Quick Start Guide

Effective February 2013 Supersedes October 2012





Imprint

Manufacturer

Eaton Automation AG Spinnereistrasse 8-14 CH-9008 St. Gallen Schweiz www.eaton-automation.com www.eaton.com

Support

Region North America Eaton Corporation Electrical Sector 1111 Superior Ave. Cleveland, OH 44114 United States 877-ETN-CARE (877-386-2273) www.eaton.com Other regions Please contact your supplier or send an E-Mail to: automation@eaton.com

Original instructions

The German version of this document is the original instructions.

Editor

Ivo Hengartner

Brand and product names

All brand and product names are trademarks or registered trademarks of the owner concerned.

Copyright

© Eaton Automation AG, CH-9008 St. Gallen

All rights reserved, also for the translation.

None of this document may be reproduced or processed, duplicated or distributed by electronic sytems in any form (print, photocopy, microfilm or any other process) without the written permission of Eaton Automation AG, St. Gallen.

Subject to modifications.

Contents

Micro

1

1 1.1 1.2	General Document Index Device Variants	5
2 2.1 2.2 2.3 2.4 2.4.1 2.4.2 2.4.3	2 Wiring	7 7 8 9 10
3 3.1 3.2 3.3 3.4 3.5 3.6	The first PLC Program PLC License Point on the Device. Installation of the PLC Runtime System on the Device. Programming the PLC–Programs with XSoft-CoDeSys-2 Installation of the PLC runtime starting out of XSoft-CoDeSys-2. Download of the program to the Device. Symbol-File Configuration.	11 11 16 18 19
4 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 4.9.1 4.9.2 4.9.3	2 Setup FTP Path in GALILEO	28 29 30 31 33 36 37 38 39 39 40
4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 4.9.1 4.9.2 4.9.3	Generate new Project Select Device Select PLC Generate Mask Generate Variable Structure Generate Display Object Compile Project Simulate Project on the PC Download Project to the Device Start FTP-Server on the Device Setup FTP Path in GALILEO	28 29 30 31 33 36 37 38 39 39 40 42 44 44

Contents

General

1

This documentation should facilitate the introduction to the handling of the XV100 touch panels from Eaton Automation. In order to ensure a fast commissioning of the device it is necessary to follow the explanations and references carefully.

The commissioning of the device, communication, PC program usage and project generation with GALILEO and XSoft-CoDeSys-2 will be described step by step.

For the description in this documentation the following versions of GALILEO and XSoft-CoDeSys-2 were used:

- GALILEO V7.2.2
- XSoft-CoDeSys V2.3.9 SP2

The illustrated pictures and described functions can differ if newer or different versions of the programs are used.

Furthermore for the print screens a 3.5" device (color) was used. For other device variants no changes in functionality apply.

1.1 Document Index

	Торіс	Document	Doc. Number
[1]	Hardware manual	User Manual MICRO PANEL XV-102 or User Manual MICRO PANEL XV-152	MN04802004Z MN04802006Z
[2]	Windows CE	System Description Windows CE It is also part of the GALILEO help	MN05010007Z
[3]	Network	System Description Networks in Brief	MN05010009Z

(The index is not exclusive)

These helpful documents can be downloaded from our home page (<u>www.eaton-automation.com</u>), «DOWNLOADS» section.

1.2 Device Variants

The devices of the product class XV100 are available in different variants. Please find further information on our homepage <u>www.eaton-automation.com</u> or ask your local contact about possible device versions.

1 General

2 Commissioning of the Device

2.1 General Remarks to Wiring

Cabling should be carried out with special care in order to ensure interference-free operation. The EMC values stated in the technical data can only be guaranteed if the connections and cables are prepared according to the specifications stated. The cabling must be laid separately from low-voltage cables or isolated with double

→ Further information, see Document [1] «Operating Instructions MICRO PANEL XV-1x2», Chapter «Installation».

2.2 Starting the device

Energize the device. \rightarrow The device will boot.

or reinforced insulation.

If the device does not boot up and/or if an error message appears while starting (booting) the device, see Document [1] «Operating Instructions MICRO PANEL XV-1x2», Chapter «Troubleshooting»).

There is no runtime software for the visualization or optional PLC installed on the device. From the respective software package e.g. visualization (GALILEO) and optional PLC (XSoft-CoDeSys-2) you can install the runtimes on the device.

2.3 Switching off the device

De-energize the device.

The lifespan of the backlight can be increased by reducing the brightness, see Document [2] «MN05010007Z System Description Windows CE».

2.4 Ethernet

The Ethernet interface of the device is used for engineering the visualization "GALILEO" as also programming the PLC with "XSoft-CoDeSys-2". To commission the communication between the device and the PC follow the next described steps.

An IP-Address always consists out of a network and computer address. The network mask specifies which bits belong to the network and which do not.

Eigenschaften von Internetprotokoll	(TCP/IP)	<u>?</u> ×		
Allgemein				
IP-Einstellungen können automatisch zugewiesen werden, wenn das Netzwerk diese Funktion unterstützt. Wenden Sie sich andernfalls an den Netzwerkadministrator, um die geeigneten IP-Einstellungen zu beziehen.				
O IP-Adresse automatisch beziehen				
Folgende IP- <u>A</u> dresse verwenden:				
IP-Adresse:	192.168.0.71			
S <u>u</u> bnetzmaske:	255 . 255 . 255 . 0			
Standardgateway:				
C DNS-Serveradresse automatisch i	beziehen			
🕞 Folgende DNS-Serveradressen <u>v</u> e	erwenden:			
Bevorzugter DNS-Server:				
Alternativer DNS-Server:				
	Erweitert.			
	OK Abbre	chen		

Select for the device a free computer address from the local network. You can determine the network address of your PC under *start* \rightarrow *setting* \rightarrow *network and telecommunications connections* \rightarrow *properties* \rightarrow *characteristics.* Select out of the list Internet protocol (TCP/IP) and press the button "*properties*".

Einstellungen der Netzwerkkarte des PCs

Example:	IP-Address PC: IP-Address: SubNetMask:	192.168.0.71 255.255.255.0
	This means: Network-Address: Computer-Address:	192.168.0 71
	Select an IP-Adresse for th Network-Address: Computer-Address:	ne device: 192.168.0 72 (Number between 1-254 and not any already used in the local network)
	→ IP-Address device: IP-Address: SubNetMask:	192.168.0.72 255.255.255.0



The usage of the same address twice can cause critical network problems.

2.4.1 Examining and Adjusting of the IP-Address of the Device

Power up the device.

If an information window appears after booting please close it.

After Windows CE has booted press the Start button and change to the menu Programs \rightarrow Control Panel.



Double-click the icon "Network".

Connection 🛃 🔀 ? 🗴	
Make New ONBOARDI	
🀉 Start 📴 C 👔 🥐 🚣 14:37 🞯	

Double-click the icon "ONBOARD1".



A window *'FEC Ethernet Driver'* will open. Select the desired IP address and subnet mask. Use the gateway only when needed then push *OK*.

The IP address and subnet mask must be consistant to the network configuration of the PC respectively the company network. In doubt ask your network administrator.

2.4.2 Wiring

Connect the device directly to the PC with an ethernet crossover cable. If you use an ethernet hub or switch us a 1-to-1 patch cable.

2.4.3 Test the Ethernet Connection

To test the connection open the "Dos-Shell" on your PC over Start \rightarrow Programs \rightarrow Accessories and ping the IP address of the device. (ping 192.168.0.72).

C Eingabeaufforderung	
Microsoft Windows 2000 [Version 5.00.2195] (C) Copyright 1985-2000 Microsoft Corp.	_
(C) Copyright 1985-2000 microsoft Corp.	
L:\>ping 192.168.0.72	
Ping wird ausgeführt für 192.168.0.72 mit 32 Bytes Daten:	
Antwort von 192.168.0.72: Bytes=32 Zeit=1ms TTL=128	
Antwort von 192.168.0.72: Bytes=32 Zeit=1ms TIL=128	
Antwort von 192.168.0.72: Bytes=32 Zeit=1ms TTL=128 Antwort von 192.168.0.72: Bytes=32 Zeit=1ms TTL=128	
Ping-Statistik für 192.168.0.72:	
Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0 (0% Verlust),	
Ca. Zeitangaben in Millisek.:	
Minimum = 1ms, Maximum = 1ms, Mittelwert = 1ms	
L:\>_	
	•

If the device does not answer then contact your network administrator.

→ Further information, see Document [1] «Operating Instructions MICRO PANEL XV-1x2», Chapter «Installation».

→ Further information, see Document [2] «MN05010007Z System Description Windows CE».

3 The first PLC Program

If you would like to use the device without the internal PLC functionality then please jump over this chapter and continue with Chapter «4 The First GALILEO project».

This chapter consists of a basic application which shows the programming with XSoft-CoDeSys-2 and the special communication between PLC and HMI in a touch panel XV100.

3.1 PLC License Point on the Device

The PLC runtime needs additional license points on the device. The XV100 devices of the classification type XV-1x2-...-PLC, XV-1x2-...-TVRC... and XV-1x2-...-TWRC... are delivered with 240 license points and are intended for operation as HMI devices and as control devices (HMI-PLC).

3.2 Installation of the PLC Runtime System on the Device

The XV100 devices do not contain the PLC runtime. The PLC runtime can be transferred to the device with the tool "TargetFirmwareWinCE". This tool can be started from the windows environment or from inside the XSoft-CoDeSys-2 development environment (see Chapter 3.4).

Requirement : The XSoft-CoDeSys-2 Software (CoDeSys) must be installed correctly on the PC. You can find the current XSoft-CoDeSys-2 software on our homepage (<u>www.eaton-automation.com</u>) under <DOWNLOADS → SOFTWARE → XSoft-CoDeSys-2>. For unrestricted operation of XSoft-CoDeSys-2 you need a license code. Please contact your sales vendor for this.

Perform the Installation from the Windows Surface:

Start the tool "TargetFirmwareWinCE_V2.4.8" on your PC through clicking:

Start \rightarrow Programs \rightarrow Eaton \rightarrow CAA-Targets \rightarrow XC-XV-Targets V2.3.9 SP2 \rightarrow Firmware \rightarrow XV-1xx

After starting the setup the follow the dialog until the following window appears.

🖥 Setup - TargetFirmwareWinCE			
Installation Type Select Installation Type			
Please specify the Installation Type, then cli	ck ''Next''.		
FTP Installation			
C Installation to a removable drive			
Installation to a local directory			
Ex-Rel			
English	< <u>B</u> ack	<u>N</u> ext >	Cancel

Select the desired installation type and execute the next steps:

FTP Installation (suggested routine):

The installation of the PLC runtime is done over FTP.

Required steps:

- Ensure that the device is connected to your PC via ethernet.
- Start the device.
- Start the FTP-server on the device by clicking *Start* → *Programs* → *Communications* → *FTP Server.*
- Continue the setup on the PC until the following dialog window appears.

🚰 Setup - TargetFirmwareWinCE	
Select components Which components should be installed?	
Select the components you want to install. - Lick "Next" when you are ready to continue.	
Operating System O Windows CE 5.0 Core Boot behaviour	OS 2.24.1 (3312)
L. V autoexec.bat	
PLC Runtime System	
└── ▼ PLC V2.4.8 └── ▼ Web Server V2.4.8	
English	
www.eaton-automation.com	< <u>B</u> ack <u>N</u> ext> Cancel

- Select *"Boot behaviour*". **Please note, that the operating system is not selected.** For the installation of the operating system, see Chapter 5.2.
- Click on the button "Next>".

🚰 Setup - TargetFirmwareWinCE			_ 🗆 🗙
Destination Select destination			Ð
Select the destination, where you want to in =Click "Next" when you are ready to continu	ie.	ents.	
Internal storage (Destination: \InternalS)	torage		
C Removable drive (Destination: \Storage	Card)		
English			
www.eaton-automation.com	< <u>B</u> ack	<u>N</u> ext >	Cancel

 Select the destination: "Internal storage" if the PLC runtime and PLC project should be stored internally on the device. Select "Removable drive" if the PLC runtime and PLC project should be stored on the SD-card and should also be started from the SD-card (also see Chapter 5). Click the button "Next>".

🐻 Setup	- TargetFirmwareWinCE	. 🗆 🗵
	Parameters hat are the FTP parameters?	
Ple	ease specify the login information and click "Next" to continue.	
IP.	Address:	
19	32.168.0.72	
Us	ername:	
an	nonymous	
Pa	issword:	
gu	uest	
English —		
	ww.eaton-automation.com < <u>B</u> ack <u>N</u> ext > Can	icel

- Enter the IP-address of the target device. Continue the setup procedure.
- After finishing the installation restart the device to start the PLC runtime.

Installation to a Removable drive (for operation from SD Card (see Chapter 5):

The installation of the PLC runtime applies directly to the Removable drive (SD card) on the PC. Required steps:

- Connect the Removable drive to your PC.
- Continue the setup routine on your PC until the following dialog appears.



- Select the Removable drive root in the directory through selecting the disk (disk character).
- Continue with the setup.

🖶 Setup - TargetFirmwareWinCE	
Select components Which components should be installed?	
Select the components you want to install. Click "Next" when you are ready to continue.	
C Windows CE 5.0 Core	OS 2.24.1 (3312)
✓ Boot behaviour ↓ ✓ autoexec.bat ✓ PLC Runtime System ↓ ✓ PLC V2.4.8 ↓ ✓ Web Server V2.4.8	
English	< <u>N</u> ext > Cancel

- Select "Boot behaviour". Please note, that the operating system is not selected. For the installation of the operating system, see Chapter 5.2.
- Click on the button "Next>".
- After completing the installation, put the removable drive back in the device. (The device has to have power off).

- Restart the device to start the PLC-runtime.

Installation to a local Directory:

All files of the PLC runtime will be installed to a local directory on your PC.

Required steps:

- Fully complete setup.
- Copy the whole contents of the directory "...\XV-1xx\" (you can find it in the newly created directory on your PC) manually on the device under \InternalStorage\ or on the SD-card depending on the boot operation type (see Chapter 5)
- Restart the device to start the PLC-runtime.

After successful installation of the PLC runtime and reboot of the device, a status display for the PLC runtime will appear on the device (after clicking in the taskbar).



If a visualization is already installed on the device and if this visualization hides the status display, you can stop the visualization by pressing the CTRL button of the device.

3.3

Programming the PLC–Programs with XSoft-CoDeSys-2

Requirement : The XSoft-CoDeSys-2 software (CoDeSys) must be installed correctly on your PC and started. On the device the PLC runtime must be installed correctly.

Over menu File \rightarrow New, you can start a new project

Before you can start programming you have to select the device type in the Dialog window "Target Setting".

2 <mark>, XSoft-CoDeSys-2 - (Untitled)*</mark> File Edit Project Insert Extras Online Window Help	- 🗆 ×
Target Settings	
Configuration: None OK Cancel	
ONLINE	OV READ

Please select the target "XV-1xx-V2.3.9 SP2

Target Settings			×
Configuration:	XV-1xx-V2.3.9 SP2		V
Target Platform	Memory Layout Gen	eral Network functionality Visualizat	tion
<u>P</u> latform:	Intel StrongARM	Y	
Eirst paramete	r register (integer):	Last parameter register (integer):	Register for return value (integer):
RO	Y	R3 💌	RO
🔽 Intel byte	order		
			Default OK Cancel

In the dialog window that appears acknowledge with "OK".

In the following dialog window you can now generate a programming unit. In the shown example the new POU "PLC_PRG" in the programming language "ST" is generated.

New POU		×
Name of the new POU: Type of POU	PLC_PRG Language of the POU	OK Cancel
Function <u>B</u> lock Function <u>Beturn Type:</u> BOOL	C LD C FBD C SFC C SI C CFC	

After that you can open the POU "PLC_PRG" in the register "POUs" and write a basic line of code:

hmiCounter:=hmiCounter+1;

🥺 PLC_PRG (PRG-ST)	
0001 PROGRAM PLC_PRG	
0002VAR	
0003END_VAR	
	F
0001 hmiCounter:=hmiCounter+1;	
0002	
0003	
0004	
	<u> </u>

After entering "hmiCounter:=hmiCounter+1;" and pressing "Return" a dialog window for variable declaration appears. Select the variable type "INT" and press OK.

Declare ¥ariable			×
Class VAR	Name hmiCounter	Type]OK Cancel
Symbol list Global_Variables	Initial Value	Address	Concer
Co <u>m</u> ment:			☐ <u>B</u> ETAIN ☐ <u>P</u> ERSISTENT

In the declaration field the variable *"hmiCounter"* is displayed.

🎭 PLC_PRG (PRG-ST)	
0001 PROGRAM PLC_PRG	
0002VAR	
0003 hmiCounter: INT;	
0004END_VAR	
	►
0001 hmiCounter:=hmiCounter+1;	
0002	
0003	
	Þ

Select in the menu *Project* \rightarrow *Rebuild All* to compile the project. If the test program compiles error free then it is ready to be downloaded.

3.4

Installation of the PLC runtime starting out of XSoft-CoDeSys-2

The XV100 devices do not contain the PLC runtime. The PLC runtime can be transferred to the device with the tool "TargetFirmwareWinCE" This tool can be started from the windows environment or from inside the XSoft-CoDeSys-2 development environment (see Chapter 3.2).

Perform the Installation from the XSoft-CoDeSys-2 Development Environment:

Requirements: The target system in target system setting is correct.

- 1. Change to the register "Resources" in the object organizer window of your XSoft-CoDeSys-2 project
- 2. Select "PLC Configuration"
- 3. Select the register "Other parameters"
- 4. Start the installation of the runtime system by pressing the start button





Select in the following dialog the desired version (min V2.4.8) of the runtime system.

After the start of the setup (by double-click) follow the installation instructions in the dialog. For further explanations, see Chapter 3.2.

3.5 Download of the program to the Device

Select in the menu Online \rightarrow Communication Parameters and generate a new communication channel (New...).



Select *"TCP/IP (Level 2 Route")* from the possibilities and give the communication connection a name e.g. "MyPanel" and Acknowledge the dialog with *OK*.



Enter in the field "Address" the IP-address of your device (e.g. 192.168.0.72). To do this you have to double click on "localhost" and put in the IP-address and press the "return-key" to end the input. Acknowledge the dialog with OK.

Make sure that in the menu Online \rightarrow Simulation Mode is deactivated (no checkmark should be set).

Afterwards you can download the program on the device via Online \rightarrow Login. You can start the program with Online \rightarrow Run.

To have the PLC permanent on the device, you have to generate a boot project on the device. If this is not done then the program is lost when the power is turned off. To save a boot project on the device, make sure you are logged in (*Online* \rightarrow *Login*) and then select *Online* \rightarrow *Create boot project*.

Further topics to the PLC can be found in the helpful documentation to XSoft-CoDeSys-2.

3.6 Symbol-File Configuration

The communication between controller and a possible visualization is done over a symbolic address of the variables. To be able to do that a symbol configuration has to be generated. Furthermore the through this process generated symbol file can also be used as a variable import file for the visualization. Through the import of the symbol file in the visualization all generated variables name (symbols) in the PLC are known to the visualization and do not have to be entered again.

The symbol file is used as the basis of communication. The contents of the symbol file are configured in the PLC-development platform. When compiling the symbol file is then generated and when downloading the program to the PLC also the symbol file is downloaded.

Out of performance reasons it is suggested that only variables that are needed in the visualization should be exported to the symbol file. Thus the variable field should be structured. This can be applied as example by defining a global variable area where the variables are separated between variables for visualization and variables that are not used in the visualization.

Procedure:

In case you have not saved the PLC project yet, save the project via the menu File → Save as... on your PC.

Speichern u	nter		<u>?</u> ×
Speichern	Projects	- ÷ 🗈 (• 📰 🕇
Datairana a			
Datei <u>n</u> ame:	MyFirstPlcProgram		<u>S</u> peichern
Datei <u>t</u> yp:	MXpro Projekt (*.pro)	•	Abbrechen
		Lizenzinfo b	earbeiten

Generation of a new variable list:

- Under the project tree click on the register "Resources".
 - The resource-project tree will open.
- In the resource-project tree open the directory "Resource/Global Variables".

- XSoft-CoDeSys-2 MyFirstPLCProgram.pro [PLC_PRG (PRG-ST)] <u>- 🗆 ×</u> 🎭 File Edit Project Insert Extras Online Window Help _ 8 × 0001 PROGRAM PLC_PRG Resources 0002 /AR 🖻 🔄 Global Variable 0003 hmiCounter: INT; 🝘 Globale 0004 END_VAR Add Object 0006 🧑 Variabler • 🖽 📄 library SysLib 0001 hmiCounter:=hmiCounter+1; 🗄 🗀 library SysLib Copy Object 🖽 📄 library SysLib 0003 🖽 📄 library SysLib 0004 🗄 📄 library SysLib 0005 🕀 📄 library Util.lib Project database 🕅 Alarm configu 0008 " 🎁 Library Mana " 🛐 Log 0009 New Folder 0010 💼 PLC - Browse 0011 🔢 PLC Configur Collapse Node
- Click with the right mouse button the entry "Global Variables" and select "Add Object...".

In the dialog window that appears enter the desired name of the variable list and confirm with pressing OK.

.oading library 'C:\Programme\Gemeinsame Dateien\CAA-Targets\Eaton Automation\V2.3.9🔺

Lin.: 1, Col.: 1

.oading library 'C:\Programme\Gemeinsame Dateien\CAA-Targets\Eaton Automation\V2.3.@ .oading library 'C:\Programme\Gemeinsame Dateien\CAA-Targets\Eaton Automation\V2.3.9 .oading library 'C:\Programme\Gemeinsame Dateien\CAA-Targets\Eaton Automation\V2.3.9

Properties	<u>?</u> ×
Global Variable List	
Name of the global variable list: HMI_Variables Link to file	
Import before compile C Export before compile	
OK	Cancel

1013

Set up the symbol configuration for the symbol file:

🞑 Sampling Tra -

🚔 Target Settin

🔣 Task configu

🔍 Watch- and I

📯 Workspace

Show Call Tree

📄 POUs 📲 Data... 🐖 Visua... 👼 Reso.

Adds a new object to the list on the left side

 Ensure that the function "Simulation Mode" in the menu "Online" is not active (no checkmark is to be seen)

- Click in the menu Project → Options... and select the category "Symbol configuration" and activate the point "Dump symbol entries".
 - With the function "Dump symbol entries" a symbol file will be generated every time the project is compiled.
- Click in the menu *Project* → *Options…* and select the category "Symbol configuration" and activate the point "Dump XML symbol table". From GALILEO 8, this button must be activated.
 - With the function "Dump XML symbol table", a XML symbol table file will be generated every time the
 project is compiled.

Category: Load & Save User Information Editor Desktop Colors Desktop Desktop Image: Colors Directories Log Build Passwords Source download Source download Source configuration Database-connection

- Define from which objects the variables should be taken to export into the symbol file:
 - Click on the button "Configure symbol file...".
 - In general all objects are selected. That is why you should deactivate for all objects the option "Export variables of object".



- In the object tree open the subdirectory "Resources \ Global Variables".
- Select the variable list that you would like to export.
- Activate the option "Export variables of object" and confirm with OK.

Set object attributes	×
MyFirstPicProgram.pro POUs POL PLC_PRG (PRG) PResources P- Global_Variables P- Global_Variables P- Horay SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic lib 2 4.09 07:54:08: global variables P- Ibray SysLibFic libray SysLibFic libray P- Ibray SysLibFic libray SysLibF	OK Cancel
Export variables of object Export data entries Export data entries Export groutcure components Export array entries	

• Confirm the project options with *OK*.

Allocate the needed variables for the visualization to the global variables specified for visualization:

In the POU-project tree double click on the programming unit in which are the variables that you would like to allocate to the variable list.

<mark>&</mark> XSoft-CoDeSys-2 - MyFirstPLCProgram.pi	o - [PLC_PRG (PRG-ST)]	
🎭 Eile Edit Project Insert Extras Online	Window Help	_ 8 ×
`` ``````````````````````````````````	X 🗈 🛍 🙀 🙀	
E	0001/PROGRAM PLC_PRG 0002 VAR 0003 hmiCounter: INT; 0004 END_VAR 0001 hmiCounter:=hmiCounter+1; 0001 0002 0002 0003 0001 hmiCounter:=hmiCounter+1; 0002 0003 0004 0005 0005	<u>></u>
POUs Data 🄁 Visua 💭 Reso	I nading library 'C. Programme)Gemeinsame Dateien)C&A-Targets)Eaton Automation	V7 3 C
	Lin.: 3, Col.: 9	DV READ

Put the cursor in the variable that you would like to allocate.

- Click in the menu Edit \rightarrow Auto Declare...
 - The window "Declare Variable" will open.
- Select the class, Class", VAR_GLOBAL".

Declare ¥ariable			×
Class VAR_GLOBAL ▼ VAR_OUTPUT VAR_IN_OUT VAR_GLOBAL ▼ Comment	Name	Ivpe INT Address	CONSTANT CONSTANT EETAIN PERSISTENT
Select under "S	Symbol list" the variables	list you would like to	allocate to.
Declare ¥ariable			×

Class VAR_GLOBAL	<u>N</u> ame hmiCounter	Type INT	ОК
Symbol list Global_Variables Global_Variables HMI_Variables	Initial Value	<u>A</u> ddress	Cancel
			PERSISTENT

Confirm the adjustments with OK.

Compile and download the PLC project to the device:

- Click in the menu Project → Rebuild all to compile the project.
- Click in the menu Online \rightarrow Login to log into the device.
- Click in the menu Online → Run to start the PLC project on the device.
- Click in the menu Online \rightarrow Create boot project to save the project on the device.
- Click in the menu Online \rightarrow Logout to log off of the device.
- The performance of visualization (Refresh cycle) can be increased by grouping the individual SPS variables in data structures "Struct" or data fields "array". The data structures and data fields are transferred in a communication package between the XSoft-CoDeSys-2 runtime system and GALILEO runtime system, individual variables are sent in individual packages behind each other.

Further topics to PLC you may find in the helpful XSoft-CoDeSys-2 documentation.

4

4.1

The first GALILEO Project

It consists of a simple application which should show the projecting of the connection of the HMI to the PLC of the touch panel XV100.

Requirements: The GALILEO visualization software must be installed correctly. You can find the current GALILEO software on our homepage (<u>www.eaton-automation.com</u>) under <DOWNLOADS → SOFTWARE → GALILEO>. The XV100 devices are supported from GALILEO version V7.0.3 onward. For unrestricted operation of GALILEO you need a license code. Please contact your sales vendor for this.

Generate new Project

Start the GALILEO software. The first step is to generate a new HMI project.

Menu Project \rightarrow New.

In the now appearing window "New Project" you should first create a new project directory.

Example : MyFirst

This is used to generate a hierarchical overview when have more than one project.



Hereupon the folder must be opened. Following this you should enter in the input field the desired file name. Example : MyFirst

4.2 Select Device

The window "Panel Selection" is opened automatically when a new project is generated. It can also be opened via the menu Config \rightarrow Panel Type and at a later time edited.

Click "Panel Selection" and select the device type:

Panel Selection		? ×
Filter: - PC - GALILEO OPEN - XV - XV - 1xx - color - 10x - XV-102-80-35TQR	Display Size: Resolution: Portrait/Landscape: Number of Colors: Monochrome:	3.5 " 320 × 240 ✓ 65536
- XV-102-B2-35TQR - XV-102-B3-35TQR - XV-102-B4-35TQR - XV-102-B5-35TQR - XV-102-B6-35TQR - XV-102-06-35TQR - XV-102-00-70TWR - XV-102-00-70TWR - XV-102-04-70TWR - XV-102-06-70TWR - XV-102-06-70TWR - XV-102-06-70TWR - XV-102-08-70TWR - XV-102-08-7	Operating System: Interfaces: CAN Ethernet Local System Port	Windows CE
	ОК	Cancel

Confirm the adjustments with OK.

Panel Type	<u>? ×</u>
Panel Type	
Panel Selection	
The project is compatible for following	ng panels:
XV-102-B5-35TQR-10	
-Colors	Operating System
65536 💌	Windows CE 5.0
Resolution	Format
X-Resolution: 320	• Landscape
N Basel Mary Loro	C Portrait
Y-Resolution: 240	
	OK Cancel

For the selection field *"Format"* the option *Landscape* is chosen whereby the device will be used in horizontal operation.

4.3 Select PLC

The window "Select PLC" will also be opened automatically when a new project is generated. It can be opened over the menu Config \rightarrow Select Communication and edited later.

Depending on the device type CAN, MPI or RS232 different communication types are available. Select under "Add" the communication to the PLC.

The following example uses the integrated PLC as controller type. Also more than one controller can be selected. So that one PLC can be connected over MPI (Onboard) and another one to the internal PLC over *XSoft-CoDeSys-2*. To keep in mind is the different types of addressing the variables.

Select PLC	2
Firm / Model Info PLC Data	
Communication	
No. Port Board Type Model	Description
0 Ethernet CoDeSys XSoft-	CoDeSys-2
Add Remove Modify	Meta Data
Status Refresh [s]:	10
break[ms]:	0
Startup Delay[s]:	0
IP Address or Hostname:	localhost
	OK Cancel Help

Selection of the integrated PLC: XSoft-CoDeSys-2

With OK the new project is configured.

4.4 Generate Mask

The first step is to generate an empty mask (picture). Register card *Masks, Masks (standard)* \rightarrow select right mouse button *"New"*:



Give the mask a name e.g.: "Startmask".

The mask can be given specific properties like screen saver, colour, type, etc. These can be configured under the sub menu "Mask Settings"

Following this you can insert objects into the mask using the Objects Toolbar. Please use the help-menu to inform yourself about the single objects and their capability.





GALILEO help system with detailed examples and instructions to every object.

As an example you can find under: <Content / Demos / Fast Start> an animated guideline for your first GALILEO project.

4.5 Generate Variable Structure

In our small example we are displaying a numeral value of the PLC. For this we must first generate the used variables. This is accomplished over the register card *Tags*.

a1			*
		Ven Draw Objects Config Extras Build	
	A		+ 2
Tegs			X Startmask.msk x
	11×	···· ♥Tags @Phi ⊠GrPhi @Re	
<pre>dFilter> x Im by byt w wor dw dw f flor </pre>		New Tag New Aray Cyskoln Broto Ennew F2	
ab stri ab stri at stri a sy sys	大山田	Cup Catary Pater Colora	
		Eigendiage (mishali++ (lehvertastatur) Columetage (troubali++ (lehvertastatur)	
		Broperties	
	.45	Find tag Find/replace address Find/replace address Hove objects Search StrogeF	Find Results 1 3
		Import	- <u> </u>
Import tags	-	and an	

If the integrated PLC is used and the symbol file of the PLC was compiled right the variables names can be imported.

Change to the register card "Tags"; move the mouse cursor to any variable type e.g. "bit" and press the right mouse button. A dialog will open where you have to select "Import".

Select the symbol file of the PLC program as the Import file. You can find the symbol file in the same directory where the PLC program is saved on the PC. Confirm the dialog with pressing the "Start" button. Also see Chapter 3.6.

1	
Project Edit View Draw Ob	jects Config E
i 🔂 👌 🖬 💕 🖬 🖉 i 🗴 🎙	a 🖪 🤊 (*
🔽 🗆 I A 🔪 🗖 🔿 🗞	🔮 📮 💷
	1. 4. -
Tags 🛛 🔍 🛪	Start
💷 i 🖹: 😵 🏟 🙋 🗐 i 🍘 i	
<filter></filter>	
x bit	
by byte	
word	
dw dword	
···· f float	
error	
·····ab string ·····st struct	
± sy system	
	Find Results
	🔳 Compiler Me
	👬
Ready	

Tag Import	<u>?</u> ×
PLC Selection	
Select PLC for tag address:	
0 CoDeSys MXpro	~
- Import File	
C:\	:\MyFirstPlcProgram.SYF 💌
-Import in Structure	
Import all tags in this structure:	
Name of structure:	
	Start Cancel

Through the import of the PLC variable *"hmiCounter"* from Type *WORD* the variable is inserted into the tag list. The green marking of the variable shows that a addressing to the PLC has already occurred.

To use variables from another controller type or to use variables without using the import function you have to use the following procedure:



E.g. a byte variable:

Position the mouse cursor on the variable type "byte" and press the right mouse button and select "New Tag". Then enter the variable name. Thus the variable is generated but marked blue. The colour blue means that the variable has no address and thus has no possible communication to as PLC. This is how you generate a local visualization variable. With a double click on the variable a *Tag Settings* window to the variable will open.



In the *Tag Settings* dialog under the register card "Address" you can click on the Address "..." button and enter the address of the PLC. This address depends on the type of PLC selected. If you are communicating to the internal PLC you must also enter the name of the symbol file. (This only applies to global PLC variables.)

4 The first GALILEO Project

1			alieo 7.0.3(7879) - myfirst.prj*
Project Edit View	Draw Objects	Config	Extras Build Window Help
🗊 👌 🖬 💕 🗖	Tag-Settings		
	format Address	Limits U	nits Translation
臣司帝直		1	Pood Write , Siemens - MPI:
ags	Name Typ	OnC	Setting address ? X ple M/S Address
I E: 😵 🏟	bByte1 byte		DB%d.DBB%d •
Filter>			D8%dl.DE8%d M8%d
x bit			AB%d
by byte by bByte1			EB%d 5T%d:DB%d.DBB%d
w word			ST%d:MB%d
dw dword			5T%d:AB%d 5T%d:EB%d
- f float - e error			
ab string			
st struct			
system			La contra de la co
			Clear Address Cancel OK
			li.
	L		
1			OK Apply Cancel Help
			Tippoy Carried Trop
sady			

When communicating to another controller the address has to be entered specific to the protocol. In the dialog "Setting address" you can see and select the possible nomenclature needed. According to the desired nomenclature the following input fields for addressing the variables are possible.

Setting a	address		<u>? ×</u>
DB%d.DBB%	%d		-
DB	12	04095	
.DBB	144	065534	
DB12.DBB14	14		
Clear	Address	Cancel	ок

The displayed example shows the address of a variable for a S7 controller over MPI. The nomenclature of a variable is selected out of the data block of the controller. The address is herewith select as DB12 byte 144.

	Format A			0.0.0			-	
Tags	Type	On Demand	Read At Startup	Polling [s]	Write On Demand	Epoblo	Siemer M/S	ns - MPI: Address
ays 그 1 🗐 😵 🖓	byte			fast		X	Master	DB12.DBB144
<filter></filter>								
主 w word		Please use the context menus (press right mouse button) of the different grid areas.						
			(pres	ss right mo	use buttor	n) of		

After following the address the variable in the variables list is marked green (=addressed).

4.6 Generate Display Object

Insert an object of the type "Value Entry / Display" in the start mask:

To do this you have to click in the object list on 2 and then draw via mouse and pressed mouse button the object in the desired size and position on the Startmask.



Through a double click on the new generated object field the property window appears. Select from the Tag list the desired variable and confirm the dialog with *OK*.

🔜 Value Enti	y / Display				x
General Si	ze / Position Visibility Col	or/Font			
Tag:	w hmiCounter			- 🕨 🗆	Delay
Address:	x bit by byte				Double Click
Unit:	w word w hmiCounter w dw dword f float			3	2767
Keyboard:	e error ab string			3	2767
	st struct sy system		LOWELLIN		2768
			Min.:	-3	2768
.73		OK	Apply	Cancel	Help
2	- = X				
---	---				
Project Edit View Draw Object	ts Config Extras Build Window Help				
1 🖸 👌 🖬 💕 🖬 🖉 I 🖇 🗅	🛍 🌱 🐃 📾 🖥 😨 🕫 🔯 🕍 🕨 🤣 🛛 Language 00 👘 👻				
	8 🔋 💷 🔀 🚍 12 📾 🖙 11 🖄 🌍 🕞 🖪 🧭 🕫 🖓 👘				
: [:] 규 프 그 그	a 💁 🗣 🎬 🗰 100% - * 💢 🍇 \$ \$ \$				
	☐ Startmask.msk* × 🔹				
💷 (E) 🤻 🏟 🖄 🗐					
<filter></filter>					
x bit by byte	-88888				
🕀 w word					
dw dword f float					
e error					
ab string st struct					
Provide and a second					

Value Entry / Display object with linked variable. (-88888)

We have finished our small project and now want to go to the next step of the project; compiling and downloading to the device.

4.7 Compile Project

Via the menu *Build* \rightarrow *Compile* or over the button the project will be compiled. The compiling procedure is protocolled in a display window. Eventual errors will be displayed red. Through scrolling the detailed error message can then be read.



4.8 Simulate Project on the PC

Via menu Build \rightarrow Start Project Inspector or over the button \blacktriangleright you can start the simulation of the project on your PC.



PC Simulation of the project (Project Inspector)

4 The first GALILEO Project

4.9 Download Project to the Device

4.9.1

Now the generated project should be downloaded to and started on the device.

Start FTP-Server on the Device

To get a connection between the PC and the device you must start the FTP server on the device. Select on the device: Start \rightarrow Programs \rightarrow Communication \rightarrow FTP Server

My Device			
FTP Server	My De	TP Server V2.24.1	2 X b Hide word Settings
	2 Start) 京司上 12:23

- The FTP server can also be started automatically when the device is booted. To change the Window CE start up behavior please look in the GALILEO help "Micro Panels with Windows CE Topics".
- → Further information, see Document [2] «MN05010007Z System Description Windows CE».
- → Further information, see Document [3] «MN05010009Z System Description Networks in Brief ».

4.9.2

Setup FTP Path in GALILEO

To be able to download the project to the device the parameters for the project transfer to the device must be generated. Change to the download dialog via the menu *Build* \rightarrow *Download* (*local, FTP*) or over the button

Download		? ×
Project Path:	c:1	Browse
Local/FTP Path:		Local Path
	Clear before download Recipe Data	ETP Path
	Password Data	Memory
	Source project as zip Components	Download
		⊆lose

In the window "Download" click on the button "FTP path". The window "FTP Connections" will appear.



Click on "New Connection". The window "Properties : FTP-Connection" will appear.

Properties: FTP-Connec	tions	<u>? ×</u>
Title :	MyPanel	_
Server / IP-Address :	192.168.0.72	
User Name :	anonymous	
Use Password :		
Path :	\InternalStorage	Browse
	OK	Cancel

Enter a title, the IP-address of the device and the path for the download to the device. With a click on "*Browse*" you should already find the path of the \InternalStorage of the device. But for this an active connection and the IP-address of the device must exist. Alternatively you can switch to the directory \StorageCard (SD card) (see Chapter 5)

Click on "OK" to save the new parameters.

The connection with its title should now be selectable. Click on the desired connection and confirm with "Close".

FTP-Connections	? ×
MyPanel	[New Connection]
	Edit
	Delete
	Сору
	Close
	Liose

The selected FTP path can now be seen in the field "Local/FTP path".

Download		<u>? ×</u>
Project Path:	c:\	Browse
Local/FTP Path:	FTP: MyPanel	<u>L</u> ocal Path
	Clear before download Recipe Data Password Data	ETP Path Memory
	Source project as zip Components	<u>D</u> ownload ⊆lose

4.9.3 Downl

Download of a Project

After the visualization project has been generated and compiled and the target settings have been completed you can now start the project download to the device. For this select the menu *Build* \rightarrow *Download* (*local*, *FTP*) or press the button

The Download dialog appears.

Download		? ×
Project Path:	c:\	Browse
Local/FTP Path:	FTP: MyPanel	Local Path
	Clear before download Recipe Data	ETP Path
	Password Data	Memory
	Source project as zip Components	Download
		⊆lose

Start the project download over the button "Download". During the project transfer you can see the progress. Eventual you will be asked if you want to also download updates of the operating system or visualization runtime (GRS) over dialogs.

Transfering project
/InternalStorage/appl/fonts/Tahoma.ttf 25%
Cancel

If the project transfer is completed the following dialog will be displayed. Select now "*Start GRS*" (GRS = GALILEO Runtime System) to start the visualization project on the device.

Galileo	×
Project 'myfirst' transfered to /InternalStorage/ !	
Do you want to reboot the HMI panel or restart the Runtime GRS?	
HMI reboot Cancel	1.



While the GRS starts status information will be displayed. Following that your designed mask will be displayed.

Display of the start mask from the project *MyFirst*. When the PLC program is started on the device the value must be constantly changing.

If there is no connection to the PLC then a cyclic error message will be displayed with the information which variables are without communication.



Operation from the Internal Flash or SD-Card

XV100 devices which are equipped with an optional SD-card can optionally operate from internal flash as also from SD-card.

Operation from the SD-card:

- The OS that is stored on the SD-card is loaded
- The runtime for HMI and PLC are started from the SD-card
- The HMI and PLC project is stored on the SD-card

5.1

5

Switch between Booting from the Internal Flash or SD-Card

Turn on the power of the device. If an info-window appears after booting, close it.

As soon as Windows CE has booted press the *Start button* and change to the menu *Programs* \rightarrow *Control Panel.*

My Device							
🔅 Favorites	Communication	•					
	Control Panel						
Start		**			_		_
			Eile View	* }}		? >	×
		_	BootDevice	-	Display	InputPanel	
			Keyboard	License	Network		
			Keyboard	License	Network	Owner	
			StorageMa	. System	⊕ Touch		

Double-click the icon "BootDevice".

File View ? X
BootDe Boot from: and and a state of the sta
InternalStorage
StorageCard r
StorageMa System Touch 💌

You can select from the following settings:

Boot from: InternalStorage

Herewith the device boots from the device internal stored OS.

→ Further information, see Document [2] «MN05010007Z System Description Windows CE», Chapter «Startup behavior».

Boot from: StorageCard

Herewith the device boots from the SD-card stored OS. → Further information, see Document [2] «MN05010007Z System Description Windows CE», Chapter «Startup behavior».

5.2

Version Change of the Operating System

The operating system of the XV100 is stored on the internal flash memory in delivery condition. The usage of newer function can require a version change of the operating system. In general this is done through the programming software GALILEO or XSoft-CoDeSys-2. GALILEO (from version V7.2.0 onward) checks while downloading a project the operating system version and offers over a dialog a download of a different version of operating system.

Older version of the software such as (Version of GALILEO previous to V7.2.0 or MXpro versions) must not be used for an operating-system download. Exceptions are XV102 3.5 devices.

→ For a manual change of the operating system, see Document [2] «MN05010007Z System Description Windows CE», Chapter «Startup behavior».

6 File Update via SD-Card (Autolaunch)

XV100 devices (OS Version V2.24.0 and upwards) can run an update automatically via an SD card. The SD card must be configured to this end.

In the case of an update-from-file the following functions can be fulfilled:

- Update of the Windows CE OS Version
- Installation or update of the GALILEO and XSoft-CoDeSys-2 runtime software.
- Project installation or update of visualization and SPS projects.
- Installation and update of any files

The device recognizes the insertion of an SD card and executes the configuration actions. In order to configure the update, the file AutoLaunch.inf is used. This file also enables configuration of whether the actions should be executed on insertion of the SD card or only on starting the device. For file-update or copying of the files a separate .BAT file is started. In this .BAT file the command-line instructions for the desired actions can be defined.

➔ Further information, see Document [2] «MN05010007Z System Description Windows CE»:

- Chapter« AutoLaunch»
- Chapter «Extended Copy (ExtCopy)»

We wish you lots of success and fun with your XV100.

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customized, integrated solutions to solve our customers' most critical challenges.

Our focus is on delivering the right solution for the application. But, decision makers demand more than just innovative products. They turn to Eaton for an unwavering commitment to personal support that makes customer success a top priority. For more information, **visit www.eaton.com/electrical.**



Eaton Corporation Electrical Sector 1111 Superior Avenue Cleveland, OH 44114 USA Eaton.com

© 2013 Eaton Corporation All Rights Reserved Printed in USA Publication No. MN04802013Z-EN / Z13334 February 2013 Eaton is a registered trademark of Eaton Corporation.

All other trademarks are property of their respective owners.