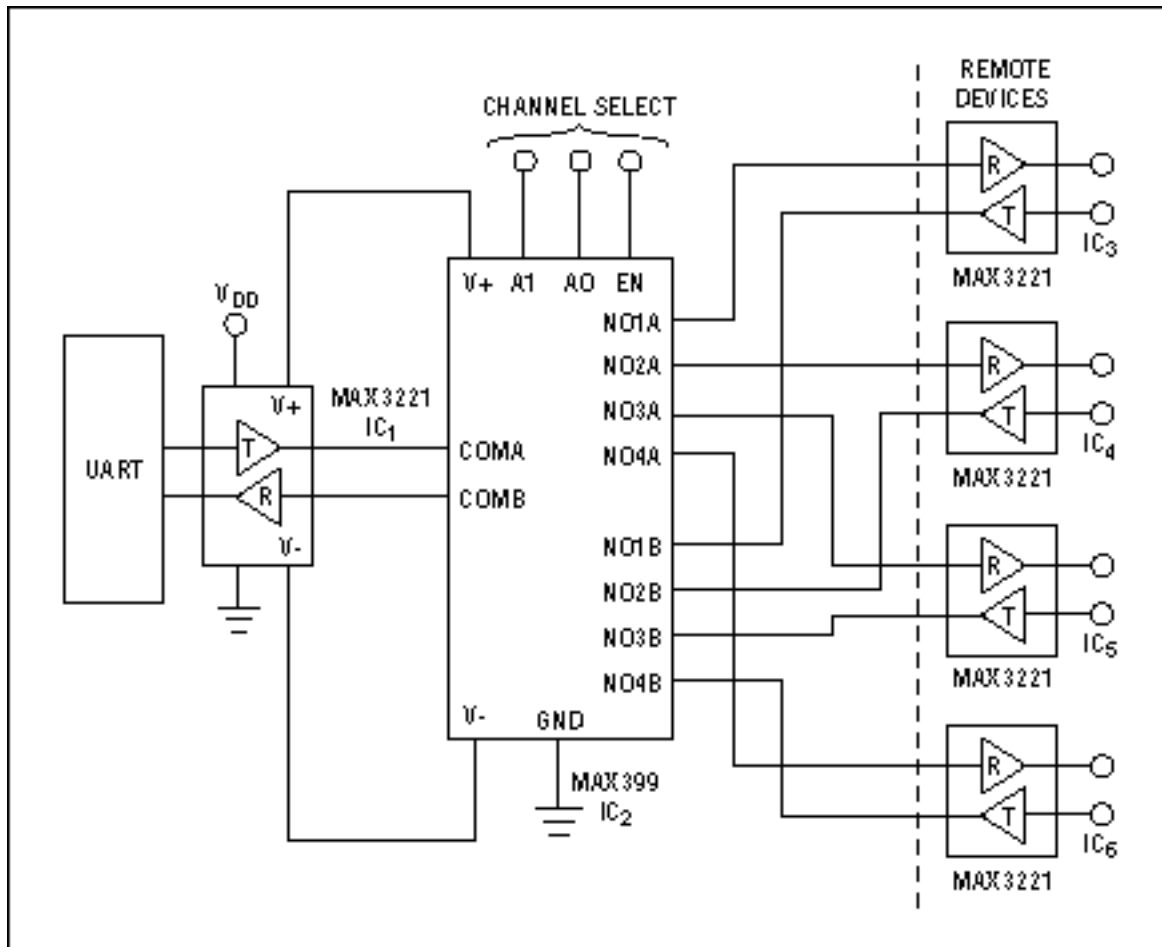


APPLICATION NOTE 588

## Multiplexer Enables Pseudomultidrop RS-232 Transmission

*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 IC<sub>1</sub> to form a network with the four remote transceivers.*

RS-232 communications with one  $\mu\text{C}$  and more than one remote system can be problematic, because most  $\mu\text{C}$ s contain only one UART, which provides an interface between synchronous and asynchronous ports. The multiplexer in the figure below, IC<sub>2</sub>, allows multiple channels (four, in this case) to share a single UART. The dual four-to-one multiplexer permits transceiver IC<sub>1</sub> to form a network with the four remote transceivers IC<sub>3</sub> to IC<sub>6</sub>. The table that follows defines the channel-selection codes. Selecting Channel 1, for instance, enables IC<sub>1</sub> to communicate with IC<sub>3</sub> without being loaded by IC<sub>4</sub> to IC<sub>6</sub>. 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 <sub>3</sub> )	0	0	1
Channel 2 (IC <sub>4</sub> )	0	1	1
Channel 3 (IC <sub>5</sub> )	1	0	1
Channel 4 (IC <sub>6</sub> )	1	1	1

The circuit's supply-voltage range (3V to 5.5V) makes it compatible with 3V and 5V logic. IC<sub>2</sub> receives its power directly from the V+ and V- terminals of IC<sub>1</sub>, whose ±5.5V outputs come from an internal charge pump. The multiplexer handles rail-to-rail signals, so obtaining its power from IC<sub>1</sub> 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<sub>DD</sub> range but do not exceed 0.47μF. Note that pulling too much current from the charge-pump terminals of IC<sub>1</sub>, 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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Application Note 588: <http://www.maxim-ic.com/an588>

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