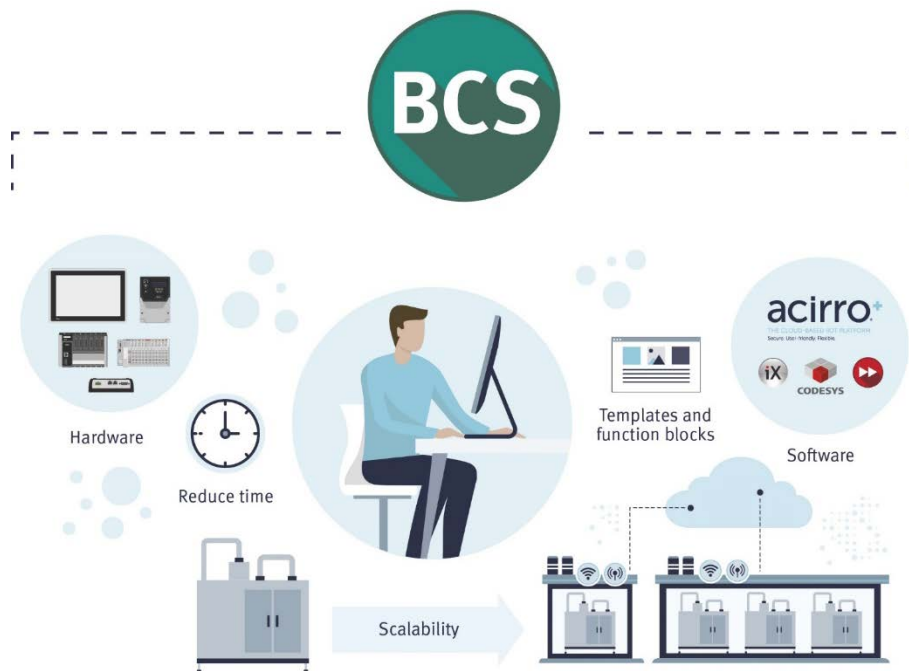


Quick start guide

GL-9971 - HMI/SCADA communication

SER0049 - X2 base v2 communication and PIO GL-9971



1 Function and area of use

This document provides guidelines when working with SER0049.

This document explains the function and use of how to setup a communication link between a X2 base v2 and PIO GL-9971.

2 About this document

This quick start document should not be considered as a complete manual. It is an aid to be able to startup a normal application quickly and easily.

Copyright © Beijer Electronics, 2022

This documentation (below referred to as 'the material') is the property of Beijer Electronics. The holder or user has a non-exclusive right to use the material. The holder is not allowed to distribute the material to anyone outside his/her organization except in cases where the material is part of a system that is supplied by the holder to his/her customer.

The material may only be used with products or software supplied by Beijer Electronics. Beijer Electronics assumes no responsibility for any defects in the material, or for any consequences that might arise from the use of the material. It is the responsibility of the holder to ensure that any systems, for whatever applications, which is based on or includes the material (whether in its entirety or in parts), meets the expected properties or functional requirements. Beijer Electronics has no obligation to supply the holder with updated versions.

Use the following hardware, software, drivers and utilities in order to obtain a stable application:

In this document we have used following software and hardware

- BCS Tools 3.33
- iX Developer 2.40 SP5/SP6
- PIO GL-9971 with firmware v2.002
- X2 base 10 v2 with image b261 or later version
 - Note! Operator panels from the entire X2-series can be used

For further information refer to

- PIO GL-997x - User's manual
- [PIO GL-9971 – Important facts](#)
- iX Developer Online Help
- BCS Tools Online Help
- [Beijer Electronics knowledge database, HelpOnline](#)

This document and other quick start documents can be obtained from our homepage. Please use the address support.europe@beijerelectronics.com for feedback.

3 Table of Contents

1	Function and area of use.....	2
2	About this document.....	2
3	Table of Contents.....	3
4	Application.....	4
4.1	<i>Default settings</i>	4
4.2	<i>Modbus addresses vs IEC addresses mapping</i>	5
4.3	<i>BCS Tools addressing</i>	6
4.4	<i>iX Developer tags configuration</i>	7
4.5	<i>Running application</i>	8
5	About Beijer Electronics.....	9
5.1	<i>Contact us</i>	9

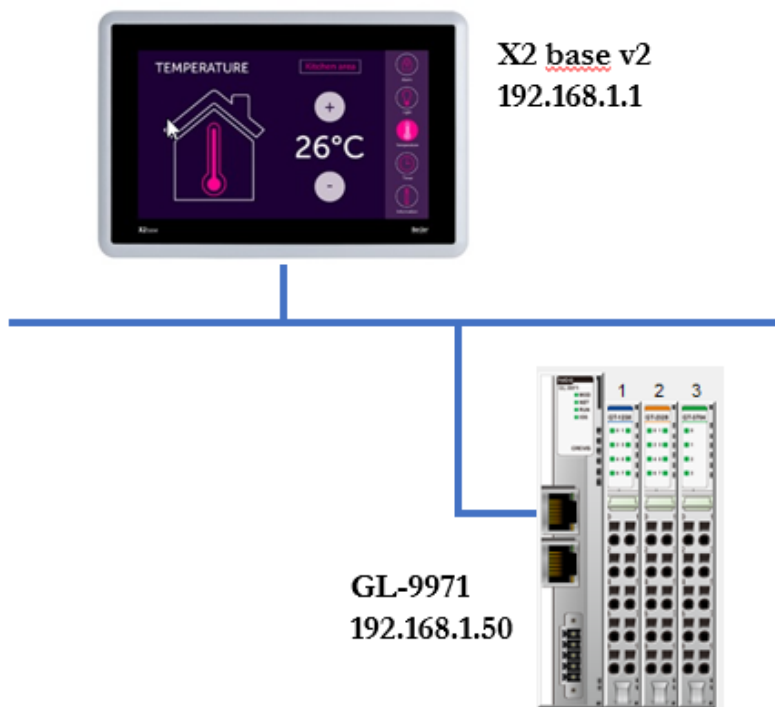
4 Application

The following chapter describes important procedures and settings needed for a well functioning system.

The GL-9971 doesn't support the symbol configuration in BCS Tools which enables the name based tag communication due to the absence of a file system.

To establish communication with a GL-9971 Modbus TCP is the only way. The GL-9971 has IEC address areas mapped to Modbus addresses.

In this example a X2 base v2 HMI was used but all models of the X2-series can be used.



4.1 Default settings

GL-9971 = 192.168.1.50

X2 base 10 v2 = 192.168.1.1

4.2 Modbus addresses vs IEC addresses mapping

Address	IEC Address	Contents
0x0000~0x07FF	%IW0~%IW2047	2048 words Input and Internal memory (Area is write-protected)
0x0800~0x0FFF	%QW0~%QW2047	2048 words Output and Internal memory (Area is write-enabled)
0x1000~0x1FFF	-	Special Function Register (PIO Information)
0x2000~0x2FFF	-	Special Function Register (Slot Information)
0x4000~0x5FFF	%MW0~%MW8191	8192 words Internal memory (Area is write-enabled)

Supported function codes (FC) are:

FC03, Read holding registers

FC04, Read input register

FC6, Write single register

FC16, Write multiple registers

The following screenshot is from the file “IEC_addr_vs_Modbus_addr.xlsx”, included in the package and provides help in the conversion between IEC addresses and Modbus addresses.

	A	B	C	D	E	F	G	H	I
1	Modbus address (hex)	Modbus address (dec)	IEC %MW address (dec)						
2	4000	16384	0		Example:				
3	4001	16385	1		BIT	WORD	HoldingRegister in X2 base v2		
4	4002	16386	2		%M0.0	-->	%MW0	-->	(4)16384.0
5	4003	16387	3		%MX500.0	-->	%MW250	-->	(4)16634.0
6	4004	16388	4				%MW10	-->	(4)16394
7	4005	16389	5						
8	4006	16390	6						
9	4007	16391	7						
10	4008	16392	8						
11	4009	16393	9						
12	400A	16394	10						
13	400B	16395	11						
14	400C	16396	12						
15	400D	16397	13						

4.3 BCS Tools addressing

To use variables with IEC addresses, %MX, %MB, %MW, %MD, the **AT** prefix is used in the declaration part.

```

Gvl_HMI x
1 {attribute 'qualified_only'}
2 VAR_GLOBAL
3
4 //BITS Modbus vs IEC = word oriented
5 GT1238 AT %MB0 : strGT1238; //Modbus address 416384.0, 416384.1, 416384.2 .....416384.7
6 GT2328 AT %MB50 : strGT2328; (*Modbus address 416409.0, 416409.1, 416409.2 .....4163409.7,
7 50/2=25 +16384 = 16409 *)
8
9 Toggle1 AT %MX500.0: BOOL; //Modbus address 416634.0, (500/2 = %MW250, 16384+250 = 16634)
10
11 //WORDS
12 GT3704 AT %MW100 : strGT3704; //Modbus address 416484...416487
13
14 SetPoint1 AT %MW110 : REAL; //Modbus address 416944
15
16 END_VAR
    
```

	Scope	Name	Address	Data type	Initialization	Comment
1	VAR_GLOBAL	GT1238	%MB0	strGT1238		Modbus address 416384.0, 416384.1, 416384.2416384.7
2	VAR_GLOBAL	GT2328	%MB50	strGT2328		Modbus address 416409.0, 416409.1, 416409.24163409.7
3	VAR_GLOBAL	Toggle1	%MX500.0	BOOL		Modbus address 416634.0, 500/0 = M%W250
4	VAR_GLOBAL	GT3704	%MW100	strGT3704		Modbus address 416484...416487
5	VAR_GLOBAL	SetPoint1	%MW110	REAL		Modbus address 41694

4.4 iX Developer tags configuration

Tags x

Tags Controllers Triggers Poll Groups Index Registers

Home

Add Delete Columns Visible Scaling Others Data Exchange

Tag			Controllers		Scaling		
Name	Data Type	Access Right	Data Type	Controller 1	Offset	Gain	Reaction
Application_Gvl_HMI_GT1238_I00	DEFAULT	ReadWrite	BOOL	416384.0	0	1	
Application_Gvl_HMI_GT1238_I01	DEFAULT	ReadWrite	BOOL	416384.1	0	1	
Application_Gvl_HMI_GT1238_I02	DEFAULT	ReadWrite	BOOL	416384.2	0	1	
Application_Gvl_HMI_GT1238_I03	DEFAULT	ReadWrite	BOOL	416384.3	0	1	
Application_Gvl_HMI_GT1238_I04	DEFAULT	ReadWrite	BOOL	416384.4	0	1	
Application_Gvl_HMI_GT1238_I05	DEFAULT	ReadWrite	BOOL	416384.5	0	1	
Application_Gvl_HMI_GT1238_I06	DEFAULT	ReadWrite	BOOL	416384.6	0	1	
Application_Gvl_HMI_GT1238_I07	DEFAULT	ReadWrite	BOOL	416384.7	0	1	
Application_Gvl_HMI_GT2328_Q00	DEFAULT	ReadWrite	BOOL	416409.0	0	1	
Application_Gvl_HMI_GT2328_Q01	DEFAULT	ReadWrite	BOOL	416409.1	0	1	
Application_Gvl_HMI_GT2328_Q02	DEFAULT	ReadWrite	BOOL	416409.2	0	1	
Application_Gvl_HMI_GT2328_Q03	DEFAULT	ReadWrite	BOOL	416409.3	0	1	
Application_Gvl_HMI_GT2328_Q04	DEFAULT	ReadWrite	BOOL	416409.4	0	1	
Application_Gvl_HMI_GT2328_Q05	DEFAULT	ReadWrite	BOOL	416409.5	0	1	
Application_Gvl_HMI_GT2328_Q06	DEFAULT	ReadWrite	BOOL	416409.6	0	1	
Application_Gvl_HMI_GT2328_Q07	DEFAULT	ReadWrite	BOOL	416409.7	0	1	
Application_Gvl_HMI_GT3704_RTD00	FLOAT	ReadWrite	INT16	416484	0	0,1	
Application_Gvl_HMI_GT3704_RTD01	FLOAT	ReadWrite	INT16	416485	0	0,1	
Application_Gvl_HMI_GT3704_RTD02	FLOAT	ReadWrite	INT16	416486	0	0,1	
Application_Gvl_HMI_GT3704_RTD03	FLOAT	ReadWrite	INT16	416487	0	0,1	
Application_Gvl_HMI_SetPoint1	FLOAT	ReadWrite	FLOAT	416494	0	1	
> Application_Gvl_HMI_Toggle1	BOOL	ReadWrite	BOOL	416634.0	0	1	

4.5 Running application

Gvl_HMI x

Device.Application.Gvl_HI

Expression	Type	Value	Prepared value	Address
GT1238	strGT1238			%MB0
GT2328	strGT2328			%MB50
OUT0	BIT	TRUE		%MX50.0
OUT1	BIT	FALSE		%MX50.1
OUT2	BIT	FALSE		%MX50.2
OUT3	BIT	FALSE		%MX50.3
OUT4	BIT	FALSE		%MX50.4
OUT5	BIT	FALSE		%MX50.5
OUT6	BIT	FALSE		%MX50.6
OUT7	BIT	FALSE		%MX50.7
Toggle1	BIT	TRUE		%MX500.0
GT3704	strGT3704			%MW100
RTD0	INT	-32768		%MB200
RTD1	INT	264		%MB202
RTD2	INT	-32768		%MB204
RTD3	INT	-32768		%MB206
SetPoint1	REAL	43.5		%MW110

Example_X2baseV2_GL9971 -
- □ ×

GL-9971 (192.168.1.50)

Description GL-9971 CODESYS, Programmable IO, MODBUS TCP, Light version

Total Current 205 mA (Max. 1000 mA @ 5VDC)

Total Size Width: 22, Height: 109, Length: 106 (mm)

Setpoint 1 %MW110, Modbus 416494

43,5 °C

Toggle 1 %MX500.0, Modbus 416634.0

Toggle1

1. GT-1238	2. GT-2328	3. GT-3704
0	1	-3276,8 °C
0	0	26,4 °C
0	0	-3276,8 °C
0	0	-3276,8 °C
0	0	-3276,8 °C
0	0	-3276,8 °C

5 About Beijer Electronics

Beijer Electronics is a multinational, cross-industry innovator that connects people and technologies to optimize processes for business-critical applications. Our offer includes operator communication, automation solutions, digitalization, display solutions and support. As experts in user-friendly software, hardware and services for the Industrial Internet of Things, we empower you to meet your challenges through leading-edge solutions. Beijer Electronics is a Beijer Group company.

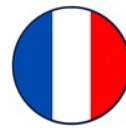
Since its start-up in 1981, BEIJER GROUP has evolved into a multinational group with sales of 1.4 billion SEK 2020. BEIJER GROUP is listed on the NASDAQ Stockholm Main Market under the ticker BELE. www.beijergroup.com



China



Denmark



France



Germany



India



Norway



South Korea



Sweden HQ



Taiwan



Turkey



United Kingdom



USA



BeNeLux

5.1 Contact us

[Global offices and distributors](#)