

## APPLICATION NOTE

# RIN32M3 Module (RY9012A0)

Software PLC Guide: CODESYS for EtherNet/IP

## Introduction

This application note explains the procedure for running evaluation R-IN32M3 module Solution Kit in connection with the CODESYS software programmable logic controller (PLC). In particular, this covers how to add and configure the protocol stack EtherNet/IP supported by CODESYS.

## **Target Device**

R-IN32M3 module

#### **Related document**

Document Type	Document Title	Document No.
Data Sheet	R-IN32M3 Module Datasheet	R19DS0109ED****
User's Manual	R-IN32M3 Module User's Manual: Hardware	R19UH0122ED****
User's Manual	R-IN32M3 Module User's Manual: Software	R17US0002ED****
Quick Start Guide	R-IN32M3 Module Application Note: Quick Start Guide	R12QS0042ED****
Application Note	R-IN32M3 Module (RY9012A0) User's Implementation Guide	R30AN0386EJ****
User's Manual	Adaptor Board with R-IN32M3 module YCONNECT-IT-I-RJ4501	R12UZ0094EJ****
Quick Start Guide	Evaluation Kit for RA6M3 Microcontroller Group EK-RA6M3 Quick	R20QS0011EU***
	Start Guide	
Application Note	R-IN32M3 Module (RY9012A0) Application Note RA6M3/RA6M4	R30AN0388EJ****
Application Note	R-IN32M3 Module (RY9012A0) Application Note RX66T	R12AN0111EJ****
Application Note	Software PLC Connection Guide CODESYS for PROFINET	R30AN0377ED****
Application Note	Software PLC Connection Guide CODESYS for EtherCAT	R30AN0379ED****
Application Note	Software PLC Connection Guide TwinCAT	R30AN0380ED****

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## 1. Overview

## 1.1 Abstract

This document describes how to setup R-IN32M3 module with CODESYS for EtherNet/IP.

## **1.2 Operating environment**

For details on the software environment and hardware environment, refer to the application note included in the sample package (r18an0052xx0 \*\*\*).

#### **Table 1-1 Application Note**

資料名	資料番号
R-IN32M3 Module Application Note RA6M3 / RA6M4	R30AN0388EJ****
R-IN32M3 Module Application Note RX66T	R12AN0111EJ****

The connection procedure described in this manual assumes that the following conditions are met. For the setup method of each evaluation board, refer to the application note corresponding to each sample software included in the sample package.

#### 1.2.1 Software environment

**Table 1-2** shows the software operating environment.

 Sample software and various documents are included in the sample package.

#### Table 1-2 Software environment

Name	Link
R-IN32M3module sample package	<u>r18an0052xx0***</u>
CODESYS	https://www.codesys.com/
CODESYS Group	
Npcap	https://nmap.org/npcap/
NMAP.ORG	



## R-IN32M3 Module (RY9012A0)

## 1.2.2 Hardware environment

This document applies only to the following configurations:

- 1) R-IN32M3 module Adapter board with EK-RA6M3 / EK-RA6M4 2) R-IN32M3 module Adapter board with SK-S7G2
- 3) R-IN32M3 module CPU card



Fig. 1.1 Evaluation environment

#### **Table 1-3 Evaluation environment**

Name	Туре
R-IN32M3 Module Adapter board	YCONNECT-IT-I-RJ450
R-IN32M3 Module CPU card	SEMB1320
RA6M3 MCU Group Evaluation Board	EK-RA6M3
RA6M4 MCU Group Evaluation Board	EK-RA6M4
SK-S7G2 starter kit.	SK-S7G2



## 2. CODESYS Setup

### 2.1 Setup EtherNet/IP project

#### 2.1.1 Creating a project

Select "All Programs > CODESYS > CODESYS V\*\* SP\*\* Patch\*\*" from the Windows start menu.

Select "New Project" from the "File" menu to create a new project.

CODESYS	Categories Iemplates	
Eile <u>Edit View P</u> roject <u>B</u> uild	Empty project HMI project	Standard proje
<u>Open Project</u> Ctrl+O <u>Close Project</u>	Standard project with Applicatio	
Save Project Ctrl+S Save Project As		
Project <u>A</u> rchive	A project containing one device, one application, and an empty implementation for I	PLC PRG
Source upload Source downloa <u>d</u>	Name         Renessa EIP           Location         D:¥	~
Print		

Figure 2.1 new project

In the "New Project" window, select "Projects" from the "Categories" section and "Standard project" from the "Templates" section. Then, specify the name of the project.

In the "Standard Project" window, select the controller and programming language you wish to use from the drop-down lists for "Device" and "PLC\_PRG in". For this example, select "**CODESYS Control Win V3 x64**" and "Structured Text (ST)", respectively. After that, click on "OK" to open the new project.

Standard P	roject		Х
	objects within - One program - A program F - A cyclic task	t to create a new standard project. This wizard will create the following n this project: mmable device as specified below PLC_PRG in the language specified below which calls PLC_PRG to the newest version of the Standard library currently installed.	
	<u>D</u> evice <u>P</u> LC_PRG in	CODESYS Control Win V3 x64 (3S - Smart Software Solutions GmbH) Structured Text (ST) OK Cancel	~

Figure 2.2 Select the Device and PLC programming

The "Device" tree for the newly created project will be displayed as shown below.

The components that belong to "Device (CODESYS Control Win V3 x64)" are managed in a tree structure.



Figure 2.3 Project View

#### 2.1.2 Install Device Information (EDS)

Install an EDS (Electronic Data Sheet) file which contains a description of the EtherNet/IP adapter device.

Select "Device Repository..." from the "Tools" menu of the CODESYS program.



Figure 2.4 Open Device Repository

In the dialog box, click on the "Install" button to produce the dialog box where you are to enter the name of the provided EDS file. The R-IN32M3 module sample package has EDS file for each application (Table 2-1 EDS file).

When the installation is complete, [R-IN32M3\_Module] will be registered in "EtherNet/IP Remote Adapter" tree.

ocation	System Repository	$\sim$	Edit Locations
	(C:\ProgramData\CODESYS\Devices)		
installed D	e <u>v</u> ice Descriptions		
String for	a full text search Vendor <all vendors=""></all>	$\sim$	<u>I</u> nstall
Name	Vendor	^	<u>U</u> ninstall
	EtherNet/IP Module		Export
	EtherNet/IP Remote Adapter		
	EtherNetIP Adapter 3S - Smart Software Solutions GmbH		
	Generic EtherNet/IP device 3S - Smart Software Solutions GmbH		
	Generic EtherNet/IP device 3S - Smart Software Solutions GmbH		
	R-IN32M3 Module Renesas Electronics		
	K-IN32M3 Module     Renesas Electronics		
<	· · · · · · · · · · · · · · · · · · ·		
	:\[_RJ45\ac_1\appl\2015013_irj45\ac\02_eip_io_data\eip_goal_renesas.eds		Details
i (	Device "R-IN32M3 Module" installed to device repository		_
			Close

Figure 2.5 Install the EDS File

Sample project	application	directory
	Mirror	RA6_CCM_V***\appl\mirror_sample\ac\02_eip_io_renesas
RA sample	Remote-IO	RA6_CCM_V***\appl\remote_io_sample\ac\02_eip_io_renesas
	Sensor	RA6_CCM_V***\appl\sensor_sample\ac\02_eip_renesas
Synergy sample	Mirror	Synergy_CCM_V***\appl\2015013_irj45\ac\06_eip_io_data_static_ip
	Mirror	RX66T_CCM_V***\appl\mirror_io_sample\02_eip
RX66T sample	Remote-IO	RX66T_CCM_V***\appl\remote_io_sample\02_eip
	Motor	RX66T_CCM_V***\appl\motor_sample\02_eip

#### Table 2-1 EDS file

### 2.1.3 Add Scanner and Adapter Device

Add the Scanner device and "R-IN32M3 Module" Adapter device to the project.

#### 1.) Add the Ethernet Interface

Right-click on "Device (CODESYS Control Win V3 x64)" in the "Device" tree and select "Add Device...".

The "Add Device" dialog box opens. Select "Ethernet" under "Fieldbuses", then "Ethernet Adapter" and click on the "Add Device" button.

			🚮 Ada	d Device					×
Devices		→ 井 ×	Name Action	Ethernet	Plug device	Update device			
PIC Logic     Application     Distance Manage     PIC_PRG (PRC     PI		Cut Copy Paste Delete Refactoring	String Nam E-	for a fulltext search	Vendor	<all vendors=""></all>	Version	Description	~
⊟ - 🥸 MainTask – 🕮 PLC_P	⊫ 1 1	Properties Add Object + Add Folder	8		3S - Smart Softwar	re Solutions GmbH	3.5.15.0	Ethernet Link.	
	°	Add Device Update Device Edit Object Edit Object with Edit IO mapping Import mappings from CSV Export mappings to CSV Online Config Mode	Appe Devic		utions GmbH thernet Adapter, Et of	hernet Adapter,	•	ions	×
1		Beert Outline Deuter (Deuter)	•	(You can select another target noc	ie in the navigator i	while this window i	Add Dev	ire Clo	15e

Figure 2.6 Add Device

You can see that "Ethernet" has been added under the "Device" tree.



Figure 2.7 Ethernet Interface in Project Tree

## 2.) Add an EtherNet/IP Scanner

Right-click on "Ethernet (Ethernet)" in the "Device" tree and select "Add Device".



Figure 2.8 Add an EtherNet/IP Scanner

The "Add Device" dialog box opens. Select "EtherNet/IP Scanner" under "Fieldbuses", "EtherNet/IP", then "EtherNet/IP Scanner" and click on the "Add Device" button.

You can see that "EtherNet/IP Scanner" has been added under "Ethernet" Interface in the Project tree.



#### 3.) Add R-IN32 Module Adapter

Right-click on "EtherNet/IP Scanner" in the Project tree and select "Add Device".



Figure 2.9 Add the R-IN32M3 Module

The "Add Device" dialog box opens. Select "R-IN32M3 Module" under "Fieldbuses", "EtherNet/IP Remote Adapter", click on the "Add Device" button.

You can see that "R-IN32M3 Module" has been added under "EtherNet/IP Scanner" in the Project tree.



Figure 2.10 R-IN32M3 Module in Project

## 3. Configuring CODESYS Network

## 3.1 Connecting HOST PC IP address

IP address setup to the HOST PC.

Open "Network Connection". Double-click or right-click on the "Local Area Connection" icon.

In the "Local Area Connection Status" window, select "Properties".

Ethernet 2 Status	× 🔋 Ethernet 2 Properties	
Seneral	Networking Authentication Sharing	
Connection IPv4 Connectivity: No network access IPv6 Connectivity: No network access Media State: Enabled Duration: 03:14:49 Speed: 100.0 Mbps Dgtals	Connect using: Connect using: Configure This connection uses the following items: Configure This connection uses the following items: Configure The and Printer Sharing for Microsoft Networks Configure Plice and Printer Sharing for Microsoft Networks Configure Plice and Printer Sharing for Microsoft Networks Configure Co	^
Activity — Sent —_ <b>kiji</b> — Received	Internet Protocol Version 4 (TCP/IPv4)     Microsoft Network Adapter Multiplexor Protocol     Internet Protocol     Internet Protocol     Internet Protocol     Internet Protocol	~
Packets: 2.191   0	Description Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.	
Properties Diagnose		
	ОК Са	incel

Figure 3.1 Network Status

In the "Local Area Connection Properties" window, highlight "Internet Protocol Version 4 (TCP/IPv4)" then click on the "Properties" button.

Select the radio button "Use the following IP Address" and set IP [192.168.0.1] and subnet mask [255.255.255.0].

nternet Protocol Version 4	(TCP/IPv4) Properties	>
General		
	igned automatically if your network supports you need to ask your network administrator ings.	
O gbtain an IP address	automatically	
Use the following IP a	ddress;	
IP address:	192.168.0.1	
Sybnet mask:	255.255.255.0	
Default gateway:	12 14 <sup>(2</sup> 11 <sup>(2)</sup> )	
Obtain DNS server ad	idress automatically	
() Use the following DNS	server addresses:	
Preferred DNS server:	· · ·	
Alternate DNS server:		
Validate settings upo	n exit Adganced	
	OK Cano	el

Figure 3.2 IP address setting

Click on "OK" to finish the configuration.

## 3.2 Connecting to the Software PLC

This section gives the procedure for connection to the target software PLC from the CODESYS development environment via a gateway.

#### 3.2.1 Starting the Gateway Server

Check the state of the gateway server on the system tray. If the server is down, click on the "• " icon and select "Start Gateway" to start the server up. Usually, the server will automatically be started as a standard service on booting of Windows and its status is indicated in the system tray<sup>Note</sup> in the lower-right corner of the desktop.

Note: If you cannot find the icon in the system tray, start the server up by the following procedure: Click on "All Programs" > CODESYS > CODESYS Gateway V3.



Figure 3.3 Start of Gateway Server

#### 3.2.2 Starting the Software PLC

Check the state of the software PLC on the system tray. If the program is stopped, click on the " III " icon and select "Start PLC" to start the program up.

	Start PLC
	Stop PLC
- 28	Exit PLC Control
1994 1994	About
-64	

Figure 3.4 Start PLC Controller

Usually, the program will automatically be started as a standard service on booting of Windows and its status is indicated in the system tray<sup>Note</sup> in the lower-right corner of the desktop.

Note: If you cannot find the icon in the system tray, start the server up by the following procedure: Click on "All Programs" > CODESYS > CODESYS Control Win V3 x64 SysTray.



Figure 3.5 Run PLC Controller

## 3.3 Configuring Network

#### 3.3.1 Device registration

Make connection settings for connecting the software PLC service from your development environment. Double-click on the "Device (CODESYS Control Win V3 x64) in the "Device" tree. On the "Device" tabbed page, select "Connection settings" and click on the "Scan network..." button.

Devices 🝷 🕈 🗙	Device X	
Renesas-EIP     Sevice (CODESYS Control Win V3 x64)	Communication Settings	Scan Network
	Applications	
EtherNet_IP_Scanner (EtherNet/IP Scan	Backup and Restore	
	Files	Gateway

Figure 3.6 Device Scan

The "Select Device" window opens and a search for available devices that can use the local network automatically starts. Finding a software PLC service constitutes success and the name of the corresponding PC will be indicated. Double-click on the PC name to make a connection.

If the service will not be found, check the settings described in previous sections, **3.2 Connecting to the Software PLC.** 

ict Device	
lect the network path to the controllers	
As Gatemay-1	Scan network
- B	Moreke .
50	
PC name	
	OK Cancel

Figure 3.7 Select the PLC

When the available device is registered, the device is activated, and the green circle mark lights up.

Scan Network Gat	eway 🔹 Device 👻	
	Gateway	
	Gateway-1	<ul> <li>International V</li> </ul>

Figure 3.8 registered device

#### 3.3.2 Configuring the Ethernet Network

Double-click on "Ethernet (Ethernet)" in the "Device" tree to open the configuration window. In the "General" tabbed page, click on the icon next to the text box for "Interface" section as shown in the red rectangle below.

Devices 🗸 🗸 🗶	Device Fi Ethernet 🗙	<u>د</u>	
Renesas-EIP     Renesas-EIP     Device (CODESYS Control Win V3 x64)	General	Interface	
	Log	IP address 192 . 168 . 0 . 1	
EtherNet_IP_Scanner (EtherNet/IP Scan	Status	Subnet mask 255 . 255 . 0	
	Ethernet Device I/O Mapping	Default gateway 0 . 0 . 0 . 0	
	Ethernet Device IEC Objects		
	Information		

Figure 3.9 Configure the Network Adapter

In the "Network Adapters" window, select the interface set by 3.1 Connecting HOST PC IP address.

Interfaces			
Name	Description	IP address	
1 # 5.4.0	1.1.1(75) 541	0.0.0	
มี 		0.000	
イーサネット 7	ASDX AX88179 USB 3.0 to Gigabit Ethernet Adapter #2	192.168.0.1	
イリホルコー	Finite Contract Filmer Allers (MDEC COO)	0.0.0	Т
1-unor o	Further COL VPN Visited Ethemot Maple	1007.08	
(P address	192.168.0.1		
Subnet mask	255 . 255 . 255 . 0		
Default gateway	0.0.0.0		
MAC address	84:AF:EC:73:D6:43		

Figure 3.10 Select the Network Adapter

## 3.3.3 R-IN32M3 Module setting

Double-click on "R\_IN32M3\_Module (R-IN32M3 Module)" in the "Device" tree to open the configuration window. Then, set the RIN32M3 Module IP address.

Devices - 7 ×	Device 🔐 Ethernet	EtherNet_IP_Scanner
Renesas-EIP     Renesas-EIP     Device (CODESYS Control Win V3 x64)	General	Address Settings
e 🗐 PLC Logic	Connections	IP address 192 . 168 . 0 . 100 Ether et/IP
- 🎁 Library Manager 	Assemblies	
□-ﷺ Task Configuration □- ♦ ♦ ENIPScannerIOTask (IEC-Tasks)	User-Defined Parameters	Electronic Keying
EtherNet_IP_Scanner.IOCycle	Log	Compatibility check
EtherNet_IP_Scanner.ServiceCycle	EtherNet/IP I/O Mapping	Vendor ID 1105 Check match Device type 43 Check match
Ethernet (Ethernet)	EtherNet/IP IEC Objects	Product code 768 Check match
EtherNet_IP_Scanner (EtherNet/IP Scanner)	Status	Major revision 1 Check match
R_IN32M3_Module (R-IN32M3 Module)	Information	Minor revision 1 Check match

Figure 3.11 R-IN32M3 Module IP Address

## 4. CODESYS Network Connection

## 4.1 Download the Project

Now we have finished the offline configuration and can start the online mode.

Click on the button 🤹 to build and download the configuration.



Figure 4.1 Login the project

When you have change something in the project then you will be asked to download it. Acknowledge it with "OK"



Figure 4.2 Download project

When the download is finished click "Start" to run the project.

		1 49 30 36 165 185 of 12			8   (] = 43 43
	1 UG 🔨   1999 GB 1993 GG   1	【 "乳 "乳 "泡   臨   钷+ ┏*   凿	Application [Device: PLC	Logic] • 🧠 🗘 🖡	ê   Çu (40 (40
Devices	<b>-</b> ₽ X	Device Ethernet	EtherNet_IP_Scanne	er 📝 🖷 R_IN32M3_Mod	ule 🗙
Renesas-EIP	-	General			
🖹 😳 📆 Device [connected] (CO	DDESYS Control Win V3 x64)	General	Address Settings		
PLC Logic	-	Connections	IP address 19	2 . 168 . 0 . 100	
Application [stopping]					Ethe
Library Manag     Library Manag     Library Manag     Library Manag		Assemblies			
E Task Configur			Electronic Keying		
	cannerIOTask (IEC-Tasks)	User-Defined Parameters			
	Net_IP_Scanner.IOCycle	Log	Compatibility ch	eck	
	cannerServiceTask (IEC-Tasks)				
	Net IP Scanner.ServiceCycle	EtherNet/IP I/O Mapping	Vendor ID 110	05 Check match	
🖻 😗 🏈 MainTa	ask (IEC-Tasks)		Device type 43	Check match	
D PLC_F	PRG	EtherNet/IP IEC Objects	Product code 768	B Check match	
😑 😳 🏢 Ethernet (Ethernet	)	Status			
C C C Charles TD C	canner (EtherNet/IP Scanner)	Status	Major revision 1	Check match	

Figure 4.3 Start project



## 4.2 Run Project

Now, if all the icons in front of the device turn green, the EtherNet/IP connection is successful.

File Edit View Project Build	Online Debug Tools Window Help			
	🗛 🍇 🍓 🍇   📕 🐄 🦄   🖷   1		: PLC Logic] 🔸 👒 🐝 🕨 🔳	<b>%</b>   [∃ c∃ q∃ +∃ \$   \$   \$
Devices		Ethernet	Scanner R_IN32M3_M	odule 🗙
Renesas-EIP     CODESYS Co     Connected] (CODESYS Co     Code     POLC Logic     Code     Code	ontrol Win V3 x64) General Connections	Address Settin	gs 192 , 168 , 0 , 100	EtherNet/IP
Library Manager	Assemblies User-Defined Param	ters Electronic Keyi	ing	
Comparison of the second	canner.IOCyde Log	Compatibi		
EtherNet_IP_Sc S S MainTask (IEC-T		Device type	1105   Check match     43   Check match	
	Statue	Product code Major revision	768   Check match     1   Check match	
- 😔 🔟 R_IN32M3_Module (	R-IN32M3 Module) Information	Minor revision	1 Check match	

#### Figure 4.4 successful running project

The icons indicating status of each device is listed below.

- 5 : The application is connected to the PLC and is running.
- S : The application is connected to the PLC but is not running.
- **A** : Error. Check the error contents and the settings of the device.
- There is no device information in the device repository. Review the device information file and reinstall it.



## 4.3 Creating and Simulating a User Interface

### 4.3.1 General

This section includes the following procedures:

- Displaying the development environment screen
- Implementation example
- Relating variables to components and to the I/O ports of devices

The CODESYS development environment allows the creation of user interfaces. You can access all internal variables used in the PLC program on the screen as well as monitoring and changing the parameters.

The PLC example it this case uses the "mirror" feature (Mirror sample application) of the R-IN32M3 module application. The INPUT value of the device (Module) will be increase by one and send back to the OUTPUT value of the PLC. The speed of this increase can be controlled by the value MAXI.

#### 4.3.1.1 Adding Components

Components to be placed on a user-interface display need to be added to the "Device" tree before creating one. Right-click on "Application" in the tree and select "Add Object", then "Visualization...".

				Alarm Configuration	
			_		
Devices	<b>-</b> ₽ X	R_IN3	Ċ;	Application	- 14
Renesas-EIP	-	General	C	C Code Module	
Device (CODESYS Control	ol Win V3 x64)	General		Data Sources Manager	1.
PLC Logic		Connections	<b>*</b> *	DUT	19
🖹 🔘 Application	<u> </u>			External File	F
Library 🐰	Cut			Global Variable List	
PLC_P 🗈	Сору		<b>A</b>	Global Variable List (tasklocal)	
	Paste			Image Pool	÷
Ţ Ĩ≞X	Delete		~	Interface	ch
= <b>\$</b> ∎	Refactoring	•	<i>🚳</i>	Network Variable List (Receiver)	cł
	Properties			Network Variable List (Sender)	ty
	Add Object	•	T	Persistent Variables	- I
🖻 🖷 Ethernet (Ethe 🚞	Add Folder		₿	POU	
🖻 👚 👔 EtherNet	Edit Object		≞	POU for implicit checks	ct ·
R_IN3	Edit Object with		А,	Recipe Manager	re
OS.	Login		ø	Redundancy Configuration	re
	Login		•	Symbol Configuration	
	Delete application from	n device		Text List	Vi
_			<b>⊡</b> ĝ	Trace	
			2	Trend Recording Manager	
			-	Unit Conversion	
		<	-	Visualization	
		Messages - Tot		Visualization Manager	

Figure 4.5 Add of Visualization object in Project tree

#### 4.3.1.2 Development Pane

Double-clicking on "Visualization" in the tree displays the development pane.

#### Development pane

The main pane for structuring user-interface displays. Place the components you will be using here.

#### <u>Toolbox</u>

The toolbox provides basic components for placements in the development pane. As well as such as graphs, tables, and labels, meters, switches, progress bars, and other items are available.

Users can select the desired components from this box and place them in the development pane.

#### **Properties**

Parameters for the components placed on the development pane are monitored and changed from here. The internal variables of the PLC program are also handled within this pane.

<u>밝황학(局和國際)합답답답</u> 關 <u>業業</u> Tsualization ×	Visualization Toolbox	
~•	Basic	Common Contro
RENESAS R-IN32M3 Module Application	Alarm Manager	Measurement Co
Messare Cent Value	Specia	oolbox
Control of speed		ImagePoolDialo
	Properties	
Development pane		* 💈 Sort order * 🗌 Adv
Development pane	Property	Value
Development pane	Property Use gradient color	Value
Development pane	Property	Value
Development pane	Property Use gradient color Gradient setting B Element look	Value
Development pane	Property Use gradent color Gradent setting H Element Iook Text Text Toolip	Value
Development pane	Property Use gradent color Gradent setting * Element look = Text Text Tool5p * Text properties	Value
Development pane	Property Use gradent color Gradent setting Element look Text Tool5p Text Tool5p Text Tool5p Text Tool5p Text Tool5p Text Tool5p Text Tool5p Text Text Tool5p Text Tool5p Text Text Tool5p Text Text Tool5p Text Text Tool5p	Value
Development pane	Property Use gradent color Gradent setting Element look Text Toolsp * Text Toolsp * Text properties * Absolute n * Relative m	Value

Figure 4.6 Development of visualisation example

To design an example just drag and drop the display and control item out of the "Toolbox" in the "Development pane"



## 4.3.1.3 Development of PLC program

For our PLC example we have to establish a small application program.



Figure 4.7 Development of visualisation example

Therefore, please double click of "PLC\_PRG" in the project tree.

Input the necessary variables like "INPUT", "OUTPUT", "COUNTER" and "MAXI".

The variables "INPUT" and "OUTPUT" are assigned to dedicated device address. These addresses can be found in the device configuration. Make a double click on the Input or/and Output module of the device and open the tab "PNIO Module I/O Mapping".

vices 🗸 🗘 🗸	C Ethernet R_IN3	2M3_Module × Device	PLC_PRG	Ethe	rNet_IP_Scann	ner 📳	Visualiza		
Device (CODESYS Control Win V3 x64)	General	Find		Filter Show al	I			<ul> <li>Add FB for IO Ch</li> </ul>	iannel →
PLC Logic	Connections	Variable	Mapping	Channel	Address	Туре	Unit	Description	
Will Stranger	Assemblies	1 - 10 1 - 10		Input Data Input Data	%IB0 %IB1	BYTE		Input Data Element Input Data Element	
PLC_PRG (PRG)	User-Defined Parameters	⊞-¥ø		Input Data	%IB2	BYTE		Input Data Element	
SUPScannerIOTask (IEC-Tasks)      EtherNet_IP_Scanner.IOCycle      SENIPScannerServiceTask (IEC-Tasks)	Log	· · · · ·		Input Data Input Data	%IB3 %IB4	BYTE		Input Data Element Input Data Element	
	EtherNet/IP I/O Mapping	iii		Input Data Input Data	%IB5 %IB6	BYTE BYTE		Input Data Element Input Data Element	
EtherNet_IP_Scanner.ServiceCycle     MainTask (IEC-Tasks)	EtherNet/IP IEC Objects	- ¥≱ ⊕- ¥≱		Input Data Input Data	%IB7 %IB8	BYTE BYTE		Input Data Element Input Data Element	
PLC_PRG	Status	- ¥≱ ⊕- ¥≱		Input Data Input Data	%IB9 %IB10	BYTE BYTE		Input Data Element Input Data Element	
UisuElems.Visu_Prg	Information	B-19		Input Data Input Data	%IB11 %IB12	BYTE		Input Data Element Input Data Element	
- 🚰 TargetVisu		B- 10		Input Data	%IB13	BYTE		Input Data Element	
WebVisu				Input Data	%IB14	BYTE		Input Data Element	
"" visuaization     "" tituaization     "" tituaization     "" Ethernet (Ethernet)     "" Ethernet IP_Scanner (EtherNet/IP Scanner)     "" R_IN32M3 Module (R-IN32M3 Module)		🍫 = Create new variable	~ <b>*</b> ∳ = Ma	Reset Ma		lways updatev	variables	Use parent device setting	

Figure 4.8 Parameter addresses

Here are the addresses of the module parameters. In our case the address %IB0 will be used for the INPUT variable and %QB0 for OUTPUT.

On the "PLC\_PRG" tabbed page, write the source code in the code-writing section with defined variables.

```
1
     // Test Program
 2
 3
     COUNTER := COUNTER + 1;
 4
     IF COUNTER > MAXI THEN
 5
          OUTPUT := INPUT + 1;
 6
          IF OUTPUT = 100 THEN
 7
              OUTPUT := 0;
 8
         END IF
 9
          COUNTER := 0;
10
     END IF
11
```

Figure 4.9 PLC program

## 4.3.1.4 Result of Running the Program

By starting the PLC, the following screen will come up:



The measurement value (green bar) will move from "0" to "100" and back to "0".

The speed of the increase of the measurement value can be controlled by the slider. The default value is 25. The highest speed is a "0" and the slowest is a "50".

## **Revision History**

		Description	
Rev.	Date	Page	Summary
Rev.1.0	2020.12.15	-	First Edition
Rev.1.01	2021.6.25	3	Add Evaluation Environment part



## APPLICATION NOTE

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