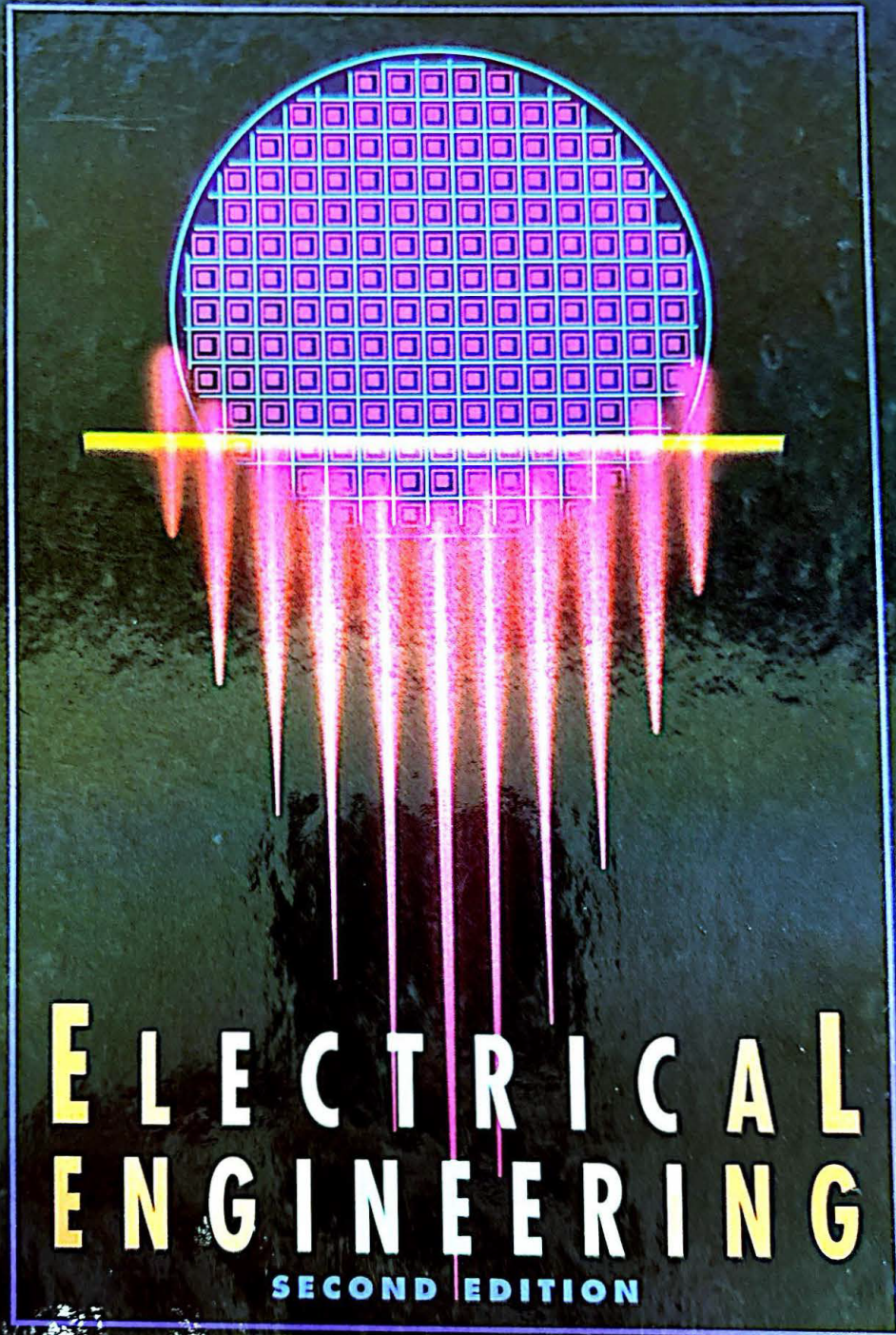


SCHWARZ & OLDHAM



ELECTRICAL ENGINEERING

SECOND EDITION

AN INTRODUCTION

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of the switches—1101 as shown) is being transmitted simultaneously over a set of four wires. (Actually there must be a ground wire also, but it is usually assumed to exist and therefore is not shown on diagrams.) The set of four wires is known as a *bus*. By means of the bus the entire byte is transmitted at the same time. After a certain time, the switches may be reset to new values and another byte sent. In this kind of operation, which is usual inside digital systems, bytes are transmitted serially, but an entire byte is sent simultaneously through the bus each time.

Normally a byte containing N bits is stored in a set of N flip-flops. This set of flip-flops is then referred to as a *register*. Often we wish to take a byte stored in one register and store it in a second register. This process is shown in Fig. 12.3, for the case $N = 4$. Initially a byte of information is stored in the left-hand register (flip-flops 1 to 4). The Q outputs are connected through a four-wire bus to the D inputs of the second register (flip-flops 5 to 8.) Now when the second register receives a “change” instruction through the “clock” wire, the Q output of FF5 takes on the value that was stored

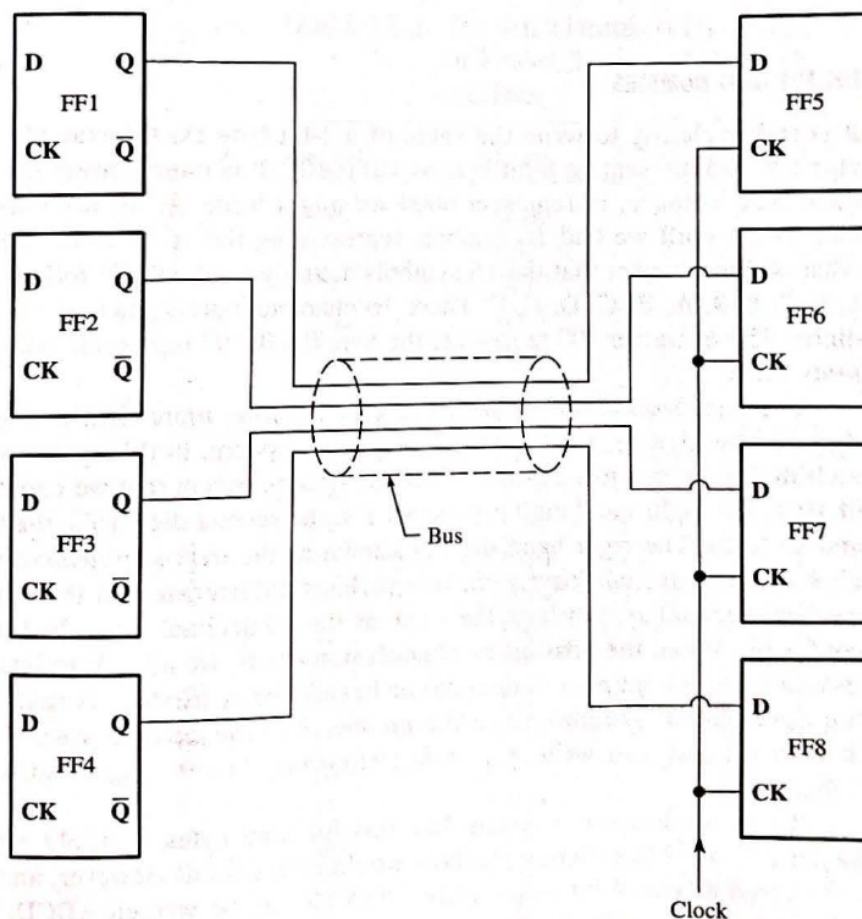


FIGURE 12.3 A 4-bit data latch.