Lecture 05: Data Transfer Instructions. The XCHG Instruction

XCHG instruction Swaps data between two registers or a register and memory location

Mnemonic	Meaning	Format	Operation ⟷	Flags affected
XCHG	Exchange	XCHG D,S	(s) (D)	None

Destination	Source
Accumulator	Reg 16
Memory	Register
Register	Register
Register	Memory

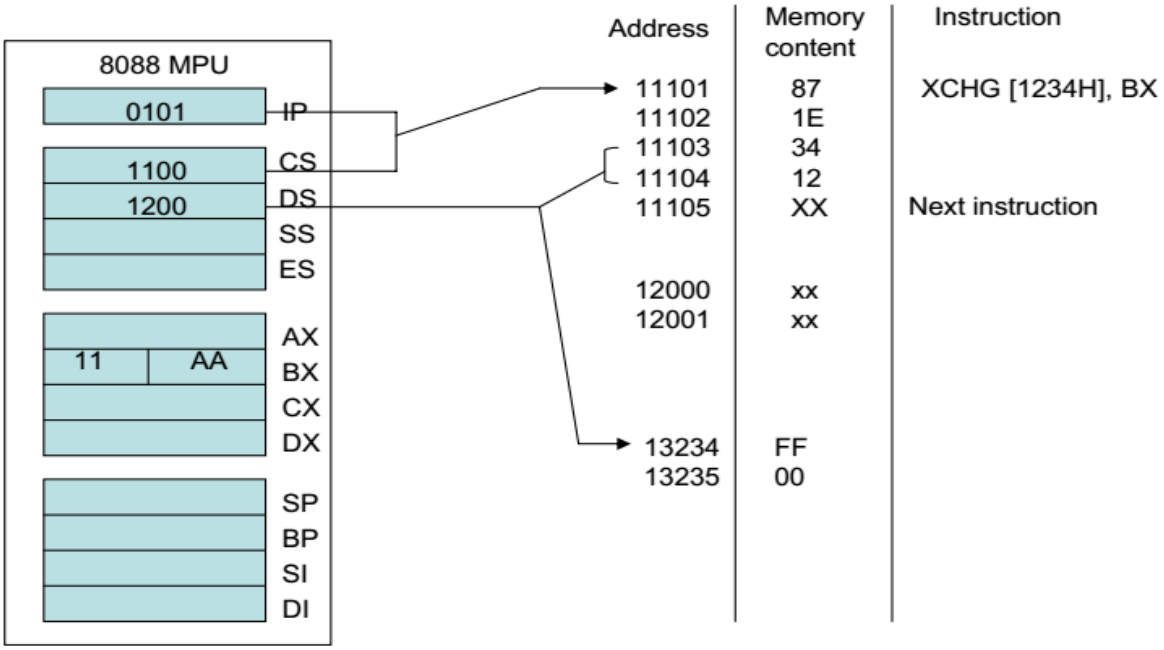
NO XCHG: { MEMs, SEG REGs }

Example: XCHG [1234h], BX

Swap the data between register BX and A word at memory location at offset 1234H

Ex: For the data shown in the figure what is the result of executing the following Instruction XCHG [1234H], BX

Execution of this instruction performs the function
(DSx10 +1234H) ⟷ (BX)



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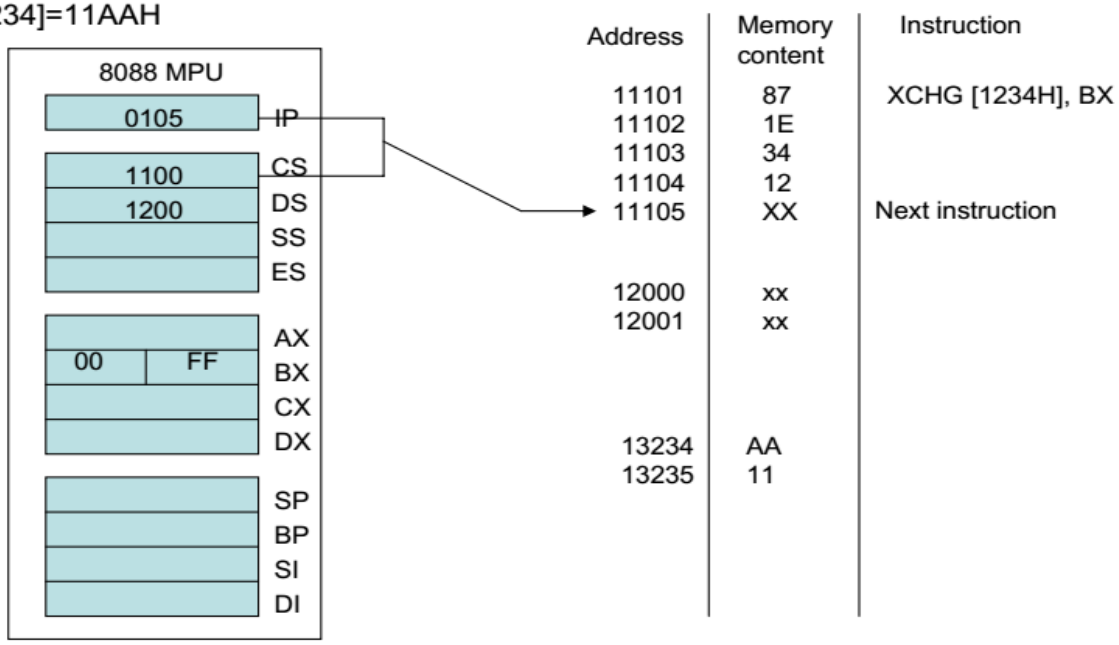
(DS) =1200H, EA or Ofset address =1234H, The PA=12000H+1234H= 13234H
The data at this address is FFH and the address that follows contains 11H.

Execution of this instruction performs the following 16-bit swap:
(13234H) ⟷ (BL)
(13235H) ⟷ (BH)

Thus we get (BX)= 00FFH
[DS:1234]=11AAH



The XLAT Instruction

Mnemonic	Meaning	Format	Operation	Flags
XLAT	Translate	XLAT	((AL)+(BX)+(DS)0) →(AL)	None

The XLAT instruction simplifies implementation of lookup table.

Example: Assume (DS) = 0300H, (BX)=0100H, and (AL)=0DH. Here 0Dh represent the ASCII character CR.
Execution of XLAT replaces the contents of Al by the contents of memory location with physical address
PA=(DS)0 +(BX) +(AL)
= 03000H + 0100H + 0DH = 0310DH
Thus
(0310DH) → (AL) Assuming this memory locations contains 52H (EBCDIC code for CR) this value is placed in AL. That is (AL)=52h.

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The LEA, LDS, LES Instructions:

Mnemonic	Meaning	Format	Operation	Flags affected
LEA	Load Effective Address	LEA Reg16,EA	EA ⟶ (Reg16)	None
LDS	Load Register And DS	LDS Reg16,MEM32	(MEM32) ⟶ (Reg16) (Mem32+2) ⟶ (DS)	None
LES	Load Register and ES	LES Reg16,MEM32	(MEM32) ⟶ (Reg16) (Mem32+2) ⟶ (ES)	None

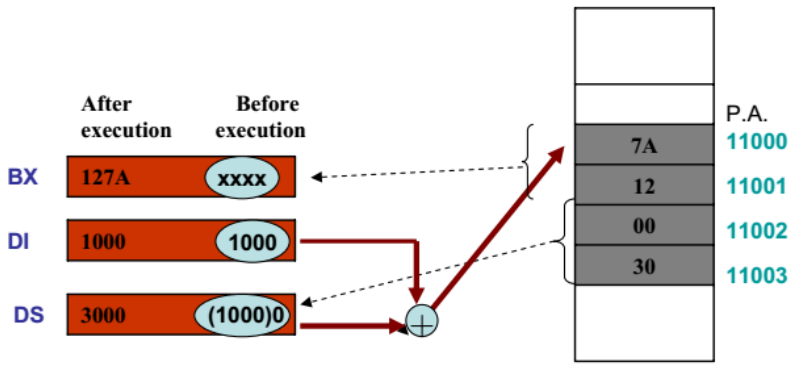
The following two instructions are equivalent, however, the second is more Efficient.

LEA SI, DATA
or
MOV SI, Offset DATA

Example: LEA SI,[DS:2345H] ➔ will load SI=2345H

Ex: assume (DI) = 1000H, (DS) = 1000H, content of P.A. 11000H=[11000H] =>7AH, [11001H]=>12H, [11002H]=>00H, [11003H]=>30H.
What happens if the following instruction is executed.

LDS BX, [DI];



Register BX is loaded from location DSx10+1000H= 11000H
Register DS is loaded from 11002H.

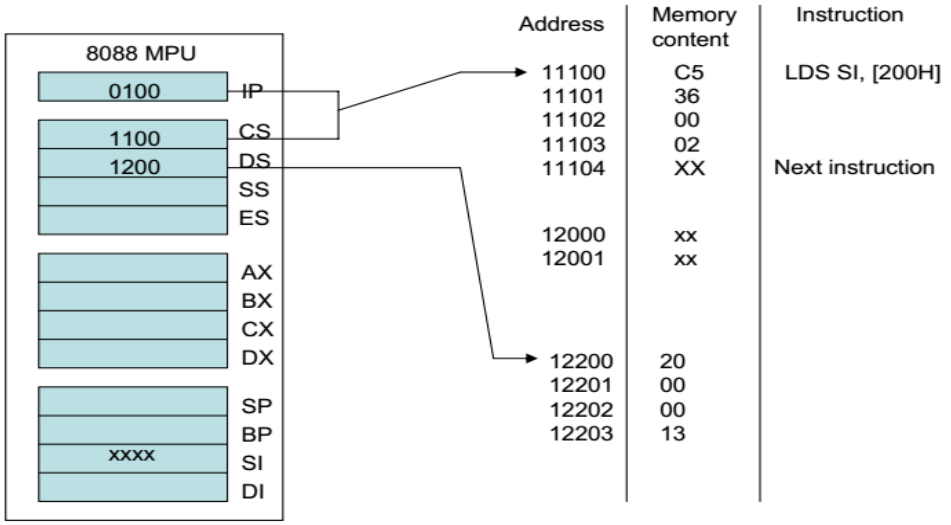
LES similar to LDS except that it loads ES in addition to the specified regisetr

Lecture 05: Data Transfer Instructions. The XCHG Instruction

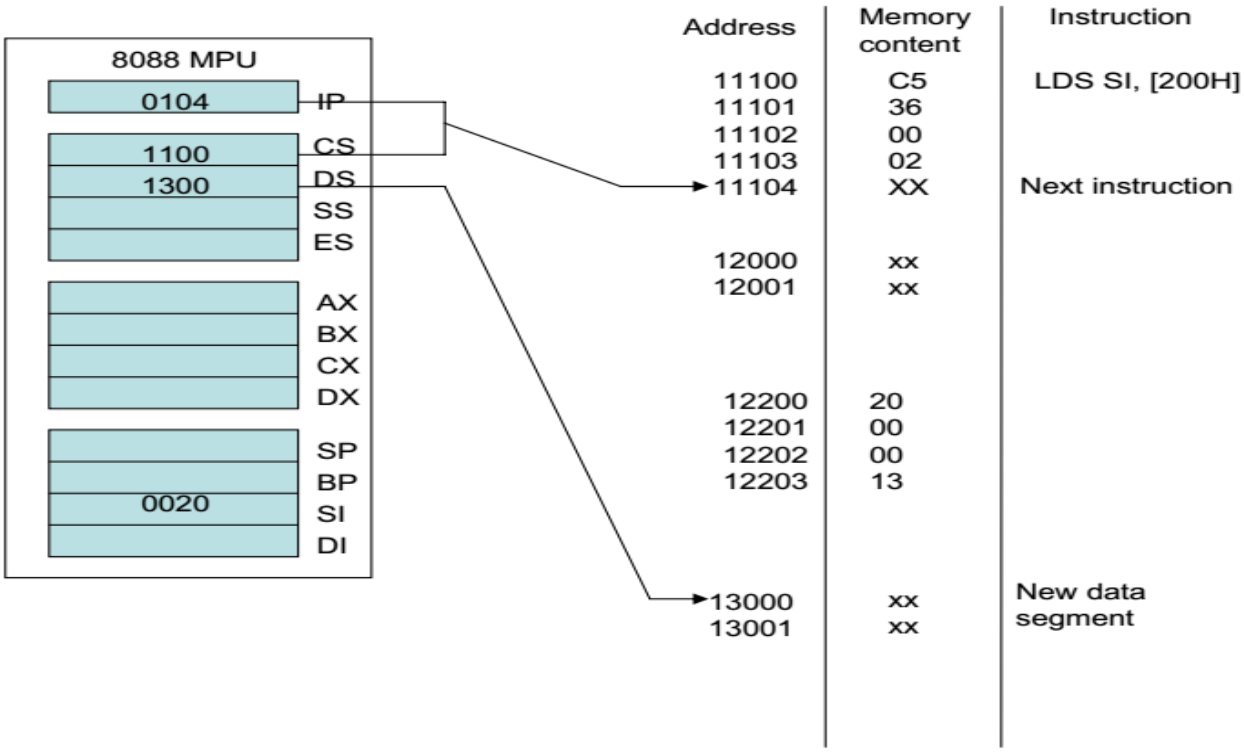
Ex: Assuming that the 8088 is initialized as shown in the following figure. What is the result of executing the following instruction?

LDS SI, [200H]

This instruction loads SI from memory location at physical location
PA= 12000H + 200H = 12200H
DS is loaded with the contents of the following two bytes at address 12202H



After execution

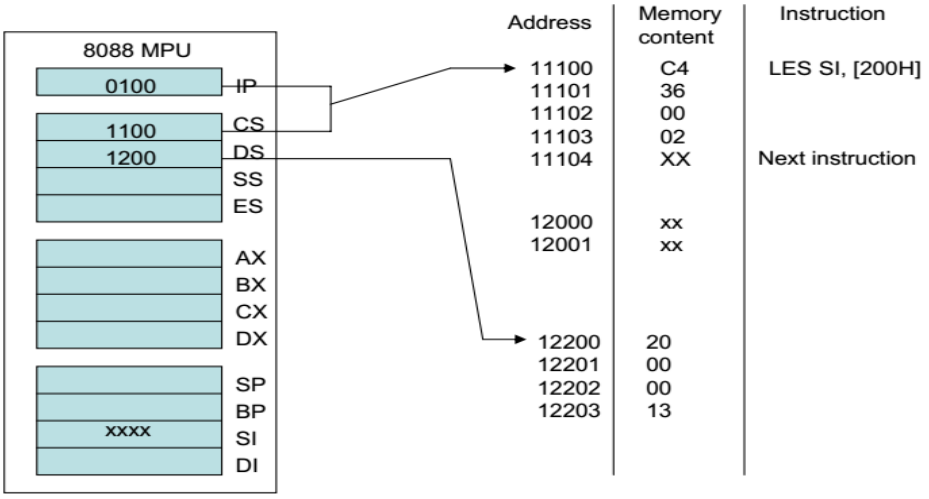


Lecture 05: Data Transfer Instructions. The XCHG Instruction

Ex: Assuming that the 8088 is initialized as shown in the following figure.
What is the result of executing the following instruction?

LES SI, [200H]

This instruction loads SI from memory location at physical location
PA= 12000H + 200H = 12200H and
ES is loaded with the contents of the following two bytes at address 12202H



After execution of **LES** SI, [200H]