The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

⚠️

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

⚠️

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠️ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠️ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.
PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

BEFORE YOU BEGIN

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNGUARDED EQUIPMENT</td>
</tr>
<tr>
<td>• Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.</td>
</tr>
<tr>
<td>• Do not reach into machinery during operation.</td>
</tr>
</tbody>
</table>

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine and, therefore, can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, you should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.
NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

START-UP AND TEST

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check be made and that enough time is allowed to perform complete and satisfactory testing.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQUIPMENT OPERATION HAZARD</td>
</tr>
<tr>
<td>• Verify that all installation and set up procedures have been completed.</td>
</tr>
<tr>
<td>• Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.</td>
</tr>
<tr>
<td>• Remove tools, meters, and debris from equipment.</td>
</tr>
</tbody>
</table>

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

**Software testing must be done in both simulated and real environments.**

Verify that the completed system is free from all short circuits and temporary grounds that are not installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

• Remove tools, meters, and debris from equipment.
• Close the equipment enclosure door.
• Remove all temporary grounds from incoming power lines.
• Perform all start-up tests recommended by the manufacturer.
OPERATION AND ADJUSTMENTS

The following precautions are from the NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer’s instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer’s instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.
About the Book

At a Glance

Document Scope

This document describes an application example implementing the remote access to an SQL database using the SqlRemoteAccess library.

Validity Note

This document has been updated for the release of SoMachine V4.3.

The technical characteristics of the devices described in this document also appear online. To access this information online:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Go to the Schneider Electric home page <a href="http://www.schneider-electric.com">www.schneider-electric.com</a>.</td>
</tr>
</tbody>
</table>
| 2    | In the **Search** box type the reference of a product or the name of a product range.  
|      | - Do not include blank spaces in the reference or product range.  
|      | - To get information on grouping similar modules, use asterisks (*). |
| 3    | If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you.  
|      | If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you. |
| 4    | If more than one reference appears in the **Products** search results, click on the reference that interests you. |
| 5    | Depending on the size of your screen, you may need to scroll down to see the data sheet. |
| 6    | To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**. |

The characteristics that are presented in this manual should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the manual and online information, use the online information as your reference.
Product Related Information

⚠️ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.¹
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.


Before you attempt to provide a solution (machine or process) for a specific application using the POUs found in the library, you must consider, conduct and complete best practices. These practices include, but are not limited to, risk analysis, functional safety, component compatibility, testing and system validation as they relate to this library.

⚠️ WARNING

IMPROPER USE OF POUS

- Perform a safety-related analysis for the application and the devices installed.
- Ensure that the POUs are compatible with the devices in the system and have no unintended effects on the proper functioning of the system.
- Use appropriate parameters, especially limit values, and observe machine wear and stop behavior.
- Verify that the sensors and actuators are compatible with the selected POUs.
- Thoroughly test all functions during verification and commissioning in all operation modes.
- Provide independent methods for critical control functions (emergency stop, conditions for limit values being exceeded, etc.) according to a safety-related analysis, respective rules, and regulations.

Failure to follow these instructions can result in death, serious injury, or equipment damage.
Incomplete file transfers, such as data files, application files and/or firmware files, may have serious consequences for your machine or controller. If you remove power, or if there is a power outage or communication interruption during a file transfer, your machine may become inoperative, or your application may attempt to operate on a corrupted data file. If an interruption occurs, reattempt the transfer. Be sure to include in your risk analysis the impact of corrupted data files.

**WARNING**

**UNINTENDED EQUIPMENT OPERATION**

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

*Failure to follow these instructions can result in death, serious injury, or equipment damage.*

**WARNING**

**UNINTENDED EQUIPMENT OPERATION, DATA LOSS, OR FILE CORRUPTION**

- Do not interrupt an ongoing data transfer.
- If the transfer is interrupted for any reason, re-initiate the transfer.
- Do not place your machine into service until the file transfer has completed successfully, unless you have accounted for corrupted files in your risk analysis and have taken appropriate steps to prevent any potentially serious consequences due to unsuccessful file transfers.

*Failure to follow these instructions can result in death, serious injury, or equipment damage.*

### Related Documents

<table>
<thead>
<tr>
<th>Document title</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>SoMachine Programming Guide</td>
<td>EIO0000000067 (ENG);</td>
</tr>
<tr>
<td>SqlRemoteAccess Library Guide</td>
<td>EIO000002411 (ENG);</td>
</tr>
<tr>
<td>SQL Gateway User Guide</td>
<td>EIO000002204 (ENG);</td>
</tr>
</tbody>
</table>

You can download these technical publications and other technical information from our website at [http://www.schneider-electric.com/en/download](http://www.schneider-electric.com/en/download).

### Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in this manual, or that appear in or on the products themselves, are generally derived from the terms or definitions of international standards.
In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as safety, safety function, safe state, fault, fault reset, malfunction, failure, error, error message, dangerous, etc.

Among others, these standards include:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61131-2:2007</td>
<td>Programmable controllers, part 2: Equipment requirements and tests.</td>
</tr>
<tr>
<td>ISO 12100:2010</td>
<td>Safety of machinery - General principles for design - Risk assessment and risk reduction</td>
</tr>
<tr>
<td>EN 60204-1:2006</td>
<td>Safety of machinery - Electrical equipment of machines - Part 1: General requirements</td>
</tr>
<tr>
<td>EN 1088:2008</td>
<td>Safety of machinery - Interlocking devices associated with guards - Principles for design and selection</td>
</tr>
<tr>
<td>ISO 14119:2010</td>
<td>Safety of machinery - Interlocking devices associated with guards - Principles for design and selection</td>
</tr>
<tr>
<td>ISO 13850:2006</td>
<td>Safety of machinery - Emergency stop - Principles for design</td>
</tr>
<tr>
<td>2006/42/EC</td>
<td>Machinery Directive</td>
</tr>
<tr>
<td>2014/30/EU</td>
<td>Electromagnetic Compatibility Directive</td>
</tr>
<tr>
<td>2014/35/EU</td>
<td>Low Voltage Directive</td>
</tr>
</tbody>
</table>

In addition, terms used in the present document may tangentially be used as they are derived from other standards such as:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 60034 series</td>
<td>Rotating electrical machines</td>
</tr>
<tr>
<td>IEC 61800 series</td>
<td>Adjustable speed electrical power drive systems</td>
</tr>
<tr>
<td>IEC 61158 series</td>
<td>Digital data communications for measurement and control – Fieldbus for use in industrial control systems</td>
</tr>
</tbody>
</table>
Finally, the term *zone of operation* may be used in conjunction with the description of specific hazards, and is defined as it is for a *hazard zone* or *danger zone* in the *Machinery Directive (2006/42/EC)* and *ISO 12100:2010*.

**NOTE:** The aforementioned standards may or may not apply to the specific products cited in the present documentation. For more information concerning the individual standards applicable to the products described herein, see the characteristics tables for those product references.
Chapter 1
Example Description

Overview

Short Description
The project SqlRemoteAccessExample.project implements an application example which shows how to implement the remote access to an SQL database in a controller application using the SqlRemoteAccess library. The SQL database supported in this example is managed on a MySQL server and is accessed through the SQL Gateway.

System Requirements and Limitations
The application example has been created with the components listed in the table:

<table>
<thead>
<tr>
<th>Component</th>
<th>Type and Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software</td>
<td>- SoMachine V4.3&lt;br&gt;- Schneider Electric SQL Gateway V1.0.0.0&lt;br&gt;- MySQL server V5.7 (third-party software)</td>
</tr>
<tr>
<td>Controller</td>
<td>TM251MESE¹)</td>
</tr>
<tr>
<td>Additional devices</td>
<td>A PC with a running MySQL server and Schneider Electric SQL Gateway</td>
</tr>
<tr>
<td>Additional requirements</td>
<td>- The SQL Gateway is running on a PC and can be reached from the controller through the network&lt;br&gt;- The connection to the MySQL server and the access to the database are configured in the SQL Gateway console and they have been successfully tested.</td>
</tr>
</tbody>
</table>

¹) The concepts presented in the application example are, in principle, transferable to other controllers supporting the controller firmware released in conjunction with SoMachine V4.3.
Chapter 2
Project Information

Overview

This section provides information about the SoMachine project.

What Is in This Chapter?

This chapter contains the following sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Hardware Configuration</td>
<td>18</td>
</tr>
<tr>
<td>2.2</td>
<td>Application</td>
<td>19</td>
</tr>
<tr>
<td>2.3</td>
<td>Visualization</td>
<td>24</td>
</tr>
<tr>
<td>2.4</td>
<td>Running the Application Example</td>
<td>27</td>
</tr>
</tbody>
</table>
Section 2.1
Hardware Configuration

Overview of the Hardware Configuration

Overview

The project example implements one controller which is linked to the same network as the PC on which the SQL Gateway and the MySQL server are running.

**NOTE:** The MySQL server can be running on another PC on the condition that the SQL Gateway can communicate with the MySQL server wherever it is running.

The figure presents the layout of the network:

Controller

SQL Gateway: TCP/IP-Port: 3457
MySQL Server: TCP/IP-Port: 3306
Section 2.2
Application

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of the Application</td>
<td>20</td>
</tr>
<tr>
<td>Libraries</td>
<td>20</td>
</tr>
<tr>
<td>SQL Gateway</td>
<td>20</td>
</tr>
<tr>
<td>MySQL Server</td>
<td>21</td>
</tr>
<tr>
<td>Read and Modify Data from the Database</td>
<td>22</td>
</tr>
</tbody>
</table>
Overview of the Application

Overview

The described application example implements the remote access to an SQL database for reading and modifying the data of a specified table.

In addition, the application implements a visualization to monitor and control the database access.

Libraries

Overview

The following libraries have been added to the Library Manager of the application:

<table>
<thead>
<tr>
<th>Library</th>
<th>Company</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SqlRemoteAccess</td>
<td>Schneider Electric</td>
<td>Provides SQL (Structured Query Language) client function blocks that allow your controller to connect to an SQL database through an SQL Gateway in order to run SQL queries for reading and writing data.</td>
</tr>
<tr>
<td>Standard64</td>
<td>System</td>
<td>Provides several string functions for wide character strings (datatype: WSTRING).</td>
</tr>
<tr>
<td>SysTimeRtc</td>
<td>System</td>
<td>Provides the components to manage the real time clock (RTC) of the controller.</td>
</tr>
<tr>
<td>SysMem</td>
<td>System</td>
<td>Provides components to access the dynamic memory management of the runtime system.</td>
</tr>
</tbody>
</table>

The SqlRemoteAccess library provides parameters to configure the supported functions. You can access these parameters in the global parameter list (GPL) available in the Library Manager of the application.

In this application example, the parameters are used with their default values.

SQL Gateway

Overview

The Schneider Electric SQL Gateway is an additional software that builds the interface between the controller and the SQL database.

The SQL Gateway must be installed on a PC from which the controller and the MySQL server can be reached.
In the SQL Gateway console, the connection to the database must be configured. For each database connection, a unique connection name must be specified. This connection name must be defined in the controller application as it is in the SQL Gateway, and is transmitted in conjunction with the SQL query from the controller to the SQL Gateway. Based on this connection name the SQL Gateway forwards the query to the configured SQL database.

For the communication between the controller and the SQL Gateway the following parameter must be provided:

- IP address of the PC on which the SQL Gateway is running
- TCP port number on which the SQL Gateway is listening (3457 per default)
- Connection name of the database connection configured in the SQL Gateway

For further information about configuration of SQL Gateway, refer to the SQL Gateway User Guide (see page 11).

MySQL Server

Overview

For the application example, an SQL database and a corresponding schema are configured. The database is provided through the MySQL Server.

The name of the schema is sqlremoteaccess_example.

Further a table is created under the schema to provide an example of remote access from the controller application.

The name of the table is sqlexample.

Database Table

The initially created fields are listed in the table:

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Data type</th>
<th>Value example</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProductID</td>
<td>INT(11)</td>
<td>2</td>
</tr>
<tr>
<td>ProductionDate</td>
<td>DateTime</td>
<td>2017-01-17 14:06:09</td>
</tr>
<tr>
<td>Status</td>
<td>VarChar(29)</td>
<td>InProgress</td>
</tr>
<tr>
<td>Color</td>
<td>VarChar(15)</td>
<td>White</td>
</tr>
<tr>
<td>Weight</td>
<td>Double</td>
<td>1.5</td>
</tr>
</tbody>
</table>
View in the MySQL Workbench

![MySQL Workbench screenshot](image)

Read and Modify Data from the Database

Read Data from the Database

The program **SR_SqlRead** implements the program code for the read access to the database. The data exchange with the database is implemented using the function block **FB_SqlDbRead** from the SqlRemoteAccess library.

For control and monitoring the read access, the visualization screen **Visu_SqlRead** is provided in the project example.

In this application example, two preformed SQL queries are created and can be selected by the associated buttons on the visualization. The concatenation of the selected SQL query is implemented in the Action (**A_QuerySelect1** or **A_QuerySelect2**) under the program **SR_SqlRead**.

Modify Data on the Database

The program **SR_SqlWrite** implements the program code for the modification of data on the database. The data exchange with the database is implemented using the function block **FB_SqlDbWrite** from the SqlRemoteAccess library.

For control and monitoring the write access, the visualization screen **Visu_SqlWrite** is provided in the project example.
In this application example, three preformed SQL queries are created and can be selected by the associated buttons on the visualization. The concatenation of the selected SQL query is implemented in the Action (\texttt{A\_QueryInsert}, \texttt{A\_QueryUpdate}, or \texttt{A\_QueryDelete}) under the program \texttt{SR\_SqlWrite}.

**Handle Product Data**

The program \texttt{SR\_ProductData} is intended to process the data exchanged with the database. In this application example, this program implements the reading and conversion of the controllers real time clock.

**Program Code SR\_Visu**

The program \texttt{SR\_Visu} implements additional functions to control the visualization output.
Section 2.3 Visualization

Visualization Screens

Overview
For each implemented communication function, a dedicated visualization screen is available. The visualization VisuStart contains a tab group that allows you to switch between the visualization screens.

Visu_SqlSettings
VisuStart → Settings

![Database settings screenshot]

- Database to be accessed
  - Name of the schema: sqlobjectaccess_example
  - Name of the table: sqlexample

- SQL Gateway connection parameter
  - IP address: 10.128.154.38
  - Port number: 3457
  - Connection name: DBConnection
  - Connection timeout: 5s
Visu_SqlRead

VisuStart → Read access

Array of read data

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>DT#2017-01-17-14:06:09</td>
<td>Done</td>
<td>White</td>
<td>1.5</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>DT#2017-01-09-00:00:00</td>
<td>InProgress</td>
<td>Green</td>
<td>1.8</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>DT#2017-01-17-15:59:28</td>
<td>Done</td>
<td>White</td>
<td>3.5</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>DT#2017-01-17-13:45:20</td>
<td>InProgress</td>
<td>White</td>
<td>1.5</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>DT#2017-01-09-00:00:00</td>
<td>Done</td>
<td>White</td>
<td>2.8</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>DT#2017-01-17-14:05:53</td>
<td>InProgress</td>
<td>White</td>
<td>1.5</td>
</tr>
</tbody>
</table>

SQL database request

1. SELECT *
2. FROM sqiremoteaccess_example.sqlexample
3. LIMIT 20

Execute Query

Result of the SQL database access

etResult: Ok
sResultMsg:  

Clear result
**Visu_SqlWrite**

**VisuStart → Write access**

![SQL database request](image)

```sql
1 INSERT INTO sqlremoteaccess_example.sqlexample
2 (ProductId,ProductionDate,Status,Color,Weight)
3 VALUES('1',2017-01-18-11:12:31','InProgress','White',1.5)
```

**Result of the SQL database access**

- **etResult:** Ok
- **sResultMsg:** 

---

**Project Information**

26 EIO0000002557 06/2017
Section 2.4
Running the Application Example

What Is in This Section?
This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
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<td>28</td>
</tr>
<tr>
<td>Downloading the Application</td>
<td>28</td>
</tr>
<tr>
<td>Operating the Application</td>
<td>29</td>
</tr>
</tbody>
</table>
Preconditions for Running the Application Example

Overview
To run the application example, the following preconditions must be fulfilled:
- The application is downloaded and is running on the associated controller
- A PC with the running MySQL Server and SQL Gateway is reachable from the controller via the Ethernet network
- A working connection to an SQL database is configured on the SQL Gateway

Downloading the Application

Overview
To set the communication parameter of the controller, and to download the applications, perform these steps:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connect your PC to the controller via Ethernet.</td>
<td>The controller and the PC must be connected to the same Ethernet network.</td>
</tr>
<tr>
<td>2</td>
<td>Open the project example in SoMachine and open the Logic Builder.</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>Double-click the MyController node in the Devices tree.</td>
<td>A network scan is performed automatically. Available controllers are provided in the Controller selection view of the device editor.</td>
</tr>
<tr>
<td>4</td>
<td>Select the target controller from the list.</td>
<td>–</td>
</tr>
<tr>
<td>5</td>
<td>Right-click the controller entry and execute the command Process communication settings... from the contextual menu.</td>
<td>–</td>
</tr>
<tr>
<td>6</td>
<td>Enter the Communication parameter.</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>Activate the option Save settings permanently and click the OK button.</td>
<td>Result: The communication parameters are stored on the controller. They are retained even if it is restarted. These parameters override the application settings.</td>
</tr>
<tr>
<td>8</td>
<td>Execute the Multiple Download... command from the Online menu.</td>
<td>–</td>
</tr>
<tr>
<td>9</td>
<td>In the Multiple Download dialog box, select the application, and click the OK button.</td>
<td>Result: The application is downloaded to the previously selected controller.</td>
</tr>
</tbody>
</table>

For more information on downloading an application and the communication settings, refer to the SoMachine Programming Guide (see SoMachine, Programming Guide).
Operating the Application

Visualization

The application examples implement a visualization for monitoring and control purposes. This section provides a brief description of each function. In addition, refer to the visualization screen (see page 24).

Settings

The visualization Visu_Start → Settings consists of two sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database to be accessed</td>
<td>Enter the name of the schema and the name of the table to access the database. These parameters are concatenated into the SQL query in the application program.</td>
</tr>
<tr>
<td>SQL Gateway connection parameter</td>
<td>The connection parameter for the SQL Gateway consists of the IP address of the PC where the SQL Gateway is running and the port the gateway is listening. Further you have to enter the connection name which is specified for the connection between the SQL Gateway and the SQL database.</td>
</tr>
</tbody>
</table>

Enter the parameter according to your system configuration.

Read Access

On the visualization screen Visu_Start → Read access, three lines are provided to enter the SQL query. Optionally a preformed query can be loaded by clicking the respective button.

By clicking Execute Query, the instance of FB_SqlDbRead is triggered and the entered SQL query is sent to the specified database connection.

Write Access

On the visualization screen Visu_Start → Write access, three lines are provided to enter the SQL query. Optionally a preformed query can be loaded by clicking the respective button.

By clicking Execute Query, the instance of the FB_SqlDbWrite is triggered and the entered SQL query is sent to the specified database connection.
A

application
A program including configuration data, symbols, and documentation.

C

configuration
The arrangement and interconnection of hardware components within a system and the hardware and software parameters that determine the operating characteristics of the system.

controller
Automates industrial processes (also known as programmable logic controller or programmable controller).

E

Ethernet
A physical and data link layer technology for LANs, also known as IEE 802.3.
Ethernet is the most widely spread technology for local networks. Each PacDrive controller has an Ethernet port. The Ethernet standard defines layer 1 and 2 of the communication. Above the Ethernet, there are many different network protocols but only IP is used.

expansion bus
An electronic communication bus between expansion I/O modules and a controller.

I

I/O
(input/output)

P

program
The component of an application that consists of compiled source code capable of being installed in the memory of a logic controller.
Glossary

R

RTC
(real-time clock) A battery-backed time-of-day and calendar clock that operates continuously, even when the controller is not powered for the life of the battery.

S

SQL
SQL (Structured Query Language) is a programming language for managing data stored in relational database management systems.

SQL Gateway Console
The SQL Gateway Console is the graphical user interface of the SQL Gateway.
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