

Explain clock signal of 8085?

8085 operates on a clock frequency of 3MHz–6MHz depending upon the version selected. Clock is provided by a crystal oscillator of 2 times the frequency, so as to produce a 50% duty cycle clock. The minimum operating frequency of 8085 is 500kHz.

What is the purpose of CLK signal of 8085?

The CLK (out) signal obtained from pin 37 of 8085 is used for synchronizing external devices.

Draw the pin diagram of 8085

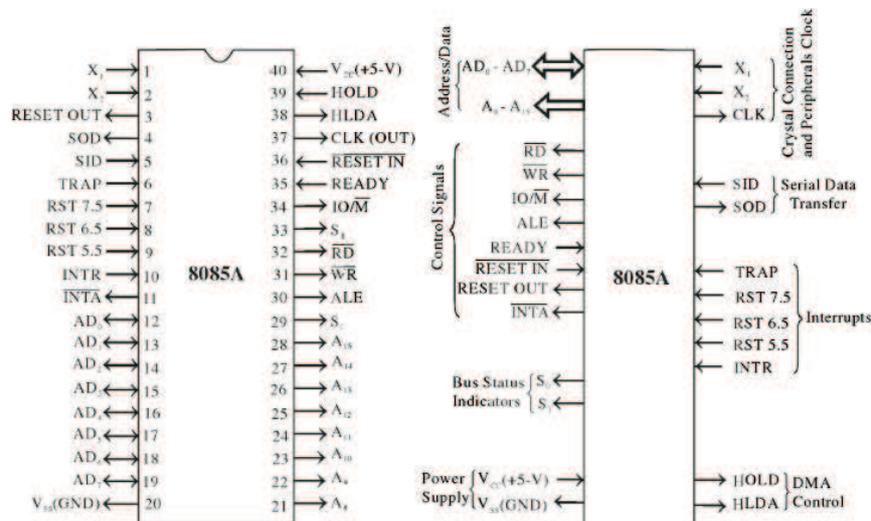


Fig. 1.4 : 8085 microprocessor signals and pin assignment.

Microprocessor 8085 is a 40 pin 8 bit general purpose microprocessor which operates at 3MHz - 5MHz. The word size of 8085 is 8 bits. By using the 8 bits 256 different Op codes can be formed but practically only 246 has been used. There are 74 different mnemonics used for 246 instructions of 8085.

Pins of 8085 can be divided into 6 different categories

1. Address lines/Bus
2. Data lines/Bus
3. Control and Status Signals
4. Power supply and clock signal
5. Externally initiated signals
6. Serial I/P and serial O/P ports

What jobs ALU of 8085 can perform?

The Arithmetic Logic Unit (ALU) of 8085 can perform the following jobs:

- 8-bit binary addition with or without carry.
- 16-bit binary addition.
- 2-digit BCD addition.
- 8-bit binary subtraction with or without borrow.

- 8-bit logical OR, AND, EXOR, complement (NOT function).
- bit shift operation.

Does 8085 have multiplication and division instructions?

No, 8085 does not have the above two instructions. It can neither multiply nor divide two 8-bit numbers. The same are executed by the processor following the process of repetitive addition or subtraction respectively.

State the characteristics of the flag register.

The following are the characteristics of flag register:

- It is an 8-bit register.
- It contains five flags—each of one bit.
- The flag register can't be written into.

What is the function of ALE and how does it function?

Pin 30 of 8085 is the ALE pin which stands for 'Address Latch Enable'. ALE signal is used to demultiplex the lower order address bus (AD0 – AD7).

Pins 12 to 19 of 8085 are AD0 – AD7 which is the multiplexed address-data bus. Multiplexing is done to reduce the number of pins of 8085.

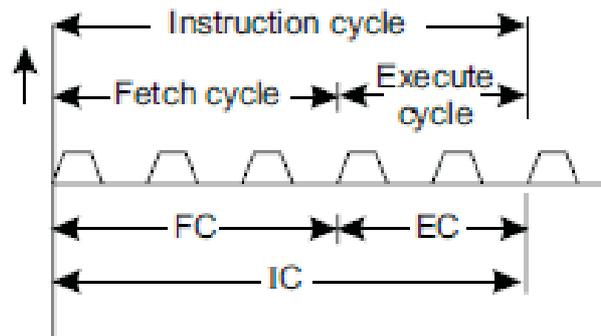
Lower byte of address (A0 – A7) are available from AD0 – AD7 (pins 12 to 19) during T1 of machine cycle. But the lower byte of address (A0 – A7), along with the upper byte A8 – A15 (pins 21 to 28) must be available during T2 and rest of the machine cycle to access memory location or I/O ports.

Now ALE signal goes high at the beginning of T1 of each machine cycle and goes low at the end of T1 and remains low during the rest of the machine cycle. This high to low transition of ALE signal at the end of T1 is used to latch the lower order address byte (A0 – A7), so that the lower byte A0 – A7 is continued to be available till the end of the machine cycle.

What is an instruction cycle?

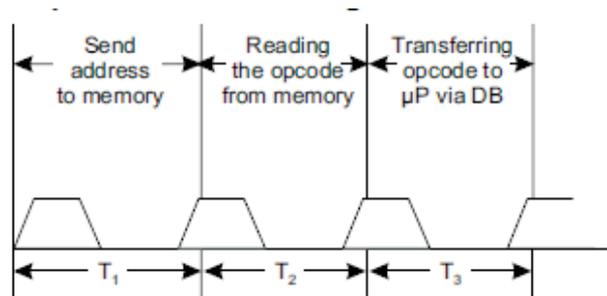
When a processor executes a program, the instructions (1 or 2 or 3 bytes in length) are executed sequentially by the system. The time taken by the processor to complete one instruction is called the Instruction Cycle (IC).

An IC consists of Fetch Cycle (FC) and an Execute Cycle (EC). Thus $IC = FC + EC$. It is shown in Figure. Depending on the type of instruction, IC time varies.



Explain a typical fetch cycle (FC).

The time required to fetch an opcode from a memory location is called Fetch Cycle. A typical FC may consist of 3T states. In the first T-state, the memory address, residing in the PC, is sent to the memory. The content of the addressed memory (i.e., the opcode residing in that memory location) is read in the second T-state, while in the third T-state this opcode is sent via the data bus to the instruction register (IR). For slow memories, it may take more time in which case the processor goes into 'wait cycles'. Most microprocessors have provision of wait cycles to cope with slow memories. A typical FC may look like the following:



What is the connection between M and HL pair of 8085?

M is a memory pointer. It points to the location whose address is given by HL pair.

What is PC register of 8085?

Program Counter is a 16-bit register. It contains address of the next instruction. It is incremented as soon as every instruction byte is fetched.

What is SP register of 8085?

The SP is a 16 bit programmable register which is used to store the address of top of the stack. The stack is the group of memory locations used to store the data temporarily during execution of a program. Stack pointer is decremented by two after execution of each PUSH instruction and incremented by two after execution of each POP instruction. The stack pointer is initiated by the programmer using instruction LXI SP, 16 bit address.

What are Instruction Register and Instruction Decoder

Instruction Register: This is an 8 bit non-programmable register used to store an 8 bit instruction code when Op code is fetched from the memory.

Instruction Decoder: The instruction decoder decodes the instruction codes and establishes the sequence of events to follow. Both instruction register and decoder are part of ALU.

What are the contents of Program Counter (PC), when the microprocessor is reading from 2FFFH memory location?

3000H as the PC contains the memory address of the instruction that is to be executed next

What is the difference between SUB B and CMP B?

Both perform A-B. SUB will store the result in A and affect the flags. CMP will NOT STORE the result, it will ONLY affect the flags.

What is the difference between ADD and ADC instructions?

Both perform addition. ADD is a half adder. ADC is a full adder, as in, it will also include the carry of the previous operation. It is used to add large numbers. It is used to add large sized numbers so that the carry of the lower byte propagates into the higher byte.

What is the significance of Accumulator in 8085?

A is the Accumulator. It holds the First operand and the result in any arithmetic and logic operation.

Note: ONLY for DAD instruction, HL pair acts as a 16-bit accumulator.

What lines are multiplexed in 8085 μ P and why?

A0-A7 and D0-D7 are multiplexed to produce AD0-AD7. This is done to reduce the number of lines.

What is the difference between JMP 2000H and CALL 2000H?

Both will take the program to 2000H. JMP will continue from there on. Call will execute the sub-routine at 2000H and then Return to the main program at the next instruction upon getting RET.

What is the use of ANA, ORA, XRA instructions?

ANA: To clear a bit from a register.

ORA: To set a bit from a register.

XRA: To complement a bit from a register.

A has a value 35H. How can you make it 53H?

Rotate A 4 times in any direction, the nibbles will get interchanged.

Code:

RLC
RLC
RLC
RLC

What are the uses of stack?

- 1) To store data
- 2) To store return address during Call
- 3) To read/write flags using PSW
- 4) To pass parameters to subroutines

How is opcode fetch machine cycle different from memory read in 8085 μ P?

In memory read we get ordinary data,so it doesn't need to be decoded. In opcode fetch the byte fetched is the opcode, hence has to be decoded in the 4th T-state.S1 and S0 are both 1 1 to indicate that it is opcode fetch cycle.

How do you determine if a number is even or odd?

Rotate the number Right
The LSB comes into carry flag.
Check carry flag.
If CF=1 Number is Odd else Even.

What determines the number of bytes to be fetched from memory to execute an instruction?

An instruction normally consists of two fields. These are: Opcode : Operand

Thus, while the system starts executing an instruction, it first decodes the opcode which then decides how many more bytes are to be brought from the memory—its minimum value is zero (like RAR) while the maximum value is two (like STA 4059H).

Does the ALU have any storage facility?

No, it does not have any storage facility. For this reason, the need for temporary data registers arise in ALU—it has two inputs: one provided by the accumulator and the other from the temporary data register. The result of summation is stored in the accumulator.

What is WZ pair of register in 8085?

It is a temporary register pair used only by the μ P. It is NOT available to the programmer. It is used in holding 16-bit temp values, like holding the address during fetching of an instruction like Call 2000H.

What are the different types of data transfer operations possible?

The different types of data transfer operations possible are cited below:

- Between two registers.
- Between a register and a memory location.
- A data byte can be transferred between a register and a memory location.
- Between an I/O device and the accumulator.
- Between a register pair and the stack.