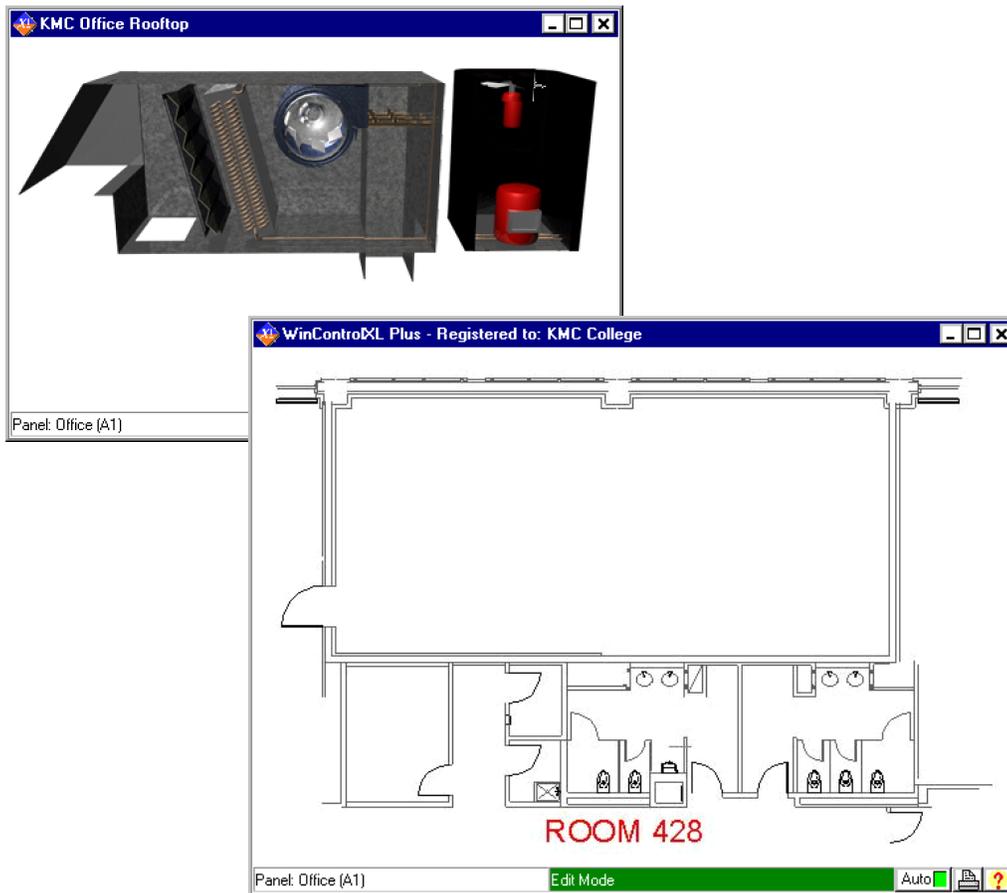




Designing and Editing Custom Graphics for WinControl

Includes WinControl, WinControl XL and WinControl XL Plus



Designing System Group Graphics

With the system groups feature in WinControl, WinControl XL, and WinControl XL Plus you can assemble graphical user interfaces to control building automation systems. This article covers techniques and resources required to create system group background graphics using the three-dimensional graphic library elements provided with WinControl XL Plus. Animated graphics are beyond the scope of this article.

Overview of System Groups

System Groups are custom designed windows created for each project to provide quick access to the most often used parts of a system. A system group can be a few text-based controls or a complex graphical user interface that includes animated displays and site plans. With the library of graphics in WinControl XL Plus you can display all parts of a system such as temperature, setpoints and equipment settings. Links can be placed in system groups which open other system groups.

System groups use graphics for two different purposes:

- Background graphics display the overall view of the system or component.
- Animated graphics display motion and provide control.

Things you need to know

Before you begin, take some time to become familiar with the following items.

- The file formats JPG, GIF, and BMP. [See *Graphic file formats* on page 7.](#)
- A paint or photo editing program. You will need to know how to cut, copy, paste, use the layers palette, and generate output files with *Save As...* or *Export*.
- Creating and modifying WinControl system groups.
- The building automation system for which you are creating graphics.

Most paint programs are supplied with a tutorial. Taking the time to work through the examples in the tutorial will often result in less time required to create background graphics.

Paint program requirements

To create custom system group backgrounds, use a paint or photo editing program. KMC Controls has tested the WinControl XL Plus graphic library elements and recommends any of the following programs. All recent versions of these programs are suitable for creating system group backgrounds.

- Jasc PaintShop Pro 8.0
- Adobe Photoshop Elements 2.0
- Adobe Photoshop 7.0
- Macromedia Fireworks MX.

If you choose to use a program that is not on the list, verify that the program meets the following minimum requirements.

- Graphic elements can be placed, moved and edited on separate layers.
- It can open, import or place a PNG, TIF or GIF file.
- It can save or export a graphic as a JPG or BMP file.

Organize the project

An effective and useful graphical user interface starts with good planning. In the planning process consider the following items.

- Are end users technical? Do they understand schematics or are picture and 3-D renderings preferred?
- What is the display capability? How big is the monitor? Is ambient light a problem?
- What is the complexity of the system? Is it a multi-building campus or a small system with just one or two controllers?
- What resources are allocated to create a system group?

Review the site plans

Site plans can serve as a visual index to individual components in system groups. The plans may be a simple, single floor plan or a complex set of plans that include campus, building, wing, floor and room drawings. Most CAD programs can export plans in a WinControl compatible format. If the CAD program does not export directly to JPG or BMP formats, export to a format your paint program can use and then save as a JPG or BMP file.

Develop a components list

After reviewing the site plans, make a list of the system components.

1. List all of the types of equipment in the system.
2. Use the equipment list to create a list of the required background images.
3. Determine how many *unique* background images.
4. Use this list of background images to select the individual graphic elements. Graphic elements can be from the KMC library or generated as required from a CAD, paint or illustration program.

Choose the library elements

KMC Controls provides five graphic libraries for constructing background graphics. These four libraries are supplied on the WinControl XL Plus CD in the following folders:

Table 1 Library file location

Equipment Type	Folder
Air Handling Units Fan Coil Units	AHU and FCU Components
Rooftop Units	RTU Components
Chillers and Boilers	Chillers and Boilers Components
Variable Air Volume	VAV Components
Buttons and Icons	Icons

Within each library folder are building blocks for pieces of equipment from which you can construct a complete graphic. Each piece is stored in multiple sizes and file formats. KMC recommends using the PNG format.

Before starting a background, choose a scale that works best in your system group. Unless you are prepared to resize the KMC animation files, do not scale the background graphics.



Detail

To aid organization, store all graphics work for each project in one folder. Before starting work, copy only the required library elements from the WinControl XL Plus CD into the graphics project folder.

Consider the animation elements

KMC Controls designed the animation elements to exactly match the background library elements. Only GIF files may be used as WinControl animation elements. Animation is added in WinControl XL.

Building a background graphic

Building a background graphic involves performing some or all of the following steps with a paint program:

- Creating a work area
- Adding library elements
- Positioning elements within the work area
- Adding buttons or other graphic elements
- Generating the output file

Example graphics

Paint Shop Pro 8.0 was used to build the background graphic in the examples. The graphic of the roof top unit was assembled from the following library files:

- RTU-Hood-50.png
- RUU-Main-Exposed filter-50.png
- RTU-Compressor-50.png
- RUT-Compressor-LeftSide-50.png
- RTU-Compressor-RightSide-50.png

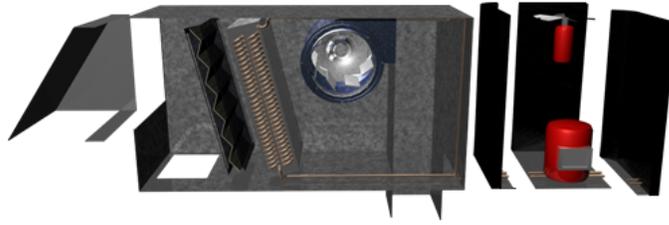


Illustration 1 Roof top unit components

Animation files that compliment the above roof top unit are:

- RTU-burner-animation-50.gif
- RTU CompressFan-50.gif
- RTU fan-50.gif

Creating a work area

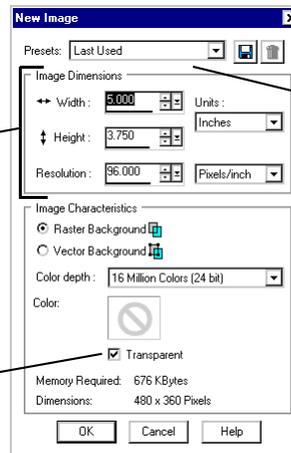
When you start a new document in a paint program you must first open a new work area. The work area (or canvas) defines the background graphics dimensions. For example, 200 by 300 pixels or 5 by 3 inches.

The dimensions of the work area are the dimensions of an unsized system group window in WinControl. Set the work area size a little larger than the graphic information but not so large as to force the operator to scroll either horizontal or vertical.

1. Start the paint program.
2. Choose *File* and then *New* to create a new document.
3. Make selections to define the work area.

Set size a little larger than the elements. Allow room for buttons and labels.

Set background as *Transparent*



Use the preset sizes to create work areas for specific monitor configurations.

Illustration 2 New work area dialog

Adding the library elements

After you create a work area, add elements, one at a time, until the background is complete. Paste each element into a separate layer.

1. Open a library element file. For example, the file *RTU-Main-Exposed filter-50.png* is the first element file used in the following example, *Background graphic under construction*.
2. Copy the entire contents of the library element file.
3. Make the work area active.
4. Paste the library element as a new layer into the work area.

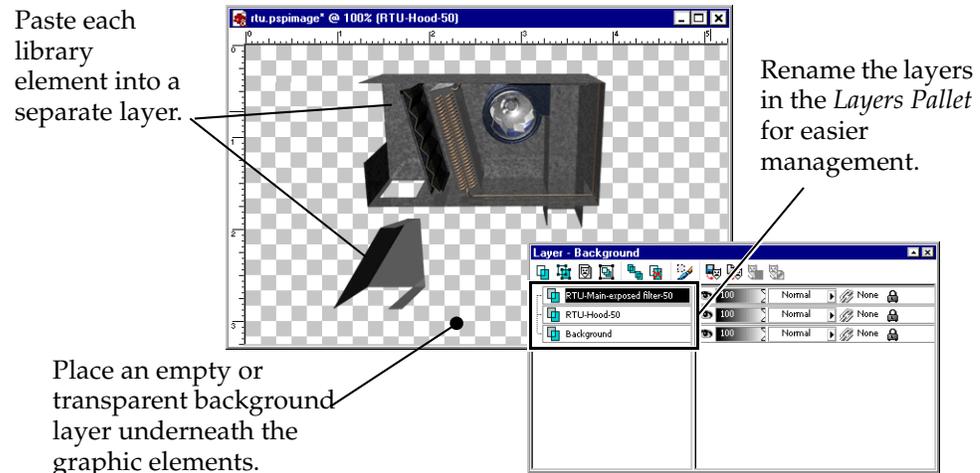


Illustration 3 Background graphic under construction

5. When all of the elements are in place, use the *Move Tool* to correctly position the elements.
6. Add additional elements and layers as required for logos, buttons or text items.



Note

Do not add animation items to the background graphic. Animation items are added in WinControl.

When the background graphic is complete, save the graphic in its native format. The native format preserves the individual layers for editing and reuse with other projects.

Generating the output file

When the new background graphic is complete, save the graphic in the program's native format.

To create the actual file that WinControl will use as a background, save or export the file as either a JPG or BMP file. Consider the following file type characteristics when choosing a background file format.

- JPG images save as small, highly compressed files which load faster than a BMP file but may blur detail. Set the compression or quality setting to about 75% of maximum quality. [See JPEG or JPG on page 7.](#)
- BMP files preserve detail but the larger file size takes longer to load. [See BMP on page 8.](#)

Move the JPG or BMP background file to the *Pictures* folder which is inside of the WinControl *Job Folder*.

Revising and retouching

When making changes to the background graphic, make the changes in the original file and then generate a new output file. Revising a JPG file and then saving it will result in a loss of detail every time the file is compressed.

About using layers

Layers provide a way to manage all of the elements that make up a system group background. Managing a graphic with layers is similar to drawing on separate tracing paper overlays. Where there is no image on a layer, you can see through to the layers below. With separate layers you work on one element of an image without disturbing the others. You can change the composition of the finished graphic by changing the order of the layers and the location and appearance of the elements on each layer. The structure of layers in a graphic can be as simple or complex as required to build the background.

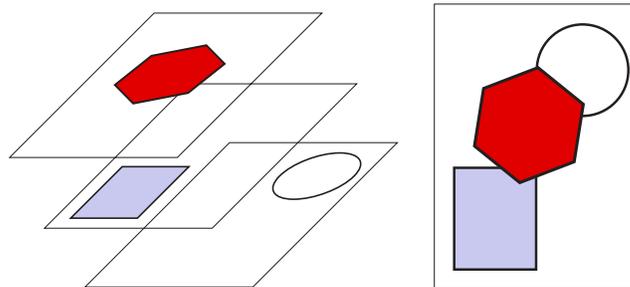


Illustration 4 An image composed of three layers

Graphic file formats **JPEG or JPG**

Short for *Joint Photographic Experts Group*, and pronounced jay-peg. The JPG format uses a lossy compression technique for color images. The information that is discarded in the compression is information that the human eye cannot detect. JPG images support 16 million colors and are best suited for photographs and complex graphics. Although it can reduce file sizes to about 5% of their normal size, some detail is lost in the compression. The JPG file format is one of the two formats supported by WinControl for background graphics in system groups.

BMP

BMP files are the standard, *Bit-Mapped* graphics format used by the Microsoft Windows operating systems. It is an uncompressed file format. The BMP file format is one of the two formats supported by WinControl for background graphics in system groups.

GIF

Short for *Graphics Interchange Format*. Unlike JPG, the GIF format is a lossless compression technique that supports only 256 colors. GIF is better than JPG for images with only a few distinct colors, such as line drawings, black and white images and small text that is only a few pixels high. With an animation editor, multiple GIF images can be assembled to create animated objects. GIF also supports transparency, where the background color can be set to transparent which allows the color on an underlying graphic to show through. WinControl uses GIF files to add animation to system groups. WinControl three-dimensional graphic library elements are distributed in the GIF format.

PNG

Short for *Portable Network Graphics*, and pronounced ping, a bit-mapped graphics format similar to GIF. Developed as a patent-free alternative to GIF files, the PNG format is a 24-bit, lossless file compression technique. A PNG file can be 5–25% more compressed than a GIF file of the same image. PNG techniques improved on the GIF background transparency properties to produce images without jagged edges. Saving, restoring and re-saving a PNG image will not degrade its quality. PNG does not support animation. WinControl three-dimensional graphic library elements are distributed in the PNG format.

TIFF or TIF

Acronym for *Tagged Image File Format*, one of the most widely supported file formats for storing bit-mapped images on both Windows based and Macintosh personal computers. TIFF is a flexible bitmap image format supported by virtually all paint, image-editing, and page-layout applications. Also, all desktop scanners can produce TIFF images. TIFF graphics can be any resolution, and they can be black and white, gray-scaled, or color. WinControl three-dimensional graphic library elements are distributed in the TIF format.

Native format

Referring to an original form. For example, many applications can work with files in a variety of formats, but an application's native file format is the one it uses internally. For all other formats, the application must first convert the file to its native format.

EPS

Abbreviation of *Encapsulated PostScript*. Pronounced as separate letters, EPS is the graphics file format used by the PostScript language. An EPS file format can contain both vector and bitmap graphics and is supported by virtually all graphic, illustration, and page-layout programs. When you open an EPS file containing vector graphics, paint programs rasterizes the image, converting the vector graphics to pixels. KMC Controls distributes its logo files in EPS format.

Data compression

Refers to storing data in a format that requires less space than in its original format or size. Lossy compression technologies attempt to eliminate redundant or unnecessary information. Data compression is particularly useful in communications because it enables devices to transmit the same amount of data in fewer bits. The JPG and most video compression technologies, such as MPEG, use a lossy technique. Other types of compressed files are PNG and GIF files.