

Mikroişlemci Sistemleri

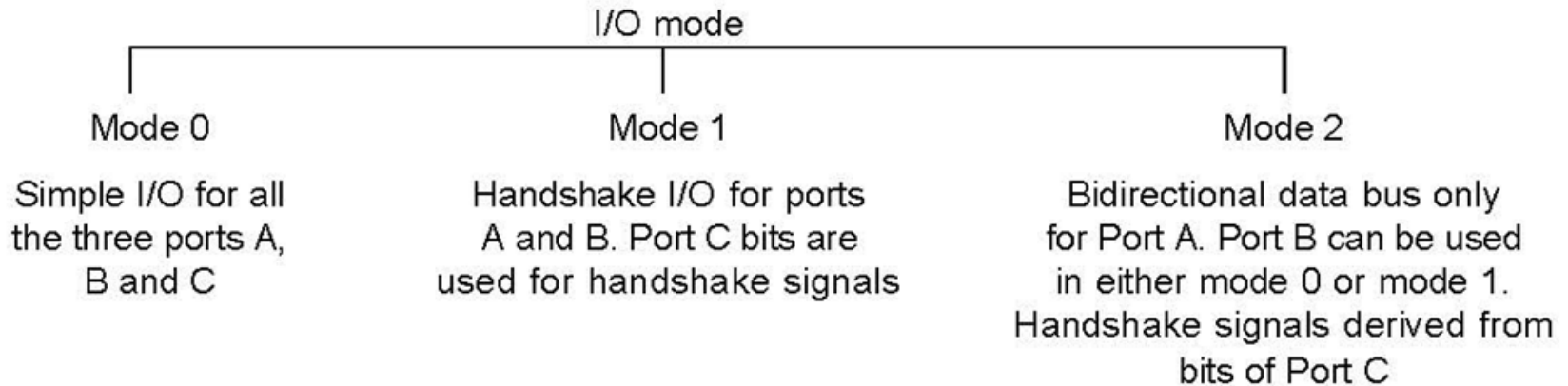
Dr. Öğr. Üyesi Hamza Osman İLHAN

2019/1-Ders 4

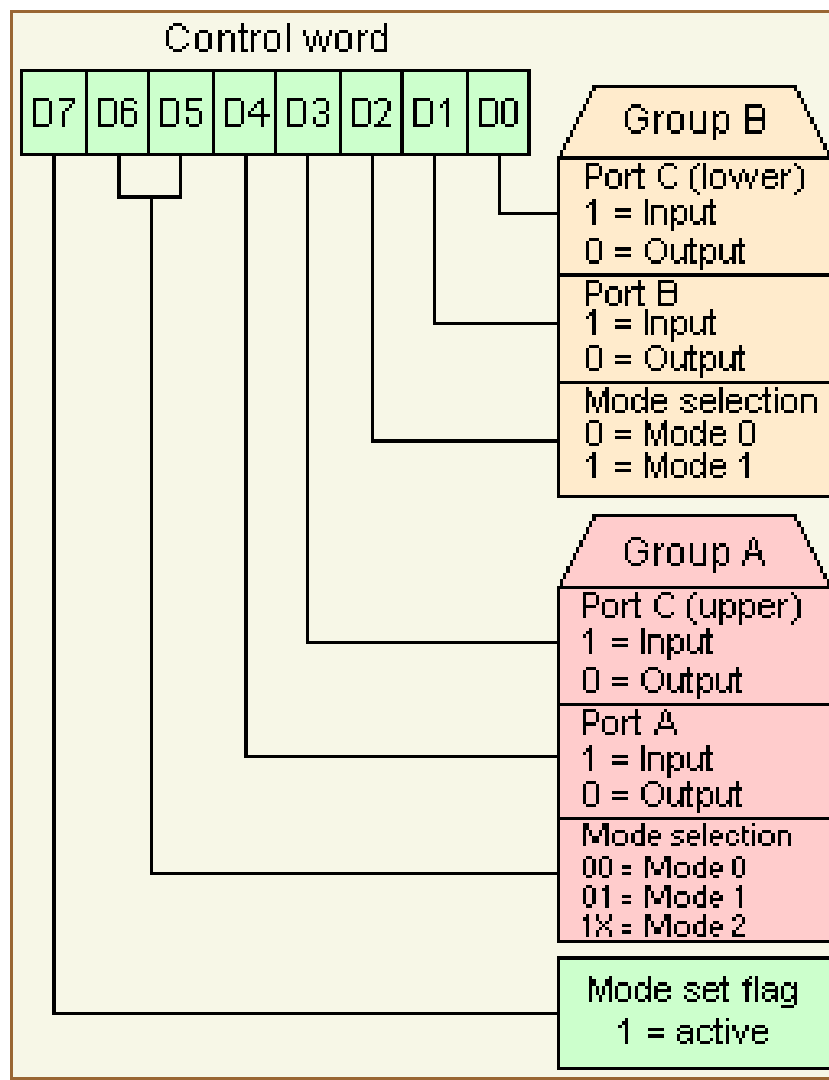
Ders-4 Konular

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

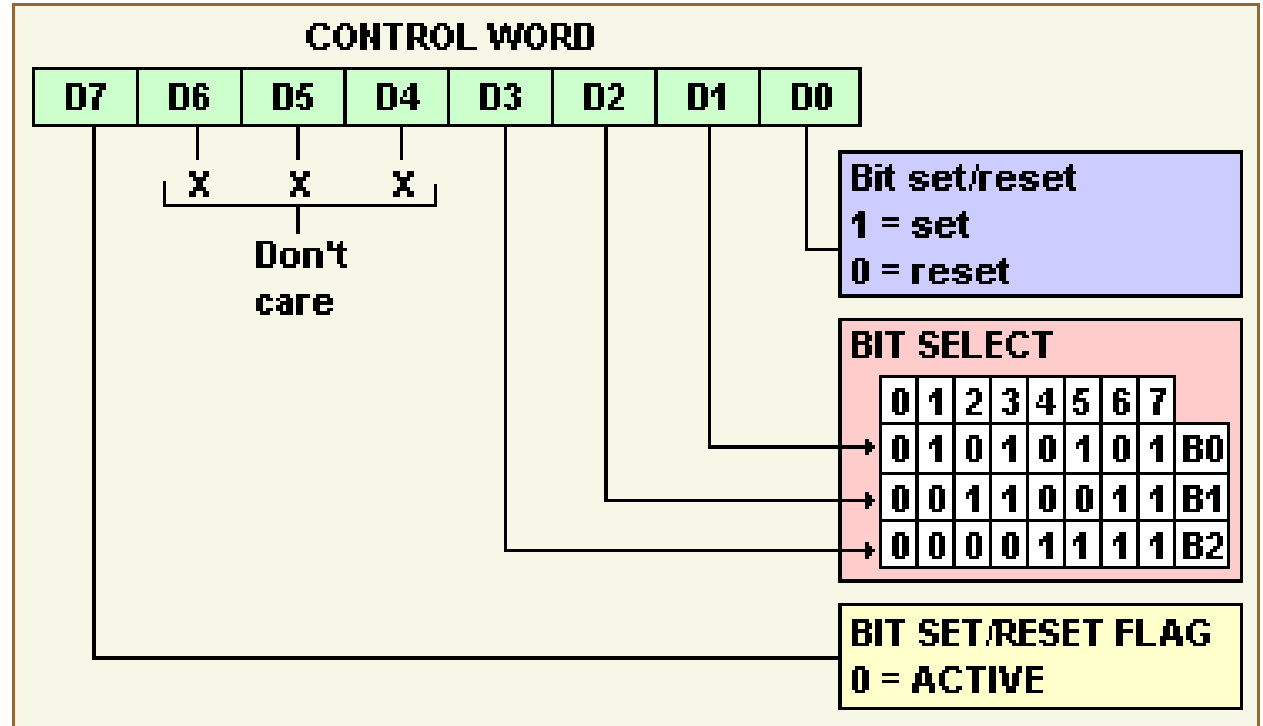
8255 Modlar



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

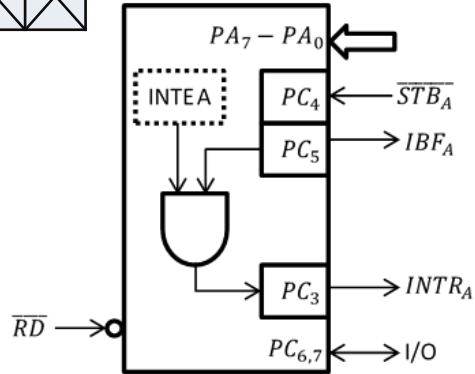
- Handshaking sinyalleri ile kontrollü tek yönlü veri gönderme veya almayı sağlar. (Mod 2'de handshaking sinyalleri ile çift yönlü veri iletimi)
- PORTA ve/veya PORTB Mod 1 için tek yönlü olarak veri iletimi için kullanılırken, PORTC uçları handshaking işaretleri için kullanılır.

8255 Mod 1

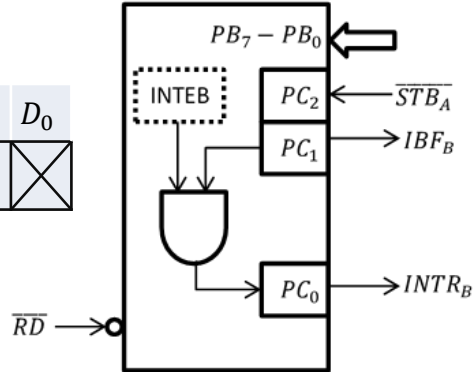
- Grup A ve Grup B ayrı ayrı Mod 1 için programlanabilir.
- Her grupta 8 bit veri 4 bit kontrol işareti vardır.

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

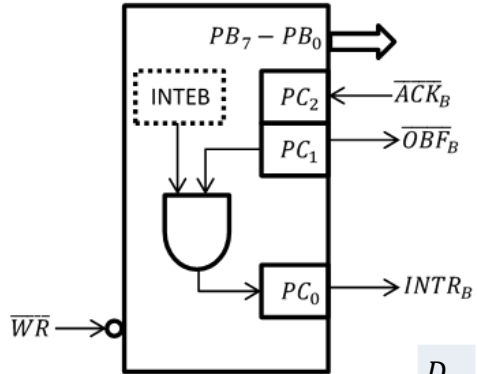
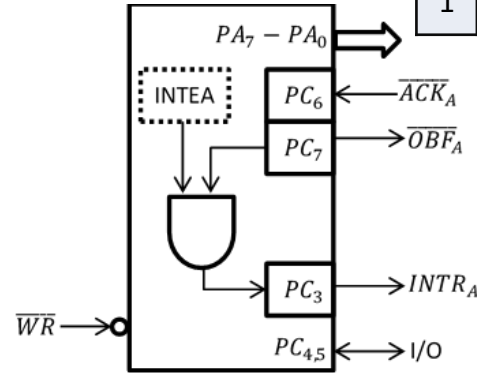


D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	X	X	X	X	1	1	X



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

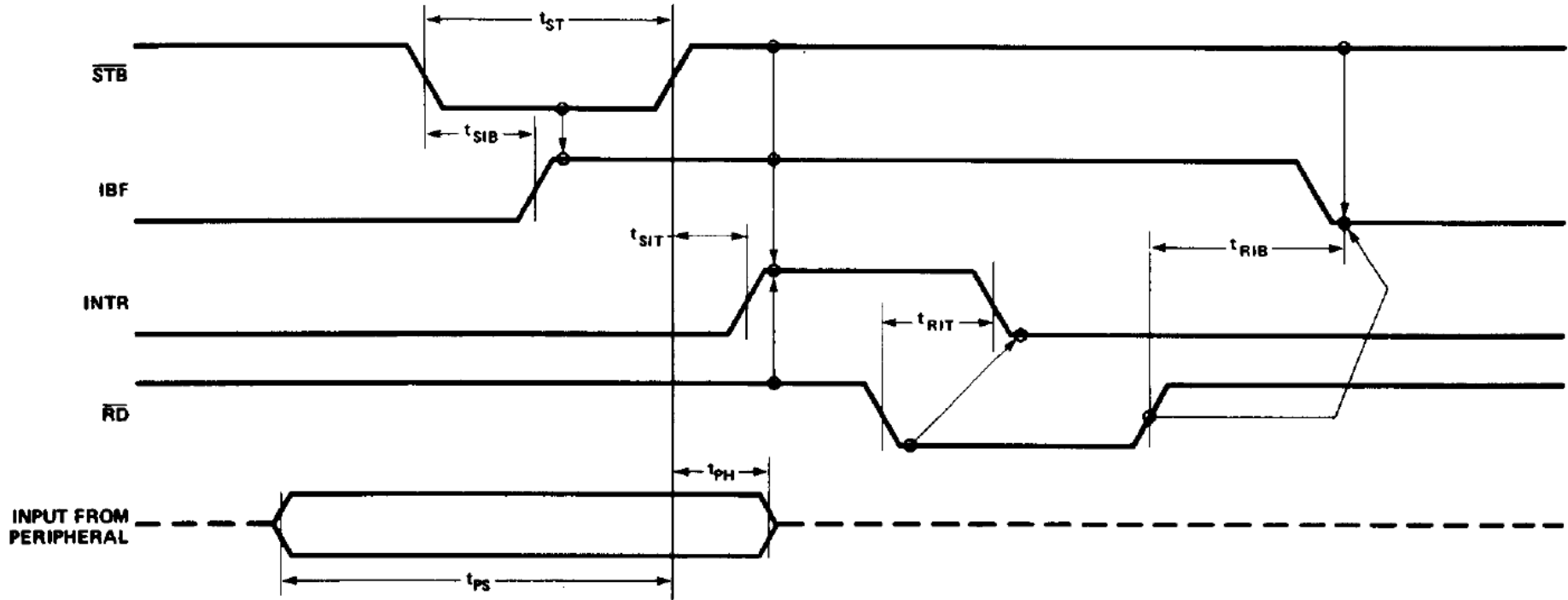
8255 Mod 1 - Input

- \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

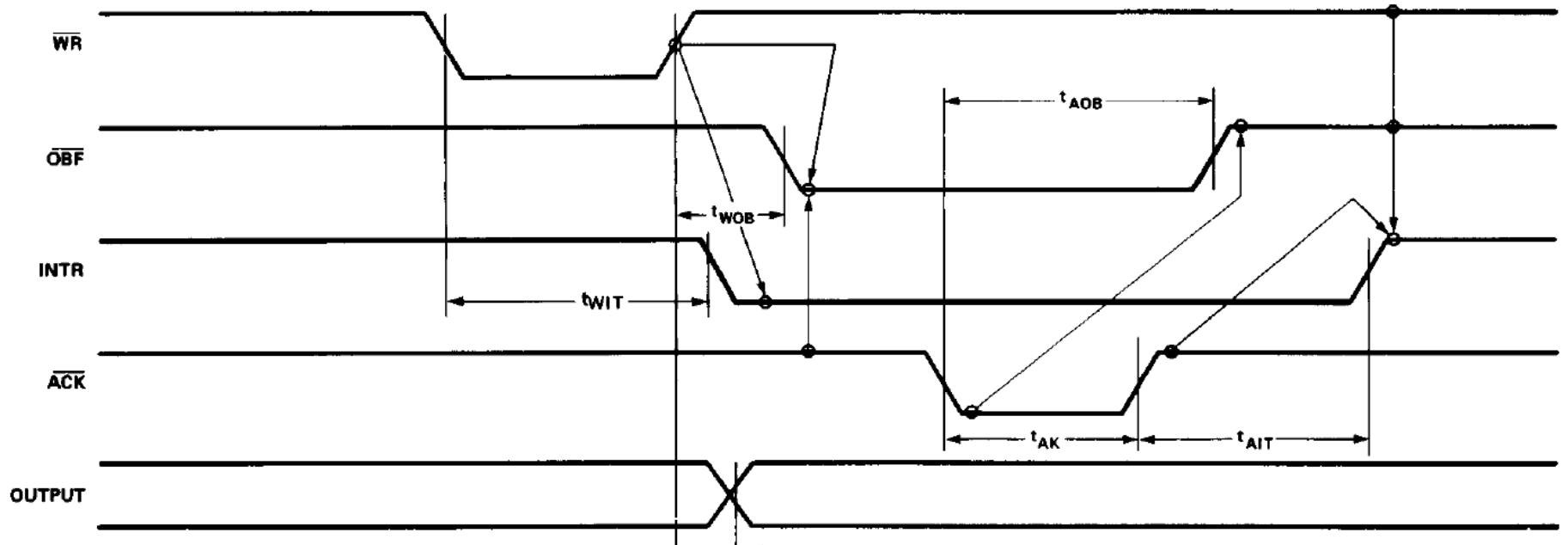
8255 Mod 1 - Output

- 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

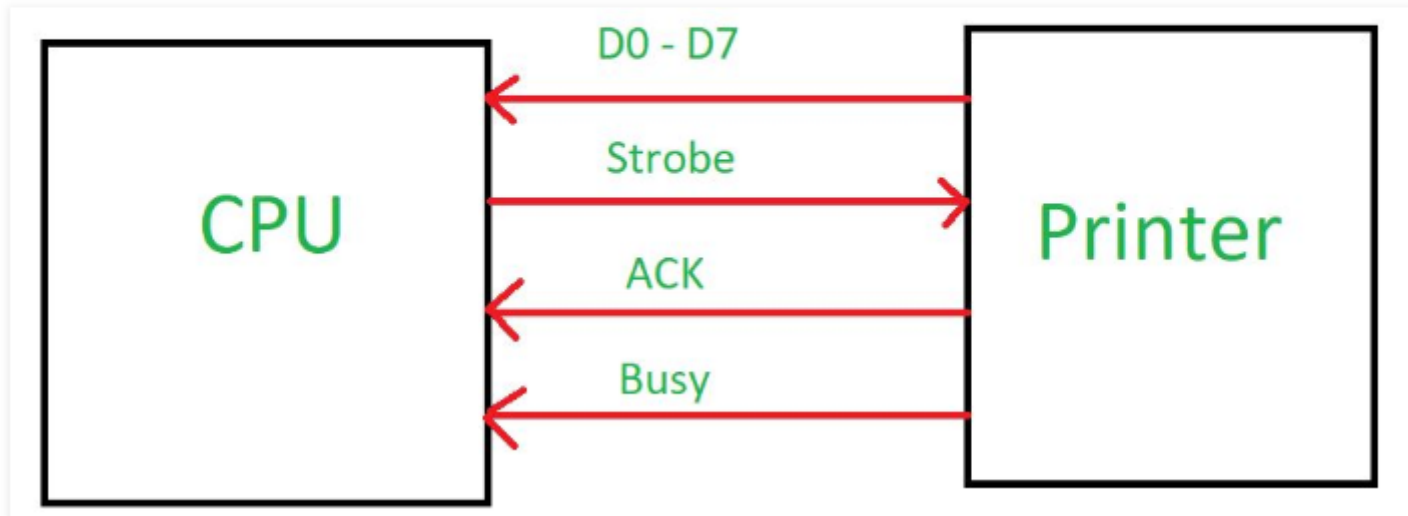
D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
OBF_A	$INTE_A$	I/O	I/O	$INTR_A$	$INTE_B$	OBF_B	$INTR_B$
GROUP A					GROUP B		

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?

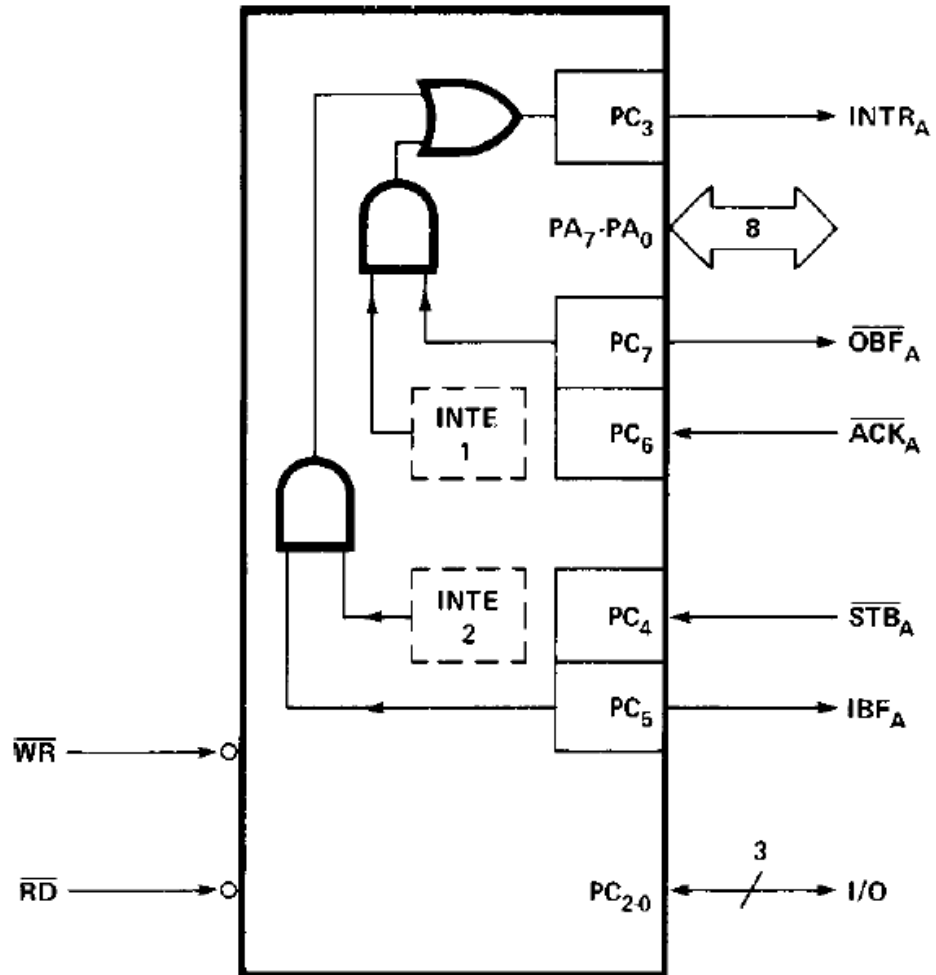
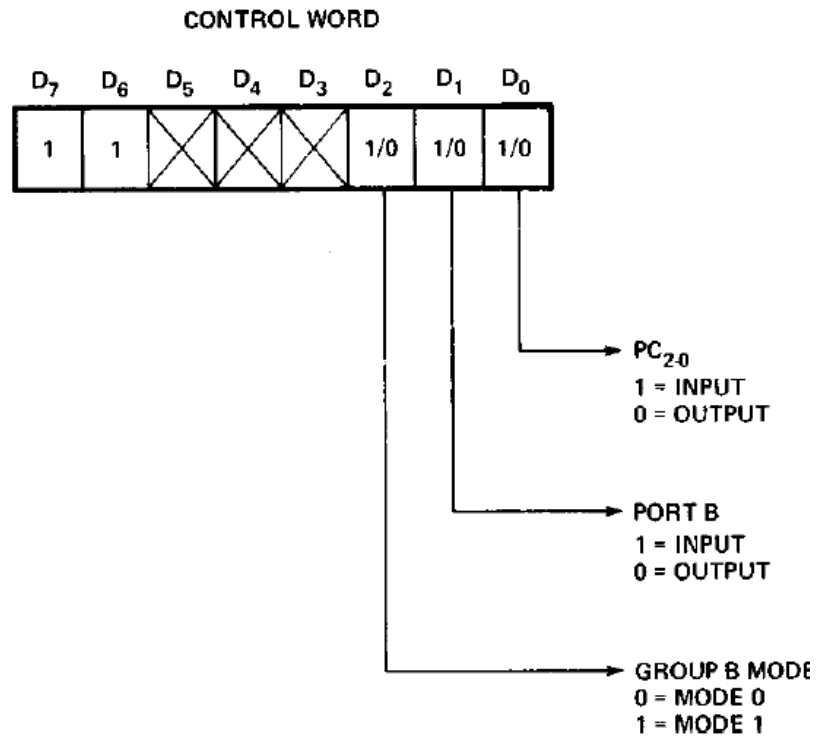
8255 Mod 1

Example: When CPU wants to send data to slow peripheral device like printer, it will send handshaking signal to printer to tell whether it is ready or not to transfer the data. When printer will be ready it will send one acknowledgement to CPU then there will be transfer of data through data bus.



8255 Mod 2

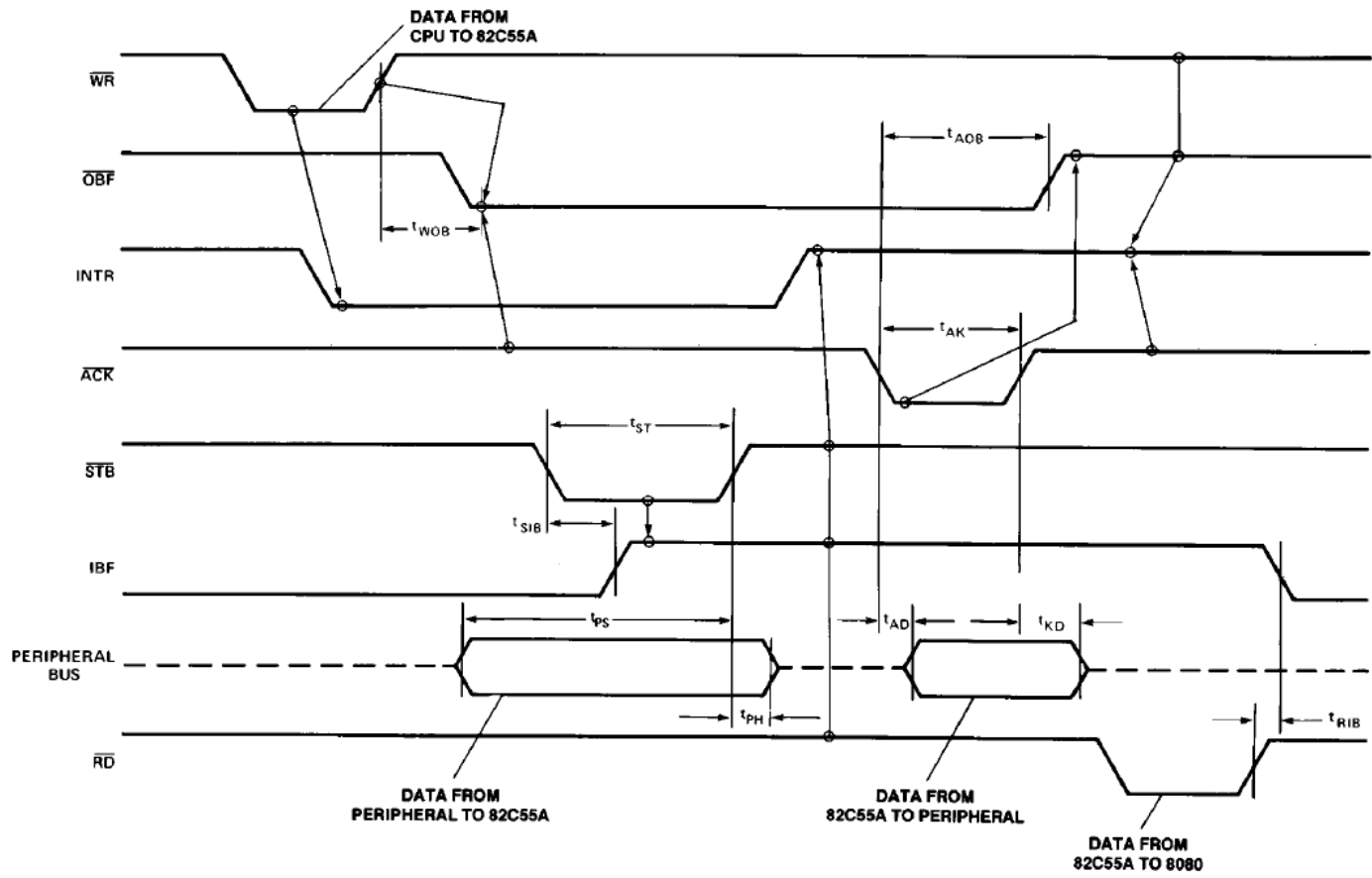
- Strobed bidirectional bus I/O
- Sadece Grup A mod 2 destekler
- 1 adet 8 bit çift yönlü port (PORTA), ve 5 handshaking kontrol işareti mevcuttur



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	
	IN	OUT
PA ₀	IN	OUT
PA ₁	IN	OUT
PA ₂	IN	OUT
PA ₃	IN	OUT
PA ₄	IN	OUT
PA ₅	IN	OUT
PA ₆	IN	OUT
PA ₇	IN	OUT
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PB ₀	IN	OUT
PB ₁	IN	OUT
PB ₂	IN	OUT
PB ₃	IN	OUT
PB ₄	IN	OUT
PB ₅	IN	OUT
PB ₆	IN	OUT
PB ₇	IN	OUT
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PC ₀	IN	OUT
PC ₁	IN	OUT
PC ₂	IN	OUT
PC ₃	IN	OUT
PC ₄	IN	OUT
PC ₅	IN	OUT
PC ₆	IN	OUT
PC ₇	IN	OUT

MODE 1	
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
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IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
IN	OUT
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INTR _B	INTR _B
IBF _B	$\overline{\text{OBF}}_{\text{B}}$
$\overline{\text{STB}}_{\text{B}}$	$\overline{\text{ACK}}_{\text{B}}$
INTR _A	INTR _A
$\overline{\text{STB}}_{\text{A}}$	I/O
IBF _A	I/O
I/O	$\overline{\text{ACK}}_{\text{A}}$
I/O	$\overline{\text{OBF}}_{\text{A}}$

MODE 2	
GROUP A ONLY	
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I/O	
I/O	
I/O	
INTR _A	
$\overline{\text{STB}}_{\text{A}}$	
IBF _A	
$\overline{\text{ACK}}_{\text{A}}$	
$\overline{\text{OBF}}_{\text{A}}$	

MODE 0
OR MODE 1
ONLY