Mikroişlemci Sistemleri

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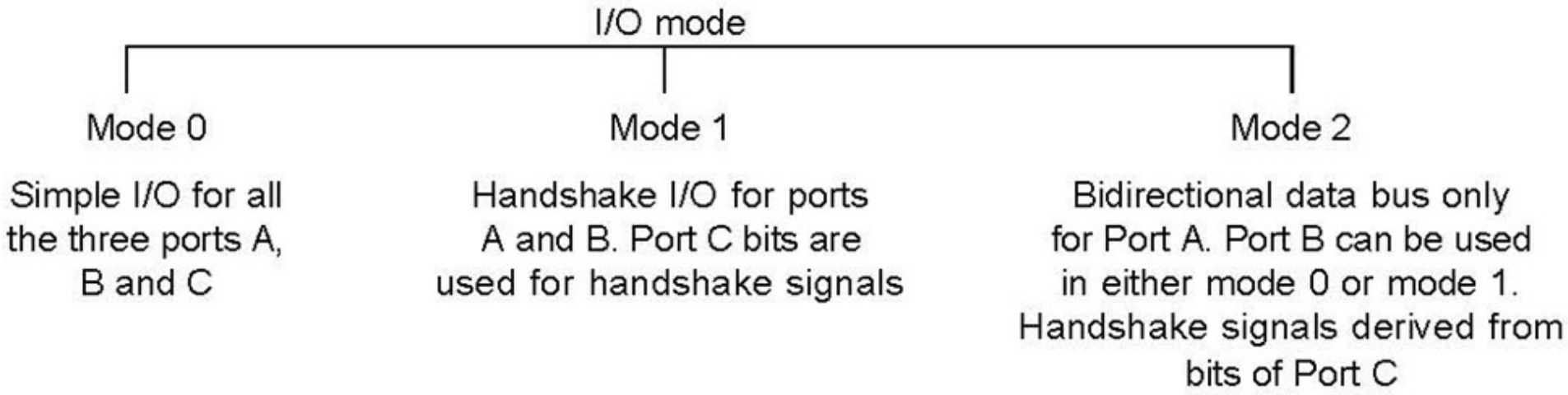
4

YTÜ-CE

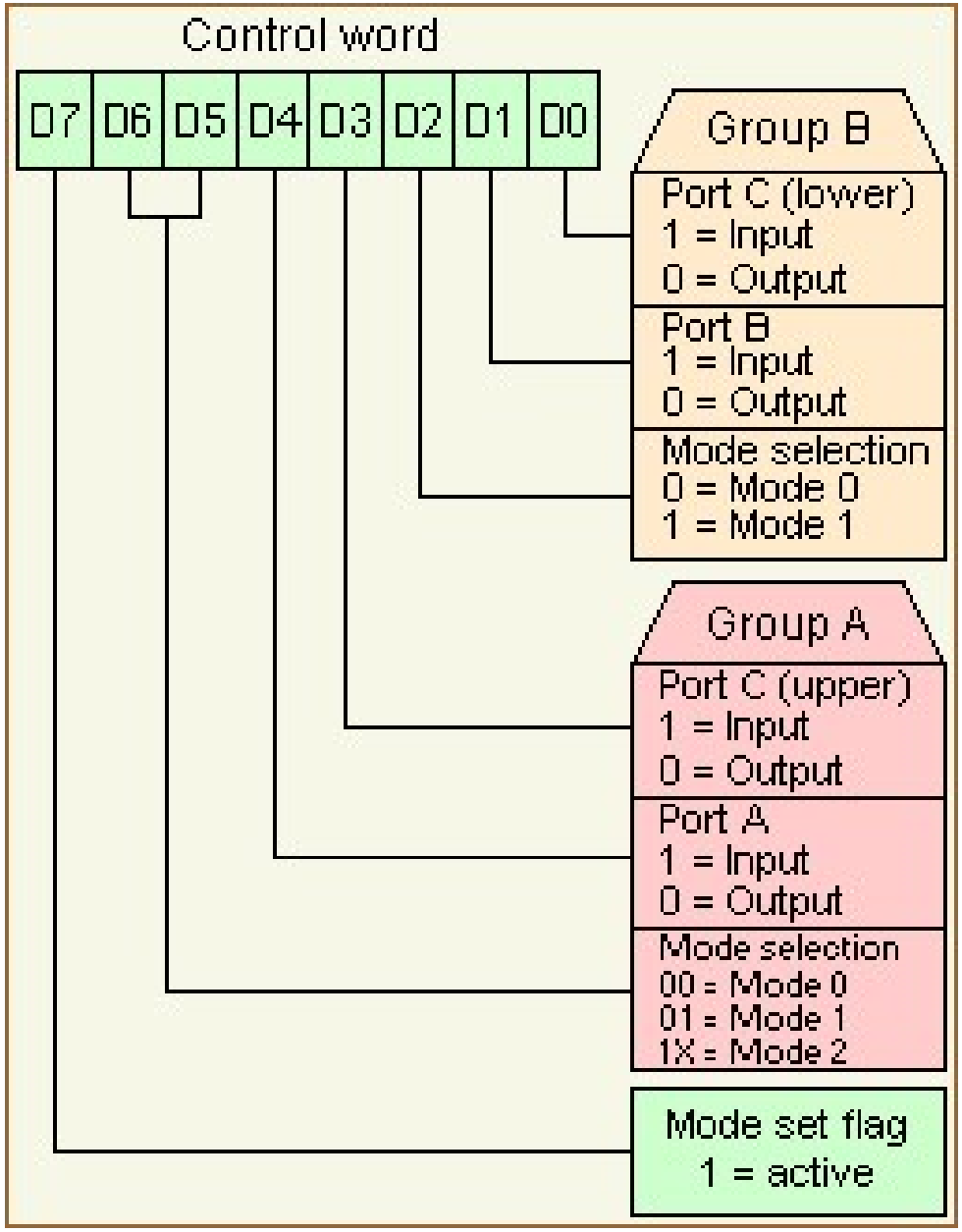
Ders-4 Konular

- 8255 modları
  - Mod 0
    - LED ve Buton
    - 7 parçalı gösterge
    - 3x4 tuş tarama
  - BSR (Bit set reset)
  - Mod 1
  - Mod 2

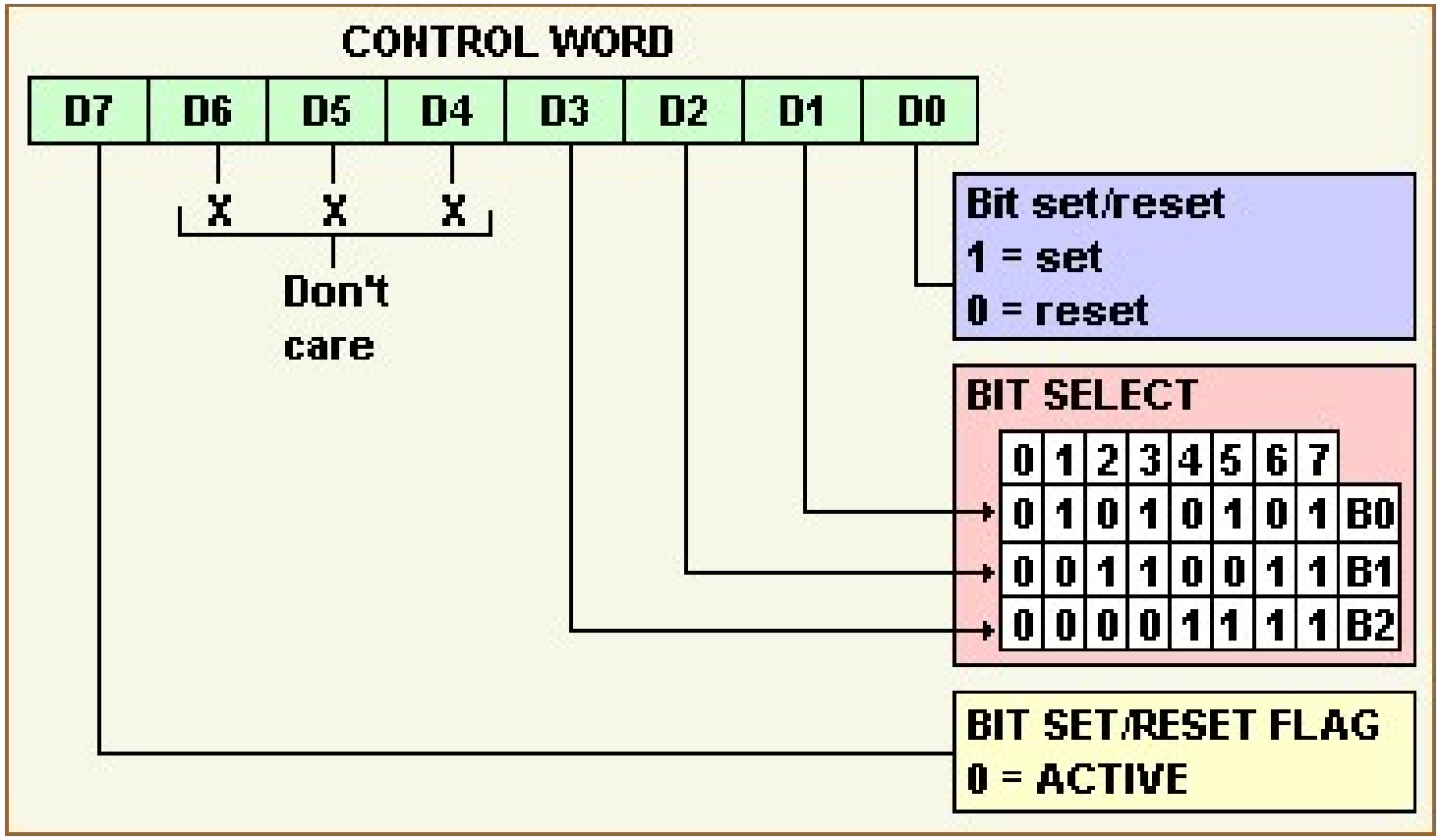
8255 Modlar


I/O mode
Mode 0
Simple I/O for all the three ports A, B and C
Mode 1
Handshake I/O for ports A and B. Port C bits are used for handshake signals
Mode 2
Bidirectional data bus only for Port A. Port B can be used in either mode 0 or mode 1. Handshake signals derived from bits of Port C

8255 Kontrol Yazmacı ➔ Mod 0



8255 Kontrol Yazmacı ➔ BSR



BSR Mod Örneği

- Örnek:
- 80H adresinden itibaren ardışık çift adreslere yerleştirilmiş bir 8255'de
  - PC2'yi lojik 1 olacak şekilde
  - PC6'da ise duty cycle'ı %66 olan bir kare dalga üretecek şekilde

programlayın

BSR Mod Örneği

- MOV AL, 00000101B
  OUT 86H, AL
- AGAIN MOV AL, 0xxx1101
  OUT 86H, AL
  CALL Delay
  CALL Delay
  MOV AL, 0xxx1100
  OUT 86H, AL
  CALL Delay
  JMP AGAIN

8255 Mod 1

- Handshaking sinyalleri ile kontrollü tek yönlü veri gönderme veya almayı sağlar. (Mod 2'de handshaking sinyalleri ile çift yönlü veri iletimi)
- PORTA ve/veya PORTB Mod 1 için tek yönlü olarak veri iletimi için kullanılırken, PORTC uçları handshaking işaretleri için kullanılır.

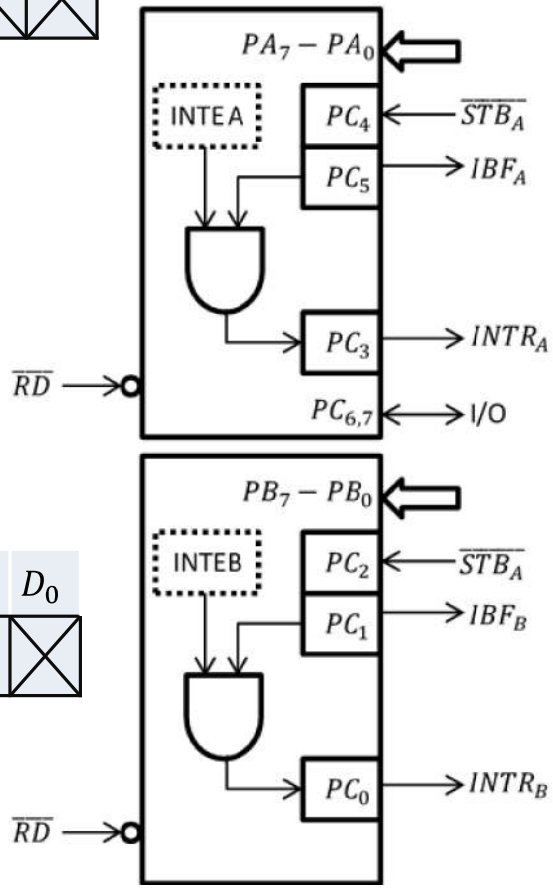
8255 Mod 1

- Grup A ve Grup B ayrı ayrı Mod 1 için programlanabilir.
- Her grupta 8 bit veri 4 bit kontrol işareti vardır.

D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	0	1	1	1/0	X	X	X

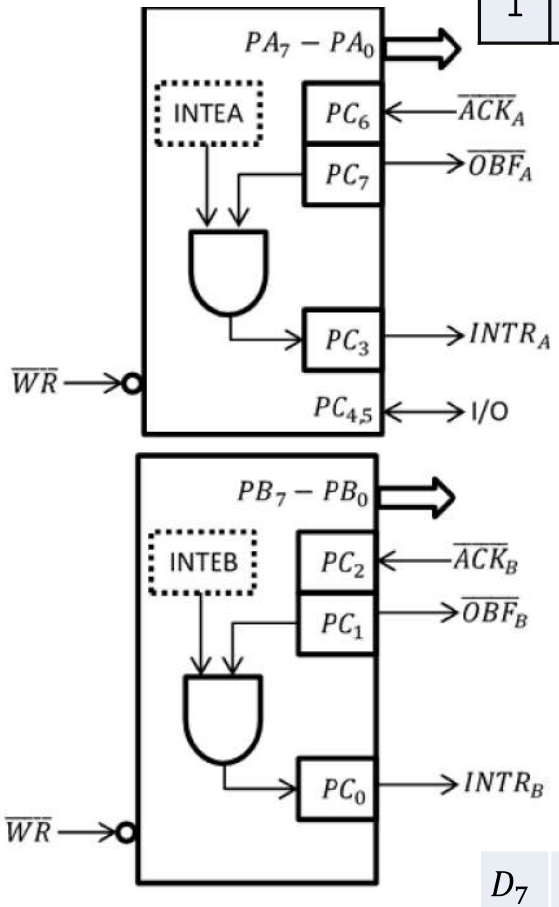
$PC_{6,7}$
1=Input
0=Output

D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	X	X	X	X	1	1	X



D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	0	1	0	1/0	X	X	X

$PC_{4,5}$
1=Input
0=Output



D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	X	X	X	X	1	0	X

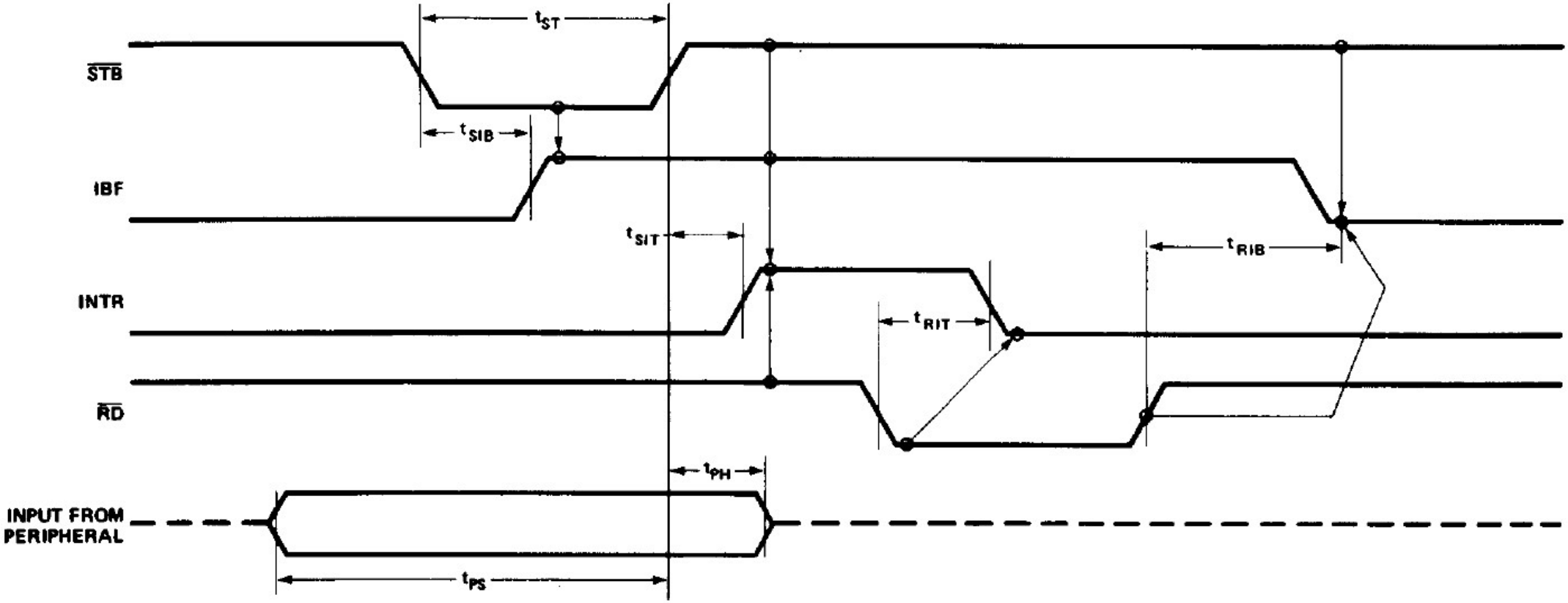
8255 Mod 1 - Input

- $\overline{STB}$: A “low” on this input loads data into the input latch
- IBF : A “high” on this output indicates that the data has been loaded into the input latch; in essence, an acknowledgement. IBF is set by $\overline{STB}$ input being low and is reset by the rising edge of the $\overline{RD}$ input

8255 Mod 1 - Input

- INTR : A “high” on this output can be used to interrupt the CPU when an input device is requesting service. INTR is set by the $\overline{STB}$ is a “1” IBF is a “1” and INTE is a “1”. It is reset by the falling edge of $\overline{RD}$
- INTEA : Controlled by bit set/reset of PC4
- INTEB : Controlled by bit set/reset of PC2

8255 Mod 1 – Input Timing



8255 Mod 1 - Output

- $\overline{OBF}$: goes “0” to indicate that the CPU has written data out to the specified port. The $\overline{OBF}$ will be set by the rising edge of the $\overline{WR}$ input and reset by $\overline{ACK}$ input being low
- $\overline{ACK}$: A “0” on this input informs the 82C55A that the data from Port A or Port B has been accepted

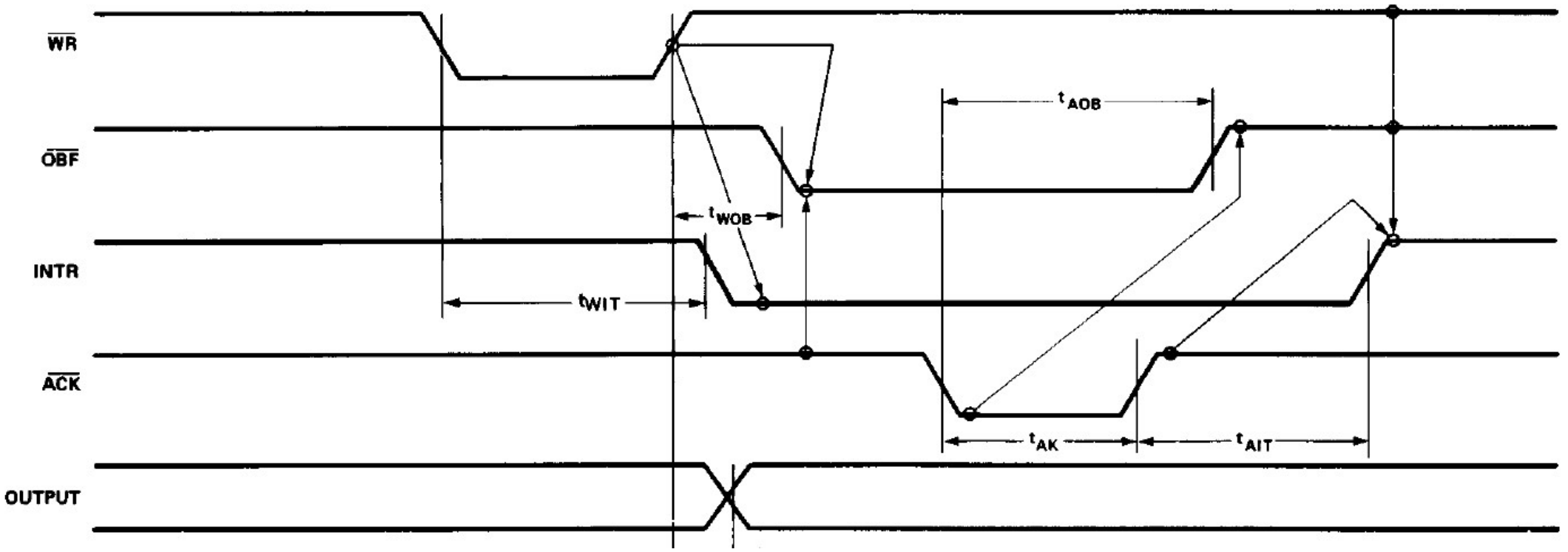
8255 Mod 1 - Output

- INTR : A “0” on this output can be used to interrupt the CPU when an output device has accepted data transmitted by the CPU. INTR is set when $\overline{ACK}$ is a “1”, $\overline{OBF}$ is a “1”and INTE is a “1”. It is reset by the falling edge of $\overline{WR}$.

8255 Mod 1 - Output

- INTEA : Controlled by bit set/reset of PC6
- INTEB : Controlled by bit set/reset of PC2

8255 Mod 1 – Output Timing



8255 Mod 1 – Status Word

- 8255 mod 1 için ayarlanmışsa PORTC'den yapılan okumalar STATUS WORD'dür
- OBF, IBF, INTR değerleri ile I/O için kullanılan PORTC uçları okunabilir

8255 Mod 1 – Status Word

- Input

D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
I/O	I/O	IBF_A	$INTE_A$	$INTR_A$	$INTE_B$	IBF_B	$INTR_B$
GROUP A					GROUP B		

- Output

D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
OBF_A	$INTE_A$	I/O	I/O	$INTR_A$	$INTE_B$	OBF_B	$INTR_B$
GROUP A					GROUP B		

8255 Mod 1

- 8255 Grup A Mod 1 output, 8255 Grup B Mod 1 input yönlü ayarlanarak, bunlar arasında handshaking tabanlı I/O işlemleri nasıl yapılabilir?

8255 Mod 2

- Strobed bidirectional bus I/O
- Sadece Grup A mod 2 destekler
- 1 adet 8 bit çift yönlü port (PORTA), ve 5 handshaking kontrol işareti mevcuttur

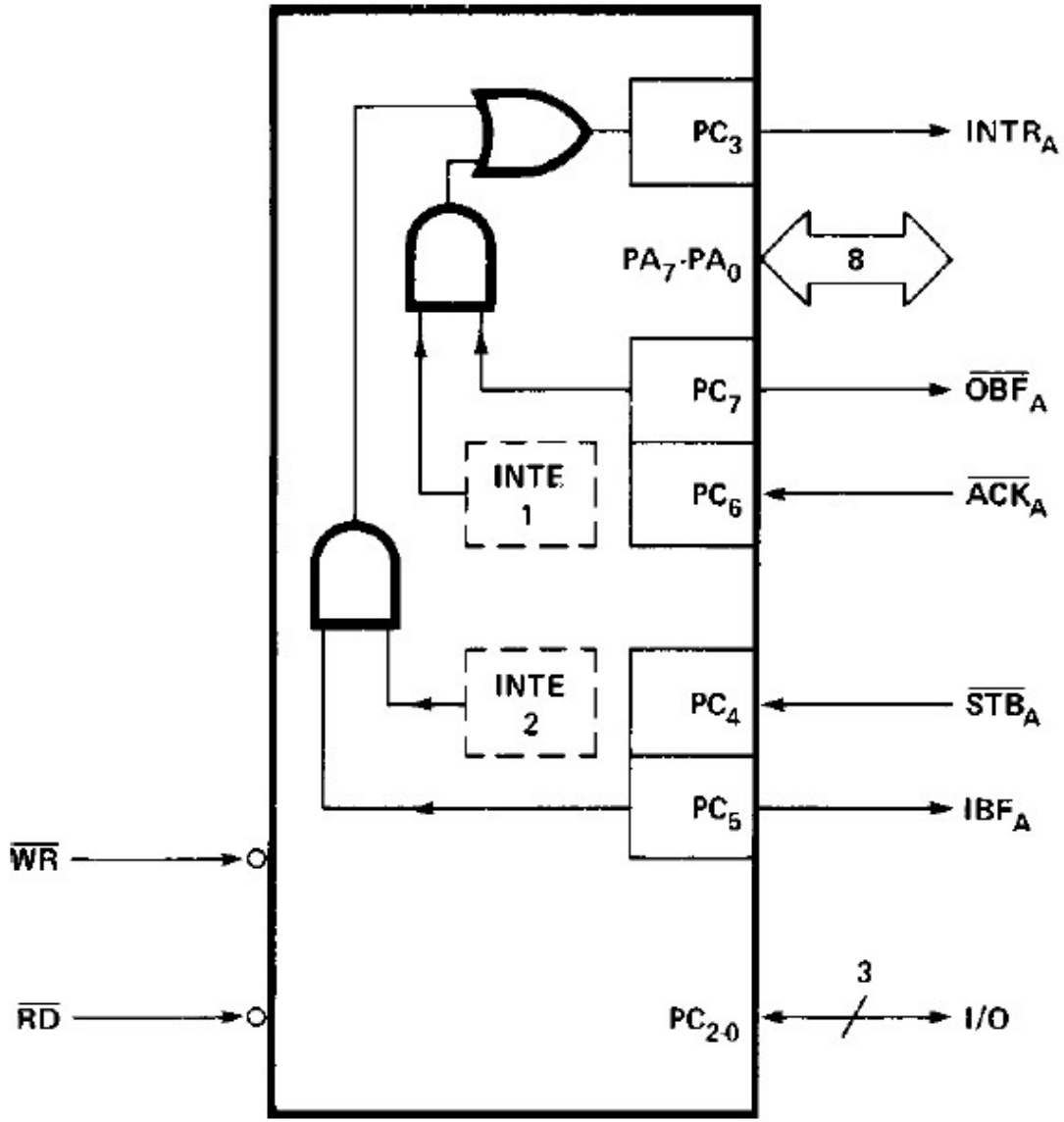
CONTROL WORD

D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	1	X	X	X	1/0	1/0	1/0

$PC_{2\text{-}0}$
1 = INPUT
0 = OUTPUT

PORT B
1 = INPUT
0 = OUTPUT

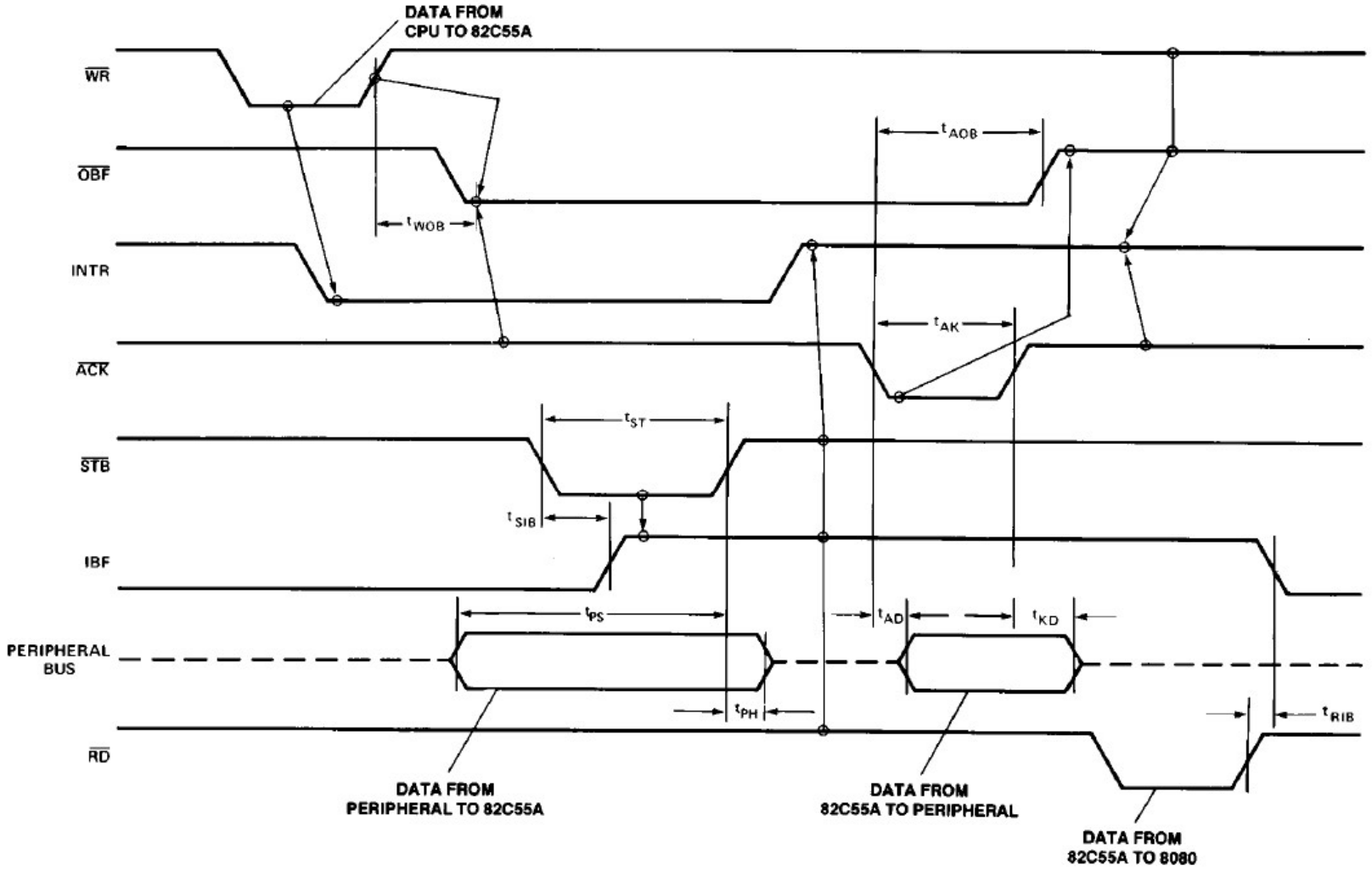
GROUP B MODE
0 = MODE 0
1 = MODE 1



8255 Mod 2

- INTE 1 : Controlled by bit set/reset of PC6
- INTE 2 : Controlled by bit set/reset of PC4

8255 Mod 2 - Timing



8255 Mod 2 – Status Word

D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
OBF_A	$INTE_1$	IBF_A	$INTE_2$	$INTR_A$			
GROUP A					GROUP B		

8255 Modlar: Özet Tablo

	MODE 0		MODE 1		MODE 2	
	IN	OUT	IN	OUT	GROUP A ONLY	
PA_0	IN	OUT	IN	OUT	⟷	
PA_1	IN	OUT	IN	OUT	⟷	
PA_2	IN	OUT	IN	OUT	⟷	
PA_3	IN	OUT	IN	OUT	⟷	
PA_4	IN	OUT	IN	OUT	⟷	
PA_5	IN	OUT	IN	OUT	⟷	
PA_6	IN	OUT	IN	OUT	⟷	
PA_7	IN	OUT	IN	OUT	⟷	
PB_0	IN	OUT	IN	OUT	—	MODE 0 OR MODE 1 ONLY
PB_1	IN	OUT	IN	OUT	—	
PB_2	IN	OUT	IN	OUT	—	
PB_3	IN	OUT	IN	OUT	—	
PB_4	IN	OUT	IN	OUT	—	
PB_5	IN	OUT	IN	OUT	—	
PB_6	IN	OUT	IN	OUT	—	
PB_7	IN	OUT	IN	OUT	—	
PC_0	IN	OUT	$INTR_B$	$INTR_B$	I/O	
PC_1	IN	OUT	IBF_B	$\overline{OBF}_B$	I/O	
PC_2	IN	OUT	$\overline{STB}_B$	$\overline{ACK}_B$	I/O	
PC_3	IN	OUT	$INTR_A$	$INTR_A$	$INTR_A$	
PC_4	IN	OUT	$\overline{STB}_A$	I/O	$\overline{STB}_A$	
PC_5	IN	OUT	IBF_A	I/O	IBF_A	
PC_6	IN	OUT	I/O	$\overline{ACK}_A$	$\overline{ACK}_A$	
PC_7	IN	OUT	I/O	$\overline{OBF}_A$	$\overline{OBF}_A$	