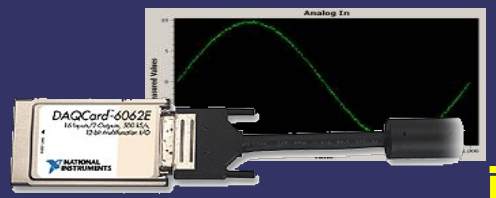
MEDAQ

Medical Experimentation Data Acquisition
“Tıbbi Deneyden Veri Toplayıcı”

Hüseyin Kozan 1306040082

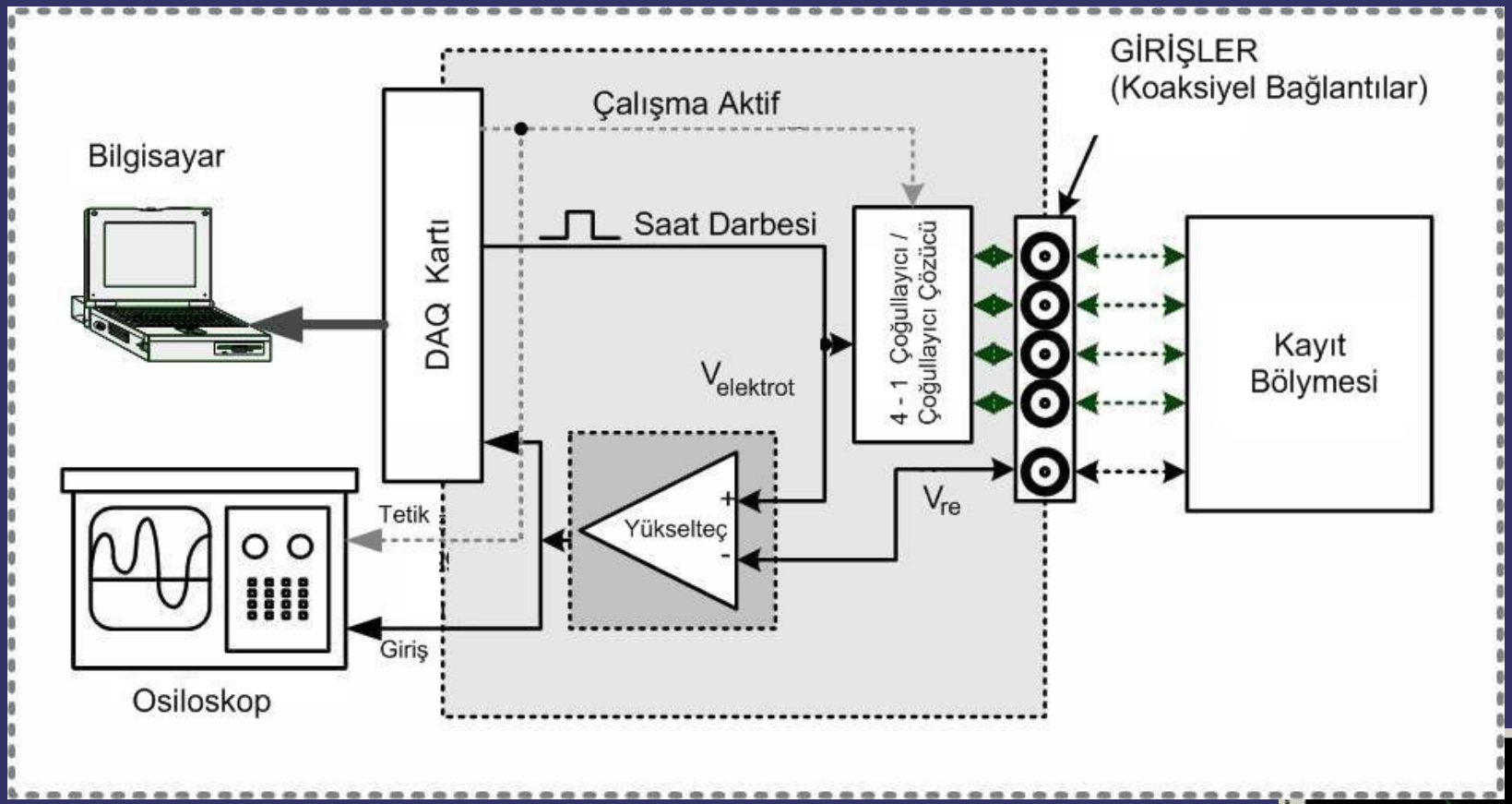
İçerik

- Proje Tanımı
- Neden MEDAQ ?
- Alternatifler
- Yol Haritası
- Araçlar
- DAQCard 6062E
- Programlama Aşaması
- Sonuç
- Kaynaklar



Proje Tanımı

- Nöron Kayıt Deneyi İçin Arayüz Tasarımı



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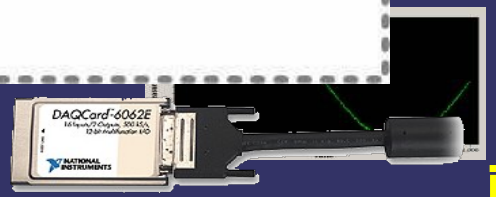
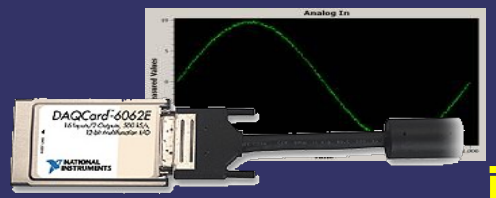


İçerik

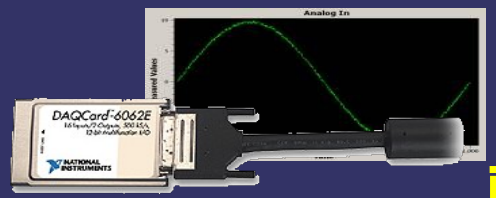
Proje Tanımı

- Analog Girişlerden Alınan Veri
  - Görselleştirilmesi
  - Kaydedilmesi
  - Sinyal İşleme
    - Ortalama Alma
    - Frekans Düzleminde Gösterim (FFT)

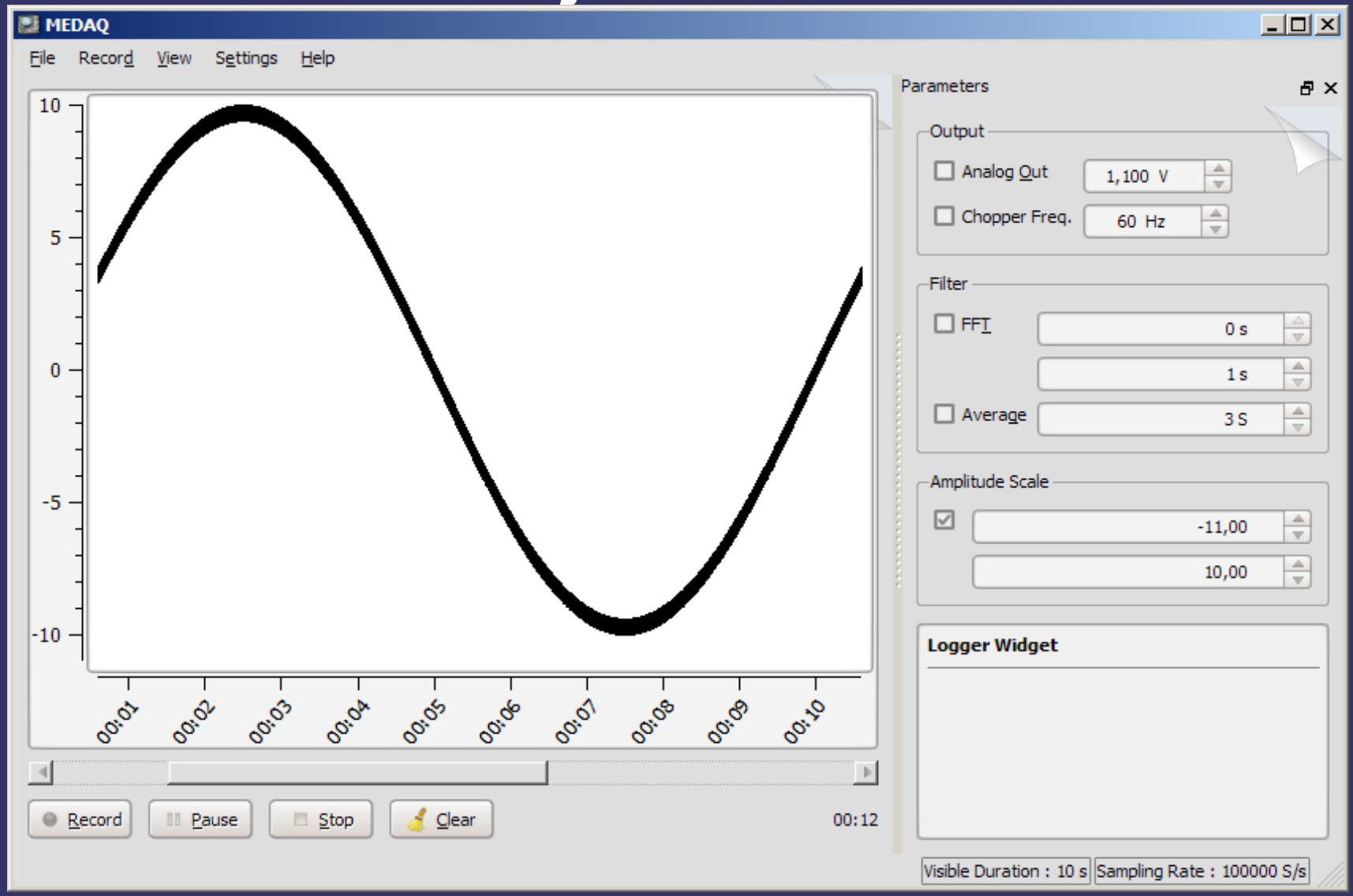


Proje Tanımı

- Analog Çıkışlardan
  - İstenen Sürekli ve Sabit Gerilim Verilmesi
- Dijital Giriş/Çıkışlardan
  - Saat Darbesi Üretimi



Proje Tanımı



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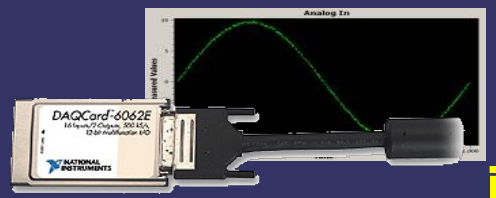
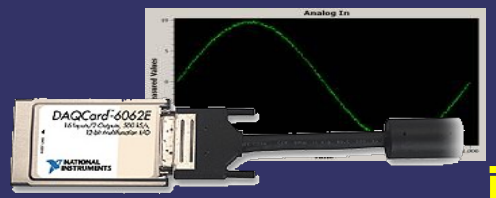


İçerik

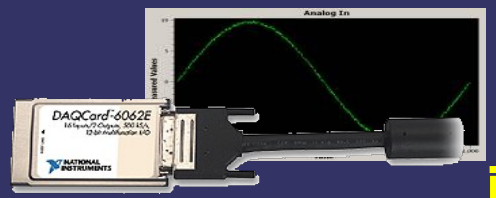
Neden MEDAQ ?

- Deneye Özel Arayüz
- Düşük Maliyet
  - Geliştirme Ortamı : Qt Creator : *OpenSource*
  - Grafik Arabirim : Qt, Qwt : *OpenSource*
  - Derleyici : GCC : *OpenSource*
- Hızlı Arabirim : C++



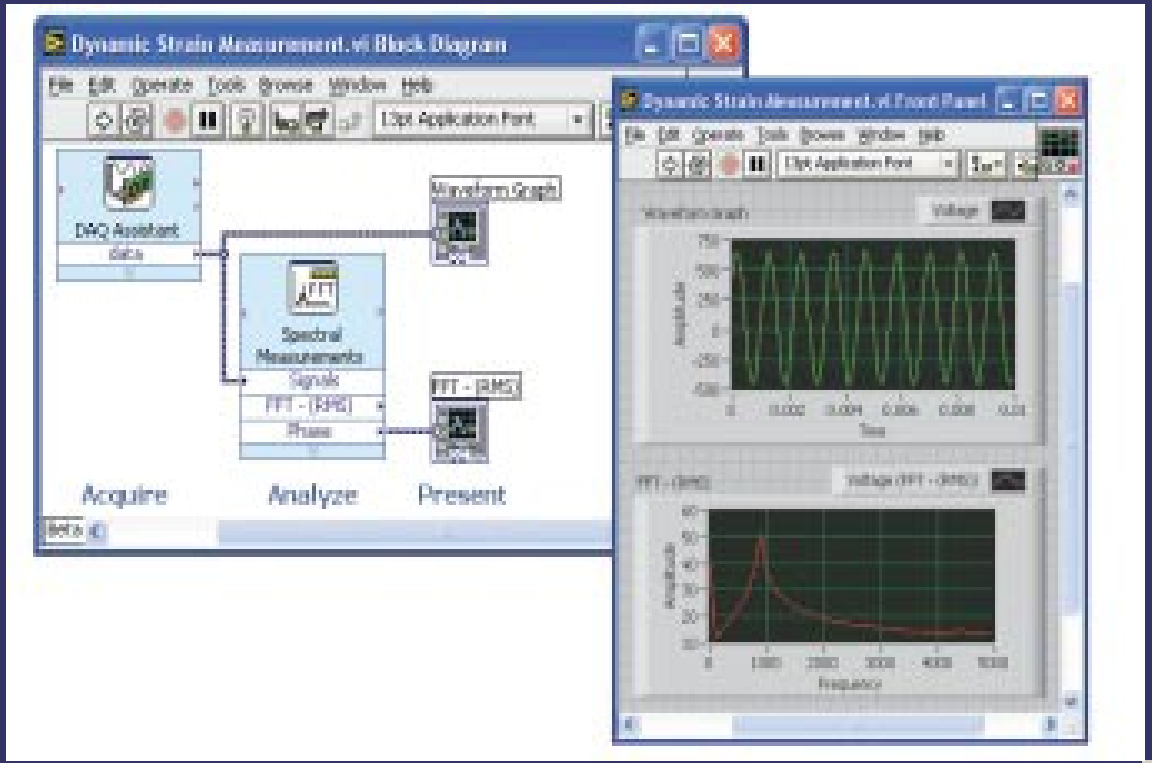
Alternatifler

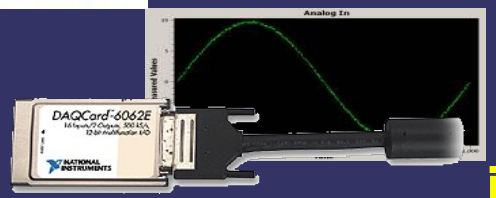
- NI LabView
- NI LabWindows/CVI
- Measurement Studio Desteği ile Microsoft Visual Studio
- ANSI C Desteği



Alternatifler

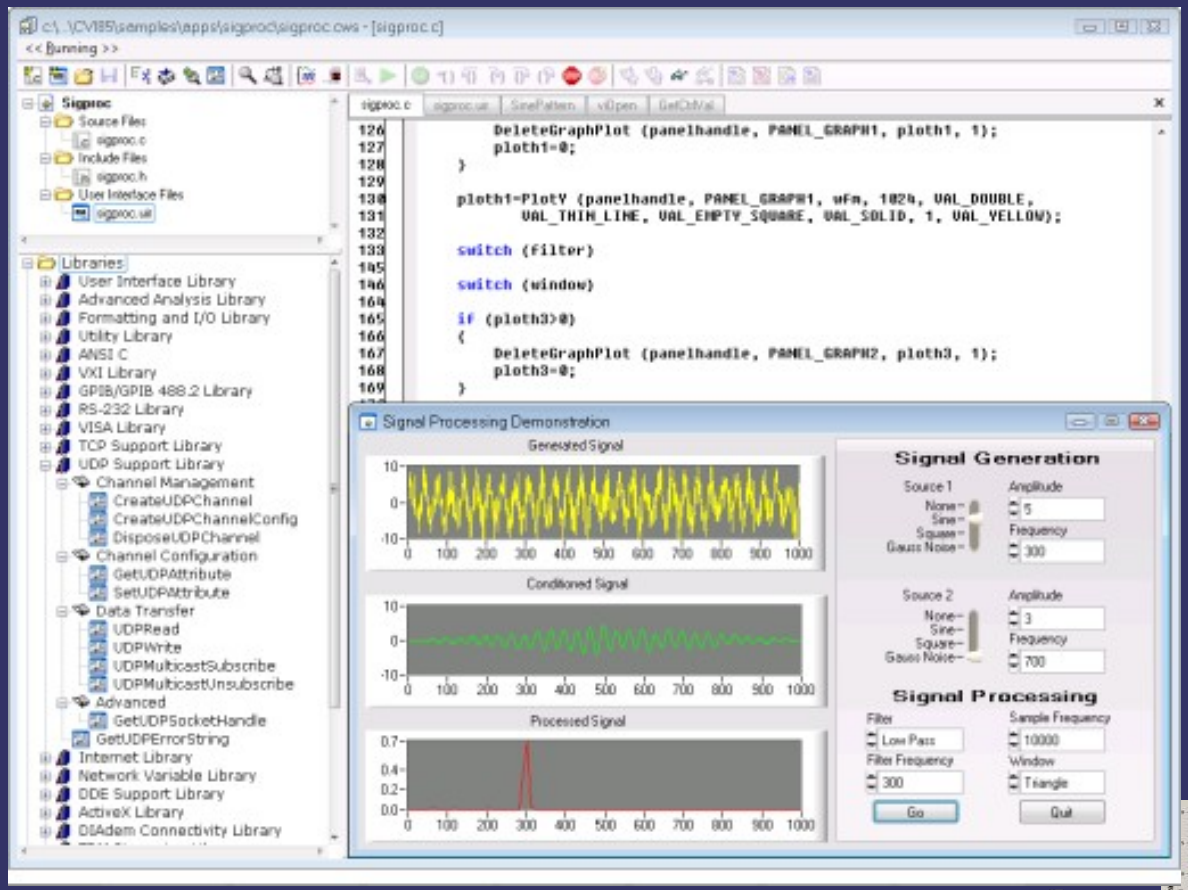
- NI LabView

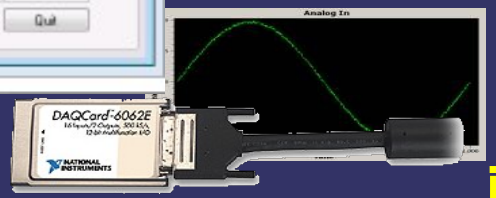




Alternatifler

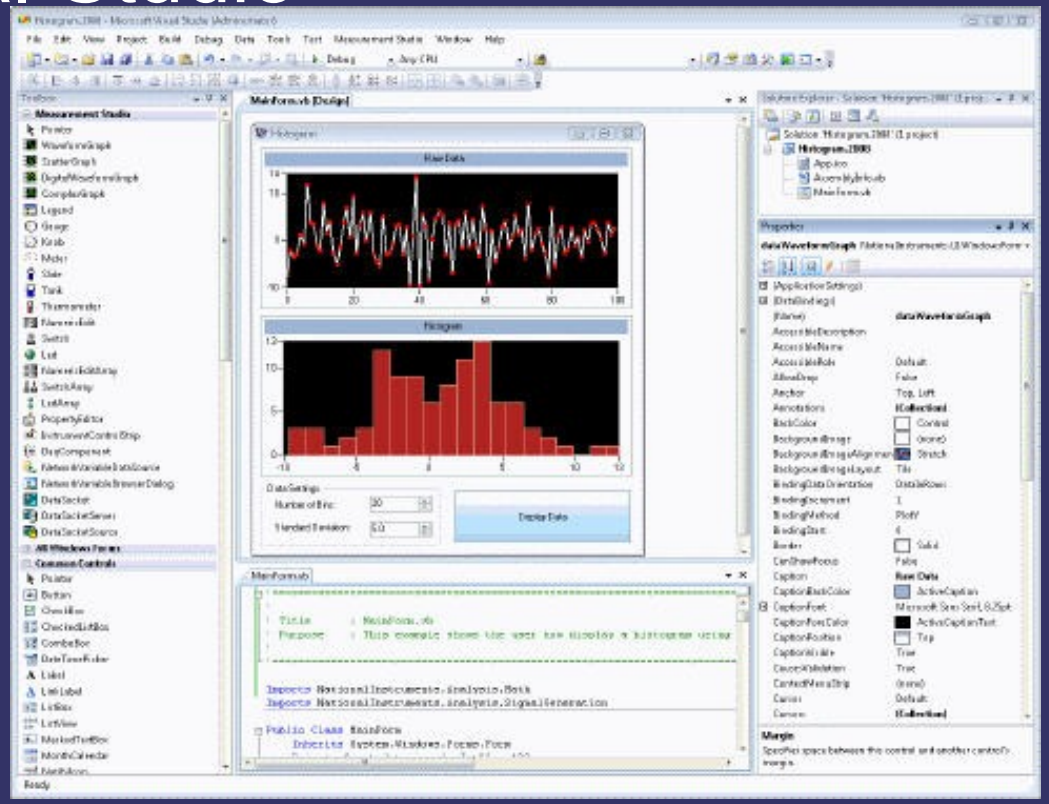
- NI LabWindows/CVI

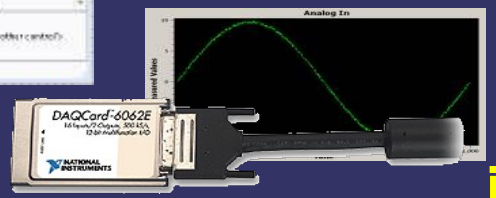




Alternatifler

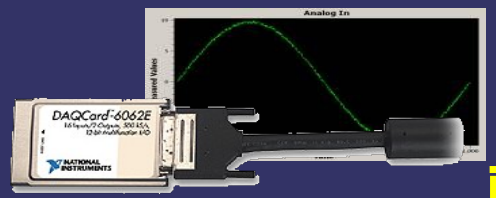
- Measurement Studio Desteği ile Microsoft Visual Studio





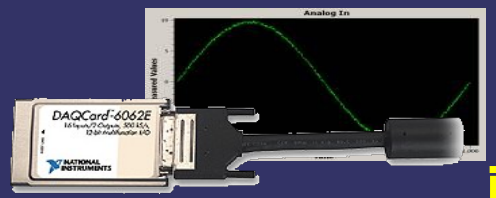
Yol Haritası

- Donanım Bilgisi
- Grafik Arabirim, Programlama
- Kullanılacak Araçlar
- Programlama Aşaması



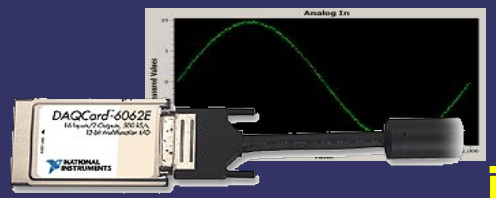
Yol Haritası

- Donanım Bilgisi
  - DAQCard 6062E User Manual : Teknik Özellikler
  - NIDAQmx Yardımı : Ölçme, API İşleyişi
  - NIDAQmx C Referansı : API Fonksiyonları
  - NIDAQmx Örnekler : API Kullanımı



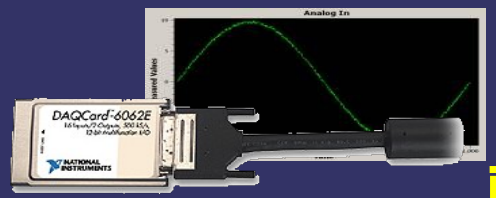
Yol Haritası

- Grafik Arabirim, Programlama
  - MS VS MFC : Kullanımı zor, Platform Bağımlı
  - Gtk : Kullanımı Zor, Windows, Linux, MAC
    - Örnek Prg. : GNOME, GIMP,...
  - Qt : Kullanımı Kolay, Windows, Linux, MAC
    - Örnek Prg. : KDE, Opera, Google Earth, Skype, Mathematica,...



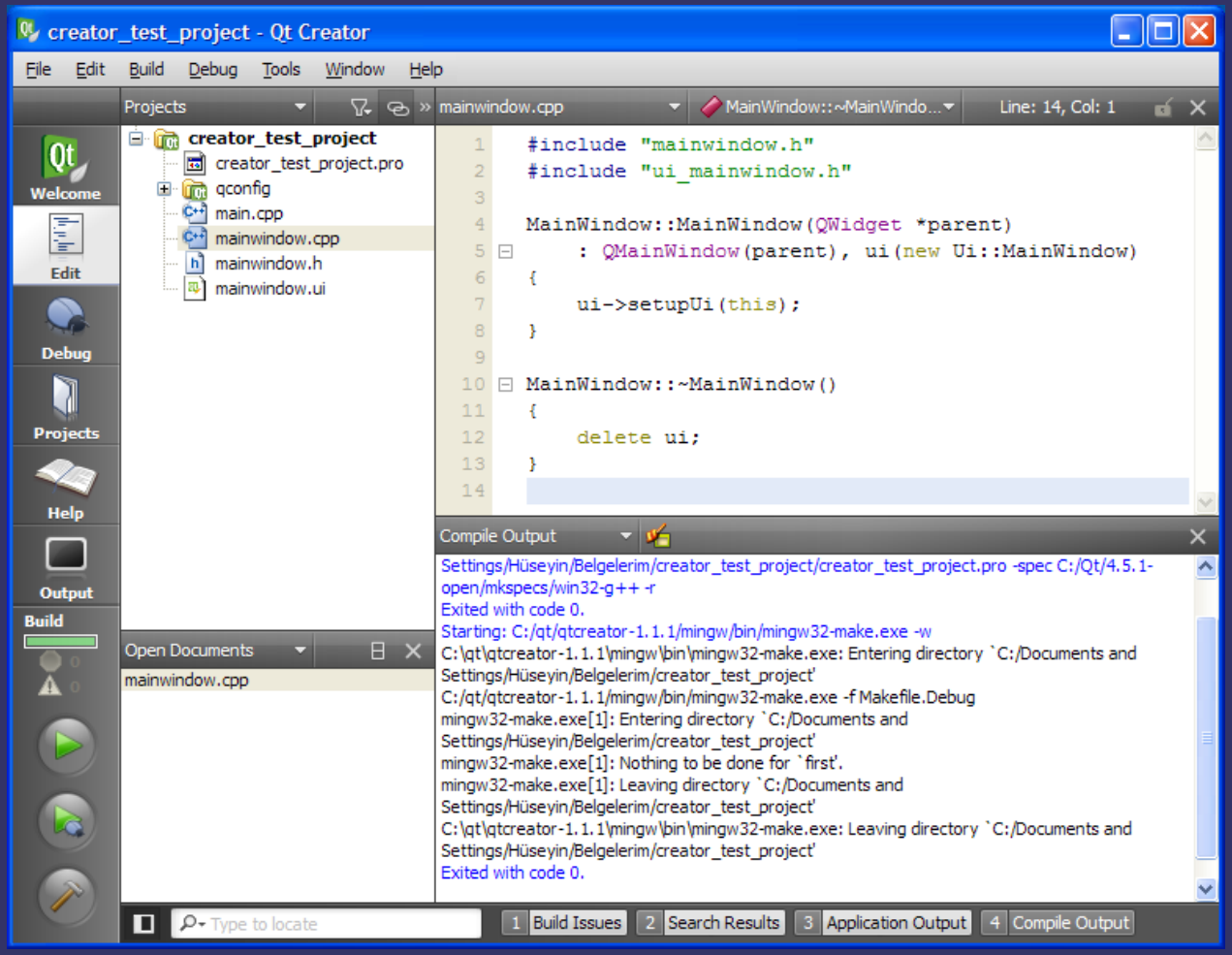
Yol Haritası

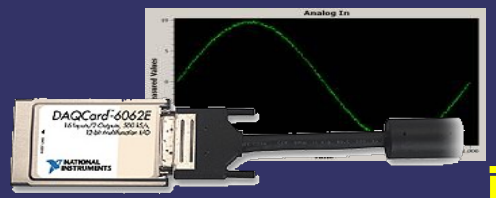
- Kullanılacak Araçlar
  - Editör : Creator
  - GUI : Qt, Qwt
  - Derleyici : MinGW (gcc, make)
  - Donanım Sürücüsü – API : NIDAQmx



Araçlar

- Creator





Araçlar

- Qt

Products

Qt enables UI and application developers to create a better user experience.

Qt is a cross-platform application and UI framework. Using Qt, you can write applications once and deploy them across many desktop and embedded operating systems without rewriting the source code.

Features

- Intuitive C++ class library
- Portability across desktop and embedded operating systems
- Integrated development tools with cross-platform IDE
- High runtime performance and small footprint on embedded

The Qt SDK includes the tools you need to build cross-platform applications with Qt in a single install:

- Qt Creator cross-platform IDE
- Qt libraries
- Qt Linguist translation & internationalization tools

Download **Free Qt SDK**

Download **Qt Sources Only**

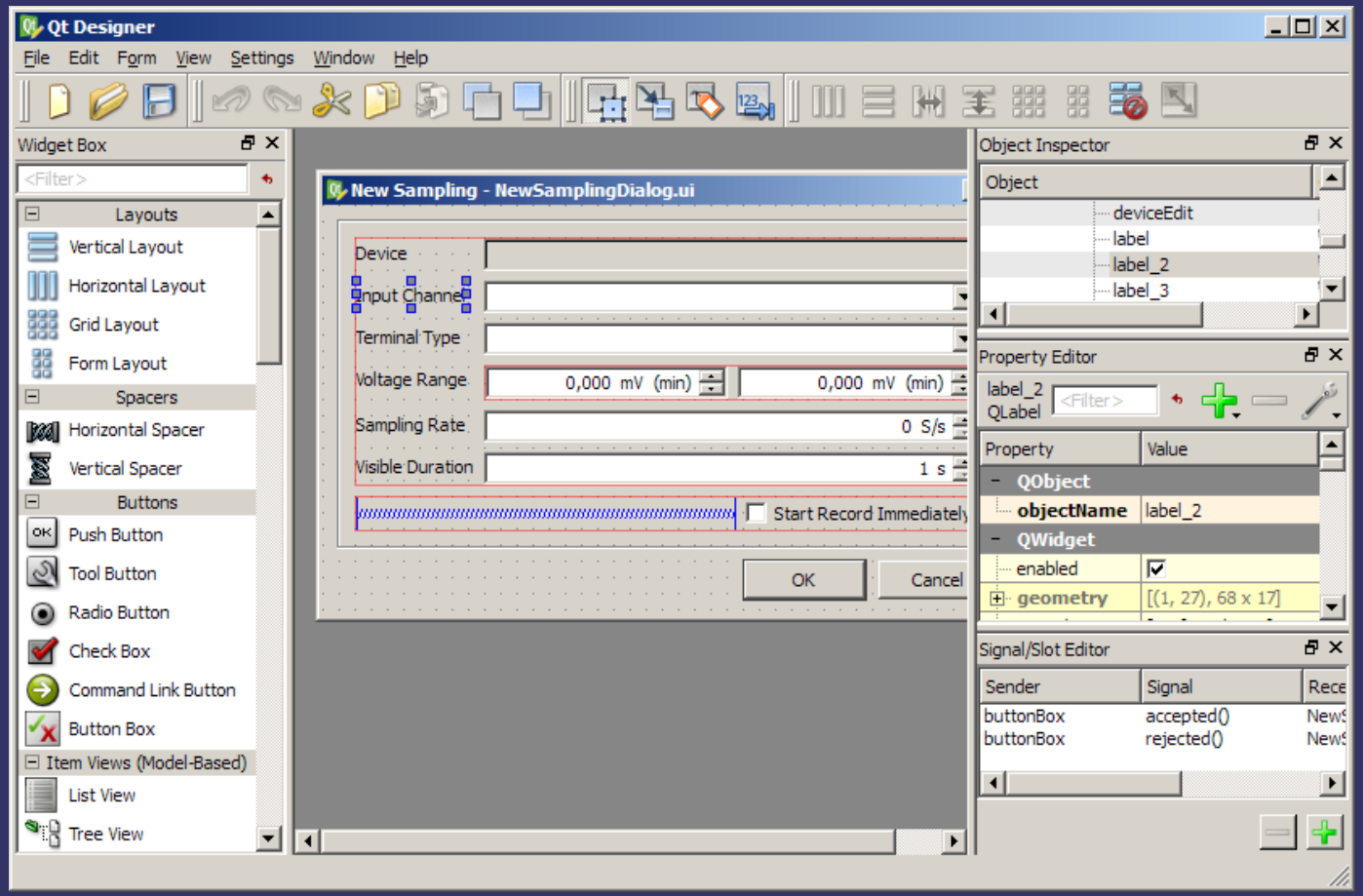
Qt is available for these platforms:

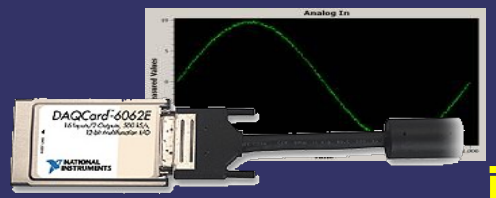
Embedded Linux | Mac OS X | Windows | Linux/X11 | Windows CE | S60

İçerik

Araçlar

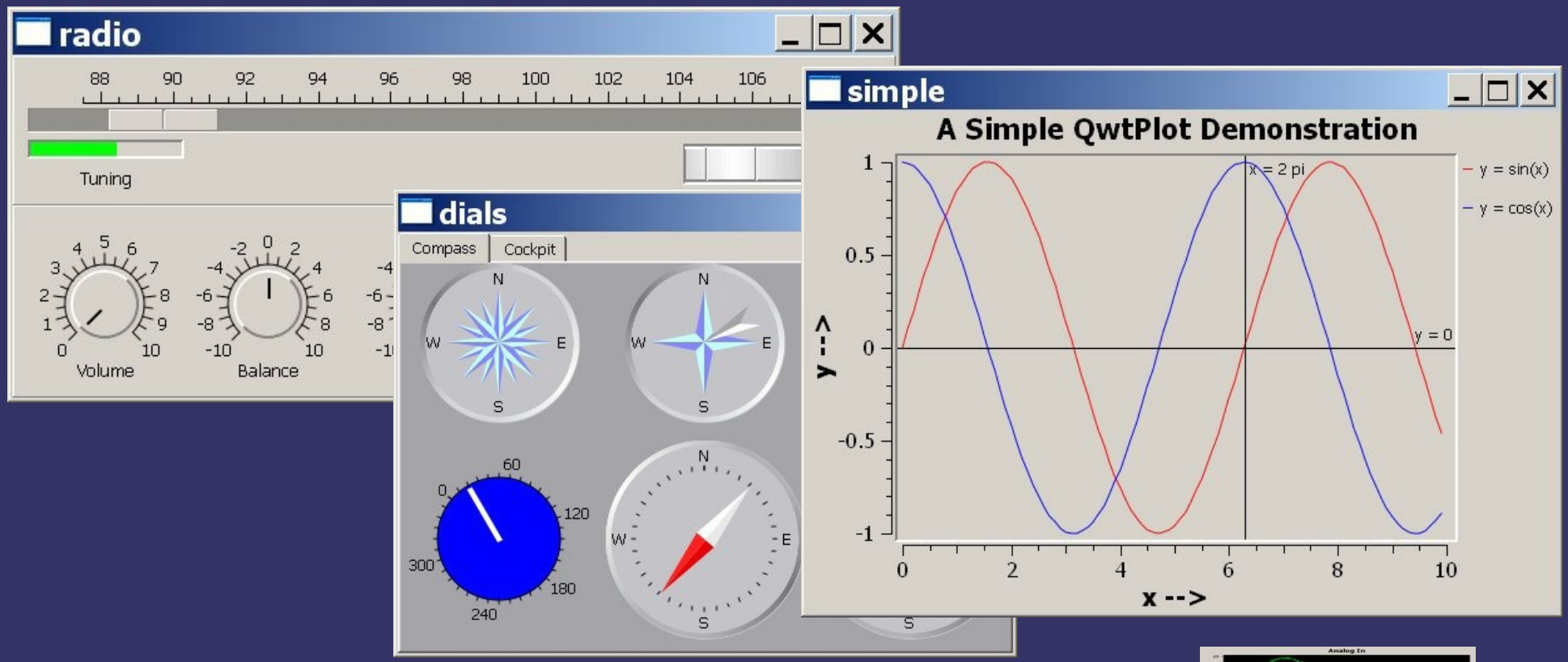
- Designer

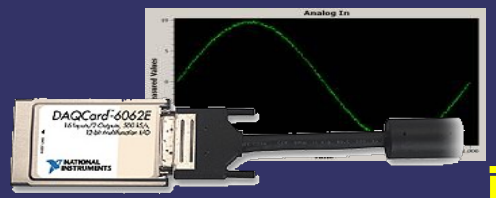




Araçlar

- Qwt


radio
88 90 92 94 96 98 100 102 104 106
Tuning
Volume
Balance
dials
Compass
Cockpit
N
W
E
S
60
0
120
300
180
240
simple
A Simple QwtPlot Demonstration
y = sin(x)
y = cos(x)
x = 2 pi
y = 0
y -->
x -->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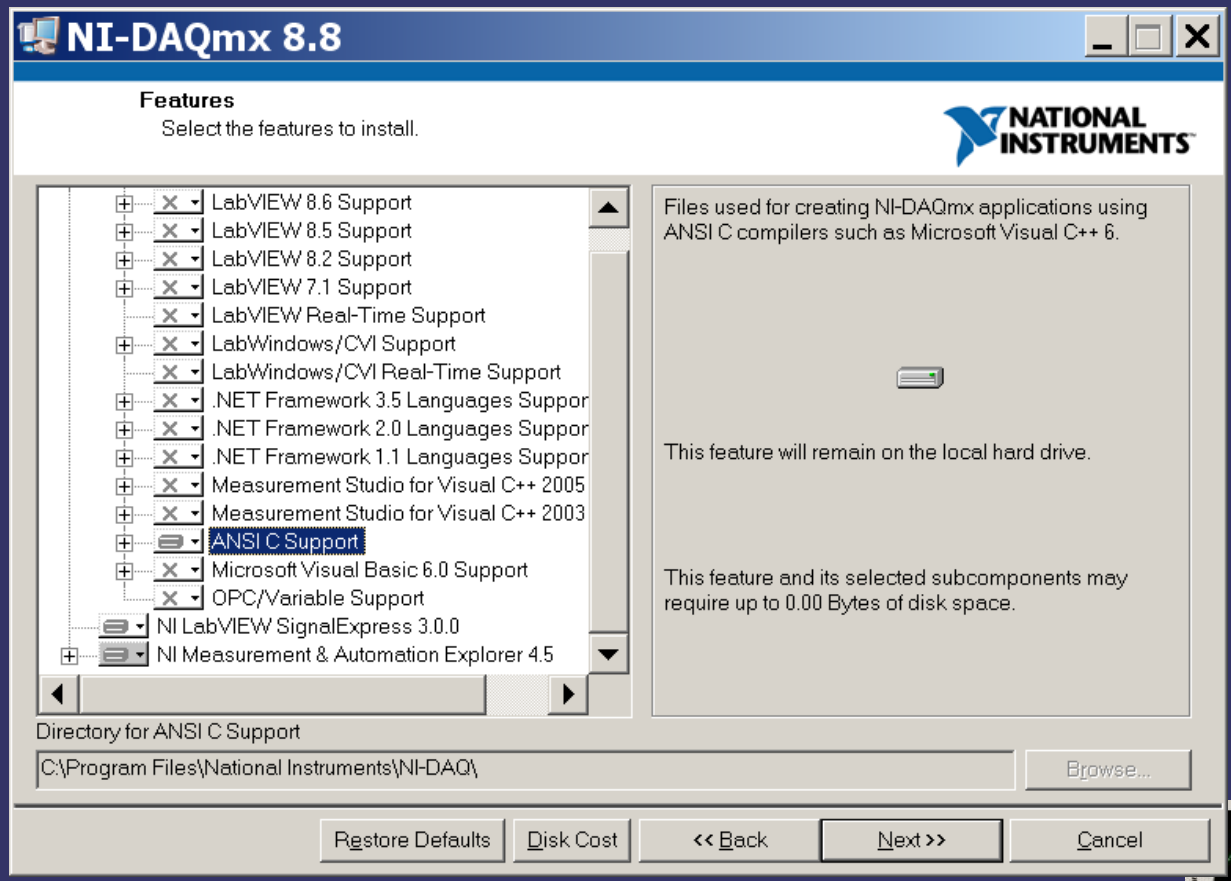
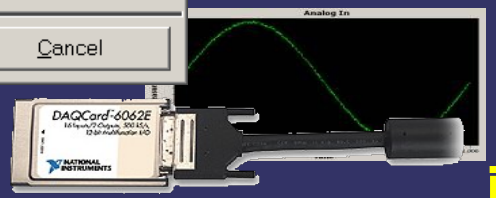
Araçlar

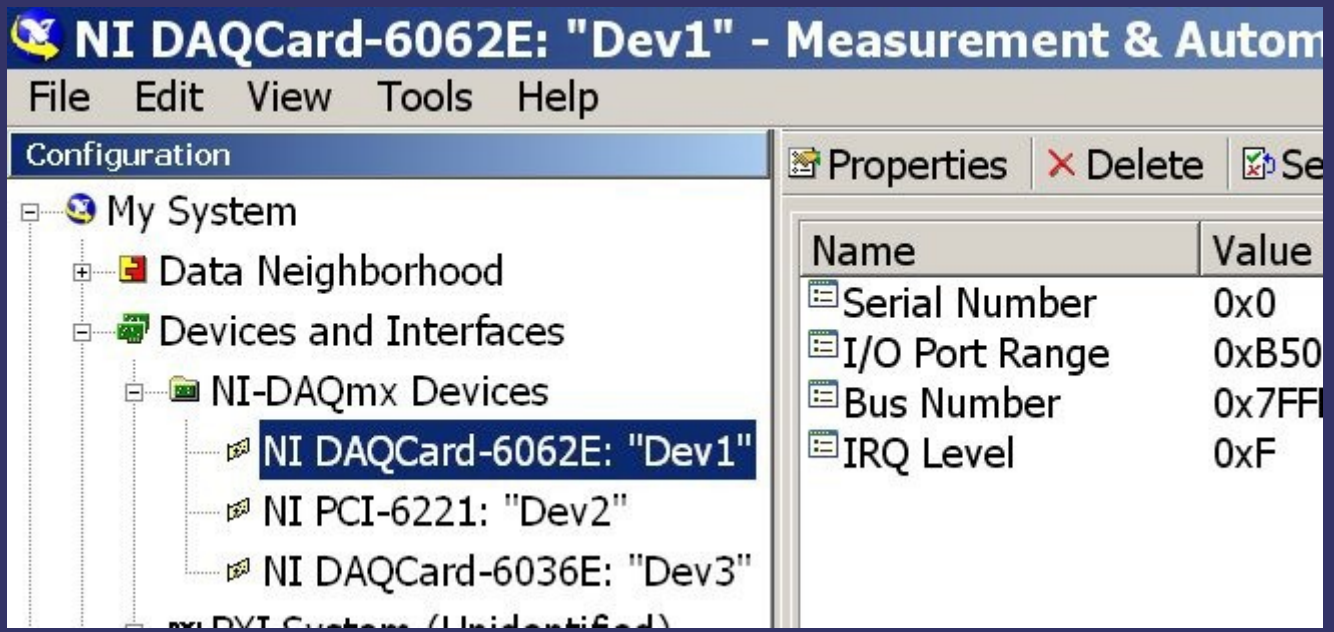
- NIDAQmx

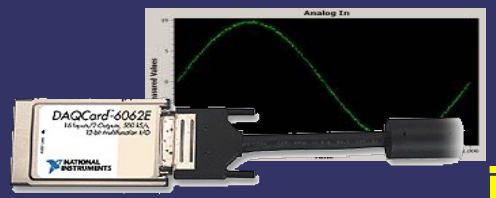




Araçlar

- MAX : Measurement & Automation Explorer





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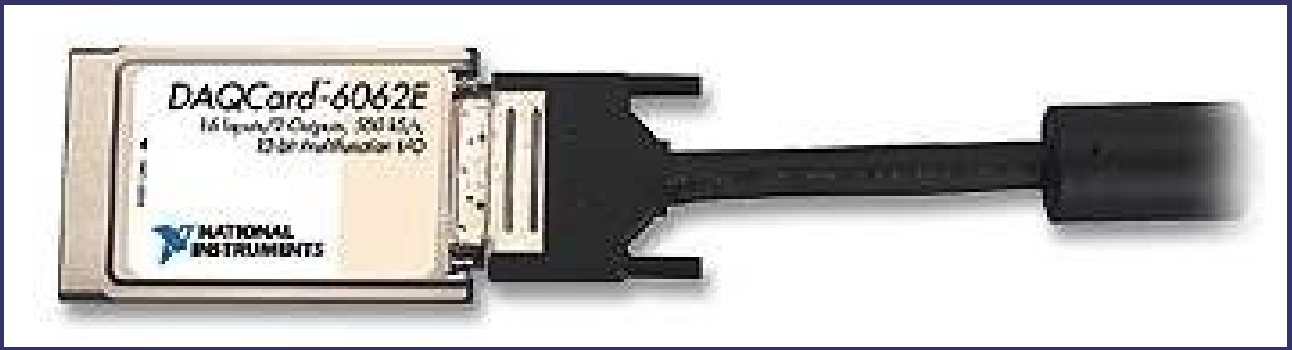
- 1 adet 12 bit ADC
- 2 adet 12 bit DAC
- 8 hat Dijital G/Ç
- 2 adet 24 bit Sayıcı/Zamanlayıcı



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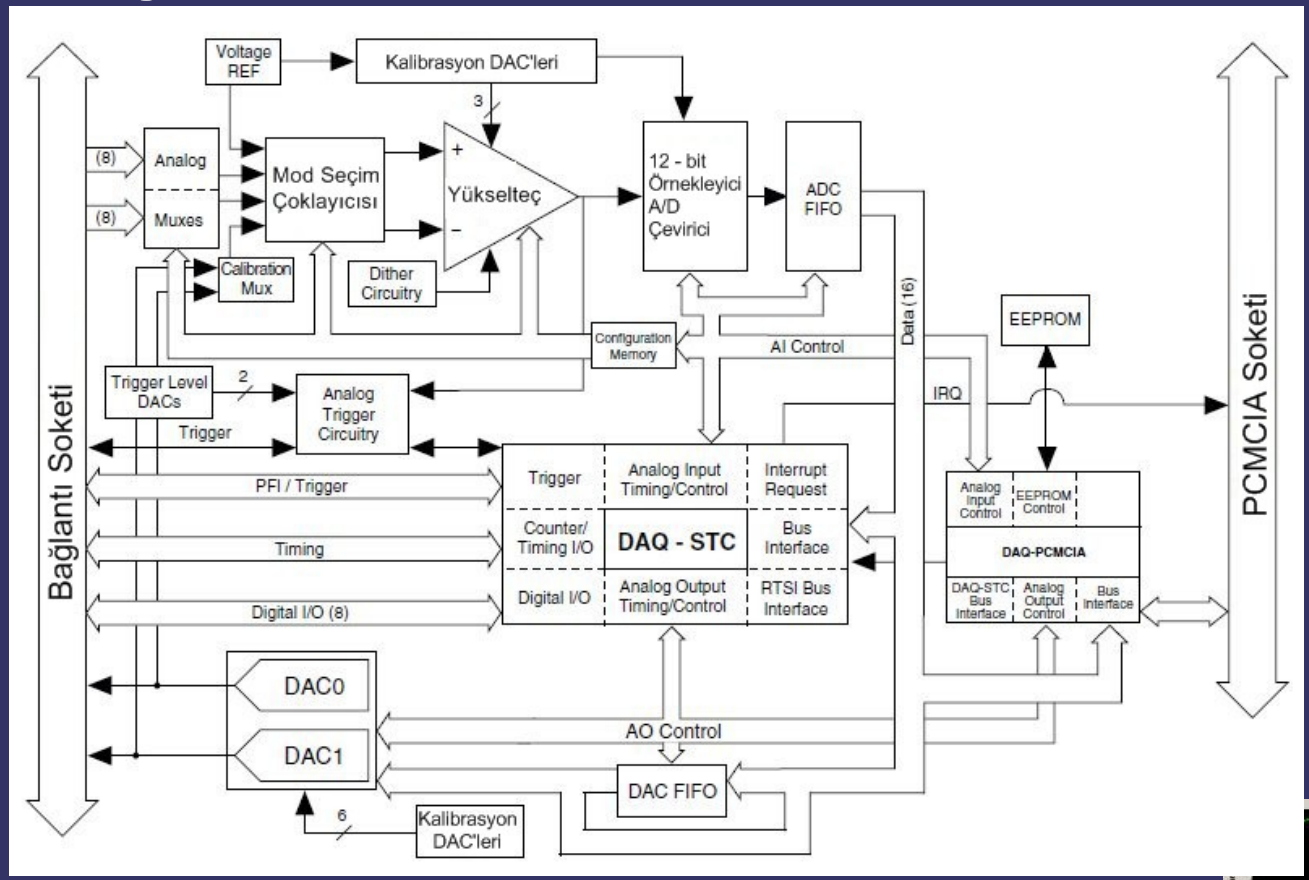
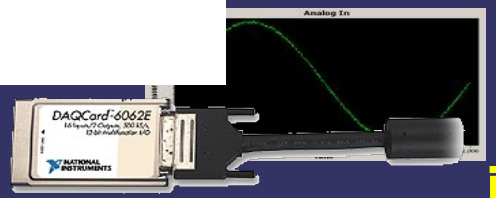
- Blok Şema





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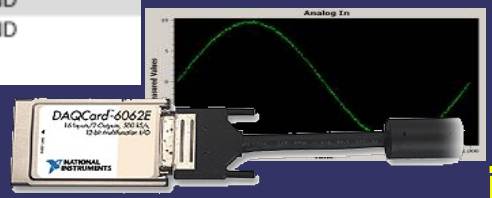
Bağlantı Şeması

Sinyal Adı	Referansı	Yönü	Açıklama
AIGND	—	—	Analog Giriş Toprak Ucu Cihaz üstünde AIGND, AOGND ve DGND birleştirilmiştir.
ACH <0...15>	AIGND	Giriş	Analog Giriş Uçları Her uç çifti ayrılmış ya da tek olarak kullanılabilir.
AISENSE	AIGND	Giriş	Analog Giriş Algılama ACH <0...15> uçları için referans
DAC0OUT	AIGND	Çıkış	Analog Çıkış 0
DAC1OUT	AIGND	Çıkış	Analog Çıkış 1
AOGND	—	—	Analog Çıkış Toprağı Cihaz üstünde AIGND, AOGND ve DGND birleştirilmiştir.
DGND	—	—	Dijital Kanal Toprağı Cihaz üstünde AIGND, AOGND ve DGND birleştirilmiştir.
DIO <0...7>	DGND	Giriş yada Çıkış	Dijital Giriş / Çıkış DIO6 ve DIO7 yukarı/aşağı sayıcının kontrol uçlarıdır.
+ 5 V	DGND	Çıkış	+ 5 V DC Kaynağı 250 mA'e kadar kendinden sıfırlamalı sigortalıdır.
SCANCLK	DGND	Çıkış	Tarama Saat Darbesi Ayarlandığı zaman A/D çevriminde bir saat darbesi üretir.
EXTSTROBE	DGND	Çıkış	Harici İşaret Yazılım kontrolü ile harici aygıtlardaki olayları tetiklemede kullanılabilir.

AI 8	34	68	AI 0
AI 1	33	67	AI GND
AI GND	32	66	AI 9
AI 10	31	65	AI 2
AI 3	30	64	AI GND
AI GND	29	63	AI 11
AI 4	28	62	AI SENSE
AI GND	27	61	AI 12
AI 13	26	60	AI 5
AI 6	25	59	AI GND
AI GND	24	58	AI 14
AI 15	23	57	AI 7
AO 0	22	56	AI GND
AO 1	21	55	AO GND
AO EXT REF	20	54	AO GND
P0.4	19	53	D GND
D GND	18	52	P0.0
P0.1	17	51	P0.5
P0.6	16	50	D GND
D GND	15	49	P0.2
+5 V	14	48	P0.7
D GND	13	47	P0.3
D GND	12	46	AI HOLD COMP
PFI 0/AI START TRIG	11	45	EXT STROBE
PFI 1/AI REF TRIG	10	44	D GND
D GND	9	43	PFI 2/AI CONV CLK
+5 V	8	42	PFI 3/CTR 1 SRC
D GND	7	41	PFI 4/CTR 1 GATE
PFI 5/AO SAMP CLK	6	40	CTR 1 OUT
PFI 6/AO START TRIG	5	39	D GND
D GND	4	38	PFI 7/AI SAMP CLK
PFI 9/CTR 0 GATE	3	37	PFI 8/CTR 0 SRC
CTR 0 OUT	2	36	D GND
FREQ OUT	1	35	D GND



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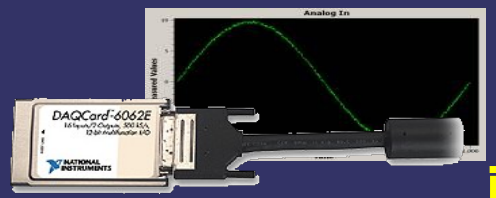
- Ölçüm Yöntemleri
  - Referanslı (Referenced)
  - Referanssız (Nonreferenced)
  - Ayrılmış (Differential)
  - Yalancı Ayrılmış (Pseudodifferential)



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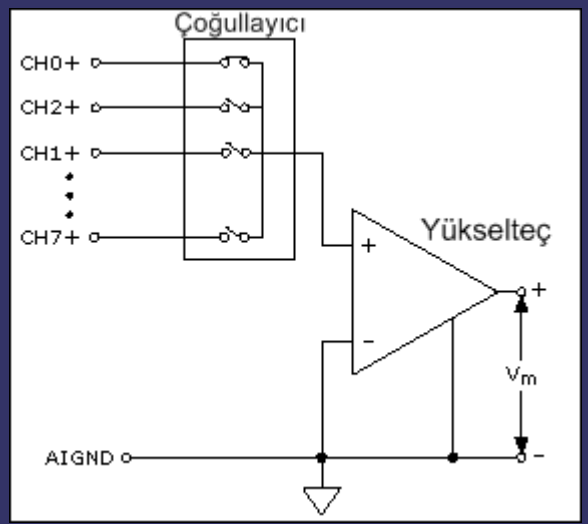
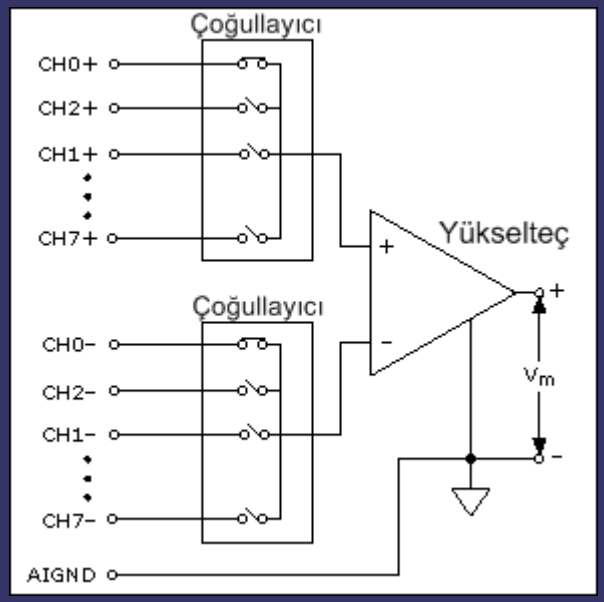
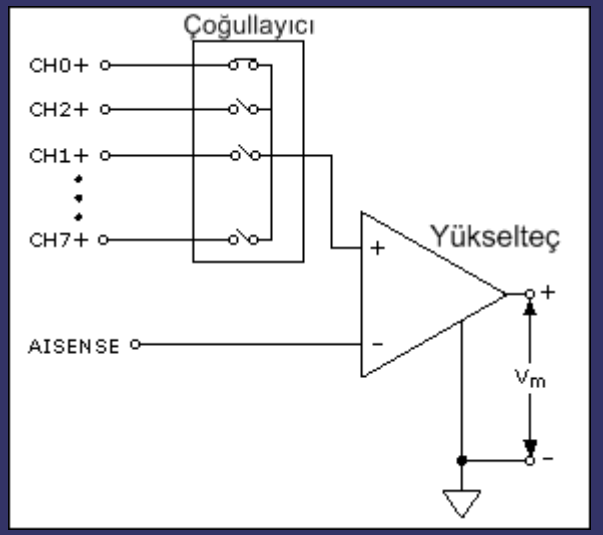
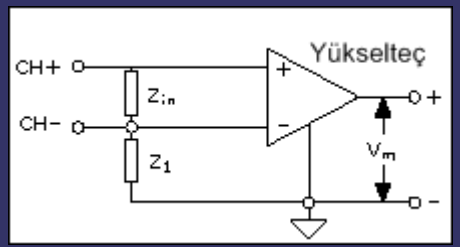
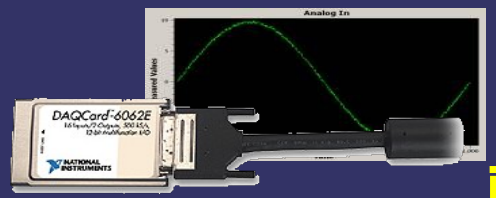
- Ölçüm Yöntemleri





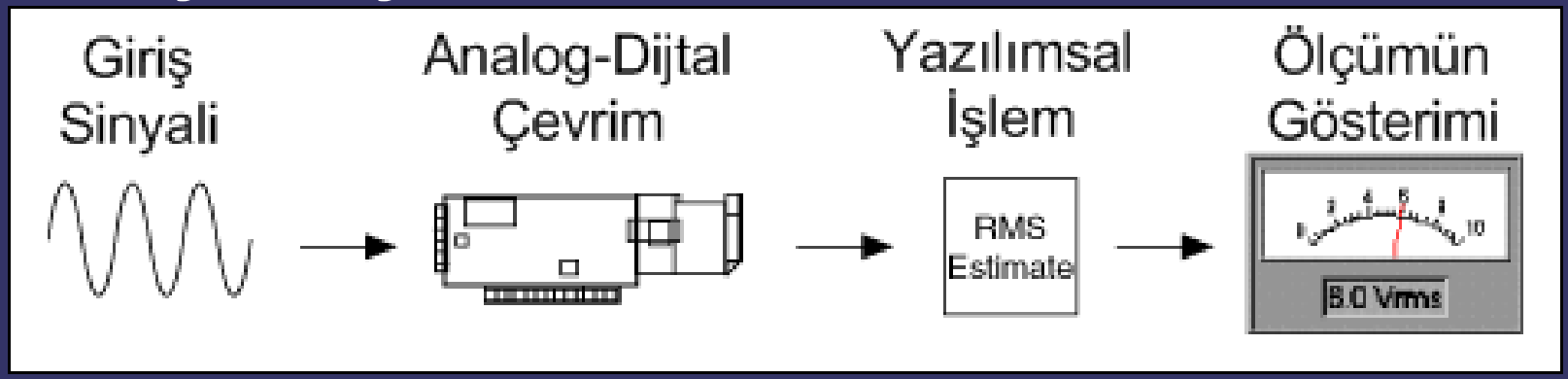


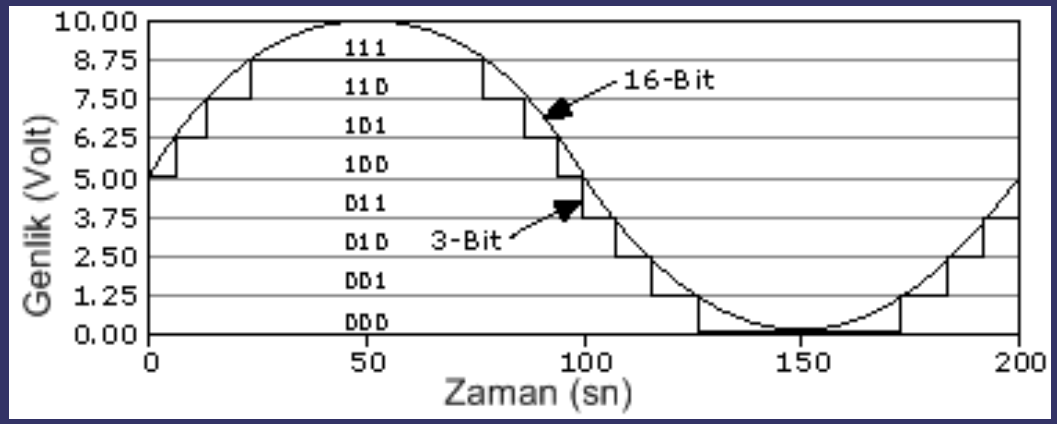


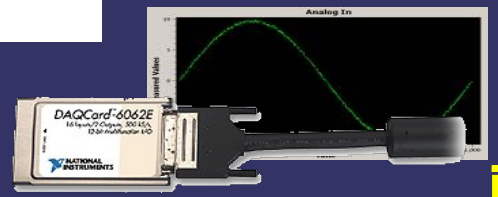


DAQCard 6062E

- Ölçüm İşlemi

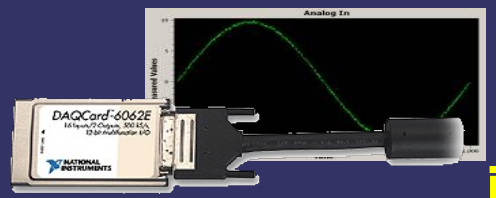






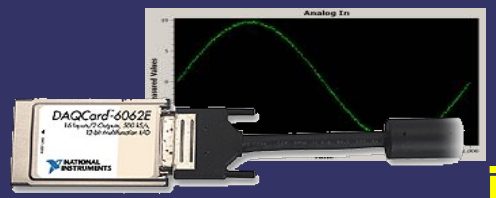
Programlama Aşaması

- Gerçekleştirilenler
  - NIDAQmx Örnekleri Testi
    - Sanal Sürücü Testi
    - Kütüphane Dosyasının Derleyiciye Uyarlanması
  - Qt, Qwt Örnekleri Testi
    - Programın Ana Pencere Tasarımı
    - NIDAQmx API Kullanılarak Grafik Çizimi



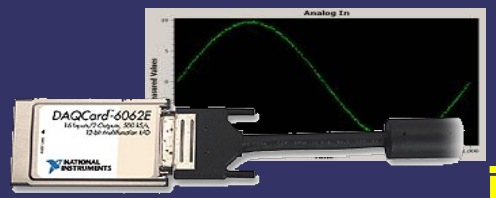
Programlama Aşaması

- Gerçekleştirilenler (Devam)
  - Temel Sınıfların Tasarımı
    - MainWindow, DeviceController, ..
  - Arayüz Tasarımı
    - NewSamplingDialog, SettingsDialog,...
  - Filtreler
    - FFT – FFTW
    - Ortalama

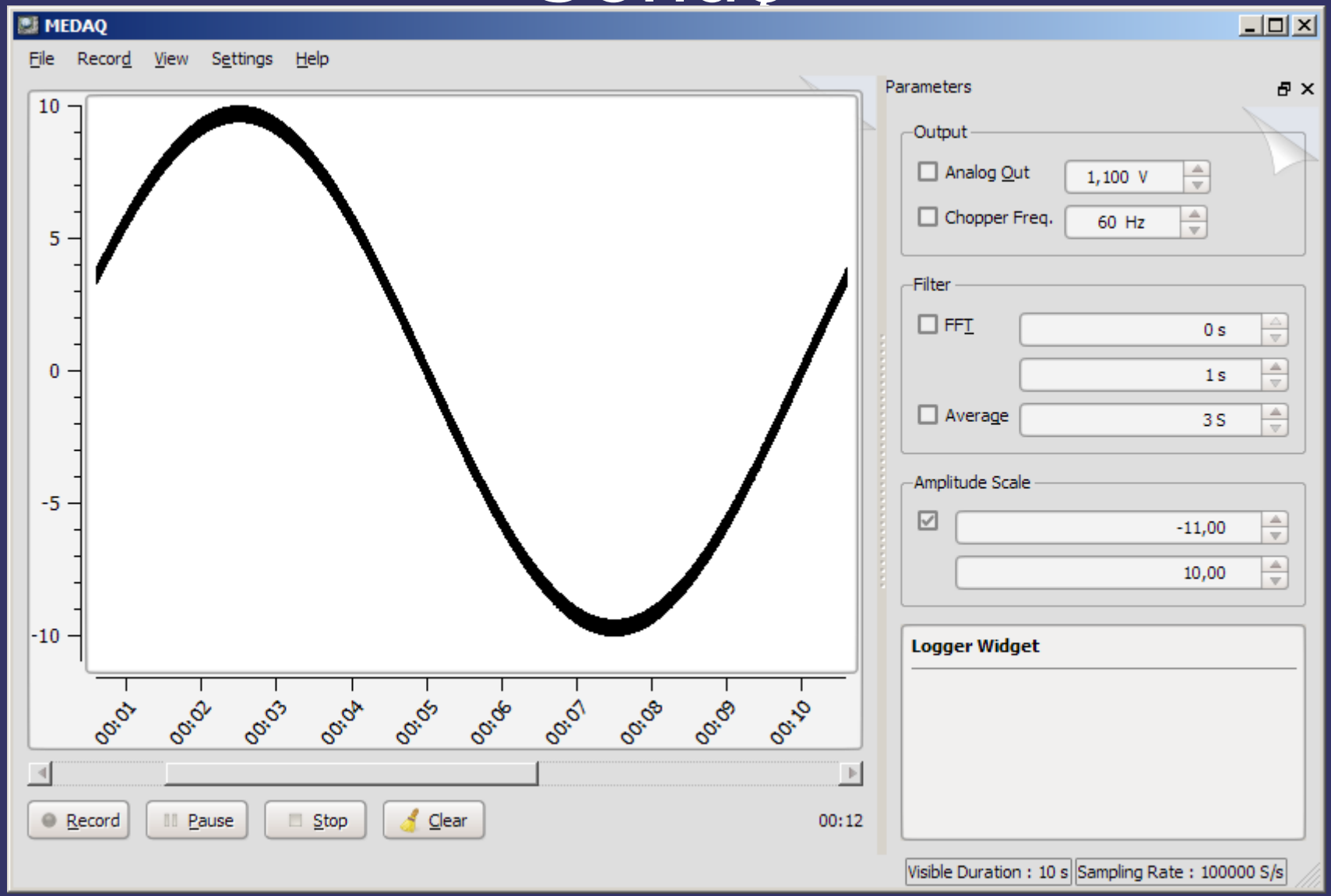


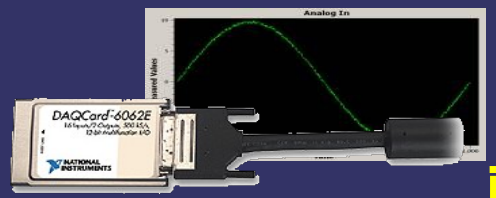
Programlama Aşaması

- Gerçekleştirilenler (Devam)
  - Kaynakların Düzenlenmesi
    - İkon seti, Tema,...

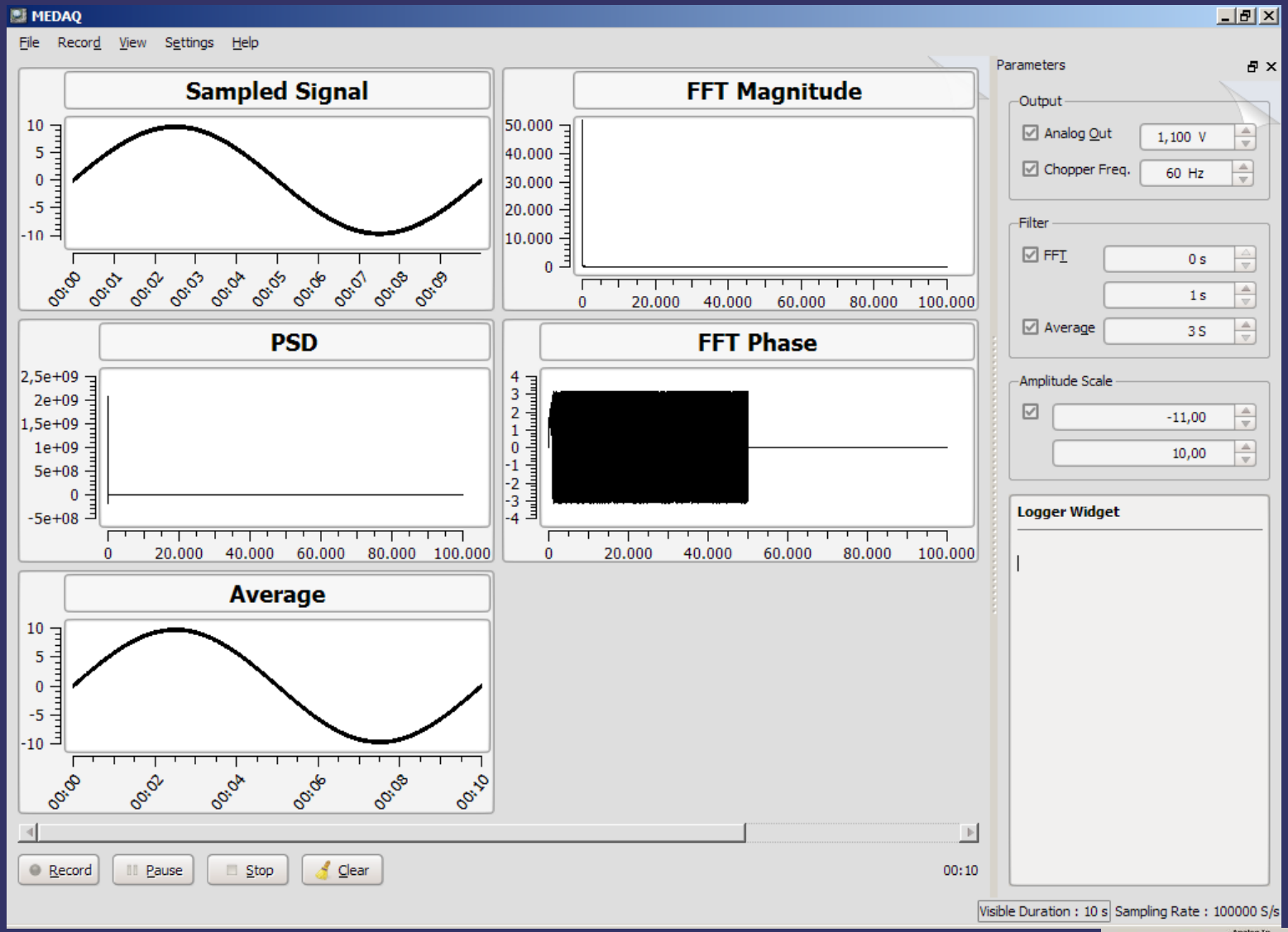


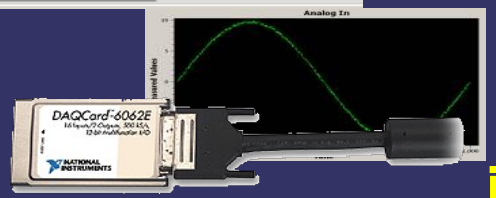
Sonuç


MEDAQ
File
Record
View
Settings
Help
10
5
0
-5
-10
00:01
00:02
00:03
00:04
00:05
00:06
00:07
00:08
00:09
00:10
Record
Pause
Stop
Clear
00:12
Parameters
Output
Analog Out
1,100 V
Chopper Freq.
60 Hz
Filter
FFT
0 s
1 s
Average
3 S
Amplitude Scale
-11,00
10,00
Logger Widget
Visible Duration : 10 s
Sampling Rate : 100000 S/s


DAQCard-6062E

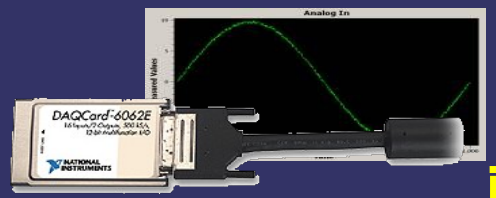
Sonuç


MEDAQ
File Record View Settings Help
Sampled Signal
FFT Magnitude
PSD
FFT Phase
Average
Parameters
Output
Analog Out
1,100 V
Chopper Freq.
60 Hz
Filter
FFT
0 s
1 s
Average
3 S
Amplitude Scale
-11,00
10,00
Logger Widget
Record
Pause
Stop
Clear
00:10
Visible Duration : 10 s
Sampling Rate : 100000 S/s


DAQCard-6062E

Kaynaklar

- NIDAQmx : http://ni.com/dataacquisition/nidaqmx.htm
- Qt : http://trolltech.com/products
- Qwt : http://qwt.sourceforge.net/
- MinGW : http://www.mingw.org/



Sorular ?

- ?