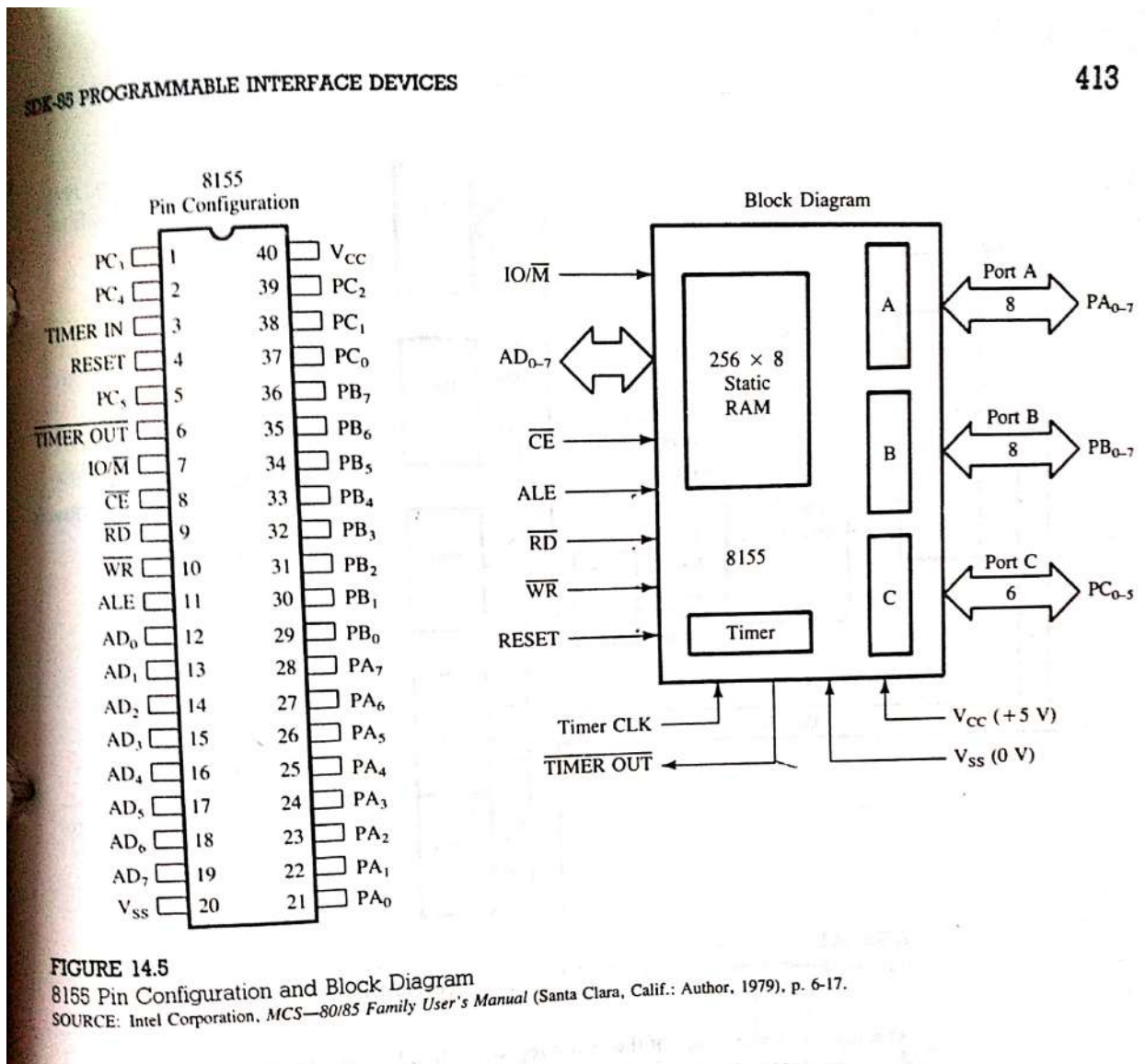


**Topic : The 8155/8156 and 8355/8755 multipurpose programmable devices**



The 8155 and 8156 are two multipurpose programmable devices compatible with 8085 microprocessor. The 8155 includes 256 bytes of R/W memory, three I/O ports and a timer. The 8156 is identical with the 8155 except that 8156 requires chip enable (CE) active high.

The 8155/8156 is a device with two sections : the first is 256 bytes of R/W memory and the second is a programmable I/O. the I/O section includes two 8 bit parallel I/O ports ( A and B ), one 6 bit port ( C ) and a timer as shown in figure. All the ports can be configured simply as input/output ports. Ports A and B can be programmed in handshake mode, each port using three signals as handshake signals from port C. the timer is a 14 bit down counter and has four modes.

### CONTROL LOGIC

The control logic of 8155 uses five control signals, all except the chip enable are input signals directly generated by 8085 microprocessor.

CE (bar)- Chip Enable : this is a master chip select signal connected to the decoded high order bus.

$IO/\bar{M}$  : When this signal is low, the memory section is selected, and when it is high the I/O section ( including timer) is selected.

ALE- Address latch enable : This signal latches the low order address  $AD_7-AD_0$ .

RD and WR : These are control signals to read from and write into chip registers and memory.

RESET : This is connected to reset out of the 8085 and this resets the chip and initializes I/O ports as input ports.

### THE 8155 I/O PORTS and TIMER

The I/O Section of 8155 includes a control register, three I/O ports and two registers for the timer. In this section two address lines plus chip select logic is used to determine port addresses. The I/O ports and the timer can be configured by writing a control word in the control register. The bits in the control register define the function that is to be used.

The timer section of the 8155 has two 8 bit registers. 14 bits are used for counter, two bits for the timer mode and it requires a clock as the input. To operate the timer, a 14- bit count and mode bits are loaded in the registers. An appropriate control word starts the counter, which decrement the count at each clock pulse. The timer can be stopped either in the midst of counting or at the end of a count depending on the type of mode used.