e!COCKPIT

WagoSolEAP

a2019006
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1 Notes about this Documentation

1.1 Copyright

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1.2 Symbols

- **DANGER**
  
  Personal Injury!
  Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

- **DANGER**
  
  Personal Injury Caused by Electric Current!
  Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

- **WARNING**
  
  Personal Injury!
  Indicates a moderate-risk, potentially hazardous situation which, if not avoided, could result in death or serious injury.

- **CAUTION**
  
  Personal Injury!
  Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

- **NOTICE**
  
  Damage to Property!
  Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.
**NOTICE**

Damage to Property Caused by Electrostatic Discharge (ESD)!
Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

---

**Note**

Important Note!
Indicates a potential malfunction which, if not avoided, however, will not result in damage to property.

---

**Information**

Additional Information:
Refers to additional information which is not an integral part of this documentation (e.g., the Internet).
1.3 Number Notation

Table 1: Number Notation

<table>
<thead>
<tr>
<th>Number Code</th>
<th>Example</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal</td>
<td>100</td>
<td>Normal notation</td>
</tr>
<tr>
<td>Hexadecimal</td>
<td>0x64</td>
<td>C notation</td>
</tr>
<tr>
<td>Binary</td>
<td>'100'</td>
<td>In quotation marks, nibble separated with dots(.)</td>
</tr>
<tr>
<td></td>
<td>'0110.0100'</td>
<td></td>
</tr>
</tbody>
</table>

1.4 Font Conventions

Table 2: Font Conventions

<table>
<thead>
<tr>
<th>Font Type</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>italic</em></td>
<td>Names of paths and data files are marked in italic-type. e.g.: <em>C:\Program Files\WAGO Software</em></td>
</tr>
<tr>
<td>Menu</td>
<td>Menu items are marked in bold letters. e.g.: <strong>Save</strong></td>
</tr>
<tr>
<td>&gt;</td>
<td>A greater-than sign between two names means the selection of a menu item from a menu. e.g.: File &gt; New</td>
</tr>
<tr>
<td>Input</td>
<td>Designation of input or optional fields are marked in bold letters. e.g.: <strong>Start of measurement range</strong></td>
</tr>
<tr>
<td>&quot;Value&quot;</td>
<td>Input or selective values are marked in inverted commas. e.g.: Enter the value &quot;4 mA&quot; under <strong>Start of measurement range</strong></td>
</tr>
<tr>
<td>[Button]</td>
<td>Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: [Input]</td>
</tr>
<tr>
<td>[Key]</td>
<td>Keys are marked with bold letters in square brackets. e.g.: [F5]</td>
</tr>
</tbody>
</table>
1.5 **Legal Bases**

1.5.1 **Subject to Changes**

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The use of the product described in this document is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the appropriate current standards.

Moreover, the persons cited here must also be familiar with all of the products cited in this document, along with the operating instructions. They must also be capable of correctly predicting any hazards which may not arise until the products are combined.

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The sample applications described in this documentation represent concepts, that is, technically feasible application. Whether these concepts can actually be implemented depends on various boundary conditions. For example, different versions of the hardware or software components can require different handling than that described here. Therefore, the descriptions contained in this documentation do not form the basis for assertion of a certain product characteristic.

Responsibility for safe use of a specific software or hardware configuration lies with the party that produces or operates the configuration. This also applies when one of the concepts described in this document was used for implementation of the configuration.

WAGO Kontakttechnik GmbH & Co. KG is not liable for any actual implementation of the concepts.
1.6 Revision History

Table 3: Revision History

<table>
<thead>
<tr>
<th>Version</th>
<th>Author</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0.0</td>
<td>u015652</td>
<td>Initial draft</td>
</tr>
</tbody>
</table>
1 Description

This application note describes the fundamental method of setting up communication between the WAGO-I/O-SYSTEM and the room control device from EAP. Furthermore, this application note describes how the functions of the operating buttons or the display can be configured using the visualization interface.

2 Components Used

2.1 Devices

Table 4: Devices

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Quantity</th>
<th>Name</th>
<th>Item No.</th>
<th>Version*</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAGO</td>
<td>1</td>
<td>Fieldbus Controller</td>
<td>750-8xxx</td>
<td>FW14</td>
</tr>
<tr>
<td>WAGO</td>
<td>1</td>
<td>RS-485 Serial Interface</td>
<td>750-652</td>
<td></td>
</tr>
<tr>
<td>WAGO</td>
<td>1</td>
<td>Bus End Module</td>
<td>750-600</td>
<td></td>
</tr>
<tr>
<td>WAGO</td>
<td>1</td>
<td>e!COCKPIT; workstation license</td>
<td>2759-101/1110-2002</td>
<td>V 1.5.0</td>
</tr>
<tr>
<td>WAGO</td>
<td>1-5</td>
<td>EAP RBG1 room control devices</td>
<td>2852-7601/000-001</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2852-7601/000-002</td>
<td></td>
</tr>
</tbody>
</table>

*This version was used when the instructions were created.

Optional components:

Table 5: Optional Components

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Qty.</th>
<th>Name</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAGO</td>
<td></td>
<td>USB communication cable</td>
<td>750-923</td>
</tr>
</tbody>
</table>

Note!

The node structure described is only one example of how communication with the multi-function room control devices can be realized. The module may be expanded as required by the respective application.
2.2 Setup

Figure 1: WAGO-I/O-SYSTEM/RBG1 Connection Diagram

Connect the serial interface (750-652) of the controller to the RS-485 inputs of the RBG1 room control devices. Connect connection points 2 and 3 (RTS-CTS) and 6 and 7 (TxD-RxD) of the serial module with jumper cables – see the black jumpers in figure 1.
The connection terminal of the RBG1 can be pulled out of the room control device to make the connection point markings visible. You can tap the 24-volt power supply of the RBG1 from the 24-volt power supply of the controller, for example – see figure 1.

The individual connections can be wired in series or in a wye configuration. The SW1 DIP switches can be used to set the slave address of the respective RBG1; each RBG1 must be assigned an individual address on the bus.

<table>
<thead>
<tr>
<th>Address</th>
<th>Dip1</th>
<th>Dip2</th>
<th>Dip3</th>
<th>Dip4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>15</td>
<td>15</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 2: Setting the RBG1 Slave Address

DIP switch SW2 can be used to interpose a bus terminating resistor; this must be activated on the last RBG1 of each line.

Figure 3: Interposing a Terminating Resistor

---

**Access options**
The connection terminal of the RBG1 can be pulled out of the room control device to make the connection point markings visible.

---

**Access options**
Depending on the fieldbus controller used, two options may be available. The first option is available for all types of fieldbus controllers. Connection to the fieldbus controller’s service interface is established via the USB communication cable (750-923). With ETHERNET fieldbus controllers, connection is also possible using the ETHERNET interface.
3 Sample Program

Note

Installation of Sample Projects for e!COCKPIT

![Sample Programs](image1.jpg)

Figure 1: e!COCKPIT Sample Projects

Sample programs can be called up from the e!COCKPIT Backstage view by clicking the Updates & Add-ons button in the navigation bar.

3.1 Task Definition

The WAGO-I/O-SYSTEM is to be used for readout of an EAP RBG1 room control device. The use of the provided WagoSolEAP library for this purpose is shown with the example program.

3.2 Programming

3.2.1 Master Function Block

The FbEAP_MasterRTU function block is used to establish a connection between the controller and room control devices. In terms of hardware, this connection is implemented using a serial interface module. The individual room control devices are addressed cyclically using the FbEAP_MasterRTU, and the data is passed to the individual FbRBG1 function blocks.
**Note**

**Function blocks**
The “FbEAP_MasterRTU” function block may only be called once per bus segment.

---

**Figure 4:** EAP Master RTU Function Block

The “bPortEAP” input is used for internal data exchange and must match the bPortEAP inputs of the FbRBG1 function blocks.
At the “I_Port” input of the block, specify the serial interface to which the room control devices are connected. This can be done using the input assistant (F2), for example.

Check the variable in the device structure:

![Device Structure View](image)

**Figure 5: Device Structure View**
3.2.2 RBG1 Function Block

One instance of the FbRBG1 function block is required for each room control device to be addressed.

![FB_RBG1](image)

The DIP switch Modbus® address of the desired slave is set at the "bSlaveAddress" input – "1" for Modbus® slave one.

The "bPortEAP" input must match the bPortEAP number you specified on the FbEAP_MasterRTU block. The data of the room control device to be addressed is exchanged via this number.

The input values, such as the current date and time, can be transferred to the device on the FbRBG1.

Among other things, the data read includes the current temperature, humidity set points and button settings.

---

**Note**

Input and output values

A description of the inputs and outputs of the FbRBG1 and FbEAP_MasterRTU function blocks is available in the block description.

Furthermore, you can find information in the application note on how to read the controller time and pass it to the room control devices.

As an example, the further processing of the button outputs with the dimming button and latching relay function blocks is shown in case you would then like to control a lamp or dimming relay, for instance.
3.3 Visualization Interface

The **RBG1** visualization shows how the output values of the room control device can be displayed, for example. The current states of the individual buttons and the various set points and actual values are output on the graphical user interface of this visualization.

![Example Visualization](image)

*Figure 7: Example Visualization*
3.3.1 User-Specific Configuration of the RBG1

The configuration of the RBG1 is stored in the “typConfigParameters” structure variable and can be adjusted via the visualization. In the visualization, click the element you want to modify; a configuration dialog then opens in which you can make changes.

For example, in the display settings of the RBG1, you can determine which RGB1 symbols and values should be displayed:

![Display Settings](image)

Figure 8: Visualization Example
Visualization
The visualization is stored in the “10 Visualization templates” folder of the application note. The “template_RGB1” template is opened in the “Visualization” visualization. The configuration interface must be connected to the instance of FbRGB1 using a placeholder (see Properties and “Referenced Visualizations”).

4 Task System
The “POU” program is opened in the task configuration – see Figure 8. A short time should be selected for the interval, because the more quickly the program is opened, the better the sampling rate and reaction time of the individual RBG is.

![Configuration](image)

Figure 9: Task Configuration

The task priority and interval settings vary from application to application; please make your own deliberate assessment of these settings.
5 Practical Examples

As an example, four RBG1s can be wired to each other on a cable of length up to 100 m with J-Y(St)Y 4x2x0.6 cable. For larger distances and a larger number of RBG1s, the cable cross section must be increased accordingly. Please use twisted pair cables.

For short operating and reaction times of the room control devices, it is advisable not to exceed the following number of room control devices:

When 750-8xxx controllers are used, use of no more than eight room control devices per serial interface is recommended.

Please note that the number of RBG1s and their sampling rates can vary by project and application program.

For the “g_tMonoflop” variable, the amount of time that the RBG1 should remember a button press before discarding it can be set via the library parameter list. It may be necessary to increase this setting if many room control devices are operated on one serial interface, but this may make it harder to execute dimming functions with the RBG1.

Figure 10: Writing Monoflop Time
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