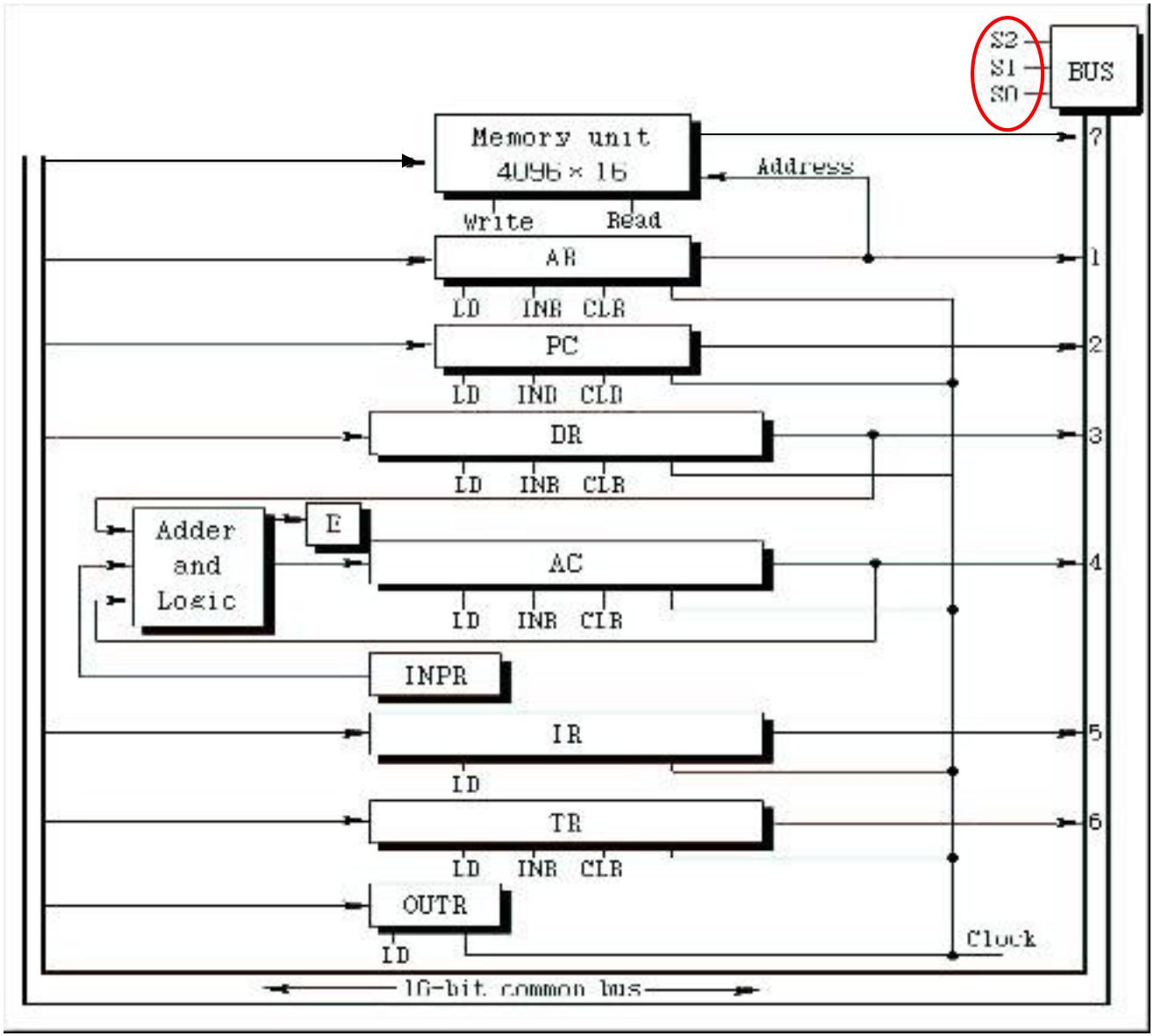
공통버스(COMMON BUS) 시스템

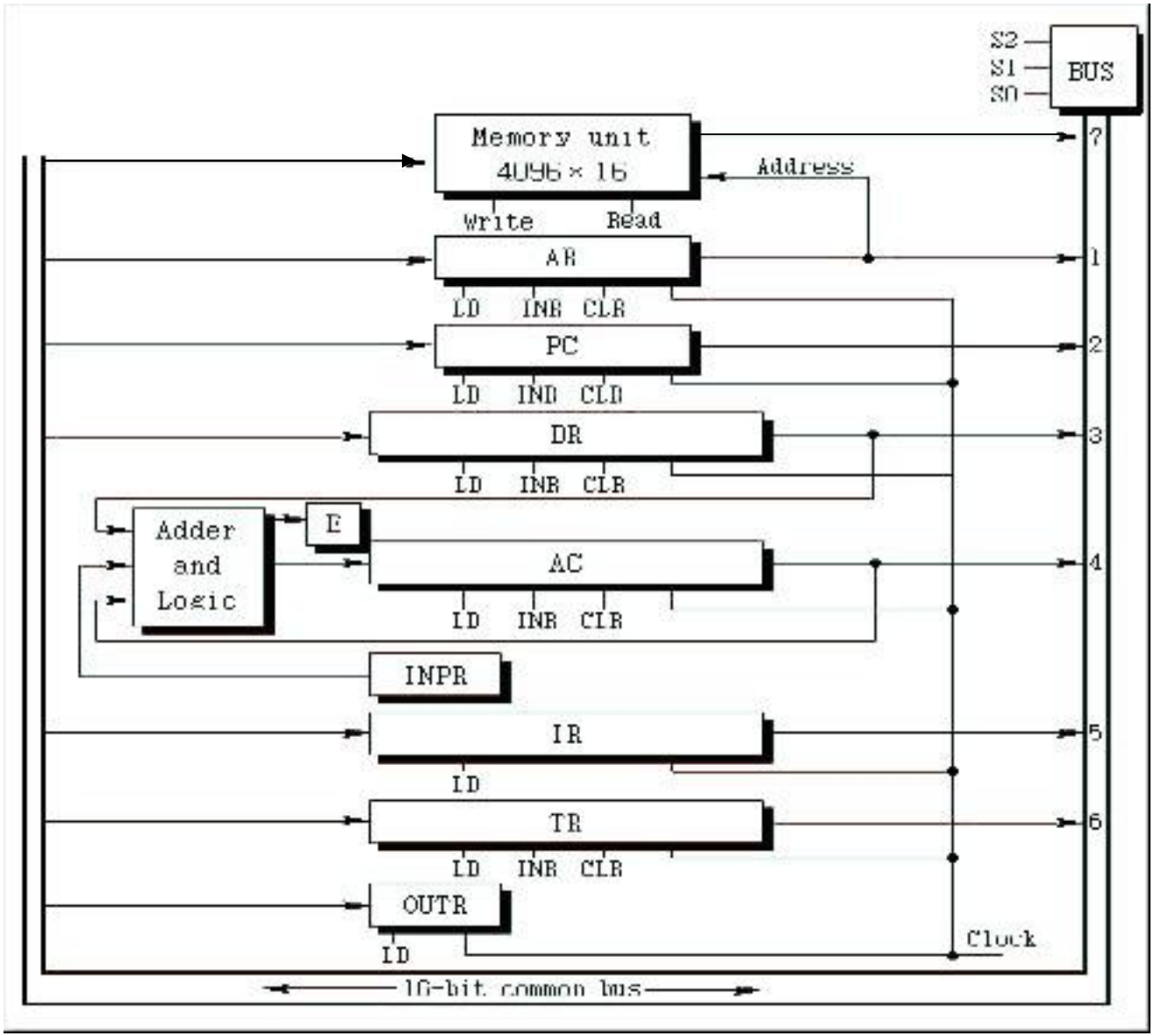
컴퓨터 명령어

타이밍과 제어

Common bus system

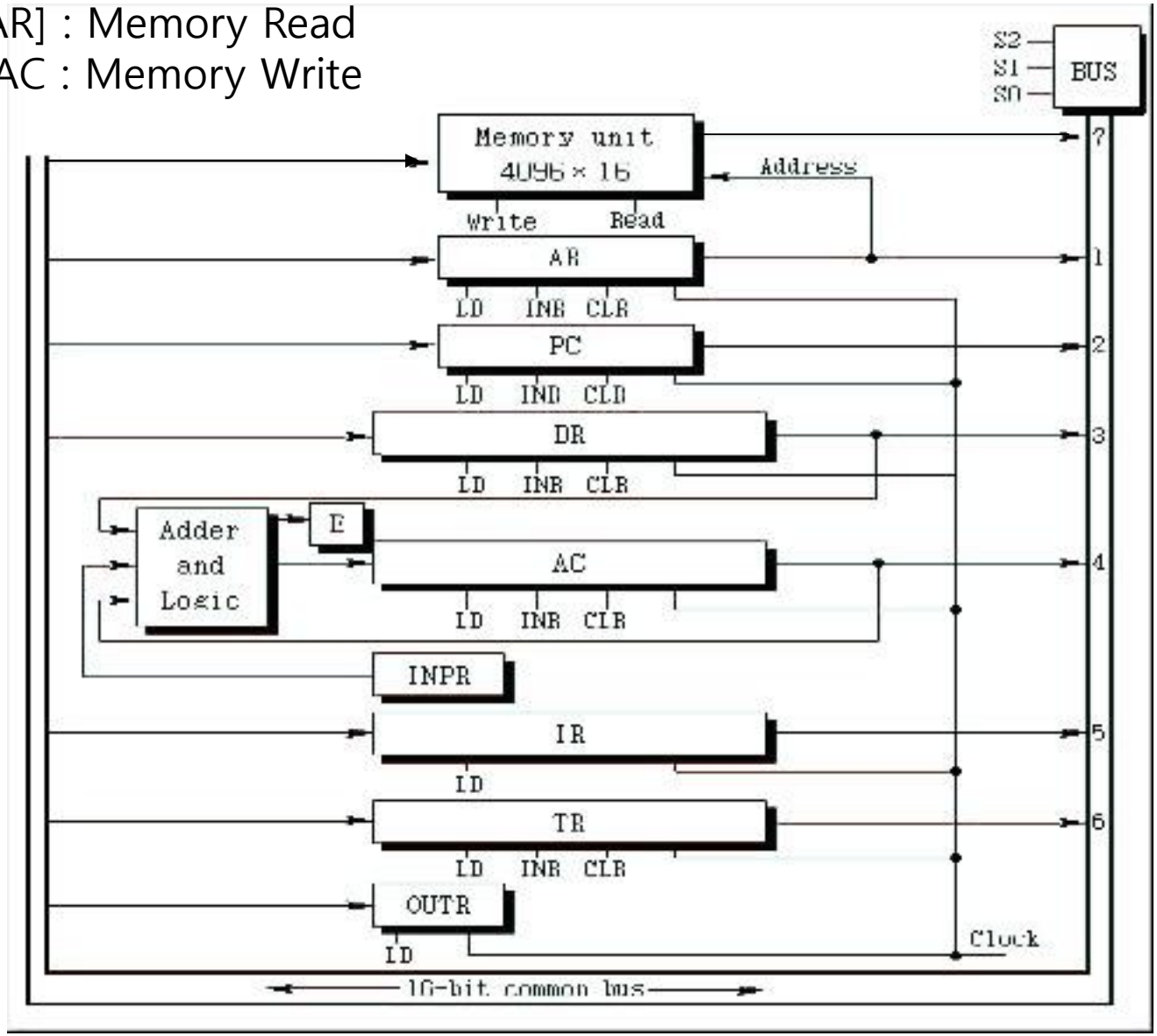


Common bus system(AR ← PC 과정 설명)



Common bus system(메모리 Read/Write과정)

DR ← M[AR] : Memory Read
M[AR] ← AC : Memory Write



5.3 컴퓨터 명령어

- 주소모드와 3비트의 연산코드에 의해 주소부분의 12비트의 의미가 결정됨.

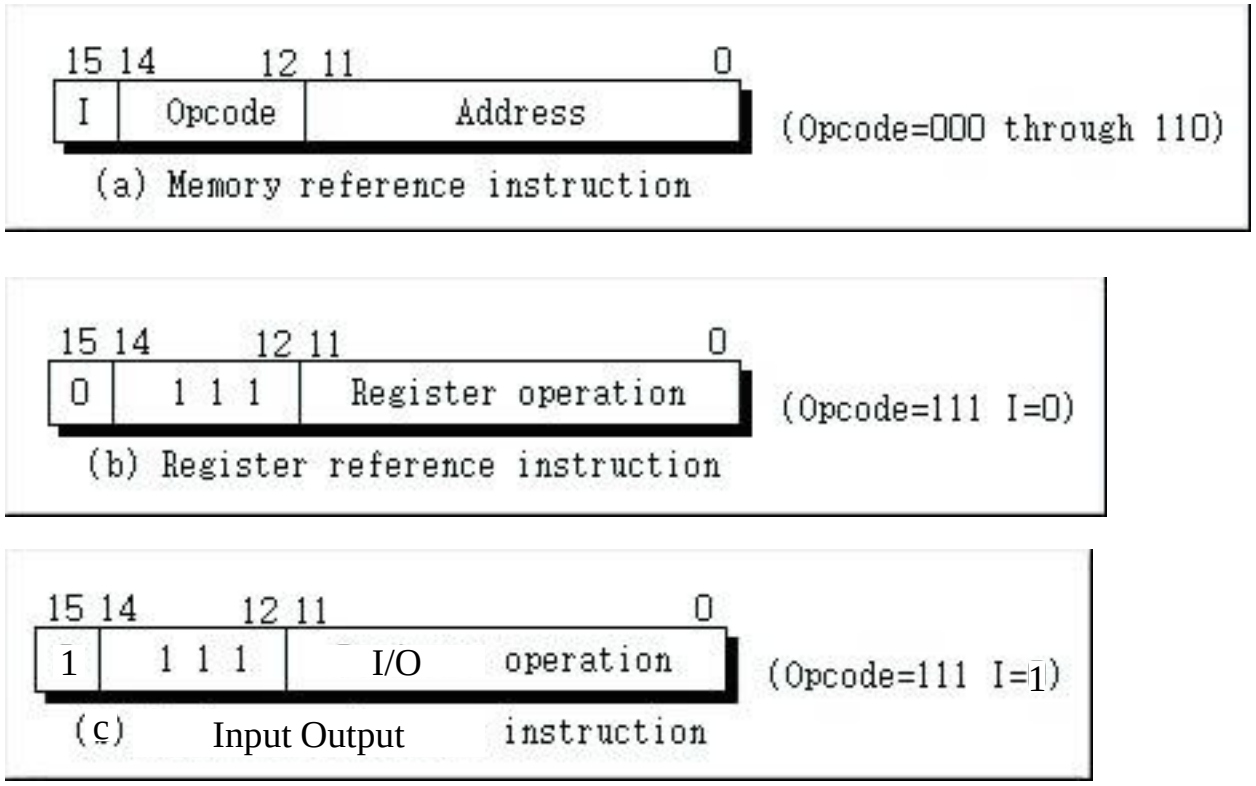
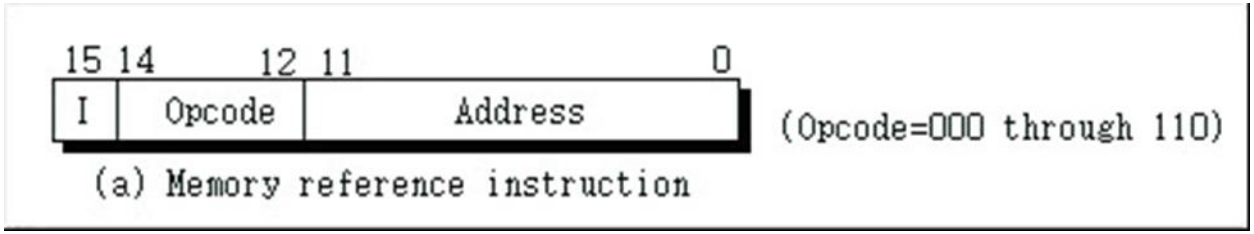


표5-2 컴퓨터 명령어

Symbol	Hexadecimal code I = 0	Hexadecimal code I = 1	Description
AND	0XXX	8XXX	AND memory word to AC
ADD	1XXX	9XXX	Add memory word to AC
LDA	2XXX	AXXX	Load memory word to AC
STA	3XXX	BXXX	Store content of AC in memory
BUN	4XXX	CXXX	Branch unconditionally
BSA	5XXX	DXXX	Branch and save return address
ISZ	6XXX	EXXX	Increment and skip if zero
CLA	7800		Clear AC
CLE	7400		Clear E
CMA	7200		Complement AC
CME	7100		Complement E
CIR	7080	7=0111	Circulate right AC and E
CIL	7400		Circulate left AC and E
INC	7020		Increment AC
SPA	7010		Skip next instruction if AC positive
SNA	7008		Skip next instruction if AC negative
SZA	7004		Skip next instruction if AC zero
SZE	7002		Skip next instruction if E 0
HLT	7001		Halt computer
INP	F800		Input character to AC
OUT	F400		Output character fron AC
SKI	F200	F=1111	Skip on input flag
SKO	F100		Skip on output flag
ION	F080		Interrupt on
IOF	F040		Interrupt off

메모리 참조 명령어



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STA	3XXX	BXXX	Store content of AC in memory
BUN	4XXX	CXXX	Branch unconditionally
BSA	5XXX	DXXX	Branch and save return address
ISZ	6XXX	EXXX	Increment and skip if zero

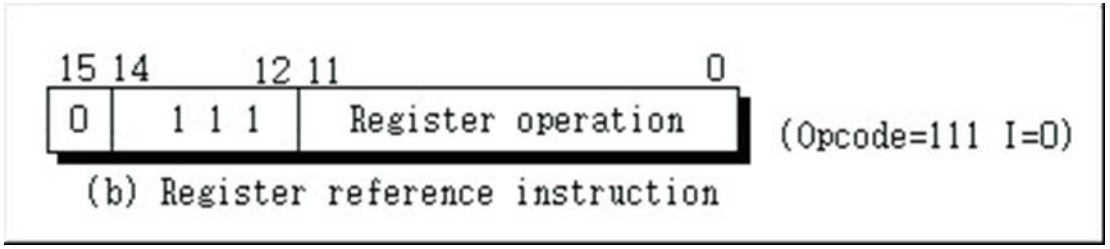
LDA 100의 예(직접주소)

0 010 0000 0110 0100

LDA @100의 예(간접주소)

1 010 0000 0110 0100

레지스터 참조 명령어



Symbol	Hexadecimal code I = 0	I = 1	Description
CLA	7800		Clear AC
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CMA	7200		Complement AC
CME	7100		Complement E
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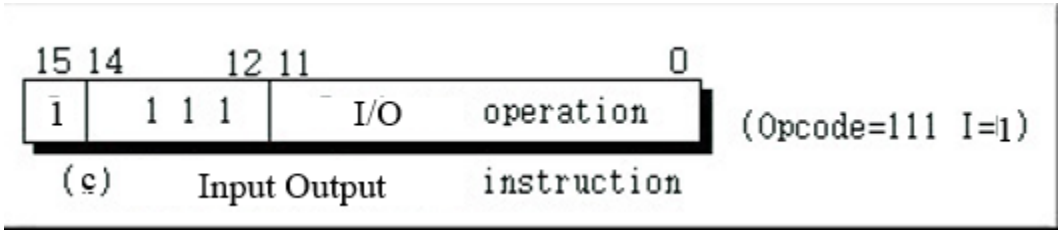
INC	7020		Increment AC
SPA	7010		Skip next instruction if AC positive
SNA	7008		Skip next instruction if AC negative
SZA	7004		Skip next instruction if AC zero
SZE	7002		Skip next instruction if E 0
HLT	7001		Halt computer

CLA 명령의 예

0111 1000 0000 0000

입출력 명령어



Symbol	Hexadecimal code I = 0	I = 1	Description
INP	F800		Input character to AC
OUT	F400		Output character fron AC
SKI	F200	F=1111	Skip on input flag
SKO	F100		Skip on output flag
ION	F080		Interrupt on
IOF	F040		Interrupt off

INP 명령의 예

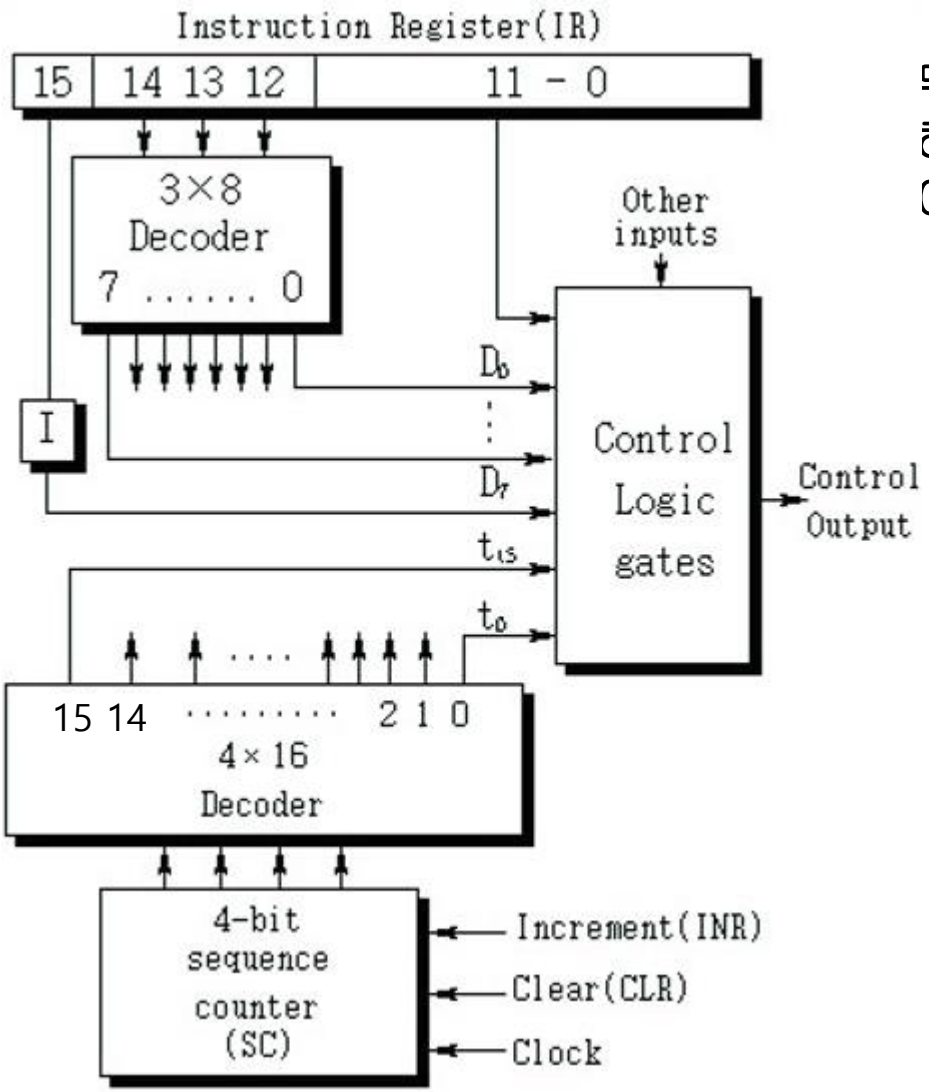
1111 1000 0000 0000

명령어 집합의 완전성

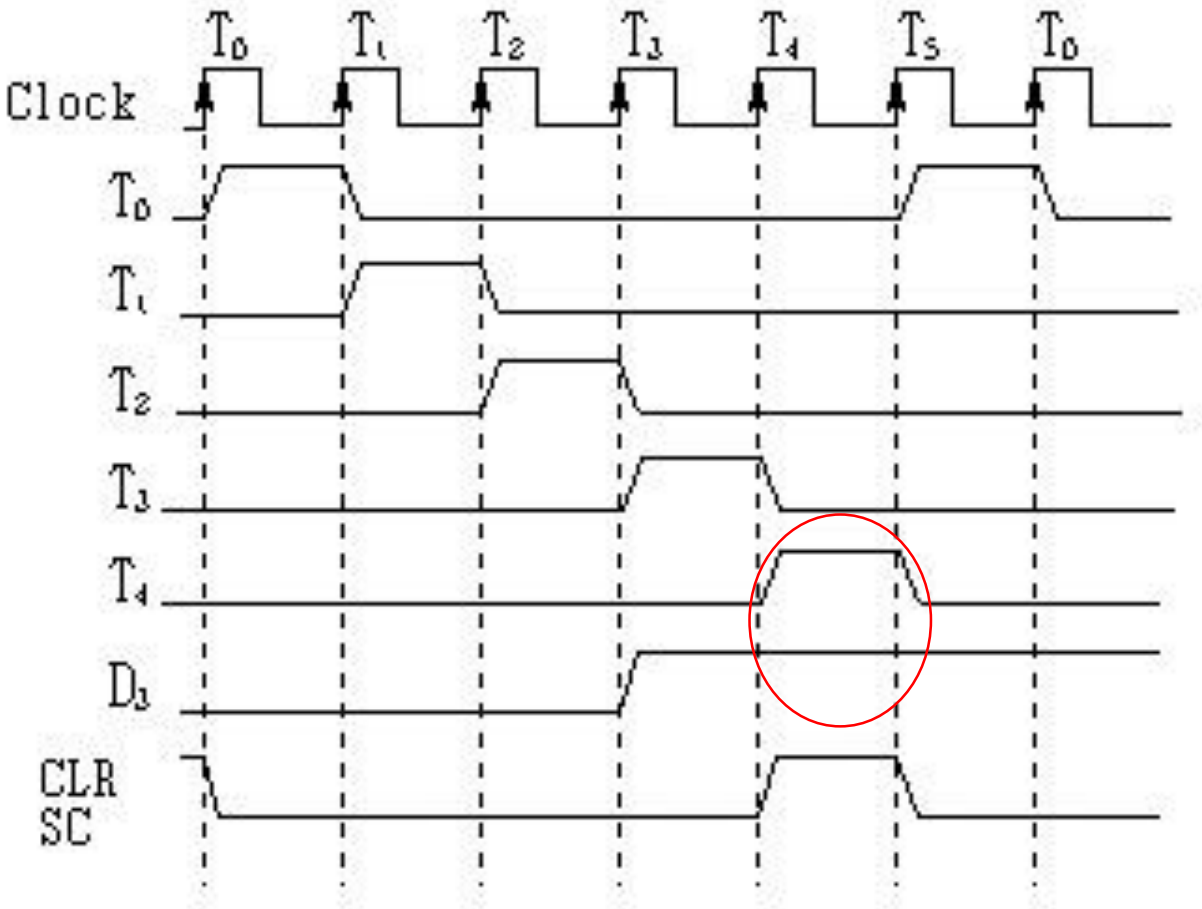
- 명령어의 종류
  - 산술, 논리, 시프트 명령어 : ADD, CMA, INC
  - 메모리와 레지스터 사이의 정보의 이동 : LDA, STA
  - 상태조건 검사 및 프로그램 제어 명령어 : BUN, BSA, ISZ
  - 입력과 출력 명령어 : INP, OUT

5.4 타이밍과 제어

- 제어장치
  - Hardwired 제어방식 : 디지털 회로를 이용하여 제어 논리를 구현
  - Microprogrammed 제어방식 : 제어 메모리에 저장된 제어 정보를 이용하여 마이크로 연산을 순차적으로 수행



두 개의 디코더
하나의 순차 카운터
여러 개의 제어 논리 게이트



$$D_3 T_4 : SC \leftarrow 0$$

Clear SC

수고하셨습니다!