# Transferring Information with QR Codes from Comfort Panel to Smartphones or Tablets

**SIMATIC Comfort Panels**

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# Table of Contents

# 1 Task

**Introduction**

It is often useful to transfer information from operator panels or controllers to a mobile phone or a tablet PC.

Here, an option is to be used without integrating the mobile phone or the tablet PC into the automation network.

**Overview of the automation task**

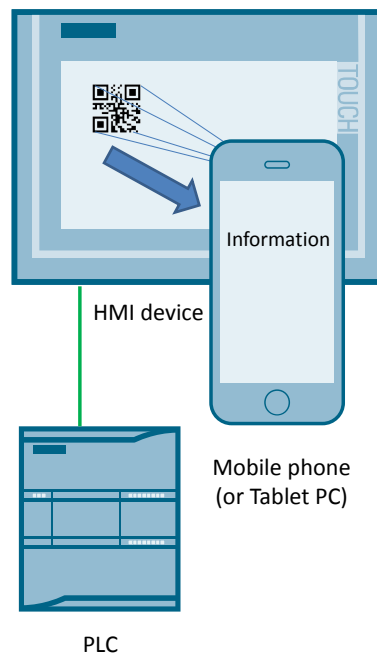The figure below provides an overview of the automation task.

Figure 1-1

HMI device

Information

Mobile phone
(or Tablet PC)

PLC
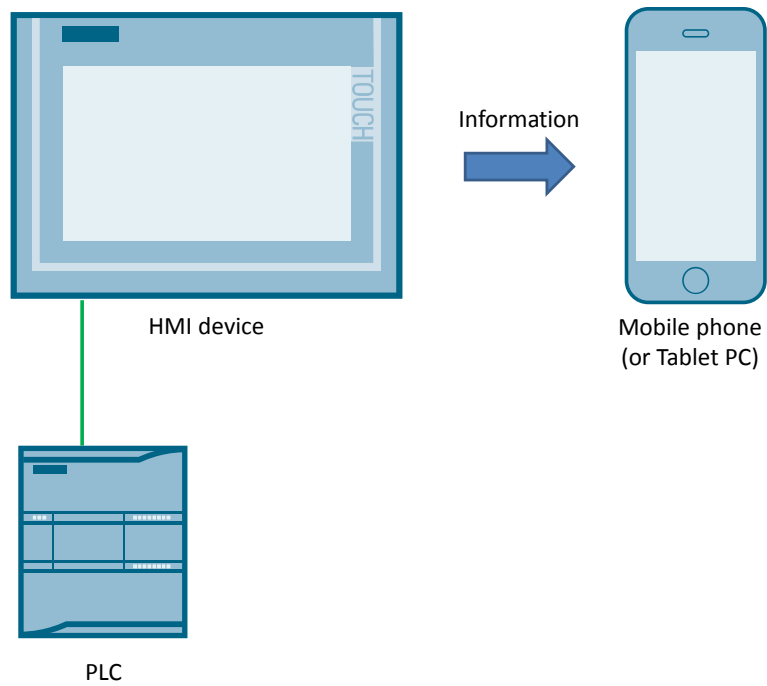
# 2 Solution

## 2.1 Overview

**Schematic layout**

The following figure gives a schematic overview of the most important components of the solution:

Figure 2-1



The comfort panel generates a QR code from the information to be transferred.

The QR code can be read and interpreted by the mobile phone or tablet PC.

**Advantages**

- Data can be directly transferred to a mobile phone, tablet PC or code reader from the comfort panel.
- There is no physical connection to different networks. Your information security is not influenced by this solution.
- You do not need a special device to interpret the QR code, almost every smartphone or every tablet PC can read and interpret QR codes.

**Delimitation**

This application does not contain a description of:

- Basic knowledge on smartphones or tablet PCs.

- Basics on Comfort Panels and their configuration with the TIA Portal.
- Basics on VB script for Comfort Panels.

Knowledge of these topics is assumed.

## 2.2 Hardware and software components

### 2.2.1 Validity

This application is valid for

- Comfort Panels
- WinCC Comfort V12.1

### 2.2.2 Components used

The application was set up with the following components:

**Hardware components**

Table 2-1

| Component | No. | Order number | Note |
|---|---|---|---|
| Comfort Panel | 1 | 6AV2124.. | |
| Cell phone | 1 | | With the option for reading and interpreting QR codes. |

**Software components**

Table 2-2

| Component | No. | Order number | Note |
|---|---|---|---|
| WinCC Comfort V12.1 | 1 | 6AV210.-....2-0 | |

**Sample files and projects**

The following list includes all files and projects that are used in this example.

Table 2-3

| Component | Note |
|---|---|
| QR_Code_Project.zip | Example project for the use of QR codes with Comfort Panels |
| QR_Code_Library.zip | Library with QR code generator scripts for own configurations. |

# 3 Basics

**Structure of the used QR codes**

Table 3-1

| QR code (color-coded) | Meaning |
|---|---|
|  | **Encoding type** <br> This QR code uses eight bit per character. This makes it possible to display the most of the ASCII characters. The encoding type is "0100" in binary format. The property cannot be changed. |
| | **Length** <br> Specifies the number of characters used in the QR code. This code always includes 17 characters. (If fewer characters are used, the script will add the missing characters.) |
| | **Data blocks** <br> The data blocks include the coded information. Each character is converted into a byte based on the ASCII table and coded into these blocks. |
| | **Error blocks** <br> The error blocks include the error number of the "Reed Solomon" algorithm. **Fehler! Verweisquelle konnte nicht gefunden werden.** |
| | **Formatting** <br> The formatting blocks include information on the structure of the QR code. This application uses a simple structure. <br> (Error Level: L <br> Mask Pattern: i%2 = 0 <br> Meaning: The black blocks change the value depending on even or odd number.) |

# 4 Mode of Operation

**Generating QR codes**

The Comfort Panel can generate QR codes dynamically due to the scripts included in the application example. Different scripts are available in the application example which display different application cases of the use of a QR code.

**Basic functionality of the script**

From the preset specifications or the specifications made by you, which will be discussed in more detail in chapter 5.3.2, Project library the script calculates the binary code of the tag to be displayed. In addition, other information is converted such as that which is used in the trouble shooting according to the "Reed Solomon" algorithm (**Fehler! Verweisquelle konnte nicht gefunden werden.**). The result of the script is displayed via the "visibility" property of the individual elements (squares) of the QR code.

**Transferred values**

The user has to transfer two values to the script. On one hand this is the name of the image in which the QR code is used and on the other hand, the tag name of the tag to be coded. This tag may contain up to 17 characters. Furthermore, a trigger has to be specified that starts the script.

**Library**

In addition to the example project a library has been added to this application example. By using it, the QR code can be directly integrated into your project and be adjusted to your requirements.

**Contents of the library**

The following elements are included in the library:

- 01_copy me to screen
  This element is a text box that includes a brief introduction of how you can use the elements of the ☐library. You can add this proceed according to the instructions given later in the document.

- 02_ QR Code 168x168
  This is the template of the QR code in the 168 * 168 pixel resolution. The resolution describes the complete size of the code, not the number of black squares. The structure of the QR code is described in chapter 3 Basics.

- 03_Input Panel
  Input Panel is the object, which forms the interface between user and script. In this example the object includes an I/O field, in which the text to be coded is entered and a button that starts the script.

- 04_Script
  This element is the script that converts the respective tag into the QR code. Further information on the script can be found at the start of this chapter.

- 05_Textoutput
  This is the HMI tag that is used in the script. If another tag is to be used for the QR code, the name has to be adjusted in the script.

- QR Code various resolutions
  This folder includes other various resolutions of the QR code which you can use depending on requirement.

# 5 Installation and Commissioning

## 5.1 Hardware installation

To commission the application example, you need a Comfort Panel that has to be connected to the supply voltage of 24 V. In addition, the Comfort Panel has to be integrated in a network with the PLC and your programming device.

| Note | The setup guidelines for Comfort Panels must always be followed. |
|------|------------------------------------------------------------------|

## 5.2 Software installation

To use this application example, at least SIMATIC WinCC Comfort V12.1 has to be installed on your programming device.
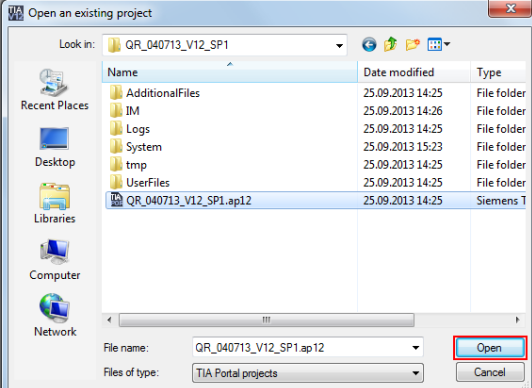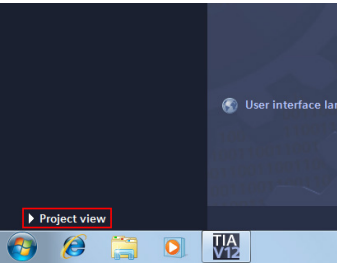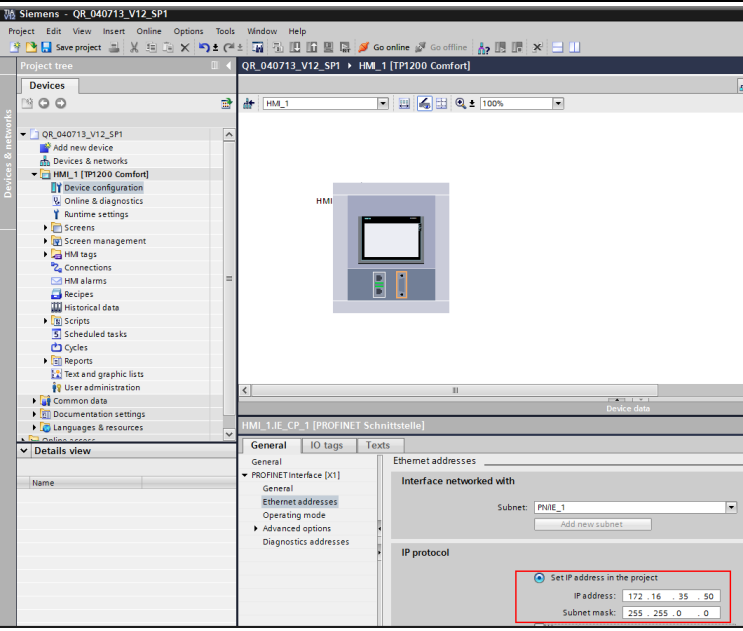
## 5.3 Commissioning

The present application example has two attached ZIP folders. Firstly, this is the example project which is to show you the general use of QR codes as well as some fields of their application. Secondly, there is a project library that you can integrate into your own project and with the help of which you can use the QR code according to your ideas.
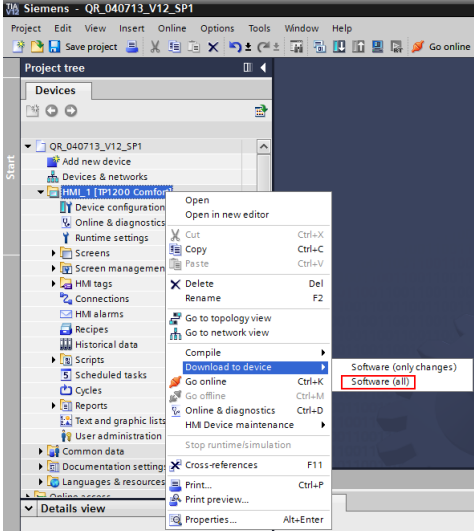
### 5.3.1 Example project

Table 5-1
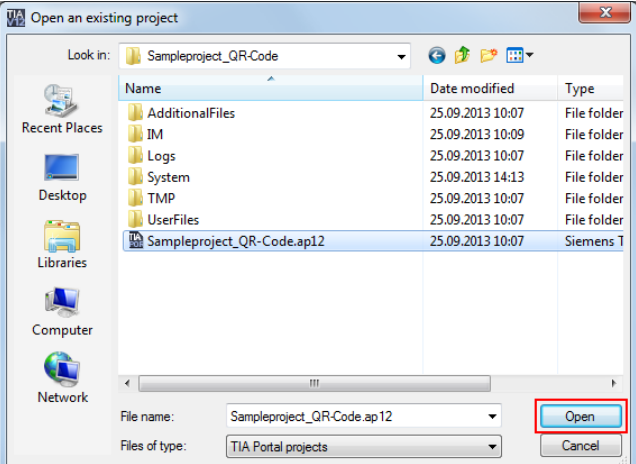
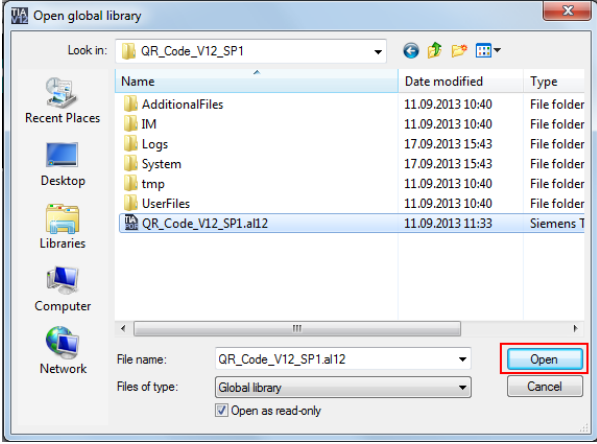| No. | Action | Comments |
|-----|--------|----------|
| 1. | Download the example project from the website specified at http://support.automation.siemens.com/WW/view/en/ EntryID. | |
| 2. | Unzip the project. | |

| No. | Action | Comments |
|---|---|---|
| 3. | Open the project in the TIA Portal V12.1 |  |
| 4. | Go to the project view. |  |
| 5. | Open the device configuration of the TP1200 Comfort and specify a unique IP address for the Comfort Panel.<br><br>**Note**<br><br>In the example project the Comfort Panel TP1200 is used. However, this application can be used for any Comfort Panel. If you would like to use a different Comfort Panel, you have to adjust the project to your panel. |  |

| No. | Action | Comments |
|---|---|---|
| 6. | Download the project onto your panel. |  |
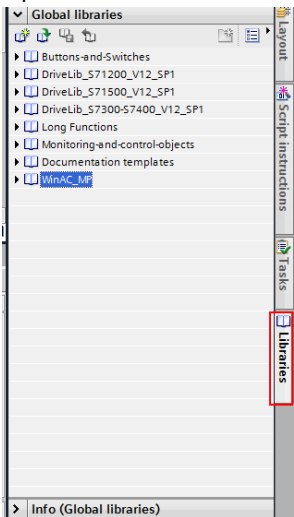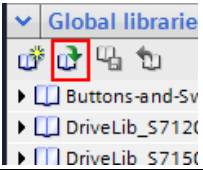
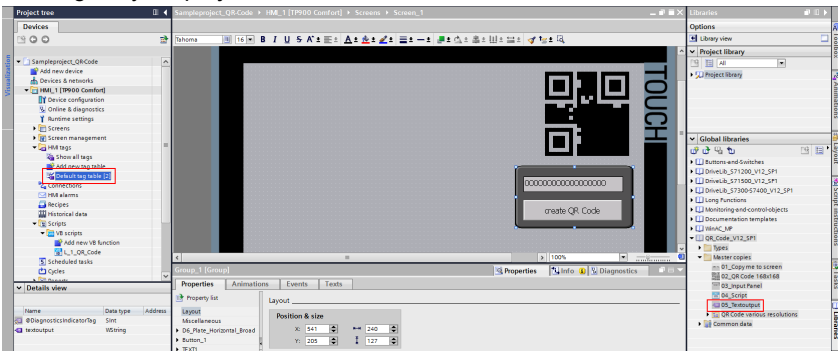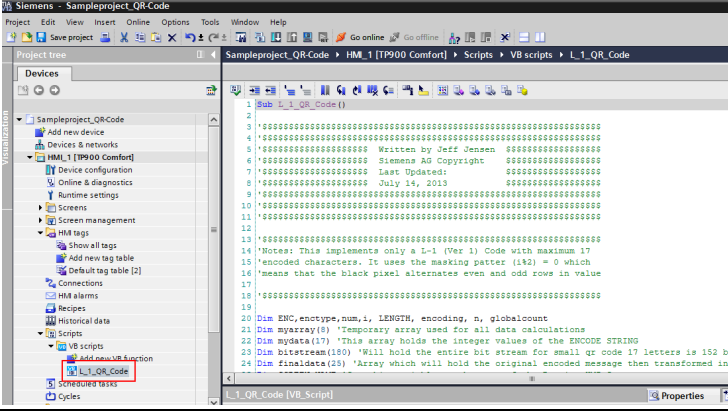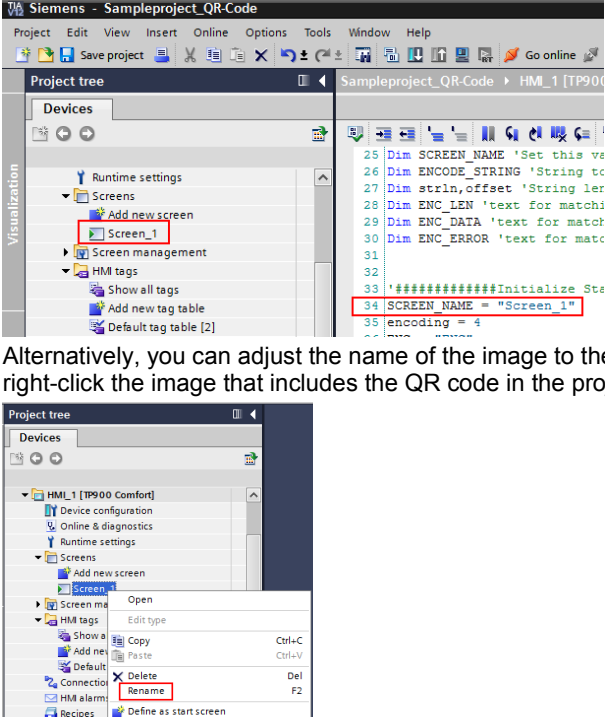### 5.3.2 Project library

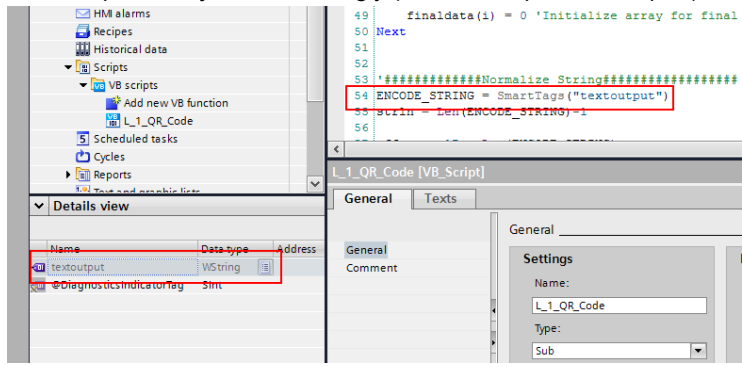| No. | Action |
|---|---|
| 1. | Download the library from the website specified at http://support.automation.siemens.com/WW/view/en/EntryID. |
| 2. | Unzip the library. |
| 3. | Open the project in the TIA Portal, in which you would like to integrate the functionality of the QR code and go to the project view.  |

| No. | Action |
|-----|--------|
| 4. | Open the "Libraries" tab on the right hand side of the TIA Portal.  |
| 5. | Click the icon to open the global library.  |
| 6. | Open the project library of the application example.  |

| No. | Action |
|---|---|
| 7. | Select the "02_QR Code 168x168" element under the master copies and drag it via drag & drop to the desired place on your image.<br><br><br><br>Please note: To ensure the functionality of the application example, only one QR code per image can be used. |
| 8. | Select the "03_Input Panel" element and drag it via drag & drop to the desired place on your image.<br><br> |
| 9. | Select the "04_Script" element and drag it via drag & drop into the "Scripts" → "VB scripts" folder of your project tree.<br><br> |

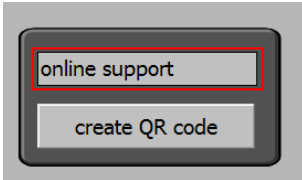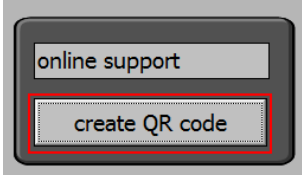| No. | Action |
|-----|--------|
| 10. | Select the "05_Textoutput" element and drag it via drag & drop to the default tag table of the HMI tags in your project tree.<br> |
| 11. | Open the "L_1_QR_Code" script<br> |
| 12. | Check the name of the image in which you have used the QR code in line 34 of the script and if required adjust it accordingly (in the example: "Screen_1")<br><br>Alternatively, you can adjust the name of the image to the name used in the script. To do this, right-click the image that includes the QR code in the project tree and select "Rename".<br> |

| No. | Action |
|---|---|
| 13. | Check the name of the tag which you would like to change to QR code in line 54 of the script and if required, adjust it accordingly (in the example: "textoutput").<br> |
| 14. | You can now download the project or test various configuration options. |

# 6 Operating the Application

## 6.1 QR code of the I/O field

Below, you find a description of how to create the QR code of a tag in Runtime which you enter via the I/O field.
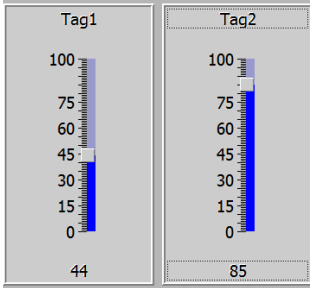
Table 6-1

| No. | Action | Comments |
|---|---|---|
| 1. | Enter the text to be coded in the I/O field via the screen keyboard of the Comfort Panel.<br><br>Please note that the tag cannot include more than 17 characters. |  |
| 2. | Acknowledge your entry with the enter button of the screen keyboard. |  |
| 3. | Start the execution of the "L_1_QR_Code" script by clicking the "create QR code" button. |  |
| 4. | The QR code is now displayed on your screen and can be scanned with a barcode scanner of your smartphone or tablet PC. |  |

## 6.2 QR code of the slide control

Below, you find a description of how to create the QR code of a tag in Runtime which can be set via the two slide controls.
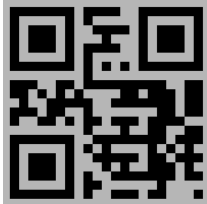
Table 6-2

| No. | Action | Comments |
|---|---|---|
| 1. | Set two values via the slide control on the right side of the screen. |  |

| No. | Action | Comments |
|-----|--------|----------|
| 2. | Start the execution of the "Tag_Values" script by clicking the "Get Tag Values" button | create QR code<br><br>Get Tag Values |
| 3. | The QR code is now displayed on your screen and can be scanned with a barcode scanner of your smartphone or tablet PC. | |

## 6.3 QR code of a MLFB

Below, you find a description of how you can create the QR code of a MLFB in Runtime.

Table 6-3

| No. | Action | Comments |
|-----|--------|----------|
| 1. | Start the execution of the "MLFB_Script" script by clicking "MLFB" | Get Tag Values<br><br>MLFB |
| 2. | The QR code of the MLFB is now displayed on your screen and can be scanned with a barcode scanner of your smartphone or tablet PC. | |

# 7 Related Literature

Table 7-1

| | Topic | Title |
|---|---|---|
| \1\ | Siemens Industry Online Support | http://support.automation.siemens.com |
| \2\ | Download page of the entry | http://support.automation.siemens.com/WW/view/en/51418740 |
| \3\ | Reed Solomon (Wikipedia) | http://en.wikipedia.org/wiki/Reed%E2%80%93Solomon_error_correction |

# 8 History

Table 8-1

| Version | Date | Modifications |
|---|---|---|
| V1.0 | 10/2013 | First version |