Time-slot assigner chip cuts multiplexer parts count

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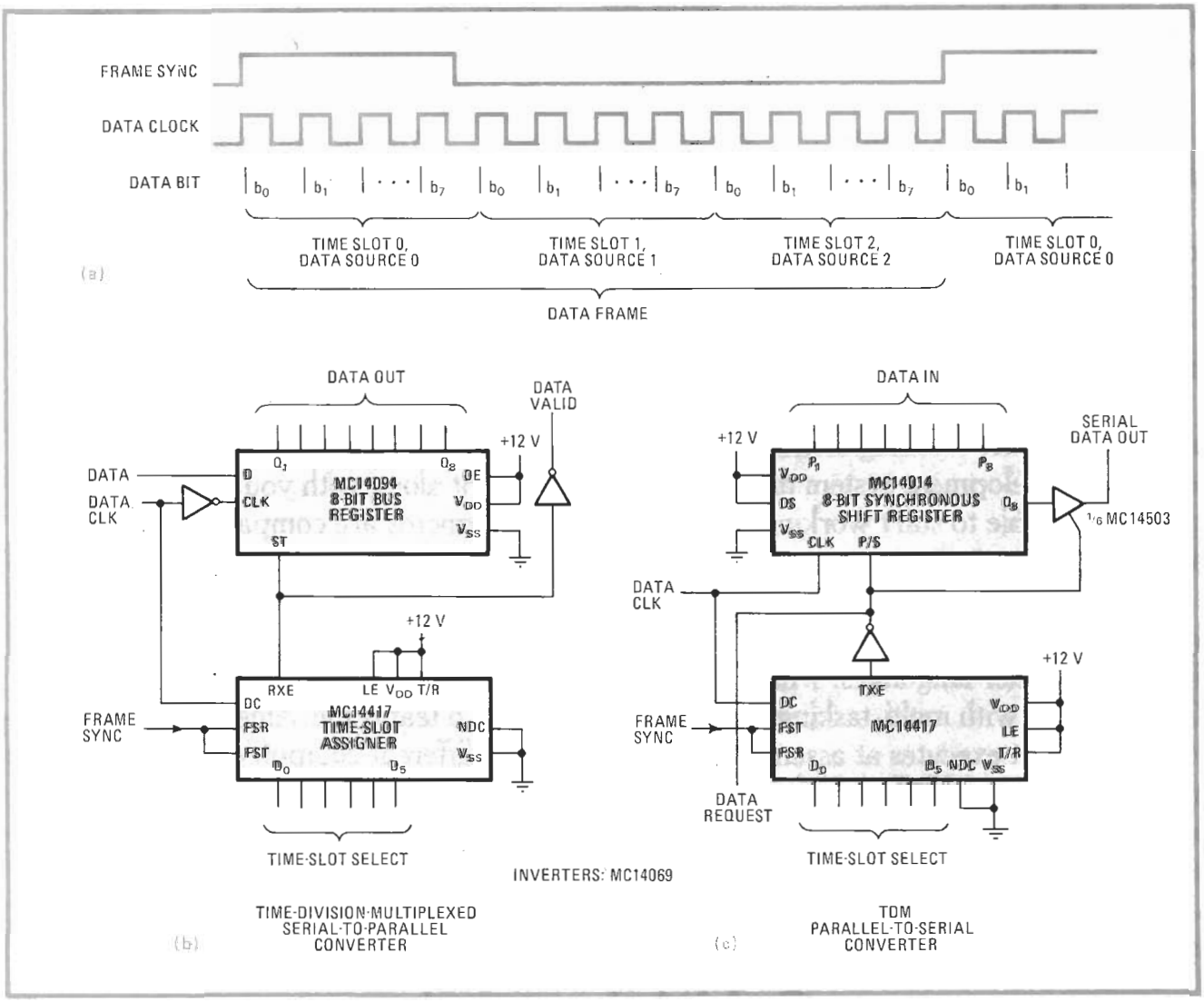
In some communications systems, particularly digital telephony equipment, it is hard to examine the data from a given source after it has been time-division–multiplexed with other data for serial transmission over a common data line. Capturing the data from its time slot and converting it into parallel form for examination usually requires many integrated circuits, since the slot must be programmable.

A special-purpose IC, the MC14417 time-slot assigner carries out this serial-to-parallel function with the aid of only a few inverters and one other IC. What's more, the cost of implementing the circuit is only a few dollars.

The timing of a simple three-slot TDM system is shown in (a). In digital telephone systems, a data frame may consist of anywhere from 24 to 40 time slots, each containing 8 bits of data transmitted at rates of up to 2.56 megabits per second.

In the all–complementary-MOS capture circuit of (b), the MC14094 shift register acts as a serial-to-parallel converter, while the 14417 computes when the data is to be captured and converted. Just which time slot it captures is determined by the binary data present at inputs D_0–D_5 of the 14417. The circuit also provides a valid-data output signal. As for speed, the circuit works for clock rates of up to 2.56 MHz with systems having up to 40 time slots.

Implementing a parallel-to-serial converter for multiplexing data onto the TDM data line is equally simple if the 14417 is used as shown in (c). Here, a three-state buffer prevents the serial data bus from being loaded during idle time-slot periods. The frequency limitations of this second circuit are the same as for the capture circuit. □



The right slot. Time-domain multiplexing (a) assigns to data from several sources specific time slots in a serial data stream. Capturing data from a specific slot is made easy with the MC14417 time-slot assigner (b), which works with the MC14094 shift register to provide data from the source dictated by the select inputs of the 14417. The versatile chip can also provide parallel-to-serial multiplexing (c).