AN-340

Programming Floor Plans in Protege GX

Application Note

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Introduction

Floor plans give operators a graphical view of the layout of a site and the status of elements within it. This provides the ability to view and control doors, outputs, inputs, trouble inputs, cameras, areas, elevators and variables from the Protege GX software in real time. Devices on a floor plan are updated dynamically, both on the graphical display and in the status pane to the right of the floor plan.

Floor plans can be added to status pages to provide a comprehensive view of what's happening in the system, and can be linked to other floor plans so that detailed layouts of specific sections can be opened from within a general overview or directory floor plan. Floor plans can also be associated with specific devices and opened from events by right clicking on the associated device record in the event log.

Up to six event reports can be displayed as additional tabs in the event window when viewing a floor plan.

Prerequisites

Standard floor plan functionality is supported in all versions of Protege GX.

The following floor plan feature enhancements were introduced in the stated Protege GX software versions.

Floor Plan Feature	Protege GX Software Version
Door status icons	4.3.264 or higher
Camera devices	4.3.262 or higher
Web link buttons	4.3.367

Background Images

Background images provide the visual backdrop for the physical layout of the site, giving a real-world point of reference to the shapes and icons which represent the devices and other elements on the floor plan.

For best results, the dimensions of the background image should match the desired size and aspect ratio of the floor plan in order to avoid any distortion issues.

Background images are not stored in Protege GX and must be loaded by the system any time a floor plan is viewed. If the client machine is not able to access an image, it will not appear in the Protege GX client.

One option is to store background images in an identical location on each client PC (e.g. C:\Background Images). The downside of this option is that any time you update a background image you must remember to copy it to all the client PCs, otherwise different PCs will display different (local) versions.

The alternative is to store background images in a shared network folder that all Protege GX client PCs have access to. This is a more efficient option overall, however there are some important requirements:

1. **Shared folder**: The folder that the images are stored in must be shared so that all client PCs have read access.
2. **UNC network path**: The **Background** path entered in Protege GX for the floor plan background image needs to be the full UNC (Universal Naming Convention) path.

   Networked drive letters can differ from one PC to the next (i.e. Drive X on one PC may be mapped as drive Y on another) so client PCs may be looking for the file in the wrong location, and the background will not load.

   The UNC path ensures that all client PCs are searching for the file in the right location on the right PC. UNC network paths are in the format: **\\server-name\shared-resource-pathname**.

   For example: \\Protege GX Server-001\C\Background Images\Office Floor Plan Background.PNG

   Tip: To find the UNC path you can right drag (hold down the right mouse button and drag) the image file from the networked folder onto a Word document or email and select **Create Hyperlink Here**.

To test your configuration you should confirm that you can open the background file(s) from each client PC.

Floor Plan View

The floor plan is an extremely useful monitoring tool which displays a live view of the status of the system's elements, lists recent events, and provides convenient and observable manual device control.

Additional system programming may enable more advanced functionality such as calls with intercoms, viewing live camera feeds, monitoring or updating variable input values, and calling elevators.

Viewing a Floor Plan

1. To open a floor plan, navigate to **Monitoring | Floor plan view**.

   The floor plan that is displayed by default when you open the floor plan view is set as the **Default floor plan** in **Global | Sites | Display**. If no default is set, the floor plan with the lowest Database ID is the default.

2. To view a different floor plan, select it from the dropdown in the toolbar.
3. It can be convenient to use the **Breakout** button in the toolbar to break out the floor plan to a new window, so you can view it on a second monitor while continuing to program the system.

Floor Plan Sections

The floor plan consists of the following sections:

- A graphical representation of the building or site, including interactive icons for devices. You can right click on any device icon on the image to open a context menu for manual commands (e.g. locking/unlocking doors, arming/disarming areas).

  The floor plan can also include buttons which are used to display a camera view or open another floor plan.
- A status list that dynamically updates to display the real-time status of the devices on the floor plan. You can right click on any device to open a context menu for manual commands.
- An event window displaying a live list of Floor plan events: events related to devices on the floor plan. You can right click on any event to run the floor plan events as a standard report, which can be exported, emailed or printed as normal.

  Up to six additional event reports can be displayed under separate tabs on this pane. This can be set as **Event window 1-6** in **Global | Sites | Display**.

  To increase the viewing area of the event window, click and drag the top edge of the window upwards.

Zoom Slider

The **Zoom** slider allows operators to view the floor plan at anywhere from 10% to 1000%, providing complete flexibility to see the whole picture or close details.

Show Device in Floor Plan

To identify where a device is placed on the floor plan you can right click on the device record in the **Status list** and select **Show device in floor plan**. This will cause the device's icon to pulse 3 times on the floor plan.

Hover

Hovering over any element on the floor plan displays its device information and status in a convenient quick-view popup.

Area Status Display

As well as displaying the written current status of the area for clear identification, the default area device symbol includes a seven segment display bar which provides advanced area status information.

The table below explains the various information displays when the listed segment(s) are **red**.

Segments are identified 1 to 7, left to right.

Segment	Description
1, 2, 3	Alarm
3	Alarm in memory
4	Exit delay
5	Force arm (including re-arm)
6	Disarmed after force arm instant / Disarmed with walk test disabled
7	Bypass / Stay arm
4, 5, 6	Exit delay when force arm instant / Exit delay with walk test enable
5, 6	Armed when force arm instant / Armed with walk test enable

Manual Control

Right clicking on a device icon, either on the floor map or in the status list, allows you to send manual control commands to the selected device and observe the real-time change in the device's state.

Action Buttons

You can click action buttons to perform one or more actions:

- Launch a live camera feed to see the situation on the ground.
- Open another floor plan, enabling you to quickly navigate around a large site with multiple distinct sections.
- Open a web page to access internal or external resources such as reports and instructions.

Data Values and Variables

Variables can be added to floor plans to enable monitoring of programmed data values. If enabled, the value can also be set by right clicking on the variable and selecting **Set variable**.

Floor Plans Associated with Records

The **Floor plan events** tab in the event window displays all recent events relating to devices on the floor plan. Additionally, up to six event reports can be displayed as additional tabs in the event window.

From the event window it is also possible to right click on an event and open the floor plan associated with the record the event relates to.

This only applies if the record has a floor plan associated with it.

To associate a floor plan with a record it needs to be assigned in the **Floor plan** setting of the record's programming. The following record types can have a floor plan assigned:

- Doors
- Areas
- Alarms
- Inputs
- Trouble inputs
- Outputs
- Cameras
- Intercoms

Status Page View

Floor plans can also be viewed on status pages to provide a comprehensive view of what's happening in the system.

Adding a Floor Plan to a Status Page

1. Navigate to **Monitoring | Setup | Status page editor**.
2. From the toolbar, select the **Status page** to add the floor plan to.
3. Configure **Columns** / **Rows** to make a space for your floor plan, as appropriate for your display needs.
4. Set the **Type** to Floor plan and set the **Record** to the desired floor plan record.
5. Configure the **Columns** and **Rows** for the floor plan display as required.
6. Click **Save**.
7. This can now be viewed by navigating to **Monitoring | Status page view** and selecting the status page.

Global Settings

Color map and floor plan symbol settings allow you to customize your system-wide configuration for the symbols which represent devices on your floor maps, and the colors which identify their various states.

Color Maps

Color maps allow you to customize the colors used to represent the state of objects (such as doors or outputs) on a floor plan or status page. For example, you could configure a color map so that unlocked doors were displayed as blue rather than the default green to aid operators with red-green color blindness.

You can select the color map that will be used for the entire system in **Global | Global settings | Display**. If no color map is set the default colors will be used.

Any changes to color map settings require Protege GX to be closed any reopened before the new settings will be applied to objects displayed in the user interface.

Adding a Color Map

1. Navigate to **Global | Color maps** and click **Add**.
2. Within each of the device tabs select the color to represent each available device state as described below.

   The available colors are gray, red, orange, yellow and green.
3. Click **Save**.

Device States

Door States

- Door offline
- Door closed and locked
- Door closed and unlocked
- Door forced open
- Door open and unlocked
- Door left open, door sense not sealed
- Door left open, bond sense not sealed

Input States

- Input offline
- Input closed
- Input open
- Input tamper
- Input short circuit

Output States

- Output offline
- Output on
- Output off

Area States

- Area offline
- Area disarmed
- Area armed
- Area entry delay
- Area (other statuses)

Elevator States

- Elevator offline
- Elevator locked
- Elevator unlocked

Floor Plan Symbols

Floor plan symbols are custom symbols programmed with specific images or icons which will represent the various objects (such as doors and areas) and their states when displayed on a floor plan.

Creating a Floor Plan Symbol

1. In **Global | Floor plan symbols**, click **Add**. Enter a **Name**.
2. Select the **Type** of device that you want this floor plan symbol to represent. Only one device type can be selected per record.
3. For each state field, click the ellipsis **[...]** button to add an image.
   - If the image is already stored on the network, select the ellipsis **[...]** beside **Path** to browse to the image. The image must be accessible from the server machine.
   - If the image does not yet exist set the **Image source** field to capture a new image. You can capture an image from a connected webcam, or from a Topaz signature pad.
   - When complete, click **Next**.
4. In the next window you may crop the image if required:
   - Adjust the dotted rectangle's size and position to include the section of the image you wish to keep. Check the **Aspect** option to fix the aspect ratio of the rectangle.
   - To crop the image, check the **Crop** checkbox.
   - Click **Ok**.
5. Repeat the above for all state fields then **Save** the floor plan symbol.
6. Once a floor plan symbol is created you can select this record as a **Device style** when you add a device to a floor plan (**Monitoring | Setup | Floor plan editor**).

Device States

Door States

- Door offline
- Door closed and locked
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- Door forced open
- Door open and unlocked
- Door left open, door sense not sealed
- Door left open, bond sense not sealed

Input States

- Input offline
- Input closed
- Input open
- Input tamper
- Input short circuit

Output States

- Output offline
- Output on
- Output off

Area States

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- Area armed
- Area entry delay
- Area (other statuses)

Elevator States

- Elevator offline
- Elevator locked
- Elevator unlocked

Creating Floor Plans

Floor plans are most commonly created and customized in the floor plan editor. Protege GX also has a process for bulk adding a series of floor plans, or a floor plan can be created when adding a controller via the controller wizard.

Floor Plan Editor

Use the **Floor plan editor** to create and tailor floor plans to meet the specific needs of your system. Each floor plan can represent a section of the system, such as a single office floor or a specific device, or the system as a whole.

Creating a Floor Plan

1. Navigate to **Monitoring | Setup | Floor plan editor** and click **Add**. The **Add floor plan** window opens.
2. Enter a **Name** for the new floor plan.
3. If this floor plan will be based off an existing floor plan or template, select it in the **Copy from existing** field. Otherwise, leave this <not set>.

   Copying will duplicate the background, devices and other properties from the copied floor plan.
4. Define the **Width** and **Height** for the new floor plan.

   If copying from an existing floor plan, the dimensions above should be the same as the copied floor plan.
5. Click **Ok**.
6. Customize the floor plan properties as described below, then click **Save**.

Floor Plan Properties

- **Record group**: The record group this item belongs to. This allows records to be organized by categories such as building, branch or company. Using roles and security levels, you can restrict operator access so that operators can only see or control the records in specific record groups.
- **Background**: Click the ellipsis **[...]** button to set a background image for the floor plan. This should be in a file location that is accessible on the server machine, such as a shared network folder. The image can be in .bmp, .jpg or .png file formats.

  Ensure that all images are located in a shared network folder that clients have access to. If the link to an image is broken or the client machine is not able to access it, the image will not appear in the Protege GX client.
- **Width**: Defines the width of the floor plan (in pixels).
- **Height**: Defines the height of the floor plan (in pixels).
- **Color picker**: Sets the background color of the floor plan.
  - To set a solid color, click the **Solid** tab and select the color by using the color picker or entering RGB values.
  - To create a gradient, click the **Gradient** tab to display a slider bar beneath the color pickers. Click on each slider to set the color of each side individually, then adjust the sliders to achieve the desired effect.
  - To set no color (transparent), click the **Null** tab.
- Use the tabs above the color picker to set whether the color will be **Solid**, **Gradient** or **Null** (no color), then set the background color by using the color picker or entering RGB values.

Brushes

The brushes section is used to set the color, visibility and opacity of lines, text and buttons on the floor plan.

1. Expand the **Brushes** section and select an item in the editor.
2. Select whether you are editing the **Background**, **Border** or **Foreground** color of the item. This will depend on the item being configured.
3. Set the colors for the item:
   - To set a solid color, click the **Solid** tab and select the color by using the color picker or entering RGB values.
   - To create a gradient, click the **Gradient** tab to display a slider bar beneath the color pickers. Click on each slider to set the color of each side individually, then adjust the sliders to achieve the desired effect.
   - To set no color (transparent), click the **Null** tab.
4. Set whether the item is **Visible** or **Hidden**.
5. Set the **Opacity** of the item.

Devices

This section is used to add representations of physical devices such as doors, areas, inputs and variables to the floor plan. When you view the floor plan each device icon will display its current status and can be right clicked to change the status.

1. Expand the **Devices** section and click **Add** to add a new device.
2. Set the **Device type** as required.
3. Set the **Device style** you wish to use. This determines the type of icon that will be used for this device on the floor plan.

   If you have created a floor plan symbol record (**Global | Floor plan symbols**) for a specific device type, when you add a device you can set the **Device style** to use your custom symbols.
4. Drag and drop the required device(s) onto the floor plan. Then **Close** the popup window.
5. Move the device by clicking and dragging, resize it using the squares in the corners, and rotate it using the circles in the corners.

The **Data** field does not need to be configured.

Lines

Lines allow you to draw basic shapes on the floor plan, which can be used for walls and other features of the site.

1. Expand the **Lines** section and click **Add**.
2. Your cursor will transform into a **+** shape. Click somewhere on the design field to create the first node of the line.
3. To create an additional node or corner, click once. The line can have as many corners as necessary, allowing you to create complex shapes.
4. To complete the line, double click.
5. Give the line a descriptive **Name**.
6. Once the line is complete you can:
   - Set the **Line width** in the **Lines** section
   - Set the color with the **Border** attribute in the **Brushes** menu
   - Move the line by clicking and dragging within the dotted box
   - Resize the line by clicking and dragging the squares at the corners
   - Rotate the line by clicking and dragging the circles at the corners
   - Move the line in front of or behind other elements using the **Front** and **Back** buttons in the toolbar.

Text

Text allows you to add text labels to your floor plan (e.g. area names, directions).

1. Expand the **Text** section and click **Add**.
2. Your cursor will transform into a **+** shape. Click and drag somewhere on the design field to create a text box.
3. Give the text a descriptive **Name**.
4. In the **Text** field, enter the required text.
5. Once the text is complete you can:
   - Set the **Font**, **Font size** and text style in the **Text** section
   - Set the color with the **Foreground** attribute in the **Brushes** menu
   - Move the text box by clicking and dragging within the dotted box
   - Resize the text box by clicking and dragging the squares at the corners
   - Rotate the text box by clicking and dragging the circles at the corners
   - Move the text box in front of or behind other elements using the **Front** and **Back** buttons in the toolbar.

Images

In this section you can add pictures to your floor plan from files.

1. Click **Add**, then enter a filepath or click the ellipsis **[...]** to browse to an image. The image can be in .bmp or .jpg file formats.

   Ensure that all images are located in a shared network folder that clients have access to. If the link to an image is broken or the client machine is not able to access it, the image will not appear in the Protege GX client.

2. Your cursor will transform into a **+** shape. Click and drag somewhere on the design field to add the image.
3. Give the image a descriptive **Name**.
4. Once the image has been completed you can:
   - Move the image by clicking and dragging within the dotted box
   - Resize the image by clicking and dragging the squares at the corners
   - Rotate the image by clicking and dragging the circles at the corners
   - Move the image in front of or behind other elements using the **Front** and **Back** buttons in the toolbar.

     You can use the **Back** button to create a background image.

Buttons and Actions

Operators can click buttons on the floor plan to perform specific actions. The types of actions available are:

- Launch a live camera feed to see the situation on the ground.
- Open another floor plan, enabling you to quickly navigate around a large site with multiple distinct sections. It is common to create a high-level 'map' of the site with buttons linking to separate floor plans for each zone or floor.
- Open a web link to access internal or external resources such as reports and instructions. The link will open in the computer's default web browser. When an operator clicks a web link on a floor plan, an event is logged for auditing purposes.

To create a button and link an action to it:

1. Create the record that the button will link to. This can be:
   - A camera (**Monitoring | Setup | Cameras**)
   - A floor plan (**Monitoring | Setup | Floor plans**)
   - A web link (**Monitoring | Setup | Web links**)
2. Open the floor plan editor.

3. Expand the **Buttons** section and click **Add**.
4. Your cursor will transform into a **+** shape. Click and drag somewhere on the floor plan to create a button.
5. In the **Text** field, enter a label for the button.
6. Set formatting details such as **Font**, **Font size** and text style.
7. Expand the **Actions** section. Select a record for one or more of the action types.
8. Once the button has been completed, you can:
   - Set the colors with the **Background**, **Border** and **Foreground** attributes in the **Brushes** menu
   - Move the button by clicking and dragging within the dotted box
   - Resize the button by clicking and dragging the squares at the corners
   - Rotate the button by clicking and dragging the circles at the corners
   - Move the button in front of or behind other elements using the **Front** and **Back** buttons in the toolbar.

If the background color of a button is set to **Null**, you must click on the text label instead of the background to activate the button.

Floor Plan Editor Toolbar

The toolbar provides functionality for controlling the layout and positioning of elements added to a floor plan.

Button	Function
Redo	Enables you to reinstate (redo) the last action that was undone.
Undo	Enables you to undo the last action.
Copy	Copies the selected object(s) to the clipboard.
Paste	Pastes the content from the clipboard into the design field.
Delete	Removes the selected object from the design field.
Snap	With this option enabled, when you draw, resize, or move an object it will align or 'snap' to the nearest objects in the design field even if the ruler is not visible. If your object does not move where you want, turn off this option.
Angle	Aligns the selected object(s) to the nearest polar grid angle.
Ruler	Select this option to toggle the ruler on or off.
Front	Moves the selected object in front of other objects.
Back	Moves selected object behind other objects.
Aln top	Aligns all selected objects to the top edge of the last object selected.
Aln btm	Aligns all selected objects to the bottom edge of the last object selected.
Aln lt	Aligns all selected objects to the left edge of the last object selected.
Aln rt	Aligns all selected objects to the right edge of the last object selected.

Add Bulk Floor Plans

The **Add bulk floor plans** feature enables you to quickly create a floor plan for each controller on a site, including all the devices (doors, inputs, outputs and/or areas) controlled by that controller.

This enables you to define a consistent background image that will be used by all floor plans, ensuring that all floor plans meet any branding or corporate style guidelines. The process also creates a placeholder image for each floor plan, which is stored outside of the Protege GX database. This allows you, or a graphic designer, to replace and update the floor layouts without opening Protege GX.

Preparation

Read the full instructions before beginning to ensure that all elements are in place.

- All controller and related device configuration (areas, doors, inputs, outputs) should be complete before performing this process. Records added at a later time are not dynamically added to the floor plans.
- Ensure that you have all required background images and they are stored in an accessible shared network folder.
- If you plan to use home and directory floor plans (see below) these must be created before starting.

Adding Bulk Floor Plans

1. Navigate to **Monitoring | Setup | Add bulk floor plans**. The **Add multiple floor plans** window opens.
2. Enter the required properties as described below.
3. Click **Add now** to create the floor plans.
4. In the location set as the **Image directory** you will find blank PNG images for each controller. You can edit or replace these images with representations of the layout for each floor plan.
5. In the floor plan editor (**Monitoring | Setup | Floor plan editor**), open each floor plan and finalize the positioning and design of the devices and other elements.

Background Template

- **Background image**: Defines the path and filename of an image that will be used as a background for all of the floor plans that are created. Ensure that you enter the full filename of an existing image to be used as the background.

  For best results, the dimensions of the image should already match the desired size and aspect ratio of the final floor plans in order to maintain the aspect ratio and avoid any distortion issues.

  Ensure that all images are located in a shared network folder that clients have access to. If the link to an image is broken or the client machine is not able to access it, the image will not appear in the Protege GX client.

- **Width**: Defines the width of the background (in pixels).
- **Height**: Defines the height of the background (in pixels).

Floor Plan Image

- **Image directory**: Defines the location where the placeholder images will be created. This process will create a new blank PNG image for each controller. Note that this will overwrite any existing images with the same name at that location.

  Ensure that all images are located in a shared network folder that clients have access to. If the link to an image is broken or the client machine is not able to access it, the image will not appear in the Protege GX client.

- **Horizontal offset**: Sets the distance (in pixels) that the image will be offset horizontally from the left.
- **Vertical offset**: Sets the distance (in pixels) that the image will be offset vertically from the top.
- **Image width**: Defines the width of the images (in pixels).
- **Image height**: Defines the height of the images (in pixels).

Buttons

The bulk add process also creates two buttons which will link to other floor plans - specifically, a 'home' and 'directory' floor plan. This makes it easy to navigate between floor plans when monitoring the system.

The home and directory floor plans must already have been created.

- **Home button text**: Defines the text (label) of the first button.
- **Floor plan**: Defines the 'home' floor plan that the button will link to.

- **Directory button text**: Defines the text (label) of the second button.
- **Floor plan**: Defines the 'directory' floor plan that the button will link to.

Devices

- **Doors**: When enabled, includes each of the available doors on the floor plan for each controller.
- **Inputs**: When enabled, includes each of the available inputs on the floor plan for each controller.
- **Outputs**: When enabled, includes each of the available outputs on the floor plan for each controller.
- **Areas**: When enabled, includes each of the available areas on the floor plan for each controller.

Controller Wizard

When you add a controller using the controller wizard, the **Options** section includes a **Create floor plan** option. If you select this option the wizard creates a floor plan which includes all inputs and outputs on the controller.

For more information and programming instructions, see the Protege GX Operator Reference Manual.

After the floor plan is created it can be customized using the Floor plan editor (see page 12).

Adding a floor plan via the controller wizard process is useful for small sites with only a few inputs and outputs. For larger sites it is generally recommended to create floor plans manually.

Programming Examples

Creating a Basic Floor Plan

In this scenario we will create a basic floor plan for a single office which has a PIR and camera for security, lights controlled by an output, and a keypad outside the door. We want to be able to control the lights and view the camera feed from the floor plan, and monitor door forced and keypad tamper events. We also want to be able to open the office floor plan from within a main directory floor plan, and from any office door event.

To complete this programming you will need the following records already created.

- A controller record
- An Office area
- An Office Door
- An Office PIR input
- An Office Door Door Forced trouble input
- An Office Keypad Module Tamper trouble input
- An Office Lights output
- An Office Camera (operational if possible)
- A status page showing all events

Before starting, you will need a background image to represent the office space. This can be any general image which represents a single-room office. The important thing is to ensure that the image is in a shared location that all clients can access. For more information, see Background Images (page 4).

Programming

1. Navigate to **Monitoring | Setup | Floor plan editor** and click **Add**.
2. Set the floor plan **Name** to Office Floor Plan.
3. Click **OK**.
4. Define the **Background** image by entering the **UNC network path** of the image file (see page 4), to ensure that other PCs will be able to access and view the background.
5. When the background image is selected, the floor plan **Width** and **Height** default to the image size.

   The size can be altered either by manually changing the settings or by clicking and dragging the handle at the bottom right corner of the image, but be mindful of the aspect ratio and potential image distortion.

6. Expand the **Devices** section and click **Add**.
   - Set the **Device type** to Area, then drag and drop the Office area onto the floor plan.
   - Set the **Device type** to Door, then drag and drop the Office Door onto the floor plan.
   - Set the **Device type** to Output and select the **Controller**. Change the **Device style** to Square, then drag and drop the Office Lights output onto the floor plan.
   - Set the **Device type** to Input, change the **Device style** to Triangle, then drag and drop the Office PIR input onto the floor plan.
   - Set the **Device type** to Trouble input, change the **Device style** to Input, then drag and drop the Office Door Door Forced and Office Keypad Module Tamper trouble inputs onto the floor plan.
   - Set the **Device type** to Camera, change the **Device style** to Dome camera, then drag and drop the Office Camera onto the floor plan.
   - Click **Close**.
7. You can now position and resize the objects to suit your background. Move devices by clicking and dragging, resize using the squares in the corners, and rotate using the circles in the corners.

All icons must be placed onto the background image. Any devices outside the floor plan perimeter will not be seen when the floor plan is viewed. Also avoid layering objects on top of one another as this will interfere with status displays and device selection.

8. Expand the **Text** section and click **Add**. We want a label for our office, so place the cross in the middle of the floor plan and click and drag to create a text box.
   - In the **Text** section, set the **Name** to Office Text to identify the text box record.
   - Set the **Text** to Office and select a **Font** and **Font size** to suit your floor plan.
   - **Add** another text box, beside the door near the Office Keypad Module Tamper trouble input.
   - Using a smaller font, set the **Name** to Keypad Tamper Text and the **Text** to Keypad Tamper.
   - Hold the **Ctrl** or **Shift** key on your keyboard, then in the **Text** section select both text box records.
   - Open the **Brushes** section and select the **Foreground** brush. Select the **Solid** tab and choose a font color for the selected text boxes. You may also want to set a **Border** or **Background** color.

     The text boxes will remain selected for editing until you click on another device.
9. **Save** your floor plan.
10. Next we want to create a basic directory floor plan, so click **Add** and **Name** the floor plan Directory Floor Plan.
11. For our purposes a **Background** image is not necessary, however we want to set a black background for our directory floor plan. Set each of the **Red**, **Green** and **Blue** settings to 1.
12. Expand the **Buttons** section and click **Add**. Place the cross on the floor plan and click and drag to create a directory button for our office floor plan.
    - In the **Buttons** section, set the **Name** to Office Floor Plan to identify the button record.
    - Set the **Text** to Office and select a **Font** and **Font size** to suit your floor plan.
    - Open the **Brushes** section and set the **Background** color for the button.
13. **Save** the directory floor plan.
14. Navigate to **Global | Sites | Display**. Set the **Default floor plan** to Directory Floor Plan.
15. Navigate to **Programming | Doors**. Set the **Floor plan** for the Office Door record to Office Floor Plan.

Testing

1. Navigate to **Monitoring | Floor plan view**. The default Directory Floor Plan should be displayed.
2. Click the **Office** button. The Office Floor Plan should open, displaying all the devices and their current states.
3. Click the **Camera** icon. A window should launch, displaying the live camera feed (if connected).
4. Test sending manual commands by right clicking the devices. You should be able to perform manual control commands on these devices and observe their states changing in real time.
   - Arm and disarm the Office area.
   - Unlock and lock the Office Door.
   - Activate and deactivate the Office Lights output.
   - Bypass the PIR input and the two trouble inputs.
5. Navigate to **Monitoring | Status page view** and select a status page which displays all events. Locate the events for unlocking and locking the Office Door. Right click on the event record and select **Floor plan**. The Office Floor Plan which we assigned to the door record above should open.
6. If available, go to another Protege GX client PC on the network and navigate to **Monitoring | Floor plan view**. The default Directory Floor Plan should be displayed and you should be able to open the Office Floor Plan. The background image should be visible. If the background is not displayed, try accessing the image file using the UNC network path. You may need to update your file sharing or path configuration.

Monitoring Power Supply Voltage and Current

The voltage and current in a Protege power supply can be monitored on a floor plan by configuring the power supply as an analog expander, programming data values to store the values of the analog expander's four channels, then adding variables to the floor plan to display those data values.

Data Values

Data values (sometimes known as registers) are used by the system to store numerical values. Data values can be used for monitoring analog inputs by storing a quantity from each channel on the analog expander, representing values such as current or voltage.

Data values can also be used in area counting, to track the number of users in an area or the number of cars in a carpark. For a programming example, see Application Note 278: Access Level Area Counting in Protege GX.

Adding the Data Values

To monitor the voltage and current of the power supply we will need to create four data values.

Navigate to **Automation | Data values** and add the following records:

- Core Voltage
- V1 Voltage
- V2 Voltage
- Current

Variables

Variables allow you to display the information stored by data values in a readable form on a floor plan.

Adding the Variables

We will need to create four variables to display the data values above.

Navigate to **Automation | Variables** and add:

- Core Voltage Variable
- V1 Voltage Variable
- V2 Voltage Variable
- Current Variable

For each variable, set the **Scale** to 0.01 and the **Data value** to the corresponding data value programmed above.

Analog Expander

The power supply needs to be addressed and programmed as an analog expander, to enable configuring and monitoring of the four analog input channels representing the voltage and current in the power supply.

The four analog expander channels represent the following power supply information:

Channel Number	Function
1	Core Voltage
2	V1 Voltage
3	V2 Voltage
4	Current

Configuring the Analog Expander

1. Connect the power supply to the module network.
2. Address the power supply as an analog expander

   For module addressing instructions, see the Protege GX Operator Reference Manual.
3. Navigate to **Expanders | Analog expanders** and create an analog expander record with a **Physical address** corresponding to the power supply.
4. Set the **Expander personality** to the type of power supply.
5. In the **Channel 1** tab, configure the following settings for the core voltage channel:
   - Check **Enable channel**.
   - Configure the channel update frequency.
     - To update the value at regular intervals:
       Disable **Send ADC value in diff mode** and set the **Channel 1 update time**.
       OR
     - To update the value whenever it changes by a defined amount:
       Enable **Send ADC value in diff mode** and set the **Channel 1 diff comparison value**.
   - Set the **Channel 1 data value** to Core Voltage.
6. Program channel configuration for **Channel 2** (V1 Voltage), **Channel 3** (V2 Voltage) and **Channel 4** (Current).
7. Click **Save**. Wait for the programming to be downloaded to the controller, then right click on the analog expander record and click **Update Module**.

Floor Plan

The variables can now be displayed on a floor plan.

1. Navigate to **Monitoring | Setup | Floor plan editor** and select an existing floor plan or create a new one.
2. Expand the **Devices** section and click **Add**.
3. Set the **Device type** to Variable and drag the four variables onto the floor plan.

   The default variable **Device style** is a 7 segment digital display. They can also be displayed as a **Linear gauge**, however a **Minimum value** and **Maximum value** will need to be defined in the programming of each variable.
4. Expand the **Text** section and create four text boxes to label each variable display.
5. Click **Save**.
6. Navigate to **Monitoring | Floor plan view** to monitor the variable values.

As well as being displayed on floor plans, data values and variables can be applied to a wide range of applications using **programmable functions**. For more information, see the Protege GX Operator Reference Manual.

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