

HAMPEL SOFTWARE ENGINEERING

S7NetCom

HAMPEL SOFTWARE ENGINEERING

Version 1.0.1 (2021-06-21)

TABLE OF CONTENTS

1. Project Description	2
2. State Machines	3
3. Calling Dependency Diagrams	4
3.1. Overview	4
3.2. Callers	4
3.3. Listeners	4
Appendix A: DQMH	5
Appendix B: Libraries	6
Appendix C: Classes	7
C.1. Classes overview	7
C.2. S7NetCom.lvclass	9
Glossary	16



Document generated automatically!

This document was created fully automated from the actual LabVIEW Source Code of this project using the [Release Automation Tools](#) of [Hampel Software Engineering](#).

The Release Automation Tools (RAT) help automate the validating, testing, documenting, building, packaging and publishing of your projects. Built-in support for Git lets you trigger our tools from your repository, via GitLab CI/CD or Azure DevOps amongst others.

For a more detailed overview of what these tools do, see <https://rat.hampel-soft.com/>, where you can find information on the available tools, how we automate them using GitLab CI, when the next scheduled webinars are on, and how you can run those tools on your own servers using a commercial license for RAT.

1. PROJECT DESCRIPTION

An open-source LabVIEW implementation of the S7 PLC network protocol using pure TCP/IP primitives.

2. STATE MACHINES

—no elements found—

3. CALLING DEPENDENCY DIAGRAMS

3.1. OVERVIEW

☒—☒no elements found☒—☒

3.2. CALLERS

☒—☒no elements found☒—☒

3.3. LISTENERS

☒—☒no elements found☒—☒

APPENDIX A: DQMH

DQMH modules documentation

APPENDIX B: LIBRARIES

Misc. reuse libraries

APPENDIX C: CLASSES

LabVIEW Classes

C.1. CLASSES OVERVIEW

This project contains 0 classe and 0 interface.

Table 1. Classes list

Classes	Interfaces
---------	------------

C S7NetCom

- ☐ IP Address : String
 - ☐ Port : U16
 - ☐ Slot No. : U8
 - ☐ Rack No. : U8
 - ☐ Timeout : I32
 - ☐ TCP Ref : TCPNetConnection
 - ☐ Connection Status : Enum {}
 - ☐ Sequence No. : U16
 - ☐ PDU Size (Bytes) : U16
-
- ☒ [Get Connection Status\(\)](#)
 - ☒ [Set Connection Status\(\)](#)
 - ☒ [Get IP Address\(\)](#)
 - ☒ [Get PDU Size \(Bytes\)\(\)](#)
 - ☒ [Get Rack Number\(\)](#)
 - ☒ [Get Slot Number\(\)](#)
 - ☒ [Get Sequence Number\(\)](#)
 - ☒ [Set Sequence Number\(\)](#)
 - ☒ [Close Connection\(\)](#)
 - ☒ [Create Object\(\)](#)
 - ☒ [Open Connection\(\)](#)
 - ☒ [COTP - Add Header\(\)](#)
 - ☒ [COTP - Build Connection Request Packet\(\)](#)
 - ☒ [COTP - Called TSAP Parameter--constant\(\)](#)
 - ☒ [COTP - Called TSAP Parameter\(\)](#)
 - ☒ [COTP - Calling TSAP Parameter--constant\(\)](#)
 - ☒ [COTP - Header for Connection Request--constant\(\)](#)
 - ☒ [COTP - Header for Data Transfer--constant\(\)](#)
 - ☒ [COTP - Response Header Mismatch--error\(\)](#)
 - ☒ [COTP - TPDU Size Parameter--constant\(\)](#)
 - ☒ [COTP - Validate Response Header\(\)](#)
 - ☒ [S7COMM - Add JOB Header to Params and Data\(\)](#)
 - ☒ [S7COMM - Build Data Array\(\)](#)
 - ☒ [S7COMM - Build Params - any-type Addressing\(\)](#)
 - ☒ [S7COMM - Create JOB Message Header\(\)](#)
 - ☒ [S7COMM - DTL to Timestamp\(\)](#)
 - ☒ [S7COMM - Evaluate Message Type\(\)](#)
 - ☒ [S7COMM - Evaluate Protocol Header\(\)](#)
 - ☒ [S7COMM - Evaluate Response Error Code\(\)](#)
 - ☒ [S7COMM - Evaluate Response Item Return Code\(\)](#)
 - ☒ [S7COMM - Evaluate Sequence Number\(\)](#)
 - ☒ [S7COMM - Evaluate Setup Communication Response\(\)](#)
 - ☒ [S7COMM - Get Size Factor from Transport Data Type\(\)](#)
 - ☒ [S7COMM - Header - Protocol ID--constant\(\)](#)
 - ☒ [S7COMM - Memory Area Values\(\)](#)
 - ☒ [S7COMM - Parse Response - Decode Data Item\(\)](#)
 - ☒ [S7COMM - Parse Response - Evaluate Header\(\)](#)
 - ☒ [S7COMM - Parse Response - Evaluate Params\(\)](#)
 - ☒ [S7COMM - Parse Response\(\)](#)
 - ☒ [S7COMM - Response Error Code-error\(\)](#)
 - ☒ [S7COMM - Response Item Return Code-error\(\)](#)
 - ☒ [S7COMM - Response Message Type Mismatch-error\(\)](#)
 - ☒ [S7COMM - Response Protocol Header Mismatch-error\(\)](#)
 - ☒ [S7COMM - Response Sequence Number Mismatch-error\(\)](#)
 - ☒ [S7COMM - Set PDU Size\(\)](#)
 - ☒ [S7COMM - Setup Communication Parameters--constant\(\)](#)
 - ☒ [S7COMM - Setup Communication\(\)](#)
 - ☒ [S7COMM - Siemens Date & Time to Timestamp\(\)](#)
 - ☒ [S7COMM - Timestamp to DTL\(\)](#)
 - ☒ [S7COMM - Timestamp to Siemens Date & Time\(\)](#)
 - ☒ [TCP - Close Connection\(\)](#)
 - ☒ [TCP - Open Connection\(\)](#)
 - ☒ [TPKT - Add Header\(\)](#)
 - ☒ [TPKT - Decode Header\(\)](#)
 - ☒ [TPKT - Get TDPU Length\(\)](#)
 - ☒ [TPKT - Header Bytes 1 and 2--constant\(\)](#)
 - ☒ [TPKT - Response Header Mismatch--error\(\)](#)
 - ☒ [TPKT - Validate Header Bytes\(\)](#)
 - ☒ [Connection - COPT Connection Request\(\)](#)

C.2. S7NETCOM.LVCLASS

Responsibility: An open-source communication driver for talking to Siemens S7 PLCs via TCP/IP; implemented in plain LabVIEW TCP/IP primitives.

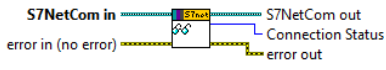

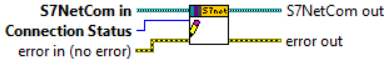



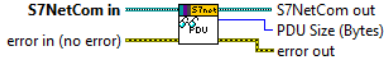






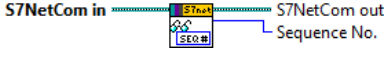



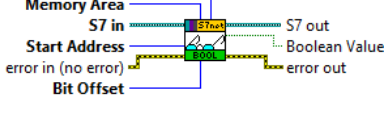

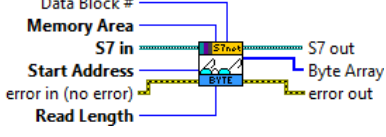

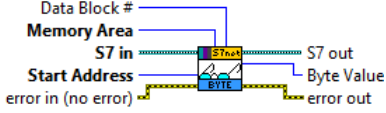

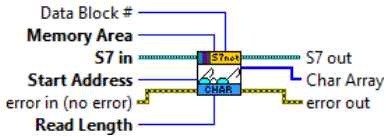

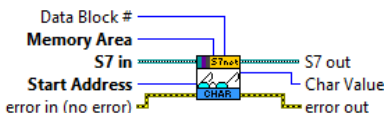

Copyright (c) 2019 Hampel Software Engineering (HSE), released under MIT license. More info can be found on <https://dokuwiki.hampel-soft.com/code/hse/s7com>. Original code published by MarcoPolo5 on the NI Code Exchange forum.

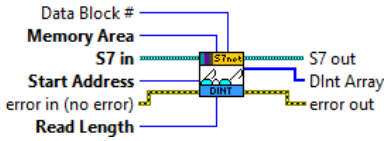

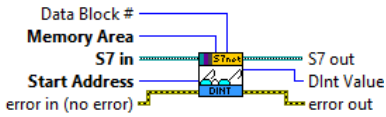

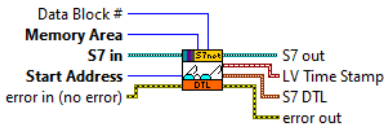

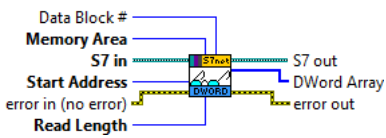

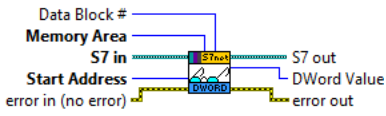

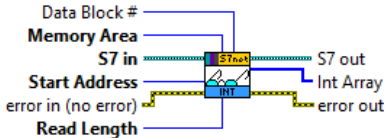

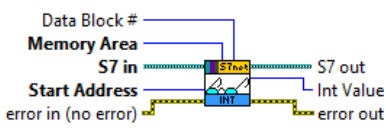


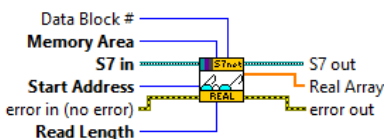

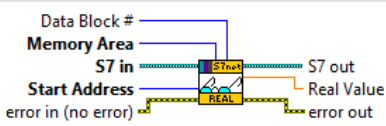
Version: 1.0.0.6



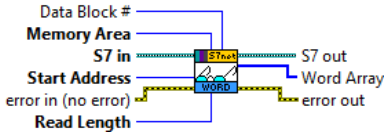



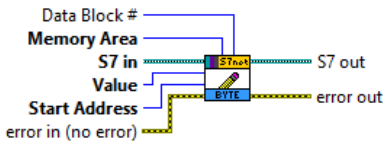

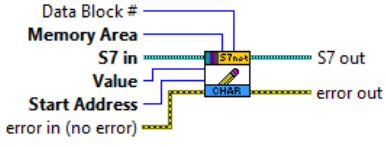

C S7NetCom

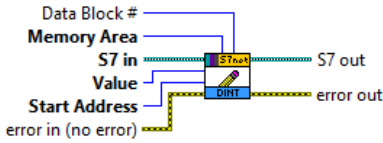

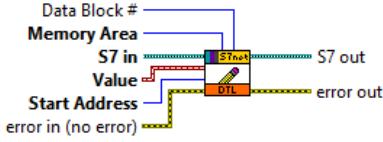

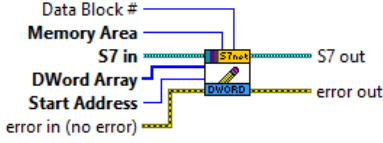

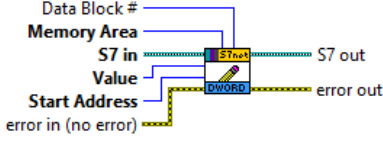

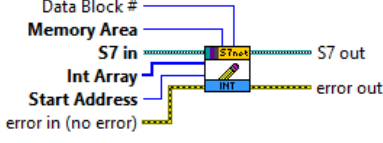

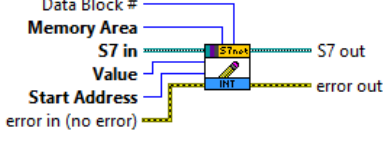

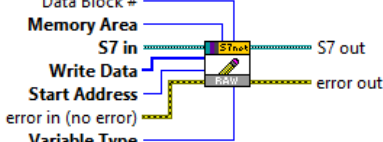

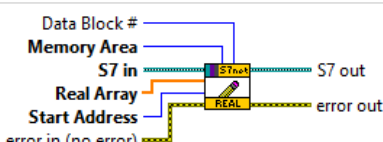

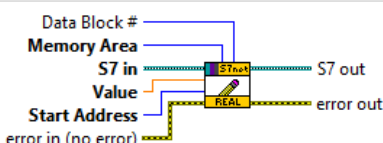

- ☐ IP Address : String
 - ☐ Port : U16
 - ☐ Slot No. : U8
 - ☐ Rack No. : U8
 - ☐ Timeout : I32
 - ☐ TCP Ref : TCPNetConnection
 - ☐ Connection Status : Enum {}
 - ☐ Sequence No. : U16
 - ☐ PDU Size (Bytes) : U16
-
- ☒ [Get Connection Status\(\)](#)
 - ☒ [Set Connection Status\(\)](#)
 - ☒ [Get IP Address\(\)](#)
 - ☒ [Get PDU Size \(Bytes\)\(\)](#)
 - ☒ [Get Rack Number\(\)](#)
 - ☒ [Get Slot Number\(\)](#)
 - ☒ [Get Sequence Number\(\)](#)
 - ☒ [Set Sequence Number\(\)](#)
 - ☒ [Close Connection\(\)](#)
 - ☒ [Create Object\(\)](#)
 - ☒ [Open Connection\(\)](#)
 - ☒ [COTP - Add Header\(\)](#)
 - ☒ [COTP - Build Connection Request Packet\(\)](#)
 - ☒ [COTP - Called TSAP Parameter--constant\(\)](#)
 - ☒ [COTP - Called TSAP Parameter\(\)](#)
 - ☒ [COTP - Calling TSAP Parameter--constant\(\)](#)
 - ☒ [COTP - Header for Connection Request--constant\(\)](#)
 - ☒ [COTP - Header for Data Transfer--constant\(\)](#)
 - ☒ [COTP - Response Header Mismatch--error\(\)](#)
 - ☒ [COTP - TPDU Size Parameter--constant\(\)](#)
 - ☒ [COTP - Validate Response Header\(\)](#)
 - ☒ [S7COMM - Add JOB Header to Params and Data\(\)](#)
 - ☒ [S7COMM - Build Data Array\(\)](#)
 - ☒ [S7COMM - Build Params - any-type Addressing\(\)](#)
 - ☒ [S7COMM - Create JOB Message Header\(\)](#)
 - ☒ [S7COMM - DTL to Timestamp\(\)](#)
 - ☒ [S7COMM - Evaluate Message Type\(\)](#)
 - ☒ [S7COMM - Evaluate Protocol Header\(\)](#)
 - ☒ [S7COMM - Evaluate Response Error Code\(\)](#)
 - ☒ [S7COMM - Evaluate Response Item Return Code\(\)](#)
 - ☒ [S7COMM - Evaluate Sequence Number\(\)](#)
 - ☒ [S7COMM - Evaluate Setup Communication Response\(\)](#)
 - ☒ [S7COMM - Get Size Factor from Transport Data Type\(\)](#)
 - ☒ [S7COMM - Header - Protocol ID--constant\(\)](#)
 - ☒ [S7COMM - Memory Area Values\(\)](#)
 - ☒ [S7COMM - Parse Response - Decode Data Item\(\)](#)
 - ☒ [S7COMM - Parse Response - Evaluate Header\(\)](#)
 - ☒ [S7COMM - Parse Response - Evaluate Params\(\)](#)
 - ☒ [S7COMM - Parse Response\(\)](#)
 - ☒ [S7COMM - Response Error Code-error\(\)](#)
 - ☒ [S7COMM - Response Item Return Code-error\(\)](#)
 - ☒ [S7COMM - Response Message Type Mismatch-error\(\)](#)
 - ☒ [S7COMM - Response Protocol Header Mismatch-error\(\)](#)
 - ☒ [S7COMM - Response Sequence Number Mismatch-error\(\)](#)
 - ☒ [S7COMM - Set PDU Size\(\)](#)
 - ☒ [S7COMM - Setup Communication Parameters--constant\(\)](#)
 - ☒ [S7COMM - Setup Communication\(\)](#)
 - ☒ [S7COMM - Siemens Date & Time to Timestamp\(\)](#)
 - ☒ [S7COMM - Timestamp to DTL\(\)](#)
 - ☒ [S7COMM - Timestamp to Siemens Date & Time\(\)](#)
 - ☒ [TCP - Close Connection\(\)](#)
 - ☒ [TCP - Open Connection\(\)](#)
 - ☒ [TPKT - Add Header\(\)](#)
 - ☒ [TPKT - Decode Header\(\)](#)
 - ☒ [TPKT - Get TDPU Length\(\)](#)
 - ☒ [TPKT - Header Bytes 1 and 2--constant\(\)](#)
 - ☒ [TPKT - Response Header Mismatch--error\(\)](#)
 - ☒ [TPKT - Validate Header Bytes\(\)](#)
 - ☒ [Connection - COPT Connection Request\(\)](#)


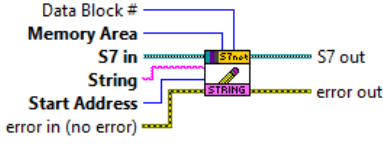

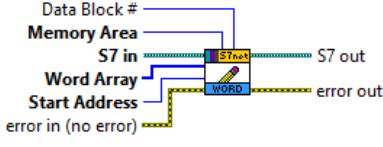

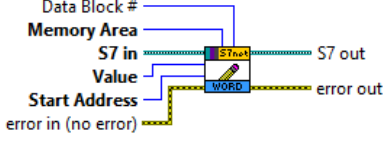



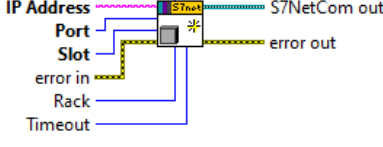



Table 2. Functions (non private scope only)

Name	Connector pane	Description	S.	R.	I.
Get Connection Status					
Set Connection Status					
Get IP Address					
Get PDU Size (Bytes)		No description found (add content in vi description)			
Get Rack Number					
Get Slot Number					
Get Sequence Number		Get TPKT sequence number.			
Set Sequence Number		Set TPKT sequence number.			
Read Data - Boolean (Scalar)		Reads a single (scalar) BOOLEAN value from the PLC.			
Read Data - Byte (Array)		Reads an array of BYTES [U8] from the PLC.			
Read Data - Byte (Scalar)		Reads a BYTE (U8) value from the PLC.			
Read Data - Char (Array)		Reads an array of CHARs [I8] from the PLC.			
Read Data - Char (Scalar)		Reads a CHAR (I8) value from the PLC.			



Name	Connector pane	Description	S.	R.	I.
Read Data - Dint (Array)		Reads an array of DINTs [I32] from the PLC.			
Read Data - Dint (Scalar)		Reads a DINT (I32) value from the PLC.			
Read Data - DTL (Scalar)		Reads a single DTL value from the PLC.			
Read Data - DWord (Array)		Reads an array of DWORDs [U32] from the PLC.			
Read Data - DWord (Scalar)		Reads a DWORD (U32) value from the PLC.			
Read Data - Int (Array)		Reads an array of INTs [I16] from the PLC.			
Read Data - Int (Scalar)		Reads a INT (I16) value from the PLC.			
Read Data - Raw		Reads raw Bytes (array of U8) from the PLC.			
Read Data - Real (Array)		Reads an array of Reals [SGL] from the PLC.			
Read Data - Real (Scalar)		Reads a single Real value from the PLC.			

Name	Connector pane	Description	S.	R.	I.
Read Data - Siemens Date&Time (Scalar)	[S7NetCom.lvclass:Read Data - Siemens Date&Time (Scalar).vi]	Reads a single Siemens Date&Time value from the PLC.			
Read Data - String	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, Start Address, error in (no error). Outputs: S7 out, String Value, error out. The connector is labeled 'STRING'.</p>	Reads a String value from the PLC.			
Read Data - Word (Array)	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, Start Address, error in (no error), Read Length. Outputs: S7 out, Word Array, error out. The connector is labeled 'WORD'.</p>	Reads an array of WORDs [U16] from the PLC.			
Read Data - Word (Scalar)	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, Start Address, error in (no error). Outputs: S7 out, Word Value, error out. The connector is labeled 'WORD'.</p>	Reads a WORD (U16) value from the PLC.			
Write Data - Boolean (Scalar)	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, Value, Start Address, error in (no error), Bit Offset. Outputs: S7 out, error out. The connector is labeled 'BOOLEAN'.</p>	Writes a single BOOLEAN value to the PLC.			
Write Data - Byte (Array)	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, Byte Array, Start Address, error in (no error). Outputs: S7 out, error out. The connector is labeled 'BYTE'.</p>	Writes an array of BYTEs [U8] to the PLC.			
Write Data - Byte (Scalar)	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, Value, Start Address, error in (no error). Outputs: S7 out, error out. The connector is labeled 'BYTE'.</p>	Writes a single BYTE (U8) value to the PLC.			
Write Data - Char (Array)	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, Char Array, Start Address, error in (no error). Outputs: S7 out, error out. The connector is labeled 'CHAR'.</p>	Writes an array of CHARs [I8] value to the PLC.			
Write Data - Char (Scalar)	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, Value, Start Address, error in (no error). Outputs: S7 out, error out. The connector is labeled 'CHAR'.</p>	Writes a single CHAR (I8) value to the PLC.			
Write Data - DInt (Array)	 <p>Diagram showing inputs: Data Block #, Memory Area, S7 in, DInt Array, Start Address, error in (no error). Outputs: S7 out, error out. The connector is labeled 'DINT'.</p>	Writes an array of DINTs [I32] to the PLC.			

Name	Connector pane	Description	S.	R.	I.
Write Data - DInt (Scalar)		Writes a single DINT (I32) value to the PLC.			
Write Data - DTL (Scalar)		Writes a single DTL value to the PLC.			
Write Data - DWord (Array)		Writes an array of DWORDs [U32] to the PLC.			
Write Data - DWord (Scalar)		Writes a single DWORD (U32) value to the PLC.			
Write Data - Int (Array)		Writes an array of INTs [I16] to the PLC.			
Write Data - Int (Scalar)		Writes a single INT (I16) value to the PLC.			
Write Data - Raw		Writes raw Bytes (array of U8) to the PLC.			
Write Data - Real (Array)		Writes an array of REALs [SGL] to the PLC.			
Write Data - Real (Scalar)		Writes a single (scalar) REAL value to the PLC.			

Name	Connector pane	Description	S.	R.	I.
Write Data - Siemens Date & Time (Scalar)	[S7NetCom.lvclass:Write Data - Siemens Date & Time (Scalar).vi]	Writes a single Siemens Date&Time value to the PLC.			
Write Data - String		Writes String value to the PLC.			
Write Data - Word (Array)		Writes an array of WORDs [U16] to the PLC.			
Write Data - Word (Scalar)		Writes a single WORD (U16) value to the PLC.			
Close Connection		Closes the network connection to the PLC.			
Create Object		Creates the S7NetCom object, setting the connection parameters IP Address, Port, Timeout and Slot.			
Open Connection		Opens the network connection to the PLC, using the connection parameters passed to Create Object.vi.			

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

GLOSSARY

The rat-documentr tool facilitates the following LabVIEW-related tools and libraries:

- Antidoc by Wovalab
- AsciiDoc Toolkit by Wovalab
- Graph Builder by C. Gambini
- Classy by T. Boyé
- DQMH® by Delacor

Furthermore, it relies on the following tools and libraries:

- Ruby
- AsciiDoctor
- Java
- GraphViz