CONTENT

'RoomAutomationConceptDemo' is a demo project that shows basic functionalities for room automation with nxtStudio software, according IEC61499, in a simple model. It demonstrates how comfortably and easy room controlling of buildings equipped with flexible room spaces can be (e.g. meeting rooms, seminar rooms, etc.).

The demo project contains one floor with twelve rooms. There are three devices used in the project to show that even the distribution makes no restrictions at all.

Room automation with nxtStudio is not only feasible to implement but also, in the field of flexible room sizing, extremely fast adaptable.

Where can you find the finished "RoomAutomationConceptDemo" application for download?

You can download the nxtONE-file **here.**

How to make the application work?

1. Open the Demo-file

The demo-file is an archive file. Start the program nxtStudio (Version 2.0, a demo-version with the "BuildingAutomation-Library" can be downloaded **here**) at first and click on **File/Unarchive Solution** in the main menu bar. In the opened dialogue you will be asked for the archive location. Thereafter the solution will be opened from nxtStudio automatically.

» Starting the SoftPLCs, loading the devices to the PLCs

A detailed description of how to start the SoftPLCs and loading a project can be found in basicConceptDemo.pdf on our homepage.

Here a short summary of the description:

- Double-click on entry **'System'** within the opened node **'RoomAutoConceptDemo'**

- Change to **tab 'Devices'** now and choose **'(Local Test)'** at **'Active Network Profile:'** at the toolbar of the editor.

- Be sure now that **'Yes'** is adjusted in column **'Login'** for all devices. If not, click into the column in the respective row. A button appears that enables you to select the desired adjustment.

- **Select all devices** within the device list, **click right** into the selected area and choose item **'Start Soft PLC'**

- The machine starts three soft PLCs, which is evident because three windows will pop up.

- Click on **'Deploy advanced …'** , select all devices in the opened dialogue **'Advanced Deploy'** and click on **'Deploy'**.

- The project is running on the soft PLCs now.

- Finally start HMI: open node **'Canvases'** and **right-click** on item **1024x768.** Click on item   **'Test HMI Runtime on Local Computer'**.

2. Handling

Figure 1.

This image shows the twelve rooms on our demo floor. In the middle of the floor we can see the central switch, that overrides all other light switches placed in the individual rooms. So the facility manager does not have to visit all rooms separately to kill the light e.g. before weekend.

Each room contains two buttons.

2.1 A click on the upper button opens a window containing the basic control functions of the room. This window is kept deliberately simple and allows only controlling but without the possibility to make changes concerning the default settings of the room size:

Figure 2.

The kind and count of control elements in this window for room controlling, depends on the implementation for the room.

Figure 3.

In our example we can control two lighting circuits independently and, additionally, they do show the current state.
The lower button serves to set the set-point for the room heating.

If some rooms have been unified to one, those buttons that cannot be used are shown greyed out. They do show the active state but cannot be used for adjustment, to show that this function will be switched in unison with the segment at the left.

Figure 7.

2.2 The second button opens a window to adjust the room settings:

Figure 2.

At the same time it shows the current settings of the interior walls to its neighbour rooms and the instance name.

A lying T symbolizes an active wall, a hyphen, on the contrary, shows that the wall has been removed. Moreover, the colour tells us something about the communication state to the neighbour rooms. Green means the communication to this segment is OK, red-grey flashing on the other side shows us that there is no communication to the next segment at this point.

Concretely, this happens in our example at the left side of room 1 and at the right side of room 12, because there are no more adjacent segments.

The junctions between the individual devices will show green as long as the communication between them is OK. If we stop one device, or shut down the soft PLC, the border symbol of the last segment, located directly next to the device not running any longer, will begin flashing red-grey to show the missing connection. As soon as the soft PLC is running again, also the appropriate border symbol will shine green again and the symbols are displayed normally.

A click on the button opens a control window to set the particular adjustments for the room. It is the working space for the house-technician:

Figure 6.

This window contains several buttons. The buttons of the middle column serve to control the wall settings: each room can control the settings of the interior wall to its right neighbour room.

The principal existence of the wall can be defined by the topmost button. The buttons arranged below keep being greyed out and inactive as long as the interior wall to the next room exist. As soon as the wall has been removed, we have the opportunity to define the behaviour of room heating and light control separately by the buttons underneath.

Therefore it is quite possible to ‚click a wall away' whereby the controlling of the two rooms will be unified to a group, but nonetheless activate the border between the two rooms, for example for one lighting circuit again, to control this light sources in the two segments separately. In the same way it could be defined whether all blinds are controlled together or separately, if we have a project containing blind controlling.

Again we can recognize whether the border to the next room is activated or not, by the symbol on the left and right edge of the button:

Figure 7.

The buttons on the right side enables you to define the dimming factor of the respective light source. In our example the upper lighting circuit consists of two light sources. The house technician is able to dim or switch them separately for test purposes (e.g. to check lamp function), although they belong to one

light band and therefore they are controlled only together by the room controller.

The buttons positioned on the left side of the window represent the direct equivalent to the push-button light switches mounted in the room. They have the same functionality as a concrete switch and therefore they enable you to switch or dim the light of the respective lighting circuit together. In our example there are two push-buttons instanced, for the first lighting circuit. On one hand, this will help the house technician to indicate the lighting circuit at first sight, and on the other side, if e.g. EnOcean buttons are used, you could display here battery level or signal strength directly. This saves a lot of time (and money) during troubleshooting and service.

The symbols of the lowest row serve to control room heating. Beneath the option to adjust the wall settings as described above, the presetting of the room heating will be adjusted here. The current settings are displayed in this symbol:

Figure 8.

With a left-click on it a window opens:

Figure 9.

Here you can choose the individual operating modes such as automatic, manual, cascade, etc. and set the adequate set-points. A click on the trend symbol opens or closes the trend view. You can choose another operating mode by a right-click on the operating mode symbols above, respectively with a left-click it is possible to select which modes are generally available.

Additionally, an accurate parameterization of the PID controller can be made by a right-click on the symbol shown at *Figure 8*.

This short demo gave you a quick summary of the basic possibilities for automation of buildings with flexible room space using nxtStudio software. Of course there are boundless possibilities to make building automation, depending on requirement and implementation, to an efficient, straightforward and on all levels logically connected system.

If you are interested in the potentialities provided by nxtStudio software, please contact us:

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