Are there any guidelines in designing a Touch Panel?

How do I determine what colors work best together?

How can a user interface tell users the current state of the system at a glance?

How many fonts are too many?

How do I create a design standard?

Which font alignment should I use?

Can animations effectively capture attention?

What layout makes it easy for users to find what they need?

How do I make user interfaces usable?

Is it wise to use a smaller font to label buttons so all the text will fit?
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Purpose
The AMX User Interface Style Guide assists in the development and design of user interfaces that are displayed on AMX Touch Panels in your control system projects.

Bright colors. Sharp graphics. With aesthetics that fit nicely within the surrounding decor, user interface design is well worth the investment necessary to develop unique, custom and intuitive user interfaces. But the most important part is the overall satisfaction you receive from your customer when the user interface complements the way they think, works well, and looks great. Throughout the Style Guide, guidelines will introduce you to the perfect themes, define the best use of different design elements and satisfy your customers with a great user interface.
What is a User Interface?

For the purpose of this Style Guide, user interfaces are defined as any electronic pages designed in Touch Panel Design 3 or 4 and displayed on AMX Touch Panels, Touch Monitors, some interface devices, and several AMX Internet Inside software applications – all designed for AMX Control Systems.

What is the Importance of the User Interface?

Often your customers don’t appreciate how the user interface fits into the overall control system. They may not understand the significant role it plays in simplifying the operation of the system. Some may not have an opinion on how the user interface looks. However, the user interface is the single most important part of the control system because it’s what your customer will interact with on a daily basis. It’s important that your customer finds the user interface appealing and easy to use - and that is why making the investment to design an easily functional and aesthetically pleasing user interface is so important.
What is a Theme?

The most difficult part of the user interface design process is establishing a direction that is appealing to the customer, shows off the control system, and properly incorporates all of the technology within the system. A good theme is simply a set of graphic elements that are laid out or designed to work together. Using a theme rather than randomly selecting graphics and layouts gives the panel a feeling of consistency and flow.

There are an infinite number of themes possible. Begin by looking around your customer’s environment and asking questions. Is there something that sticks out or is unique? Consider what graphic elements can be used to complement the environment incorporating your customer’s interests. The graphic elements you choose will give the user interface its look, feel and functionality.

Most importantly, engage your customer. The more input they give, the more they will feel a part of the project and the more enthusiastic they will be once the project is complete.
Is the Touch Panel for a Corporate Boardroom?

For a boardroom, consider the culture of the company. Is this a traditional corporation with an established identity, or is this a contemporary place, fast paced, more “on the edge?” Check for any Graphic Standards or Guidelines that the Marketing Department may already have to help you develop a theme. Make sure the company logo appears as often as your customer suggests.

Is the Touch Panel for a Home Theater?

For a home theater, consider the interior design of the theater. The mood can be more relaxed and playful for the home panel. You might use graphics of curtains.

Will the Touch Panel be Placed on the Wall?

A wall mounted Touch Panel is best designed to blend into the surroundings. Use a background that also blends into the wall and/or graphics that accent the wallpaper or theme of the room.
What To Do

Consistency and flow will eliminate the feeling of frustration typically exhibited by customers with bad user interfaces. And remember, when using a theme, stick with it. Do not switch themes from page to page. Review the different examples and imagine the type of home or business that these might be used in.
What Not To Do

These User Interface pages all come from the same design and demonstrate some principles of what not to do when designing panel pages.

In each page, the background has been changed and does not maintain a consistent theme from page to page. The "Welcome" page and the "Quick Control" page do keep the same graphic theme and colors, but that theme becomes lost in the "Lighting" and "Device Control" pages. If each of the backgrounds were colored alike and contained similar elements, interest would have been developed. Yet, as the design exists the backgrounds become distracting.

Another pitfall of this design is the cluttered appearance of icons and buttons. On the "Quick Control" page, more than 50 buttons are used presenting the user with what might be considered an overwhelming choice of possible actions. The concept was to present the user with the necessary one-touch controls. With all the choices available, the user may have trouble determining what to do.

Several elements common to each of the pages are placed in different locations. For instance, the pointing hand icon, indicating the way to return to the "Welcome" page, is in a different corner on each page. Likewise, the labeling of the "Lighting" page and "Quick Control" page is in different places.

A few minor changes and paying attention to these guidelines would make this a very useable, consistent looking control user interface.

Do not...
- change your theme from page to page.
- clutter the screen with unnecessary graphics.
- change the location of key graphics or buttons from page to page.
After working with the customer to create the theme for the user interface, it’s time to think about all of the elements that you will incorporate to make a successful user interface design.

This section explores the use of graphic elements on AMX Touch Panels. The different types of graphic elements are presented with practical examples of what works and what does not.

The layout for a user interface is just as important as the choice of colors and graphics. A poorly designed layout can be confusing and distracting. Keep the layout uncluttered and consistent. A typical layout contains the following: page name, main navigation, sub navigation, main design space, and persistent design space. On the next few pages we have provided sample layouts for small and large panels.

Most User Interface designs have many pages and pop up pages. Limit the number of button presses to access a function from anywhere on the panel to a maximum of three page changes. This will help prevent the user from getting lost in the structure of the user interface.
Parts of a Layout

**Page Name** - Used as a marker for the user to identify where they are in the interface.

**Main Navigation (global)** - Used to navigate to the main pages of the panel. When possible it is best to have the main navigation always visible.

**Sub Navigation** - Used to make a second jump to additional functions within the panel. Sub navigation is only visible where needed.

**Main Design Space** - The core functions the users are to reach such as the "play" button for the VCR or the "on/off" buttons for the lights.

**Persistent Design Space** - Used by different pages throughout the panel. For example, volume control may be used for the television, CD player, and the video conferencing system.
Pictures
Use pictures that have meaning to your customers, in both corporate and residential settings. For example, if a client has a large collection of paintings, choose images from those works of art to provide a personalized theme for the User Interface.

The most common use for pictures are as background images. Choose background images with consideration for the functionality of the panel.

Buttons
Buttons give a User Interface its functionality. Often, the only graphic elements that are needed on a panel are buttons.

TPDesign3 and 4 each offer a wide range of button types. To create a feeling of consistency, limit the number of button types on a panel. AMX recommends the use of no more than three button types per panel.

The number of buttons per page on a panel should be kept to a minimum in order to achieve the desired amount of functionality. To keep pages from appearing cluttered, you can group buttons together in function groups. The example at the left shows different type of buttons and boarders in TPDesign4.
Icons

Icons are frequently used to replace text on a button. A left arrow, right arrow, play, or stop are all common icons. Other icons you might use on a User Interface include channel station logos, device representations, and device actions.

Choose icons that are completely understood by the end user. If an icon is not easily recognized, the button should also be labeled with text to avoid any confusion.

Logos

Most corporate customers will want their logo on the User Interface. When working with a company logo, confirm company standards on usage, placement, and size. When making design decisions for the panel, the logo needs to complement the design.
Animation

With the introduction of AMX fourth generation graphics (G4) and TPDesign4, adding animated graphics to a user interface has become easier than ever. Animations can become an effective means to increase the comprehension of a user interface design.

Animations can be as simple as an hourglass, or as sophisticated as a short video clip.

When Should Animation Be Used?

Animation can be used effectively in user interface designs to:
- Convey change over a period of time
- Hold the user's attention while a background task is performed
- Draw attention to an object
- Show a change in status
- Demonstrate a series of actions
- Provide visual continuity

What Not To Do With Animation?

Here are a few tips about what not to do with animation:
- Do not animate everything - if everything is animated the user can become overwhelmed and the animation loses its value
- Avoid jumpy transitions - when looping an animation ensure that the beginning and end of the animation join together smoothly without sudden shifts in position
- Avoid incompatible colors - use color to match the color scheme of the user interface
Typography

Typography is the style, arrangement, or appearance of typeset material. In relation to graphical user interfaces, typography provides the messaging to the user on system status, device control and information.

Fonts

Fonts are typically classified into several classes: serif, sans serif, script, and decorative. This guide will briefly describe each class and give examples of how they can be used.

Serif: A serif typeface has a line-ending cross stroke. This stroke may vary based upon the font. The serif typeface, also referred to as Roman, is one of the most used and legible type styles.

Sans serif: The sans serif typeface does not contain the line-ending cross stroke. Therefore the term sans, meaning without, was added to the serif classification. Sans serif fonts are popular due to their simplistic, neat and clean lines. These fonts are primarily used for headlines and small groupings of text.

Both serif and sans serif fonts can be displayed in an italic setting which creates a forward slant to the typeface. Italic typefaces are used to provide emphasis, but should not be used as a main font for larger text areas.

Script: Script typefaces have also been created to imitate popular handwriting. Script typefaces frequently contain flourishes and large rounded upper case letters. Using script fonts gives a more casual appearance.

Decorative: Decorative typefaces are typically used only for specific purposes such as headings or displays. These typefaces use novel characters to create a mood or evoke an emotion in the reader. Many different decorative typefaces are available.
Font Size Guidelines

Careful consideration should be given to the font size used on graphical user interfaces. As a practical matter, the size of the smallest text used on a User Interface page should be easily read at a distance of 24 to 36 inches (2-3 feet). While each design should be evaluated individually, AMX typically recommends that an 8-point font should be the smallest font size used on AMX Touch Panels. Typically, font sizes will depend upon three factors, the size of the panel display, the amount of information to be displayed on the panel, and how the panel is to be used.

Consistency

The typeface used should be consistent throughout the user interface design. For example, menu and navigation controls should always use the same font type, size, and color. Text used for device controls and information displays should also be coordinated.

Additionally, do not mix fonts from different font families in the design. Choose two or, at a maximum, three fonts to be used throughout the design. Even varying the weight or appearance of the font (adding bold or italics) can be considered a different font.
You have just started a new User Interface project. What colors should you use? There are now more than 16 million color choices available with the TPI/4 and Modero Touch Panels. Choosing colors that work well together can be a challenge. This section describes the color palettes available in TPDesign3 and TPDesign4, and provides guidelines for selecting color schemes.

### Color Palettes for TPDesign3 and TPDesign4

Colors are described in TPDesign3 and TPDesign4 using the values of the additive primary colors (red, green, and blue) contained in the color. Yellow, for example, is described as 255,255,0 since it contains an equal amount of red and green, but no blue.

TPDesign3 uses a color palette of 256 colors. AMX has fixed 89 colors in the palette for use in page, button and text colors. The other colors are determined based upon the colors used in graphic images imported into TPDesign3. Tech Note 239 on the AMX Website (www.amx.com) documents the RGB values for the 89 colors included in the default TPDesign3 palette.

TPDesign4 uses a color palette of more than 16 million colors (24-bit). Each color can be displayed at 256 levels of transparency.
Basics of Color Theory

To create and use color schemes properly, we must first understand a few basics about color theory. Colors that are displayed on televisions, in movies, and on User Interface screens are combinations of red, green, and blue light. The colors red, green, and blue are added together in equal proportions to create white light, or in varying proportions to create other colors. AMX Touch Panels use individual LCD pixel elements that can combine the red, green, and blue colors to create up to 16.7 million different colors.

Since there are so many potential color combinations, it can be difficult to determine which ones work well together. There are some simple rules of color harmony that can help create color schemes that complement each other well. A circular representation of the primary colors and their combinations, a color wheel, can help illustrate how color schemes are developed. The most commonly used color schemes are monochrome, analogous, complementary, split complementary, and triad.

On the following pages, an example of a User Interface page will be shown using each one of these color schemes.
Monochrome Color

A monochrome color scheme uses one color of varying brightness. For example, we may choose fully saturated blue (RGB value 0,0,255) as our base color. The monochromatic blue color scheme can include colors from very light blue, almost white, to a very dark blue, and almost black. Although only one hue (or color value) is used, interest is maintained by varying the intensity of the color.
Analogous Color

An analogous color scheme uses three adjacent colors of the color wheel. Taking cues from nature, we can use green, yellow, and orange in various intensities to place buttons on a background of Fall foliage (see layout below). Although we are limited to the colors that can be selected for the TPDesign3 buttons, we do have a sufficient amount of colors to create an eye-pleasing scene.

For a more corporate appearance, a blue analogous scheme using darker colors can give a prestigious look.
Complementary Color

A complementary color scheme uses two colors directly opposite each other on the color wheel. The complementary scheme uses these two colors to balance the image. Each complementary pair includes both a warm and a cool color. For example, the blue-yellow complement contains the "warm" yellow and the "cool" blue. Complementary colors provide a high level of contrast, making the design elements stand out.

The TPDesign4 page below uses the blue-yellow complement to provide the contrast between "off" and "on" states of the button.

Fully saturated blue (large circle) with varying intensities of brightness. Each blue circle is the same color value with a different brightness or level of light intensity.
Split Complementary Color

The split complementary color scheme uses a color opposite two colors on either side of the complementary color on the color wheel to provide balance. By using less intense tones, the complementary colors provide a softer contrast.

In the example below, the main color used is a dark purple with yellow and green complements. Even on the highlighted button, the yellow and bright green work well together.
Triad Color Scheme

The triad color scheme uses three colors equally spaced on the color wheel. Regardless of the colors for the triad scheme, a high level of contrast between the colors will exist. This contrast can be accentuated or muted by using lighter or darker shades.

On the panel below, the "background" and "off" state of the buttons use two shades of blue-cyan. The button "on" state uses a very dark red-violet with a lighter shade of the green-yellow as the icon and text color.
Color Scheme Samples

This page contains several example schemes created using the color schemes described on the previous pages. All colors used are available in the default palette in TPDesign3. When a three-dimensional type border is used in TPDesign3, the color for the border should be selected from the first or seventh column of colors for optimum appearance. In schemes where a border color is not selected an alternate color is shown.