# User Interface Design Best Practices

**Presented to the Long Island Chapter of the IEEE Instrumentation & Measurement Society and the Long Island LabVIEW User Group (LILUG)**

**on Thursday, March 6, 2014**.

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Based upon presentation created by Simon Hogg, Senior Product Manager, National Instruments.

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# Agenda

1.   Definitions, rules, and advice

> (not specific to LabVIEW, but important)

2.   Some cool UI techniques for LabVIEW

> (and why you would consider using them in your application)

3.   Where to go to download some reusable components

> (because everybody loves free stuff)

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# Quote

"The other thing…that people seem to get wrong is to think that the code they write is what matters.  No, even if you wrote 100% of the code, and even if you are the best programmer in the world and will never need help with the project at all, the thing that really matters is the users of the code.  The code itself is unimportant; the project is only as useful as people actually find it."

- Linus Torvalds

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# Quote

"A good company must 'impute' – it must convey its values and importance in everything that it does, from packaging to marketing."

- Steve Jobs / Mike Markkula

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# What Is a UI?

- **UI:** User Interface

  - How user interacts with the program

  - First thing the user notices


- **UX:** User Experience

  - Sometimes used interchangeably with UI

  - Broader, covers workflow

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# Some General Rules

1. Do not be innovative

2. Less is more

3. Think about your user

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# 1. Do Not Be Innovative

Use familiar elements

- Buttons

- Icons

- Terminology

- Dialogs

- Menus

# 1. Do Not Be Innovative

Still some creative license

- Do not change the way similar looking things behave

- Polish, do not reinvent

# Style Guidelines

➢ Make UI decisions once and record them

  ➢ Often a living document

➢ Be consistent

  ➢ Inconsistency robs your users of productivity

  ➢ VI Analyzer can help to enforce

➢ Not everyone needs to be a UI/UX expert



• References:

  • LabVIEW Style Guide

  • Windows Application UI Development Guidelines

  • Apple OS X Human Interface Guidelines (HIG)

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# Style Guidelines - Example

Dev Center - Desktop > Docs > Desktop app development documentation > Windows Application UI Development > Windows User Experience Interaction Guidelines > Guidelines > Controls > Command Buttons

## Command Buttons

▷ Windows Desktop App Development

▷ Desktop app development documentation

▷ Windows Application UI Development

▷ Windows User Experience Interaction Guidelines

▷ Guidelines

  ◢ Controls

    Balloons

    Check Boxes

    Command Buttons

    Command Links

    Drop-down Lists & Combo Boxes

    Group Boxes

    Links

    List Boxes

    List Views

    Progress Bars

    Progressive Disclosure

79 out of 108 rated this helpful - Rate this topic

Is this the right control?
Design concepts
Usage patterns
Guidelines
  General
  Split buttons
  Default values
Recommended sizing and spacing
Labels
Documentation

With a *command button*, users initiate an immediate action.

    OK

A typical command button.

The *default command button* is invoked when users press the Enter key. It is assigned by the developer, but any command button becomes the default when users tab to it.

**Note:** Guidelines related to layout are presented in a separate article.

### Is this the right control?
To decide, consider these questions:

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# 2. Less Is More

➢ Too much on screen at once is distracting

➢ Allow your user to focus on what is important

➢ Animations, decorations have their place, use sparingly

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# 3. Think About Your User

➢ You are an expert user of your own application

➢ Your end users probably do not know as much as you

  ➢ Explain what buttons do

  ➢ Keep them informed about what your program is doing

➢ Know how the user plans on using your application

  ➢ Mouse, keyboard?

  ➢ Touch screen → large buttons

  ➢ Outdoors → high contrast

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# Better Yet…

Great UI design takes talent, training, and/or experience

If you have access to experts, use them

They don't have to be LabVIEW users – PPT, PDF, Photoshop work well to iterate on designs
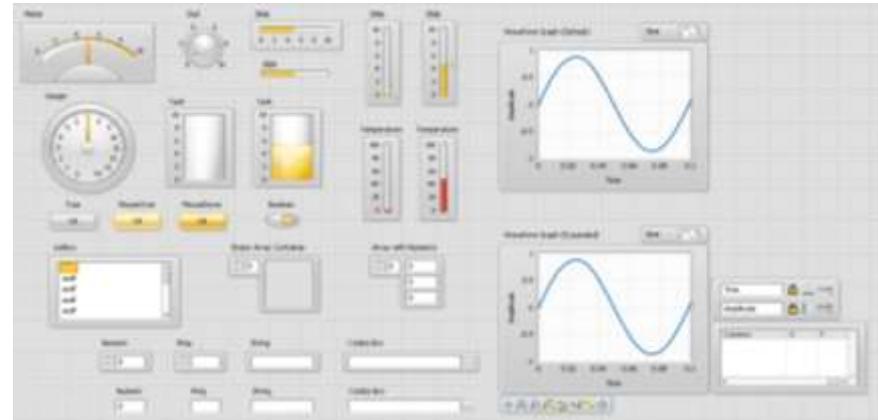


Silver controls initial design in Photoshop



UI Design ver2.pdf

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# Let's Take a Look at Some UIs

➢ Windows Desktop App

➢ Small Touch Screen App

➢ Informative Kiosk Display
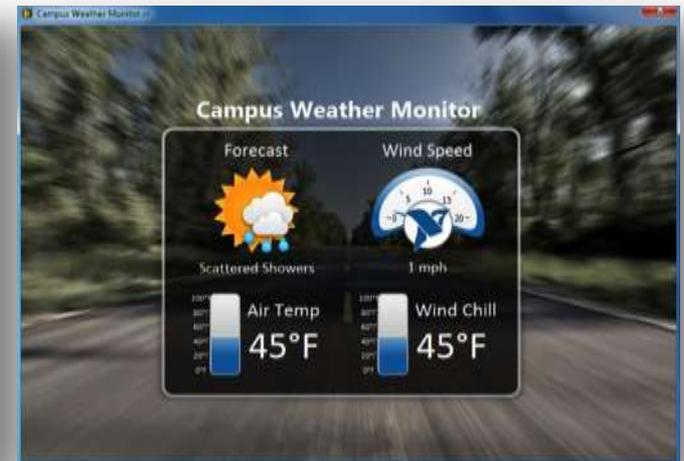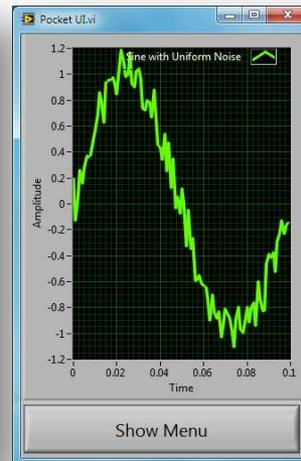
# Windows Desktop App

# Applying the Rules

## Desktop Windows OS Application

| Do not be innovative | Less is more | Think about your user |
|---|---|---|
| • Use system controls<br>• Add familiar icons to task buttons<br>• Use X to close application | • Allow user to hide less important displays<br>• Hide the LabVIEW toolbar<br>• Do not persist one-time configuration controls for no reason → use temporary dialogs<br>• Customize the run-time menu | • Create a status bar and use the busy cursor to update user<br>• Use tooltips to clarify functionality<br>• Allow the user to cancel long tasks<br>• Use panes to let the user resize your application |

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# Use Appropriate Controls
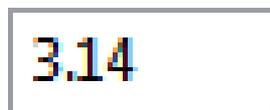


You can change your default type in **Tools»Options»Front Panel**

# Add Decals to Buttons

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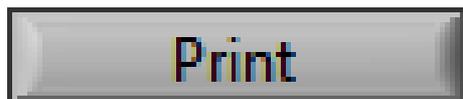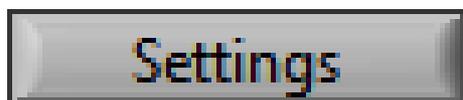
# Add Decals to Buttons – Demo
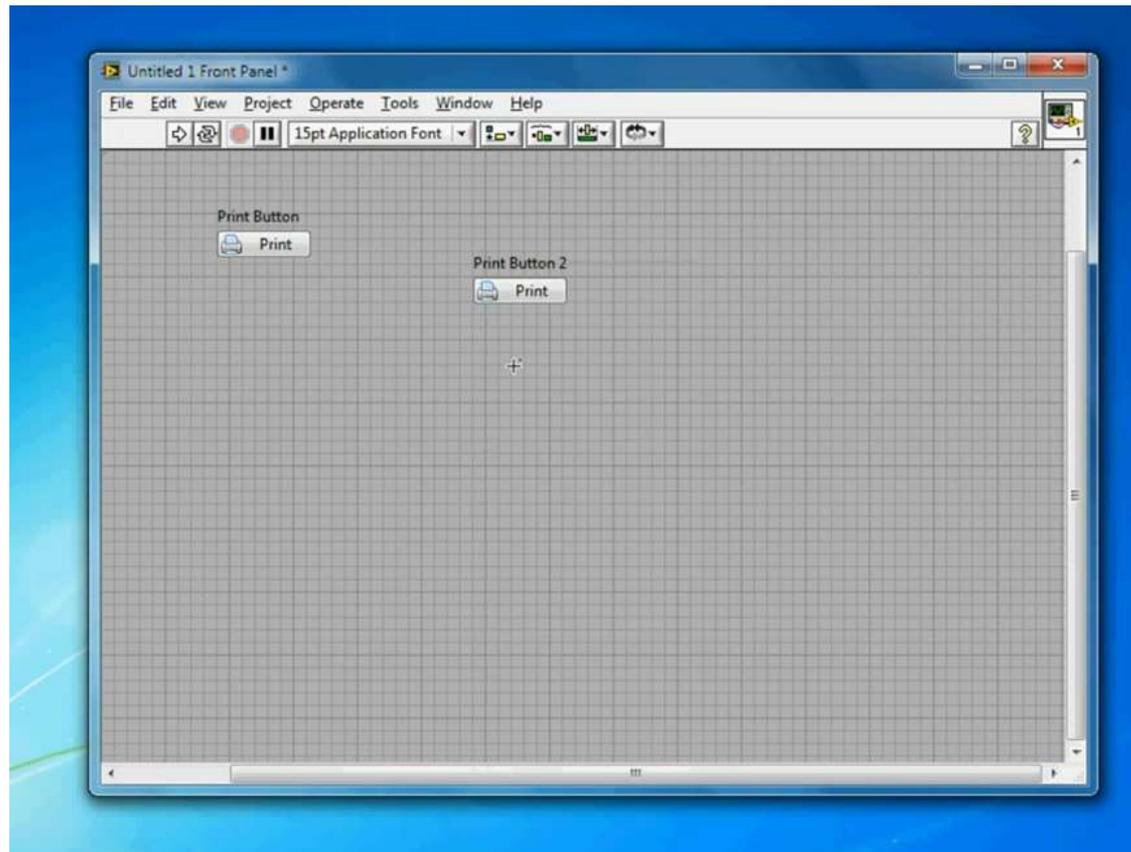


## 01 - LabVIEW UI Tips - Add Decals to Buttons

http://www.youtube.com/watch?v=2NdqXh67mak

# Tooltips
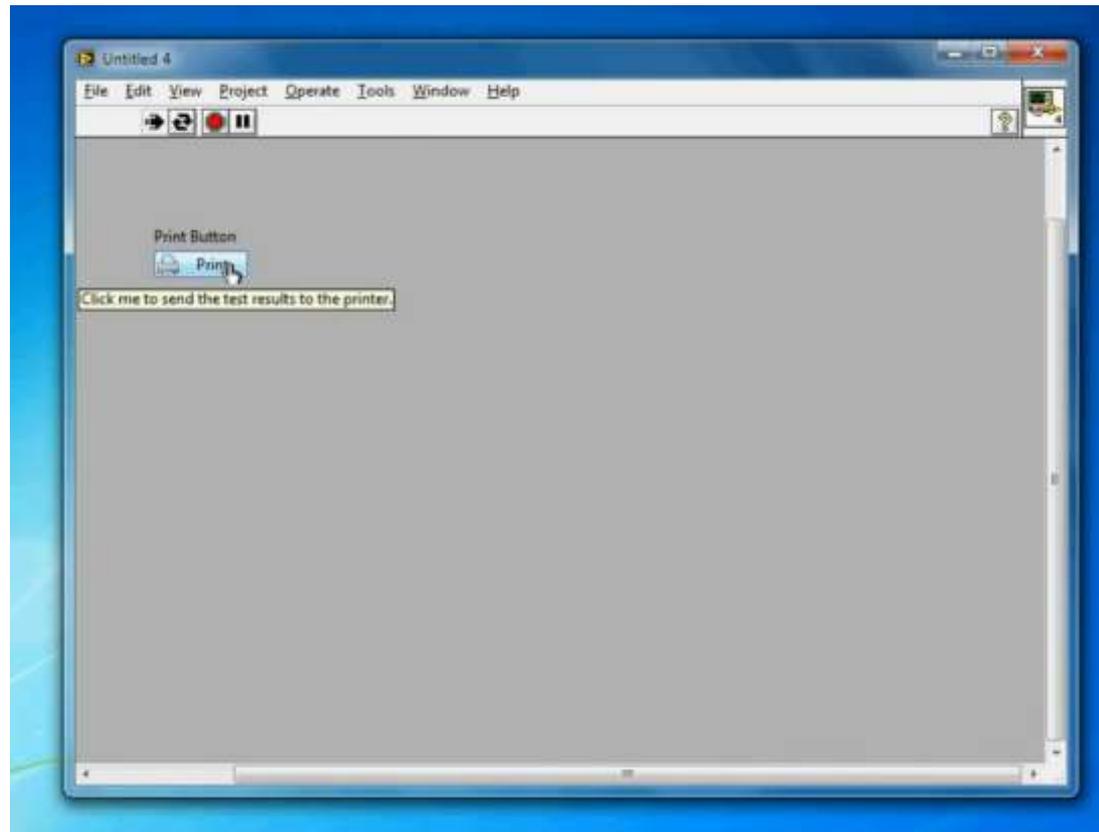
# Tooltips – Demo



## 02 - LabVIEW UI Tips - Tooltips

http://www.youtube.com/watch?v=NGeEImr1q2g
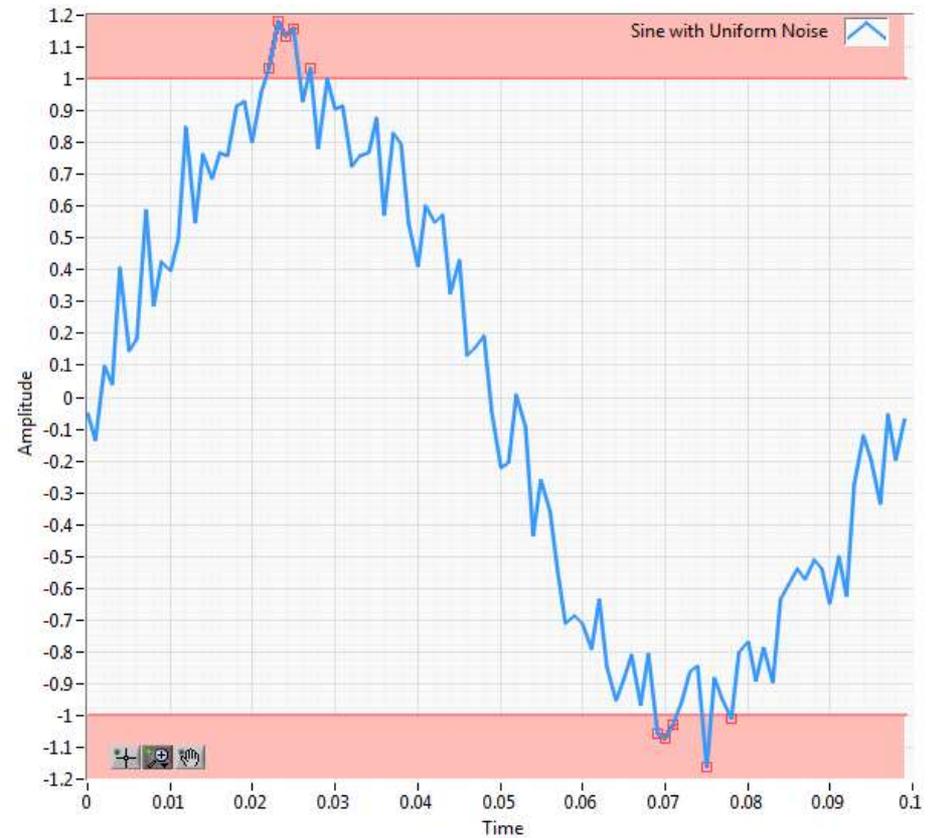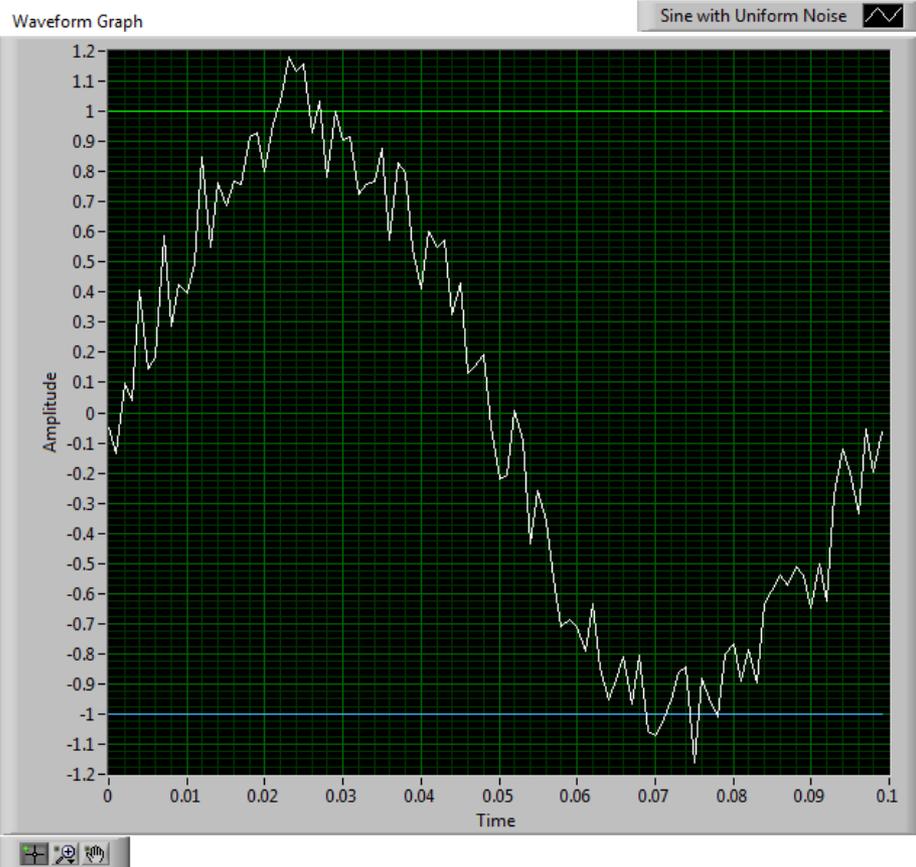
# Recolor Graphs

# Recolor Graphs – Demo
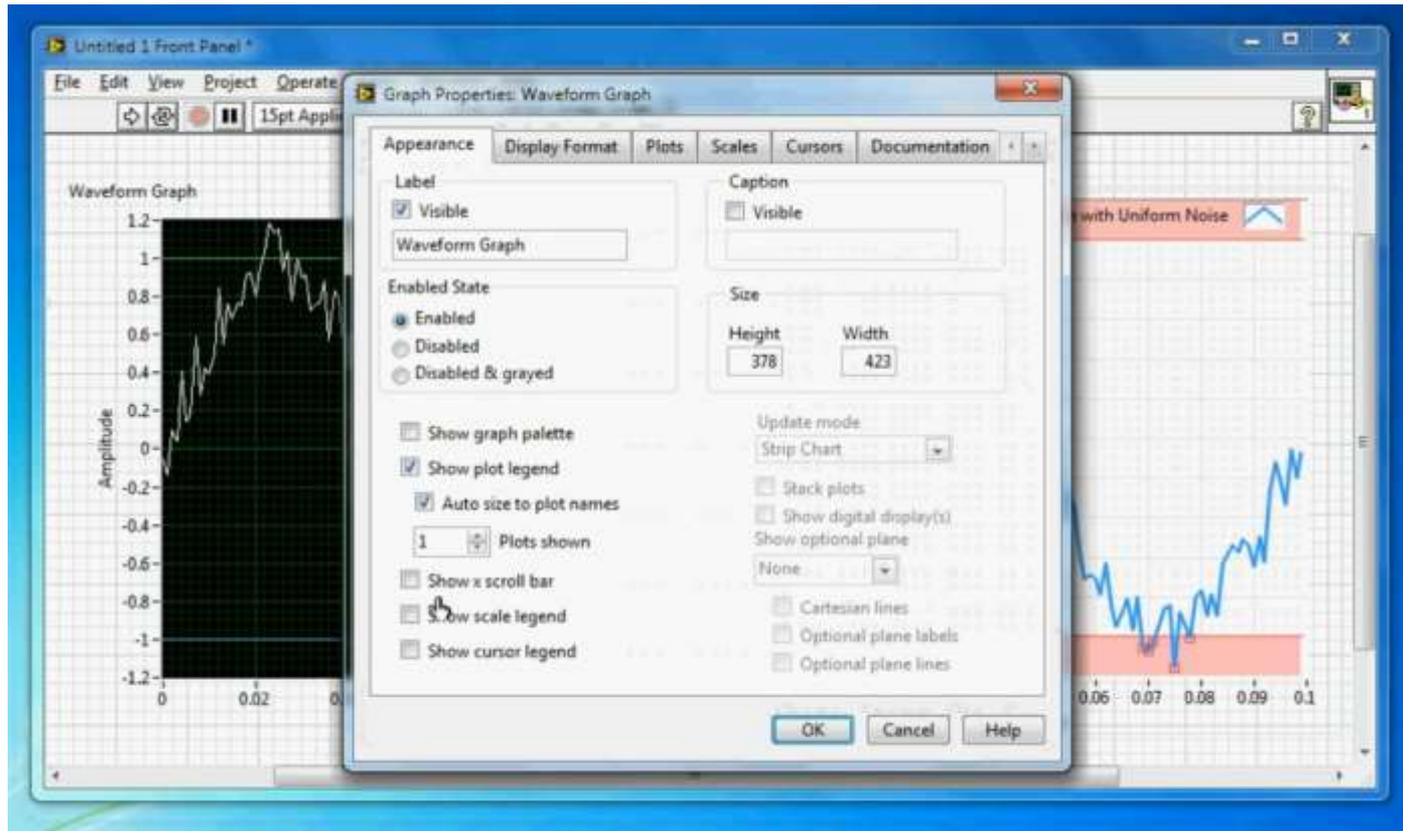


03 - LabVIEW UI Tips - Recoloring Graphs
http://www.youtube.com/watch?v=rOUcBvyHj5E

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# Hide the LabVIEW Toolbar

# Hide the LabVIEW Toolbar – Demo
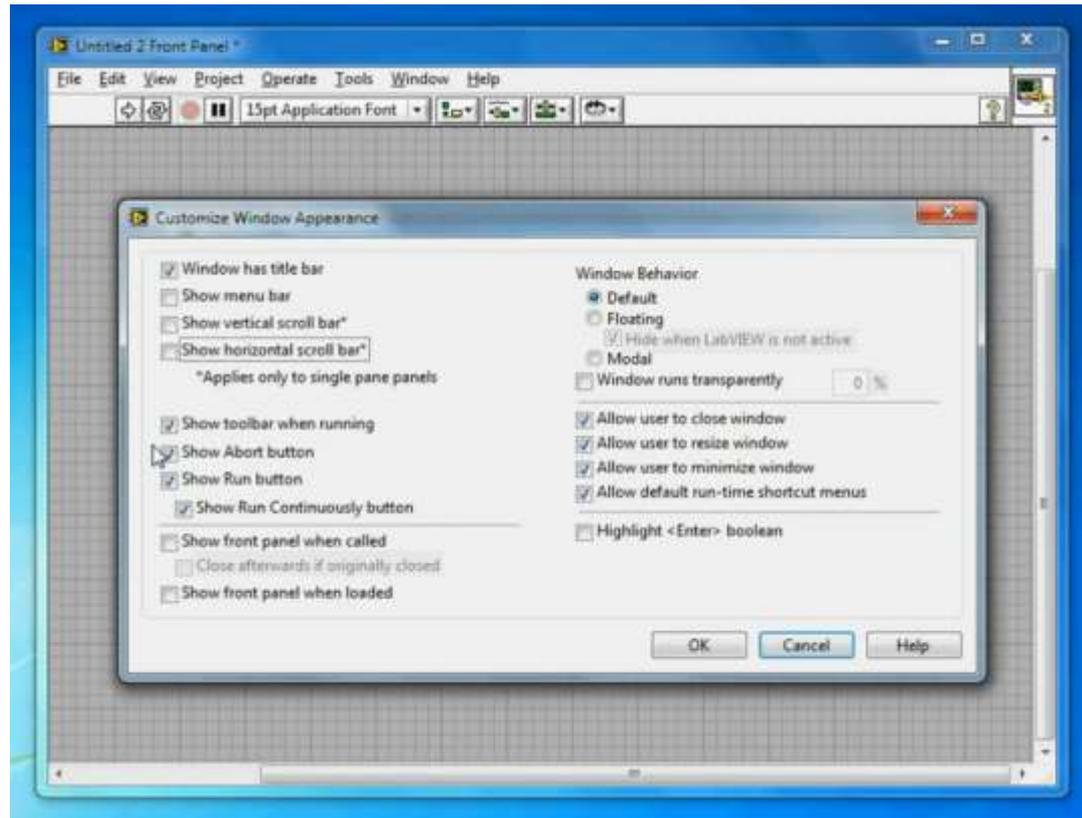


04- LabVIEW UI Tips - Hide the LabVIEW Toolbar
http://www.youtube.com/watch?v=2CbKuBVGzo0

# Customizing the Run-Time Menu
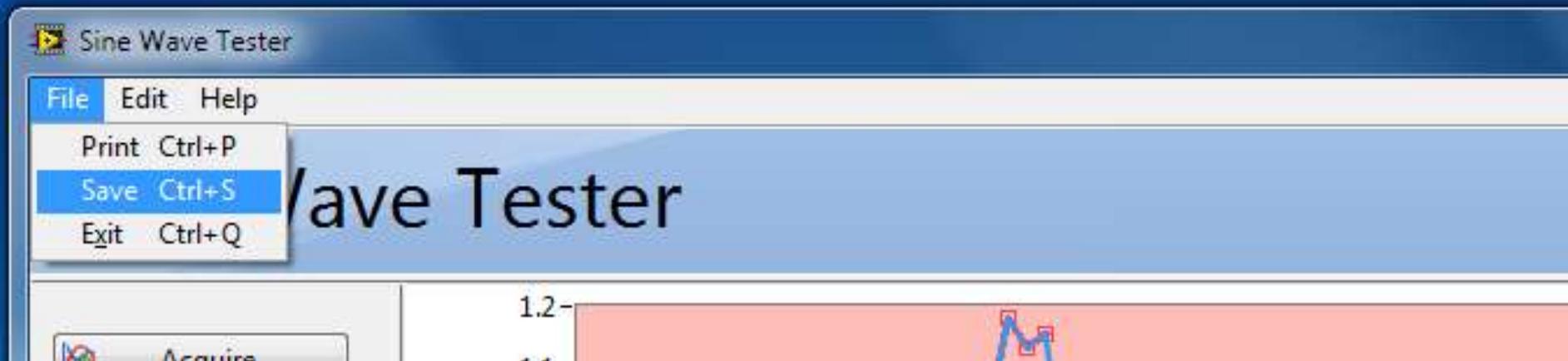
# Customizing the Run-Time Menu – Demo
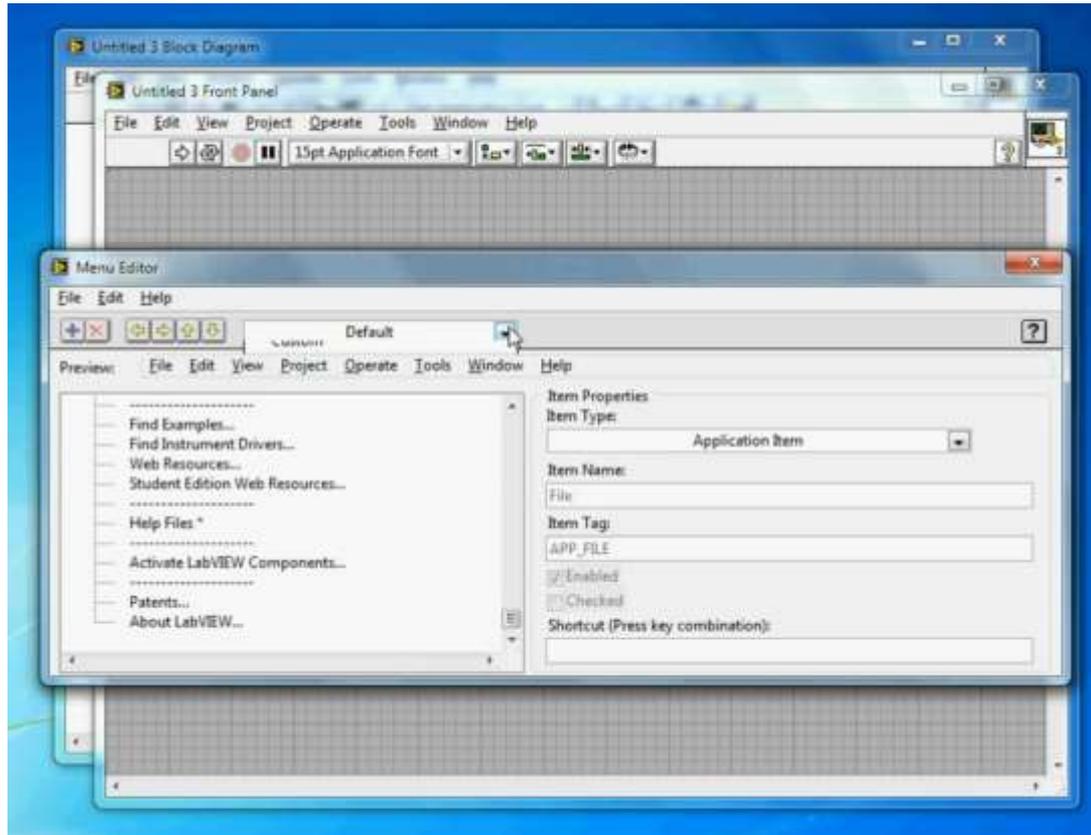


05 - LabVIEW UI Tips - Customize the Run Time Menu
http://www.youtube.com/watch?v=wkpiAmHFddM

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# Spawning Dialogs

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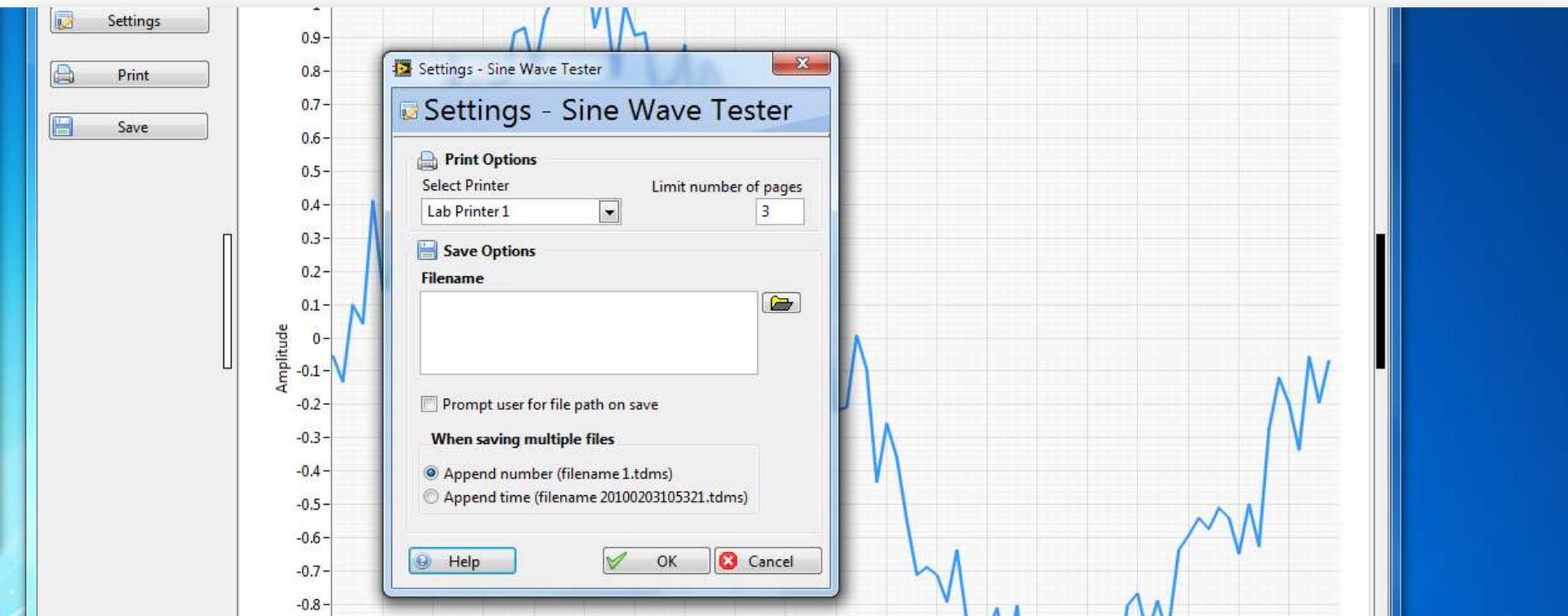
# Spawning Dialogs – Demo
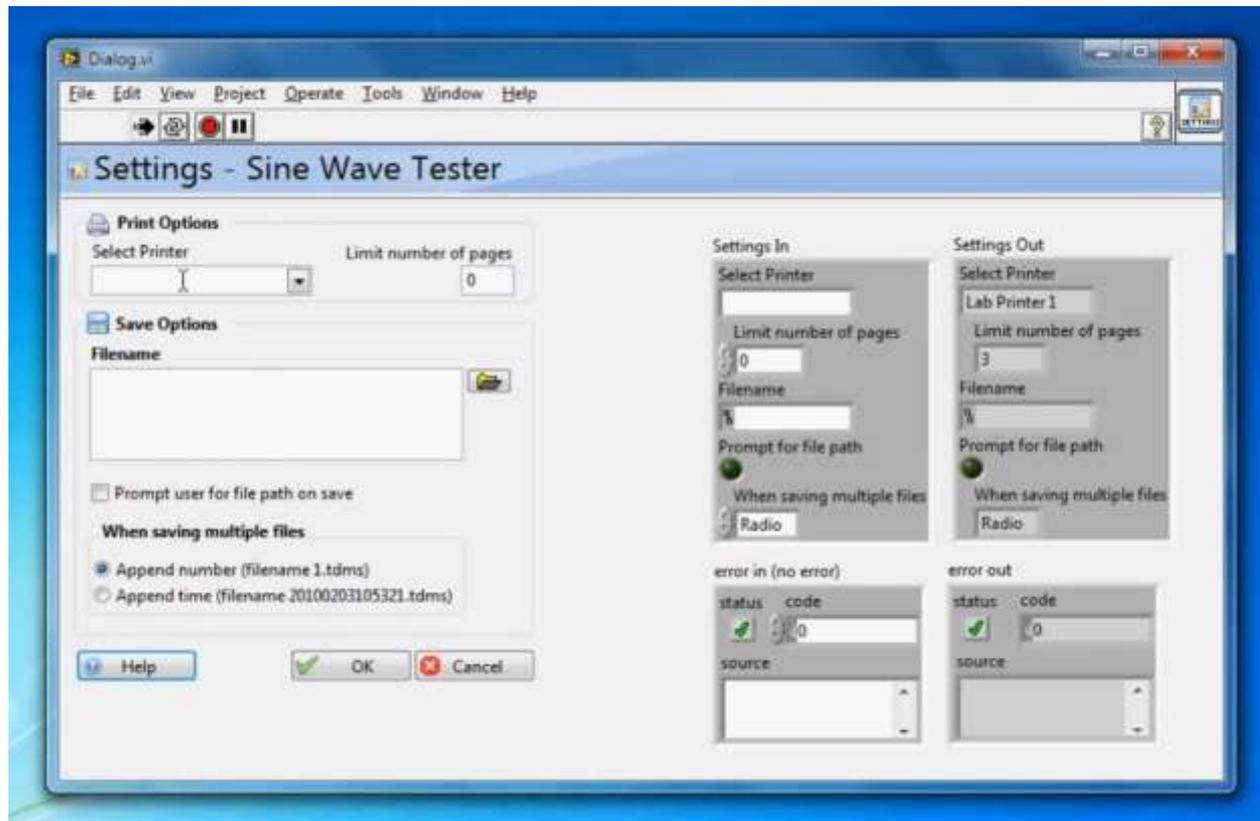


## 06 - LabVIEW UI Tips - Spawn Dialogs
http://www.youtube.com/watch?v=L-hNmzQ9tFc

# Using Panes

Title Area

Menu/Commands
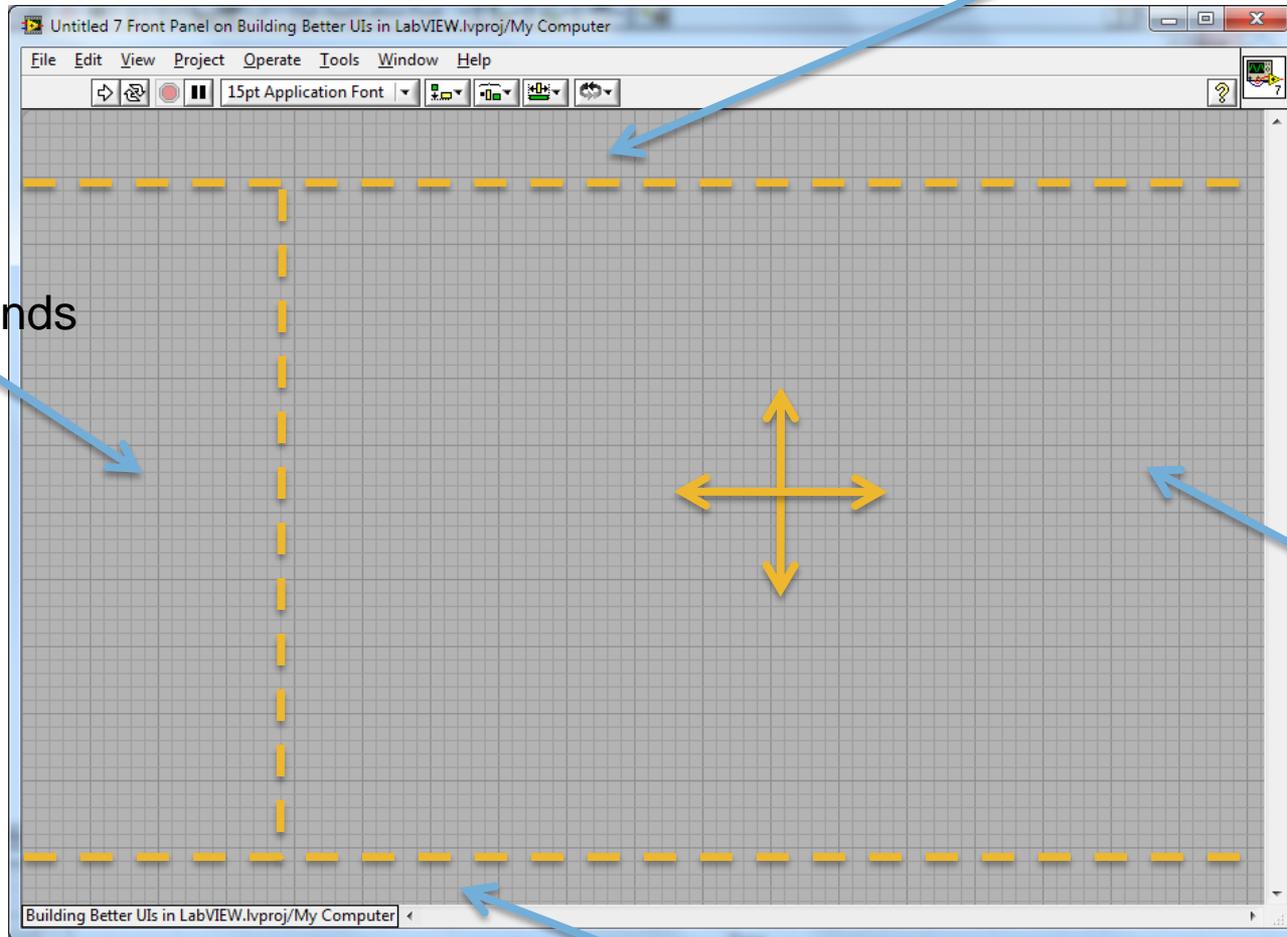
Expandable Content Area

Status Bar

# Using Panes – Demo
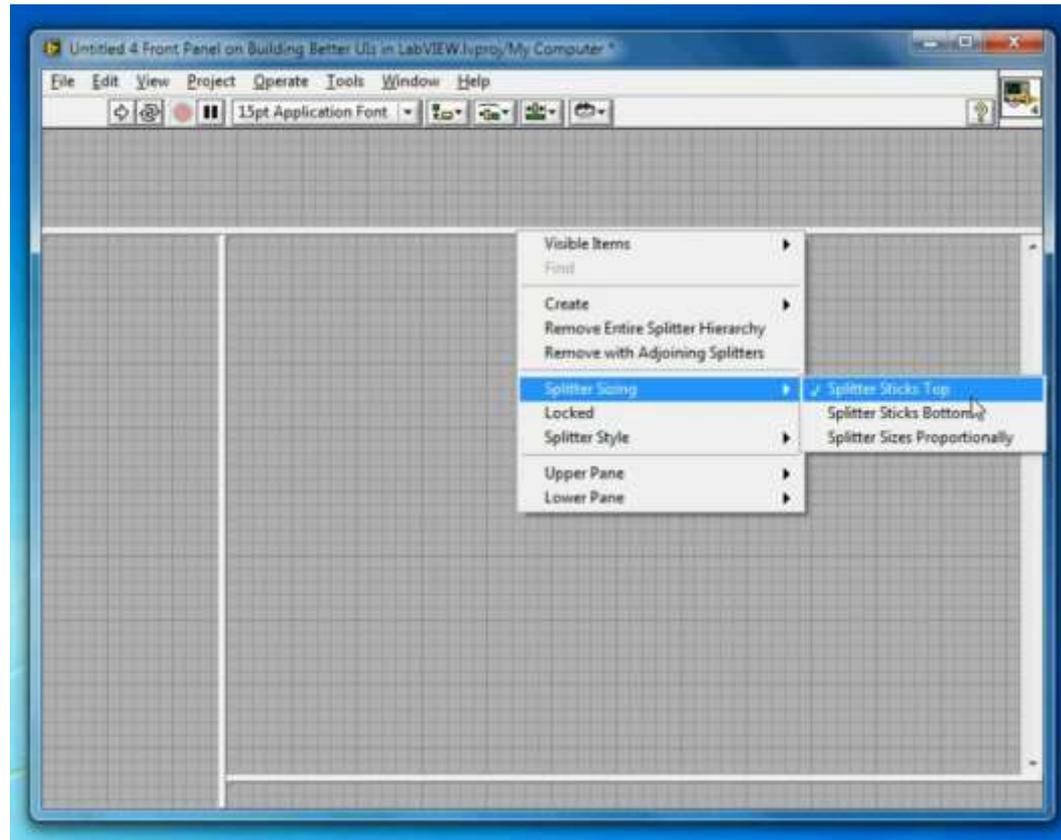


## 07 - LabVIEW UI Tips - Using Panes

http://www.youtube.com/watch?v=hZ180R7ADto
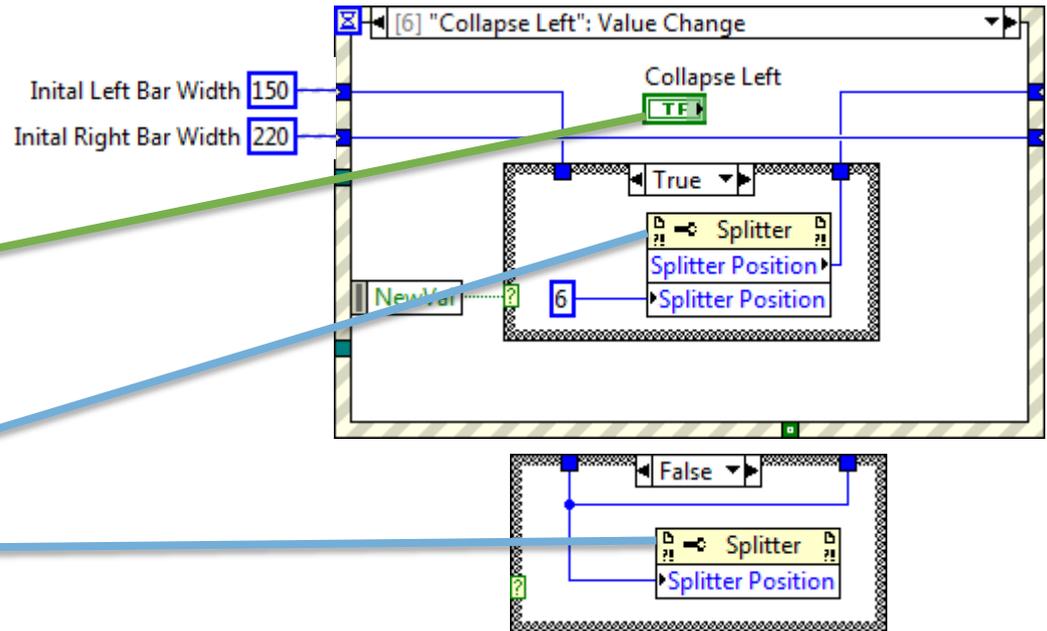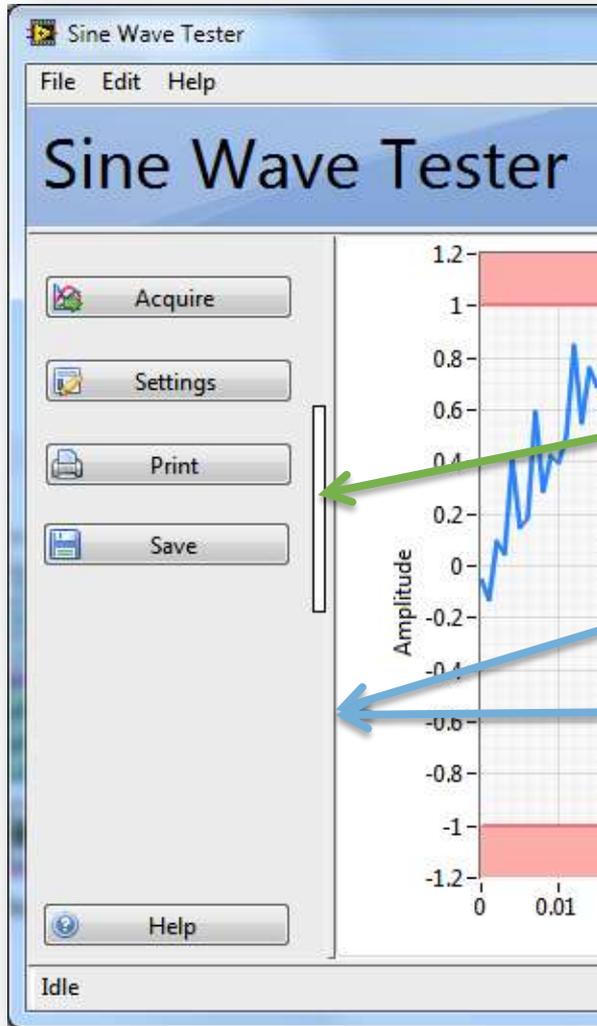
# Hiding Panes

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# Status Bar

# Busy Cursors

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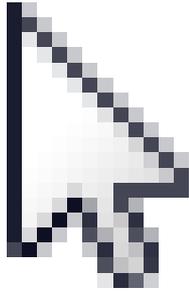
# Busy Cursors – Demo
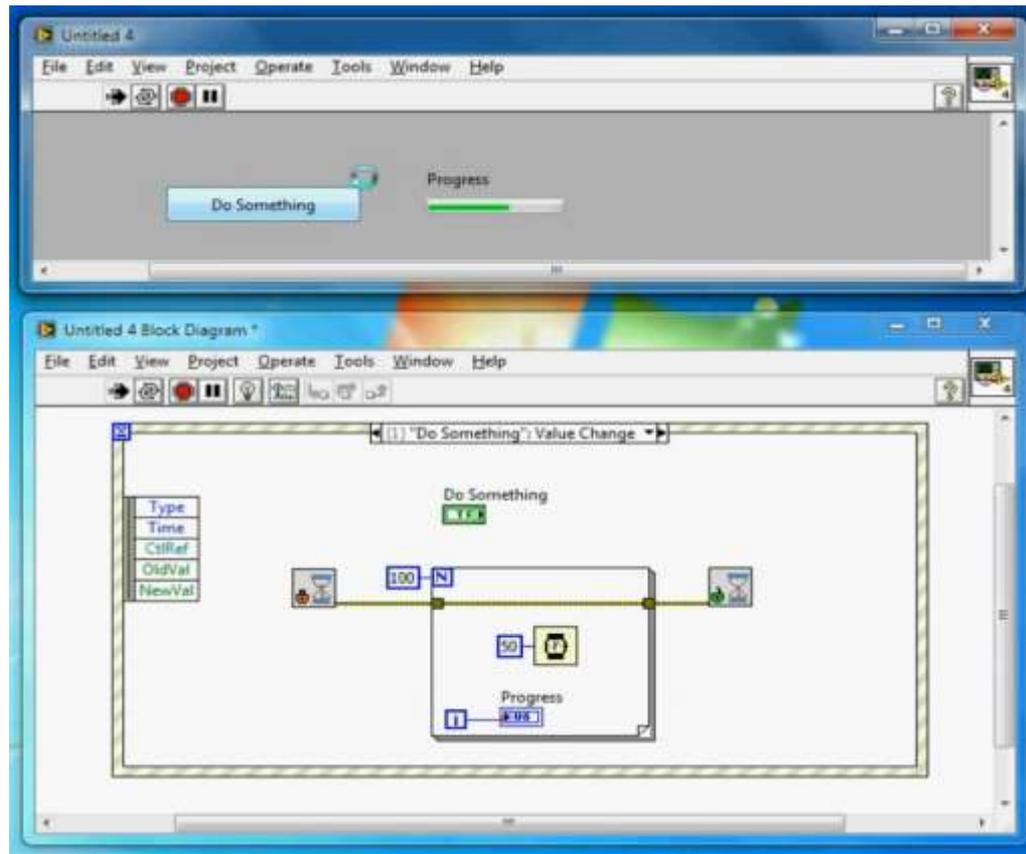


## 08 - LabVIEW UI Tips - Use the Busy Cursor

http://www.youtube.com/watch?v=_mosr-oTgRM

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# Keeping the User Updated
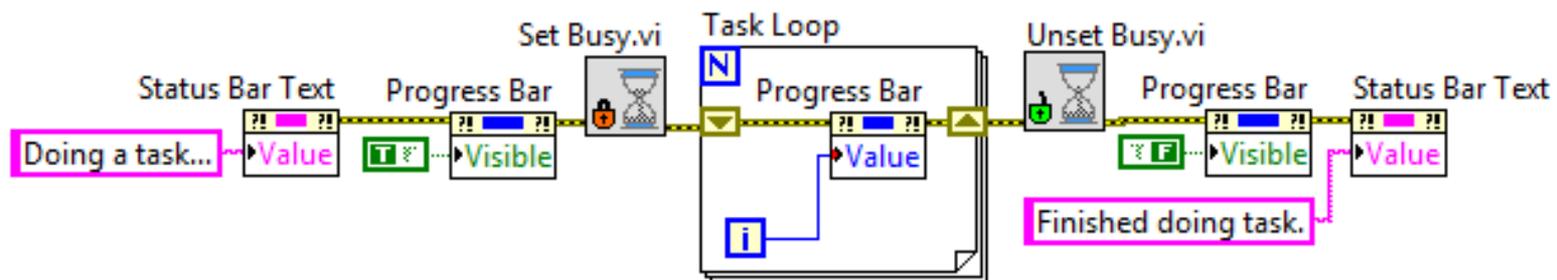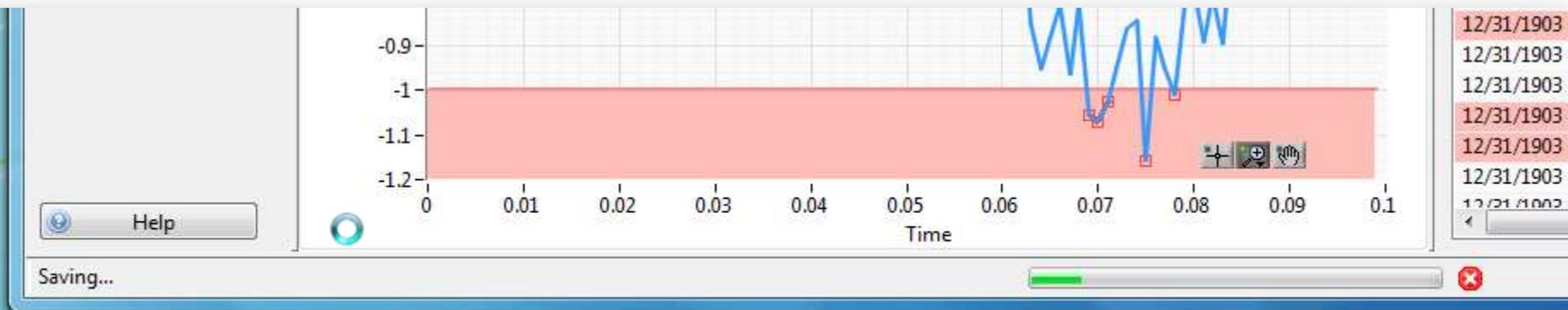
# Small Touch Screen App
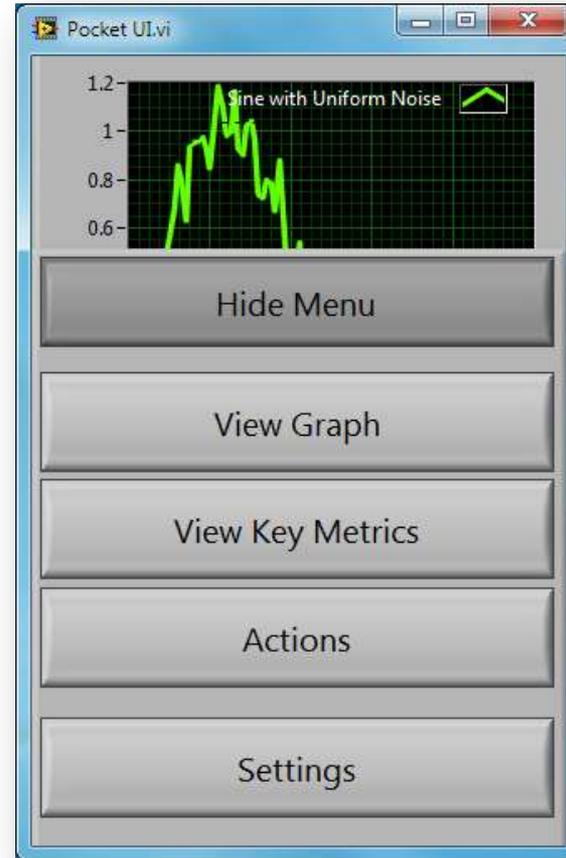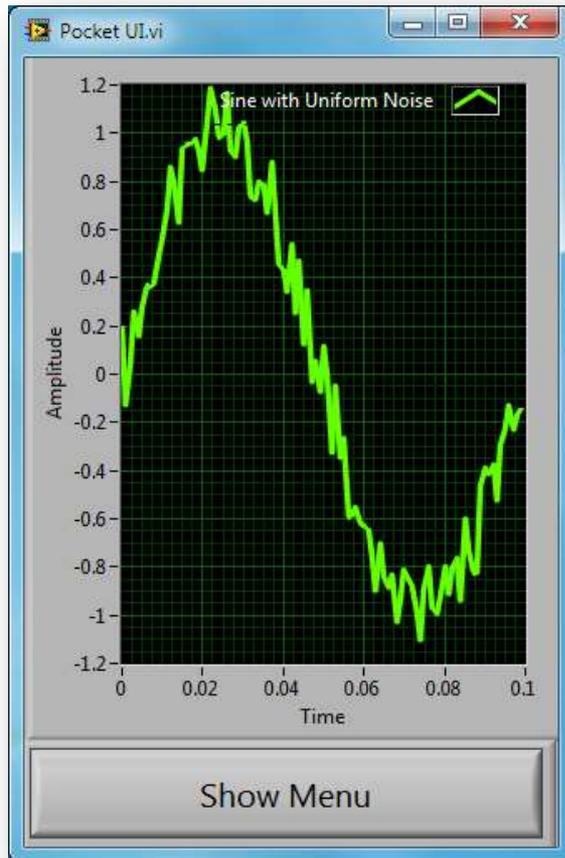
# Applying the Rules

## Small Touch Screen

| Do not be innovative | Less is more | Think about your user |
|---|---|---|
| • Use large controls and indicators that resemble their physical equivalents<br>• Simple is best | • Screen real estate is valuable; use it wisely<br>• Use trays, tabs, or different screens to stretch screen space | • Glare may be an issue → use more contrast<br>• Touch screens require more spacing<br>• Users' fingers may obscure part of the screen |

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# Tab Controls

- Tab controls are a familiar way to put more information on a screen

- Because the tabs can be hidden and changed programmatically, they are also useful for some less obvious UI techniques
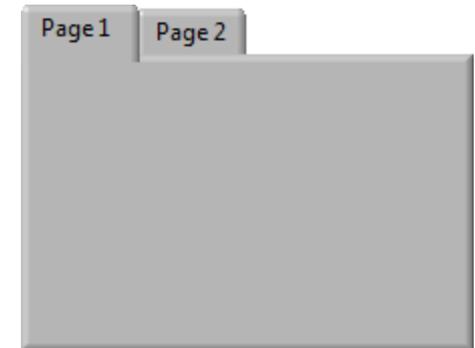
# "Hidden" Tab Controls

Sliding Tab Control
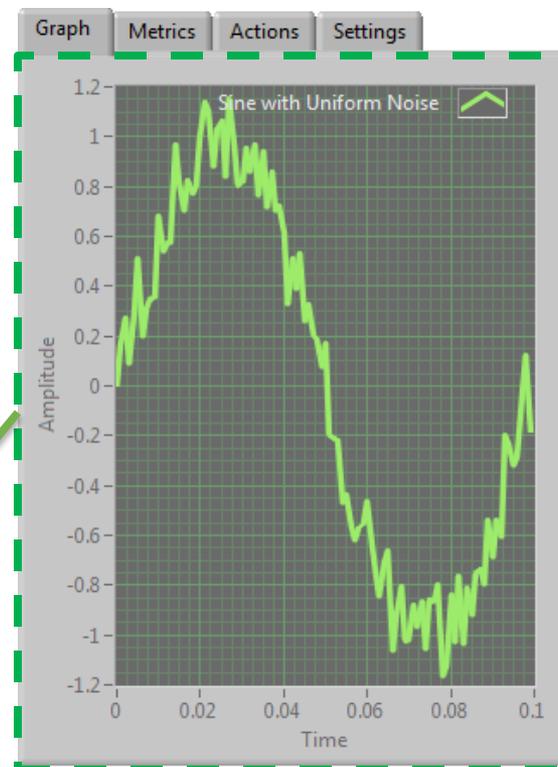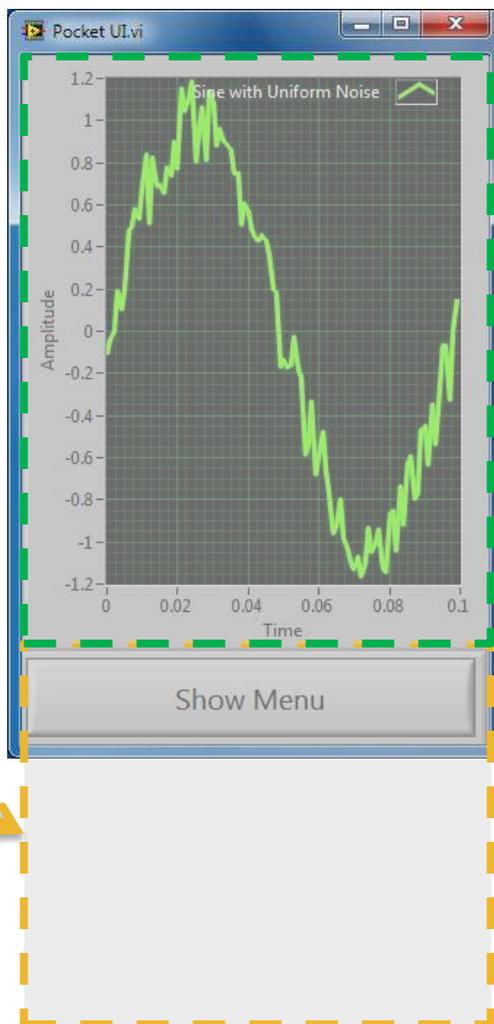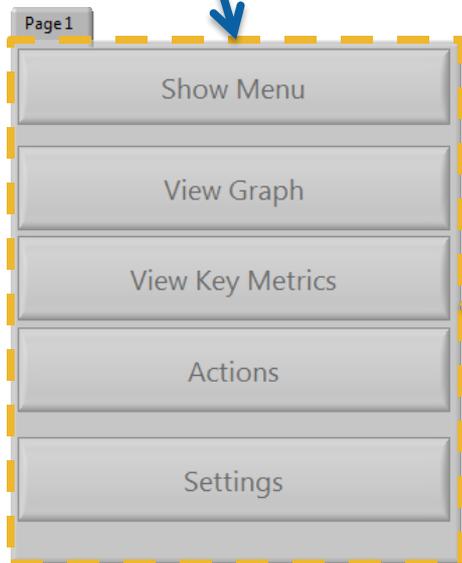
Main Content Tab Control

# Sliding a Control – Move.vi
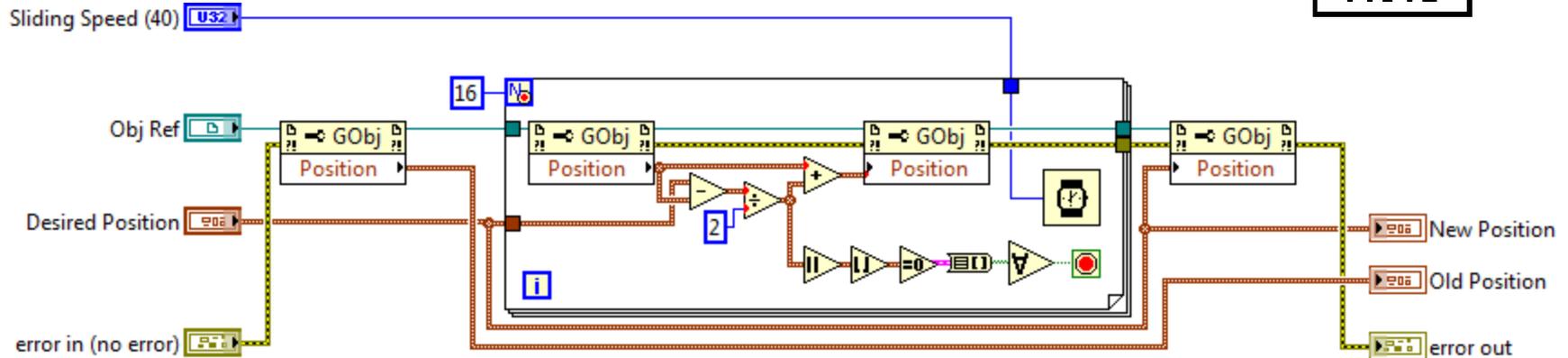


- Moves an object to the Desired Position
- Moving half the remaining distance in each loop iteration gives a natural sliding appearance

# Putting It Together
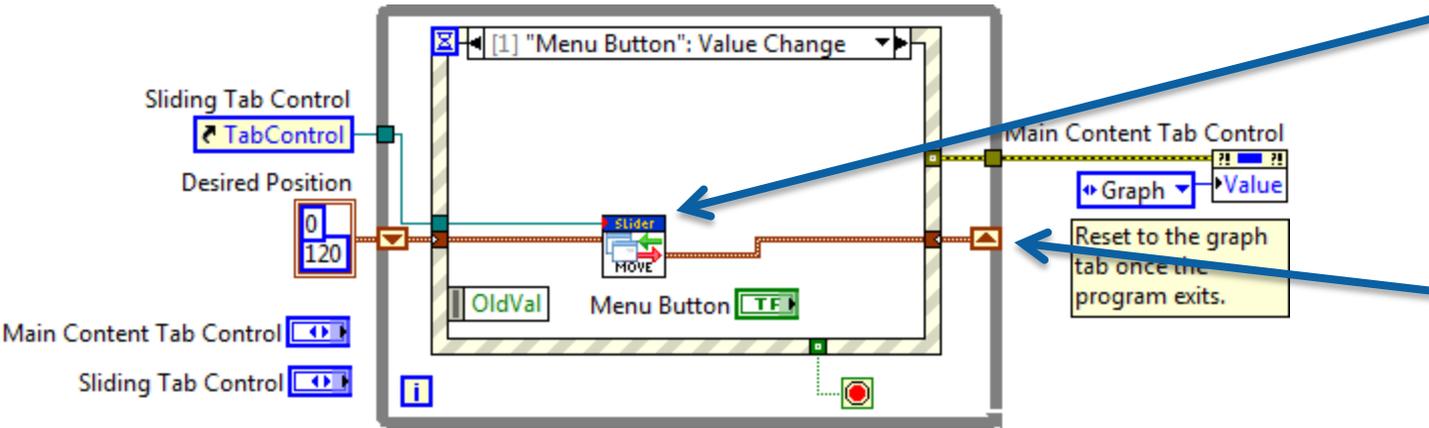
When the Menu Button is clicked, slide the invisible tab control into view

Store the old position of the menu so we can slide it back
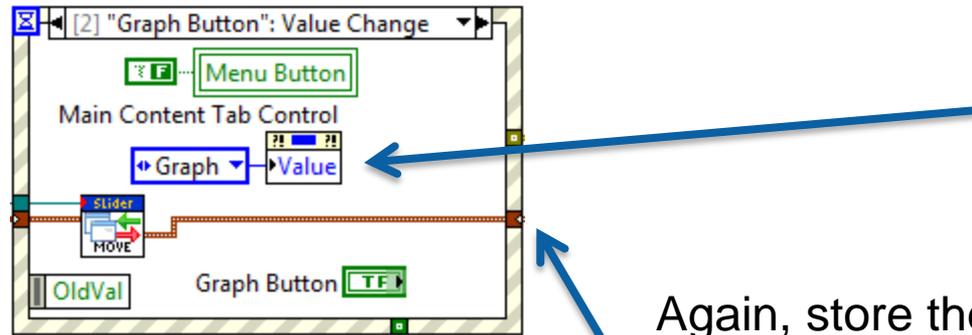
When a new view is selected, change the Main Content Tab Control to the selected page

Again, store the old position of the menu so we can slide it back

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# Informative Kiosk Display
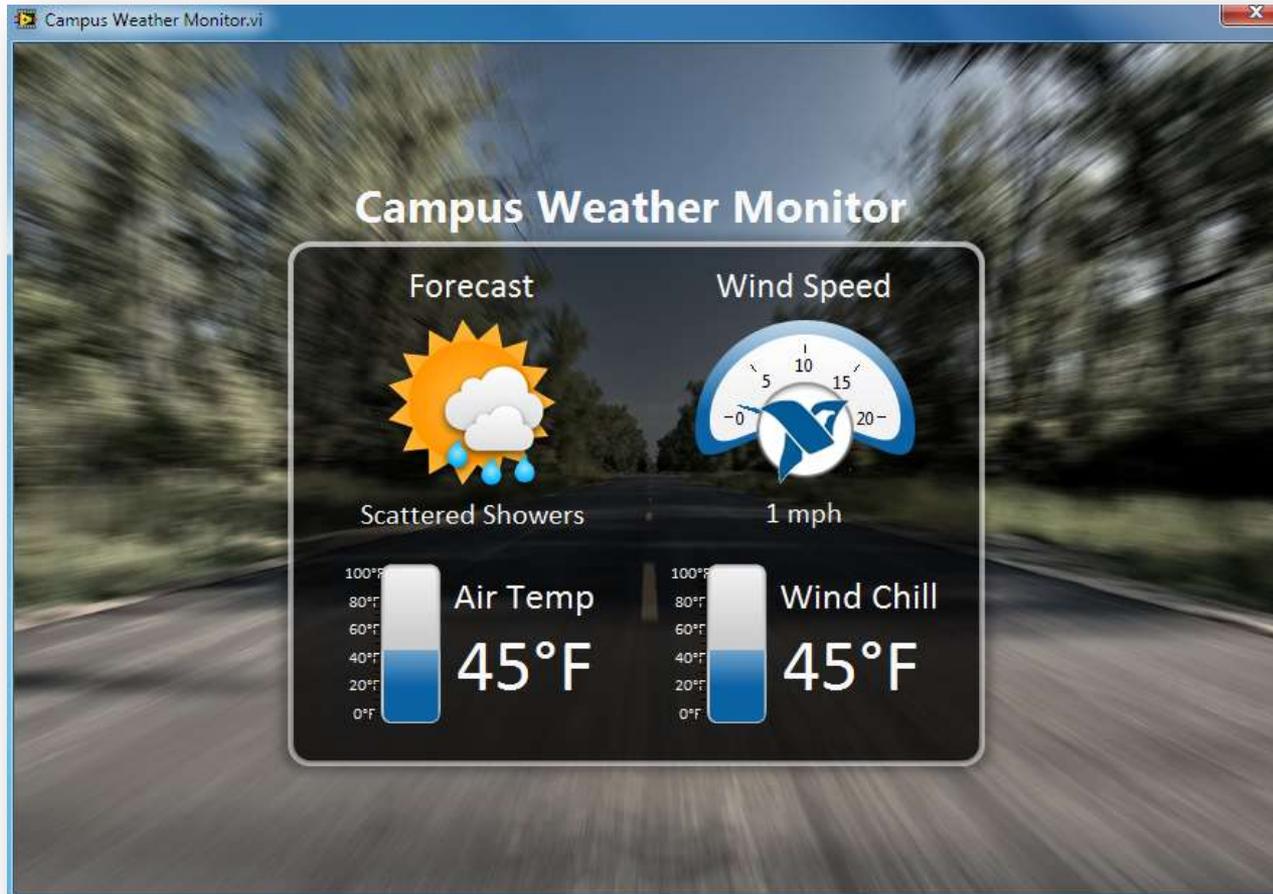
# Applying the Rules

## Informative Console Display

| Do not be innovative | Less is more | Think about your user |
|---|---|---|
| • Take inspiration from TV, Web sites or similar applications | • Show only the important information in an instantly recognizable way | • Passive audience → visual appeal is more important |

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# Panel Background

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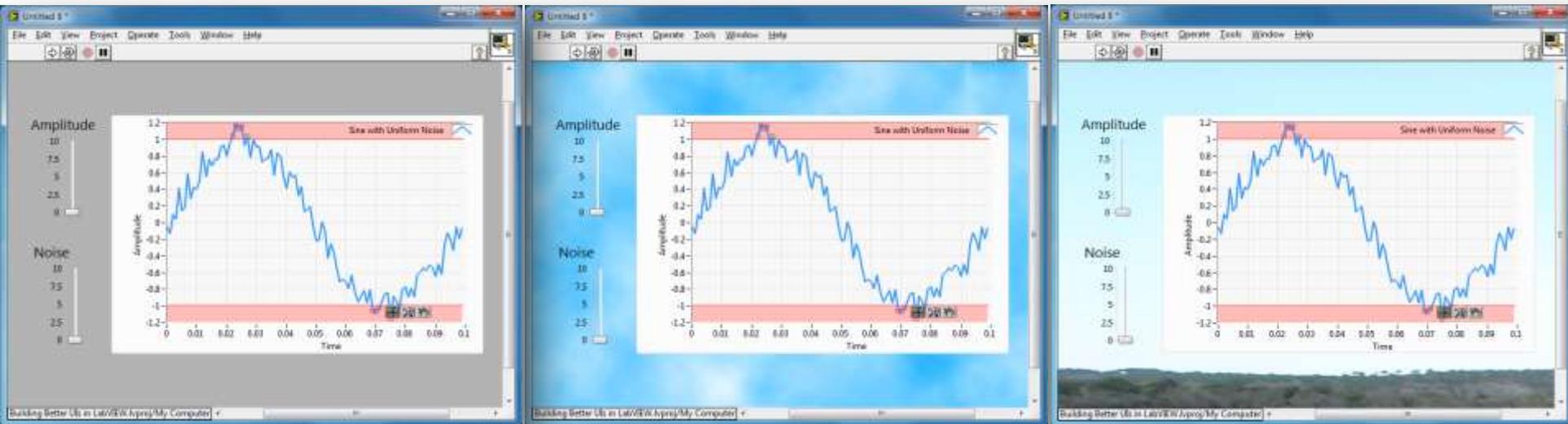
# Panel Background – Demo
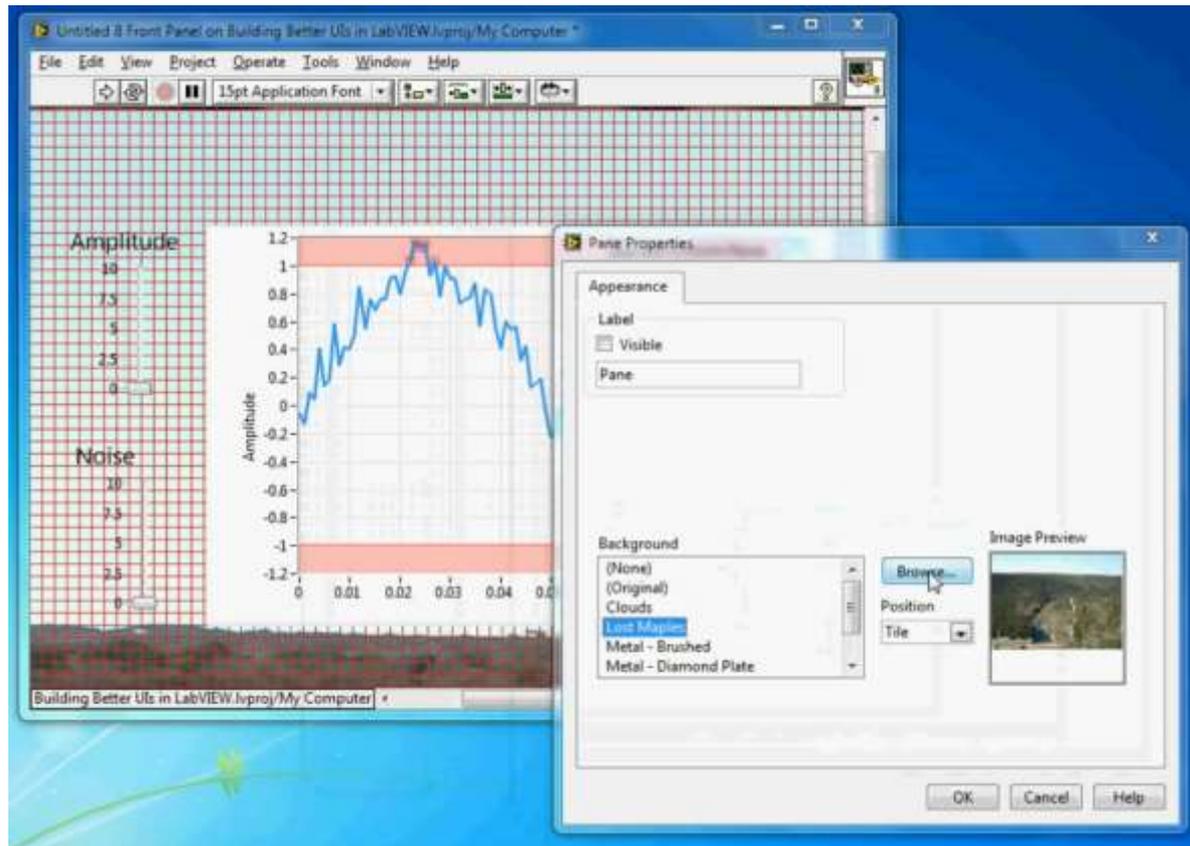


## 09 - LabVIEW UI Tips - Panel Backgrounds
http://www.youtube.com/watch?v=gxXJfonTIFc

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# Create Decorations in PowerPoint

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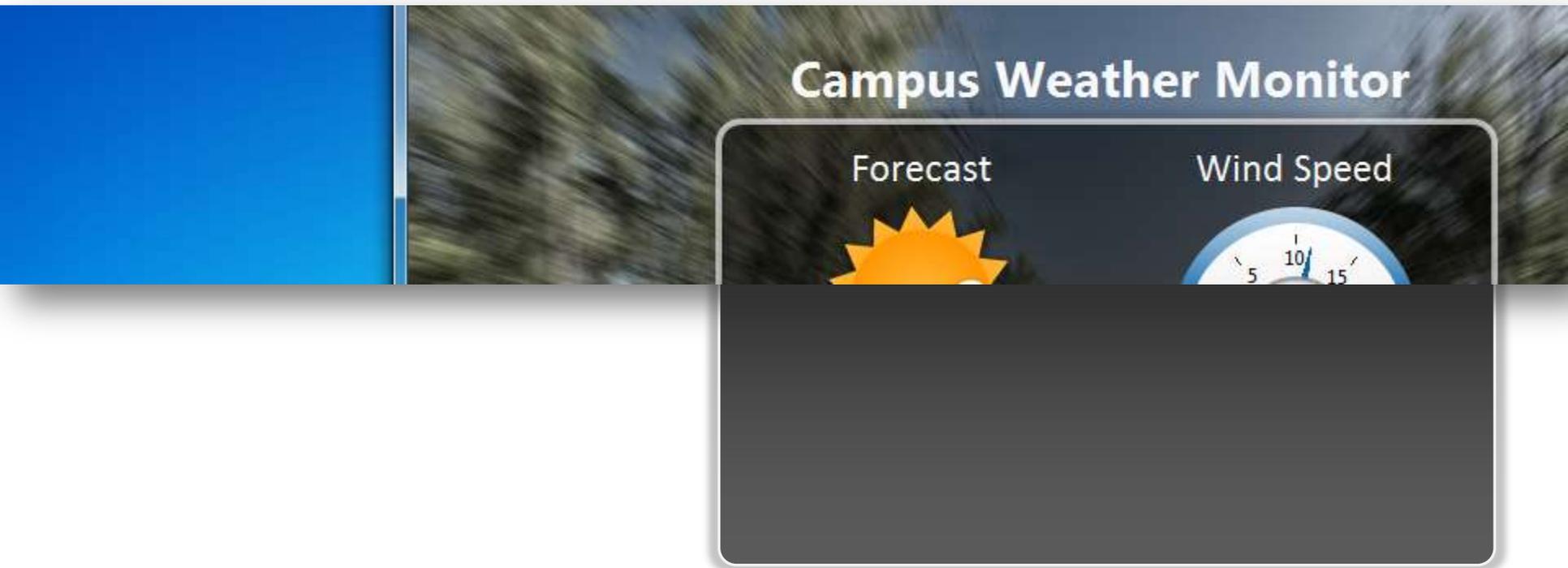
# Create Decorations in PowerPoint – Demo
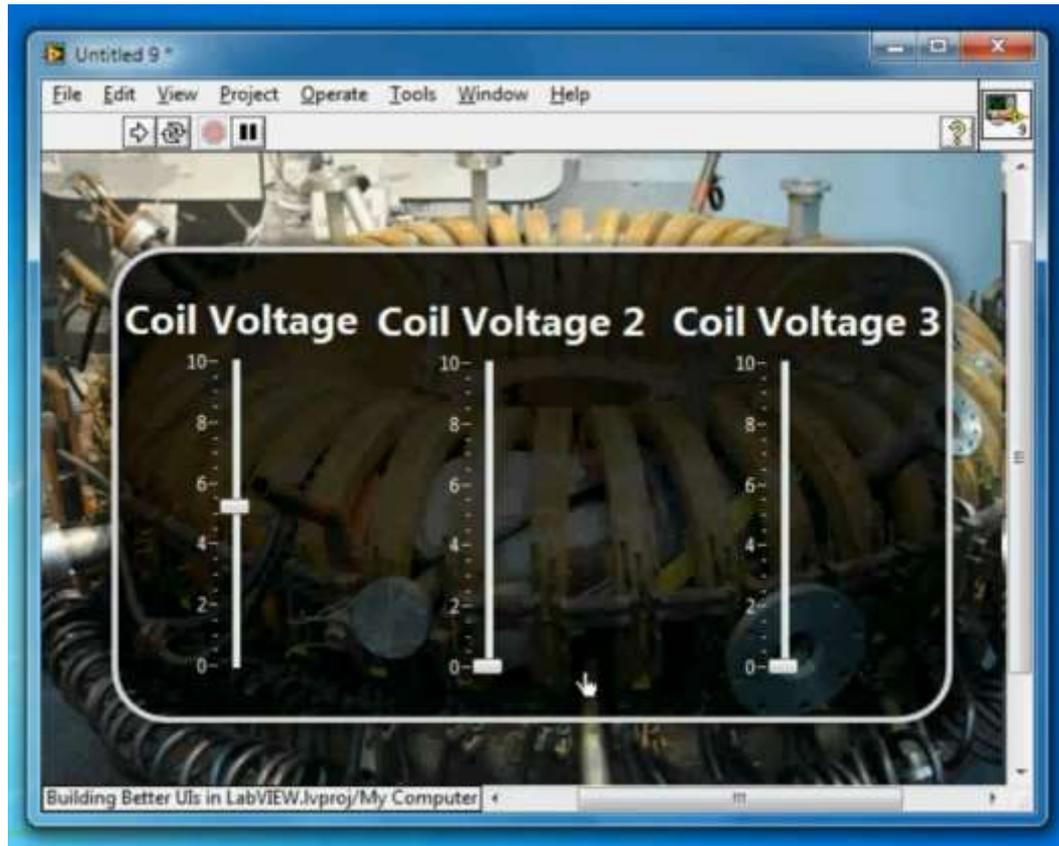


10 - LabVIEW UI Tips - Create Decorations in PPT
http://www.youtube.com/watch?v=gjYfqhlv2hQ
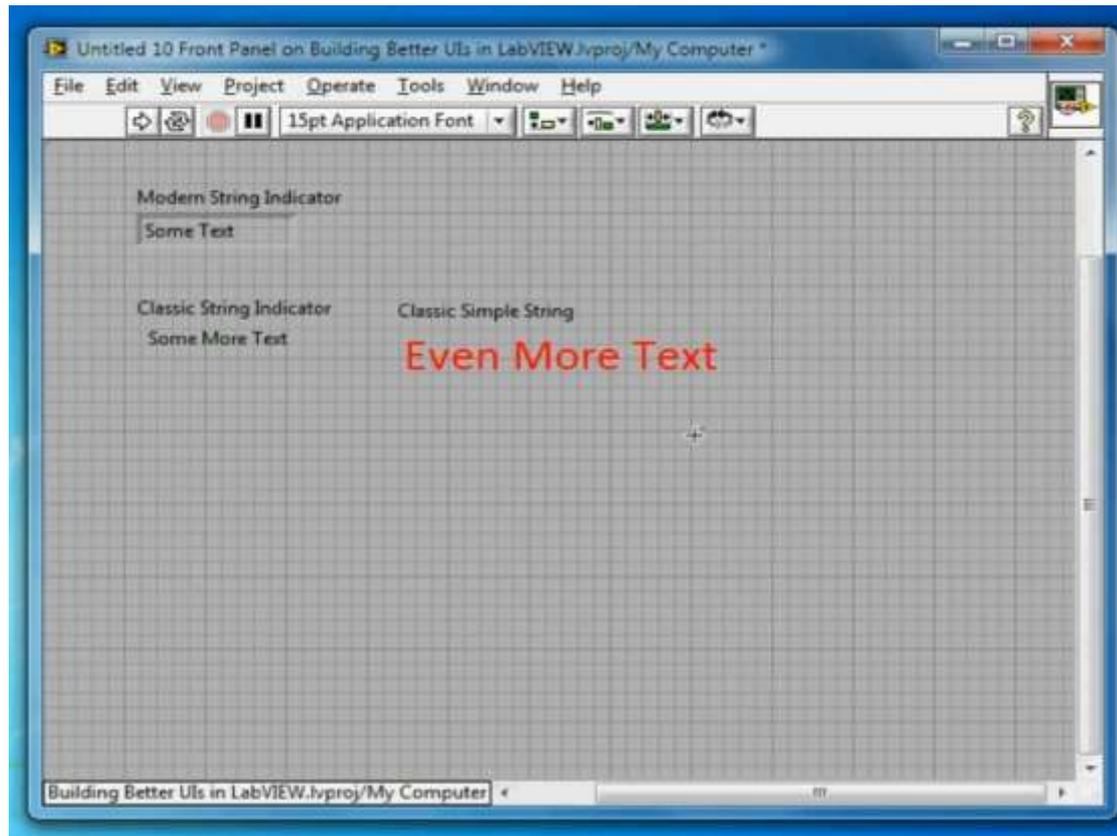
# Transparent Indicators



Partially Cloudy    11 mph

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# Transparent Indicators – Demo



## 11 - LabVIEW UI Tips - Transparent Indicators
http://www.youtube.com/watch?v=jgUB1oDmf-4

# Transparent PNGs in a Picture Ring

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# Transparent PNGs in a Picture Ring – Demo
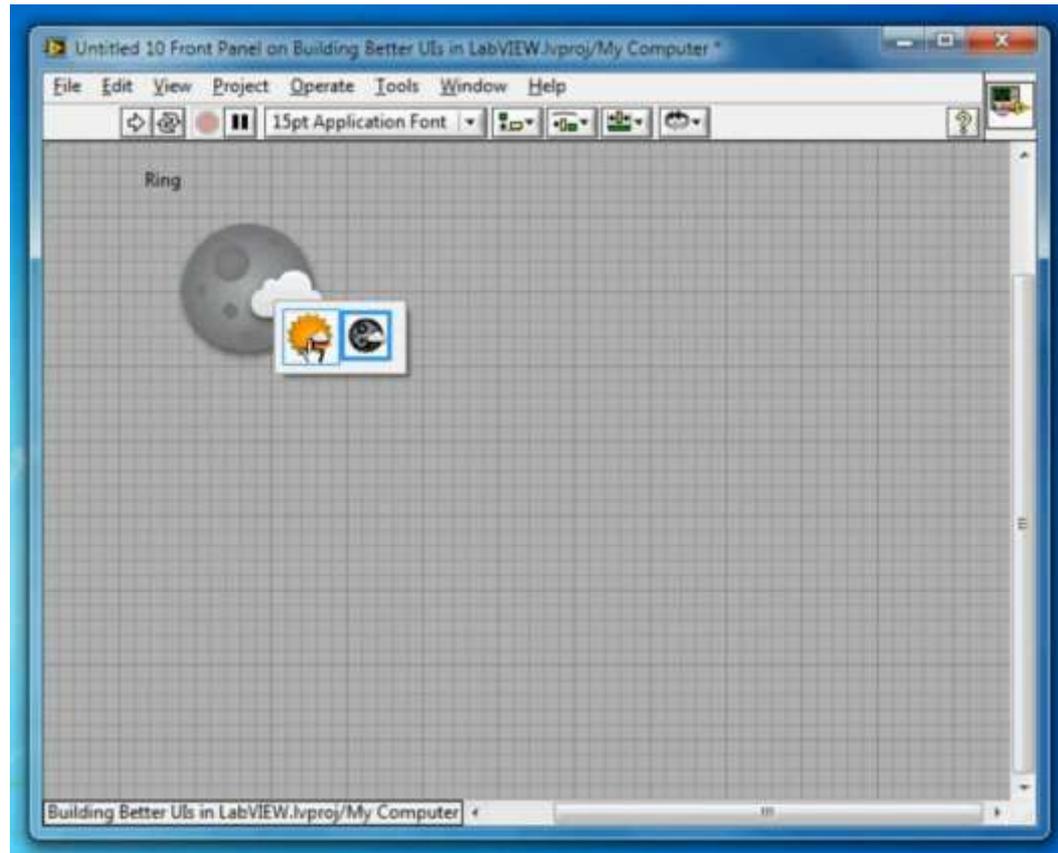


12 - LabVIEW UI Tips - Transparent PNGs in a Picture Ring
http://www.youtube.com/watch?v=AmDLCsnOegw

# Heavily Customized Controls

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# Free Stuff – UI Interest Group



http://decibel.ni.com/content/groups/ui

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# Key Takeaways

➢ The "Rules"

    1. Do not be innovative

    2. Less is more

    3. Think about your user

➢ Take advantage of what LabVIEW gives you

    1. Transparency

    2. Different controls/control customization

    3. Panes/tabs

➢ UI interest group on the community

    ➢ http://decibel.ni.com/content/groups/ui

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# Presentation/Code Availability

This presentation along with the LabVIEW code will be available at the **IEEE Long Island Section** website **Instrumentation & Measurement Society** webpage at:

http://www.IEEE.LI/im/

To see all the **BENEFITS** that **IEEE** has to offer check the following webpage:

http://www.ieee.org/benefits

To join the IEEE and become a member:
http://www.ieee.org/join

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