

T.C.

BİLECİK ŞEYH EDEBALİ ÜNİVERSİTESİ

MÜHENDİSLİK FAKÜLTESİ

ELEKTRİK-ELEKTRONİK MÜHENDİSLİĞİ BÖLÜMÜ

2018-2019 BAHAR DÖNEMİ

EEM432 GÖMÜLÜ SİSTEMLER

DERS NOTU

Arş. Gör. Zeynep KAYA



<u>İÇİNDEKİLER</u>

<u>SAYFA</u>

Altera Cyclone® IV EP4CE22F17C6N tanıtılması ve kurulum bilgileri	4
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Altera Cyclone® IV EP4CE22F17C6N FPGA Genel özellikleri

- 153 maximum FPGA I/O pins
- 2 Adet 40 pin grubu (GPIO)
- 32MB SDRAM
- 2KB I2C EEPROM
- 8 Adet Yeşil LED
- 4 Adet Dipswitch
- 2 Adet Push Button
- G Sensörü
- ADC Modülü
- 50 Mhz Osilatör



Cyclone® IV EP4CE22F17C6N Bileşenleri

Kurulum:

Altera Cyclone® IV EP4CE22F17C6N FPGA Paket İçeriği



Kurulum CD takıp gerekli kurulum işlemleri yapıldıktan sonra FPGA'yı Bilgisayara tanıtıyoruz bunun için gerekli işlemler aşağıdaki resimlerde gösterilmektedir.

İnternet kurulumu:

https://www.intel.com/content/www/us/en/programmable/downloads/software/quartus-ii-se/101.html#tabs-4

Hardware Update Wizard						
	Welcome to the Hardware Update Wizard					
	This wizard helps you install software for:					
	USB-Blaster					
	If your hardware came with an installation CD or floppy disk, insert it now.					
	What do you want the wizard to do?					
	 Install the software automatically (Recommended) Install from a list or specific location (Advanced) 					
	Click Next to continue.					
	< Back Next > Cancel					

Burada yükleyeceğimiz "USB-BLASTER" dosyasının adresini manuel olarak göstermemiz gerekiyor. Yukarıdaki pencereye "NEXT-İLERİ" diyerek devam ediyoruz.

Found New Hardware Wizard
Please choose your search and installation options.
 Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM)
Include this location in the search:
C:\altera\10.1\quartus\drivers\usb-blaster VBrowse
O Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back Next > Cancel

Burada "BROWSE" Sekmesinden "USB-BLASTER" adresini buluyoruz.

---Aksi durum seçilmediği sürece driver adresi "C:\altera\10.1\quartus\drivers\usb-blaster"

Hedef dosyayı seçip "NEXT-İLERİ" diyoruz. Gelen pencerede yüklemeye devam et diyerek donanım kurulumunu bitiyoruz.

Found New Hardware Wizard						
Found New Hardware Wiz	Ard Completing the Found New Hardware Wizard The wizard has finished installing the software for: Altera USB-Blaster Altera USB-Blaster					
	Click Finish to close the wizard.					
	K Back Finish Cancel					

PROGRAMIN ÇALIŞTIRILMASI:

1-Yeni proje oluşturmak

--OK İşaretlerini takip edin!!!





PROJE OLUŞTURUYORUZ

ÇIKAN PENCEREDE "NEXT" Diyerek devam ediyoruz



İşlemlerden sonra "NEXT" diyerek devam ediyoruz

🕲 Quartus II 64-Bit		
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Project Navigator & X		
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A Hierarchy Files of Design Units	File Name Type Library Design Entry/Synthesis Tool HDL Version	Add All
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Flow: Full Design		
Task (Down Properties
Assgr Consultants Analysis & Synthesis Manalysis & Synthesis		View Quartus II Information Documentation
X g		
8 4	Specify the path names of any non-default loraries. User Libraries	
System Processing Extra Info Info Warning Critical War Message: Location: Location: 	< Back Next > Finish	Cancel Help V Locate 0% 00:00:00

Hiçbir işlem yapmadan "NEXT" Diyerek devam ediyoruz.

Show in 'Available devices' list Device family Image: Im	K Nev Project Vizard										
Select the family and device you want to target for compilation. Devices family Show in 'Available devices' list Devices: All Devices: All Optices: All Devices: Ist Name Core Voltage List Devices: Ist Optices Devices	Family & Device Settings [page 3 of 5]										
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"Altera Cyclone® IV EP4CE22F17C6N" Seçiyoruz ve "NEXT" Diyerek devam ediyoruz

NOT:Başka cihaz seçiminde programınız çalışmaz!!!

Quartus II 64-Bit						
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Tasks & X	Timing Analysis	<none></none>	None>		Run this tool automatically after compilation	īγ≙∖.
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Hiçbir işlem yapmadan"NEXT" Diyerek devam ediyoruz



"FİNİSH" Diyerek kurulumu bitiriyoruz



"FILE-NEW-VHDL FILE" Secerek "OK" diyoruz

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Program yazılmaya hazır örnek VHDL dosyası

VHDL YAZILIMININ DERLENMESİ:

Yazdığımız programın makine diline çevirmemiz için, FPGA yükleme yapmadan önce programımızı Şekilde imgeye basarak "DERLEME" İşlemini gerçekleştiriyoruz. Bu işlemden sonra gerekli error ve hata mesajlarını düzelttikten sonra artık programımızı FPGA atabilir ve deneyebiliriz.

Quartus II 64-Bit - C:/Users/ACER/Desktop/Yeni klasör (4)/AA	LAAAAA - AAAAAAA		
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oject Navigator 6 × intity Cyclone IV GX: AUTO ★ AAAAAAA del Hierarchy E Files d ^a Design Units sks 6 × tow: Full Design Customize Task 6 × Customize Task 6 × Customize Task 6 × b Costraints b Aasign Constraints b Aasign Constraints b Aasign Constraints b Aasign Constraints b Aasign Constraints b Aasign Constraints create Design b Aasign Constraints create Design b Aasign Constraints create Design b Aasign Constraints create Design b Aasign Constraints create Design b Aasign Constraints create Design b Aasign Constraints create Design b Aasign Constraints create Design create Design b Aasign Constraints create (Cancer ate programming files) * create Programming files) *	White White	YAZDIĞIMIZ PROGRAMI FPGA ATMADAN ÖNCE DERLEMEMİZ GEREKİYOR.	F
g System // Processing // Extra Info // Info // Warning //	Critical Warning /\ Error /\ Suppressed /\ Flag /		,
Message:			* Locate

FPGA PİN ATAMALARI:

"Assigments" sekmesinden "Pin Planner" seçiyoruz

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File Edit View Projec	Assi	gnments rocessing Tools	Window Help	
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Cyclone IV GX: AUTO	3	Assignment Editor	Ctrl+Shift+A	
	4	Pin Planner	Ctrl+Shift+N	
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Lk) Æ		LED[30]	Output Group						
<u>e</u>		< <new group="">></new>				- 00			
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ŝ	P	Node Name	Direction	Locati	on I/O Ban	k VREF Group	I/O Standard	Reserved	
CH.		CLOCK_50	Input				2.5 V (default)		
_		KEY[0]	Input				2.5 V (default)		-
		LED[3]	Output				2.5 V (default)		-
Ϋ́,		CP LED[2]	Output				2.5 V (default)		
E			Output				2.5 V (default)		
<u></u>		C LED[0]	Output				2.5 V (default)		
48H		< <new node="">></new>]
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Aşağıda "LOCATION" sekmesinde yönlendireceğiniz pinlerin numaları bulunmakta.

Signal Name	FPGA Pin No.	Description	I/O Standard				
KEY[0]	PIN_J15	Push-button[0]	3.3V				
KEY[1]	PIN_E1	Push-button[1]	3.3V				
Pusbutton Pinleri							

		0	
Signal Name	FPGA Pin No.	Description	I/O Standard
LED[0]	PIN_A15	LED Green[0]	3.3V
LED[1]	PIN_A13	LED Green[1]	3.3V
LED[2]	PIN_B13	LED Green[2]	3.3V
LED[3]	PIN_A11	LED Green[3]	3.3V
LED[4]	PIN_D1	LED Green[4]	3.3V
LED[5]	PIN_F3	LED Green[5]	3.3V
LED[6]	PIN_B1	LED Green[6]	3.3V
LED[7]	PIN_L3	LED Green[7]	3.3V

<u>LED Pinleri</u>

Signal Name	FPGA Pin No.	Description	I/O Standard
DIP Switch[0]	PIN_M1	DIP Switch[0]	3.3V
DIP Switch[1]	PIN_T8	DIP Switch[1]	3.3V
DIP Switch[2]	PIN_B9	DIP Switch[2]	3.3V
DIP Switch[3]	PIN_M15	DIP Switch[3]	3.3V

!!!!CLOCK PİNİ:R8

!!NOT:Diğer Pinler için "USER Manuel" bakın...

ÖRNEK UYGULAMA

Pin Name	FPGA Pin Location
KEY[0]	J15
LED[3]	A11
LED[2]	B13
LED [1]	A13
LED [0]	A15
CLOCK_50	R8

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		KEY[0]	Input	PIN_J15	5		B5_N0	2.5 V (default)		
		LED[3]	Output	PIN_A11	7		B7_N0	2.5 V (default)		
v		LED[2]	Output	PIN_B13	7		B7_N0	2.5 V (default)		
E		LED[1]	Output	PIN_A13	7		B7_N0	2.5 V (default)		
		LED[0]	Output	PIN_A15	7		B7_N0	2.5 V (default)		
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- Program VHDL olarak yazdıktan sonra programı derliyoruz
- Hatalar ve Error mesajlarına bakıp gerekli düzeltmeleri yapıyoruz.
- Pin atamalarını gerçekleştiriyoruz.
- Tüm işlemlerden sonra yukardaki arayüzü kullanarak yazmış olduğumuz programı FPGA'ya yüklüyoruz.

!!!NOT:""USB-BLASTER"" Yüklenmediği taktirde.Donanımınız ""NO HARDWARE"" Olarak gözükecektir.

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Cyclone IV E: EP4CE22F17C6 mux4to1	Flor	v Settings v Non-Default Global Settings v Flansed Time	Quartus II Ver Revision Name Top-level Entit	rsion e ty Name	10.1 Build 153 11/29/ mux4to1 mux4to1 Cvclone IV E	(2010 SJ Web Edition			
win mux2to1:M2		v OS Summary v Log Jusis & Synthesis	Device Timing Models	ments	EP4CE22F17C6 Final 2 / 22,320 (< 1 %)				
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Programmer - C:,	/Users/mehmet/Desktop/C)uartus II/mux4to1/r	mux4to1 —		×
Hardware Setup.	. No Hardware P to allow background program	Mode: ЛТАС	MAX V devices)	Progress:	
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