

# ThinklO<sup>™</sup> - P

# Premium DIN Rail PC for Fieldbus and IO Systems

Manual ID: 29867.06, Rev. Index 01 19 March, 2007

## **PROGRAMMING ASSISTANCE GUIDE**

CoDeSys PLC

Think of the second sec



The product described in this manual is in compliance with all applied CE standards.

# **Revision History**

Publication Title:		ThinkIO™ - P: Programming Assistance Guide - CoDeSys PLC			
ID Number:		29867.06			
Rev. Index		Brief Description of Changes	Date of Issue		
01	Initial issue		19 Mar, 2007		

## Imprint

Kontron Modular Computers GmbH may be contacted via the following:

#### MAILING ADDRESS

Kontron Modular Computers GmbH

Sudetenstraße 7

D - 87600 Kaufbeuren Germany

**TELEPHONE AND E-MAIL** 

+49 (0) 800-SALESKONTRON

sales@kontron.com

For further information about other Kontron Modular Computers products, please visit our Internet web site: www.kontron.com

# **Table of Contents**

1.	Сору	/right	. 1
2.	First	Steps with CoDeSys on ThinkIO-P	. 1
З.	Virtu	al Console	. 2
4.	Ethe	rnet Network Configuration	. 2
	4.1	Interfacing	. 2
	4.2	Providing a Route Between the Windows Host PC and the ThinkIO-P	. 3
5.	CoD	eSys Installation and Settings	. 4
	5.1	Installation of CoDeSys IDE on a Host PC (Windows)	. 4
	5.2	Installing the CoDeSys Target Support Package (TSP)	. 9
6.	Work	king with the CoDeSys IDE	12
	6.1	Creating a New Project	13
	6.2	PLC Configuration (I/O)	16
	6.	2.1 Configuring K-Bus I/O Modules	16
	6.	2.2 Configuring a Fieldbus	22
	6.3	Writing a Test Application	25
	6.4	Creating a Visualization	26
	6.5	Compiling the Project	26
	6.6	Setting Up the Gateway Server for Communication	27
	6.7	Download the Program	29
	6.8	Start the Program	30
7.	Tran	sfering an Application to the ThinkIO-P	30

This page has been intentionally left blank.

# 1. Copyright

Copyright © 2007 Kontron Modular Computers.

Kontron Modular Computers makes no representations or warranties with respect to the contents or use of this manual, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose.

Kontron Modular Computers makes no representations or warranties with respect to this CoDeSys PLC package, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose.

Permission is granted to make and distribute verbatim copies of this manual provided that the copyright notice and this permission notice are preserved on all copies.

Permission is granted to copy and distribute modified versions of this documentation under the conditions for verbatim copying, provided also that the entire resulting derived work is distributed under the terms of a permission notice identical to this one.

Permission is granted to copy and distribute translations of this documentation into another language, under the above conditions for modified versions.

Trademarks, registered trademarks, and trade names are the property of their respective owners.

# 2. First Steps with CoDeSys on ThinklO-P

This document provides basic information as well as step by step procedures for creating a new CoDeSys target, setting up the target settings, compiling, downloading, and starting a CoDeSys program within the CoDeSys workbench (IDE). For further details refer to the CoDeSys documentation.

The following hardware, software, and documentation are required in order to perform the procedures provided in this document:

- a Host PC with either Windows XP or Windows 2000 operating system
- a ThinkIO-P configured with appropriate WAGO IO modules and a PROFIBUS fieldbus interface
- a network connection between the Host PC and the ThinkIO-P (1-to-1 patch cable or a crossed Ethernet cable)
- a DVD from Kontron containing the CoDeSys IDE and CoDeSys ThinkIO-P target files
- a USB keyboard for the ThinkIO-P
- a monitor (TFT or CRT) and either a DVI cable or a cable adapter DVI to VGA and a VGA cable for the ThinkIO-P
- CoDeSys manuals

# 3. Virtual Console

ThinkIO-P (for CoDeSys with Target Visualization) supports two consoles:

- Console 1: login text console (operating system command line)
- Console 2: graphic console (used for CoDeSys Target Visualization)

The default resolution of the graphic console is 640 x 480 pixels, 16-bit color depth. To switch between the consoles, use the keys <ALT > <F1> and <ALT > <F2>. The resolution can be changed with the "vgaconfig" tool or the resolution can also be changed via Web Based Management. The settings for graphic console must corrrespond to those supported by the monitor display in use.

## 4. Ethernet Network Configuration

#### 4.1 Interfacing

The ThinkIO-P ports X8 and X9 provide interfacing for an Ethernet network. The port X8 is configured for BootP and the port X9 is configured with the IP address of 192.168.0.50 at the factory.

Use of the Ethernet interface requires that the IP addresses of the local host PC and the ThinkIO-P be known, and the IP address of the gateway if the ThinkIO-P and the local host PC are in different networks. If requred, consult the system administrator for this information.

The following figures illustrate the basic types of network connections that are possible with the ThinkIO-P.



#### Simple ThinkIO-P to Local Host PC (development system) Configuration

The addresses indicated in these figures are for illustration purposes only and do not necessarily represent the actual development situation.

**CoDeSys PLC** 



#### **Standard Network Configuration**

If the IP address of the ThinkIO-P is known and it is required to change the address, the ThinkIO-P maybe accessed via Web Based Management. In any event, the IP address of the ThinkIO-P is required to download a CoDeSys application.

# 4.2 Providing a Route Between the Windows Host PC and the ThinkIO-P

If the host PC and the ThinkIO-P reside in two different networks, a logical route between the networks must be established. This is accomplished using the DOS line command "route" on the Windows host PC.

In the following example, 192.168.52.220 is the IP address of the ThinkIO-P, and the address of the gateway for this network is 193.102.136.40. The command is as follows:

route ADD 192.168.52.220 MASK 255.255.255.0 193.102.136.40

target sub-netmask gateway

To verify the communication path, issue a "ping" command.



# 5. CoDeSys Installation and Settings

### 5.1 Installation of CoDeSys IDE on a Host PC (Windows)

Perform the following procedures to install the CoDeSys IDE on an Windows application development system.

PROCEDURE START: Installation of CoDeSys

- 1. Insert the DVD which contains CoDeSys IDE
- 2. Run the "setup.exe" in the CoDeSys directory
- 3. Choose a language and then click OK

Wählen Si	e eine Setup-Sprache aus 🛛 🔀					
2	Wählen Sie die Sprache dieser Installation aus der unten aufgeführten Auswahl aus.					
	Englisch					
	OK Abbrechen					

- 4. If requested by the InstallShield Wizard, close all running applications, and then click **OK**
- 5. To continue, click Next





- 6. Select the installation destination folder
  - to select the default folder, click Next
  - to select a different folder, click **Browse** and select an appropriate folder or create a new folder, and then click **Next**

InstallShield Wizard	×
Choose Destination Location Select destination folder where Setup will inst	tall files.
Setup will install CoDeSys for Automation Allia Each component will be installed in a subfold	ance in the following folder. Ier.
To install to this folder, click Next. To install to another folder.	o a different folder, click Browse and select
Destination Folder C:\Programme\3S Software	Browse
InstallShield	
	< Back Next > Cancel

- 7. Select CoDeSys components
  - · to select components, set or delete selections as required
  - to continue, click Next

The selection indicated below is minimal but sufficient for an installation.

Choose the components Setup will install.		Abbrever 102
Select the components you want to instal install. CoDeSys V2.3 CoDeSys base component 3S Licensing Manager CoDeSys SoftMotion CoDeSys HMI Communication modules CoDeSys Gateway Server CoDeSys OPC Server CoDeSys ENI Server CoDeSys SP BTE	I, and clear the co	mponents you do not want to Description IEC6-1131-3 Programming system for controller. with different programming languages, codegenerators, Online functions, integrated visualization, inclusive libraries, help, documentation, examples,
Space Required on C: Space Available on C:	70400 K 9550272 K	

8. To accept the proposed program folder click Next



- 9. Examine the Configuration Overview
  - if satisfactory, click Next to continue
  - to revise, click Back and modify as required

InstallShield Wizard			×
Configuration overview		Abbeden	The Loss
Please check all settings.		515-	and the
Selected component: CoDeSys V2.3.5.0 CoDeSys base components CoDeSys Gateway Server V2.3.5.0			<u> </u>
Destination folder: C:\Programme\3S Software Program Folder: 3S Software			
<u>र</u>			<b>▼</b>
InstallShield			
	< Back	Next >	Cancel

ThinklO<sup>™</sup>- P

The InstallShield Wizard copies all of the required files from the DVD disk and installs all Target files.



10. Click **OK** to complete the installation of xml4



The Microsoft XML Parser is now installed. This is required due to the fact that there may be an older version of the parser installed which will not operate with this version of the CoDeSys software.

11. Click Finish to exit the InstallShield Wizard



**PROCEDURE END:** Installation of the CoDeSys components is now complete.

**CoDeSys PLC** 

The installation in the folder "Programme" or "Program Files" now should look like this:

![](_page_11_Picture_4.jpeg)

ThinklO<sup>™</sup> - P

![](_page_12_Picture_3.jpeg)

Of special interest is the "Targets\KONTRON" folder:

SKONTRON				
Datei Bearbeiten Ansicht Favor	iten Extras	?		<b>1</b>
🗘 Zurück 👻 🤿 👻 🔂 🔯 Sucher	Ordner	3 8 8	X n	<b>Ⅲ</b> ▼
Adresse 🗀 C:\Programme\35 Softwar	e\CoDeSys V2.	.3\Targets\KONTR	.ON 🔻 (	∂Wechseln zu
Dateiname				
Browser				
Error				
🗀 Help				
🚞 Hook				
🗀 Libraries				
DLCconf				
🚞 ReadMe				
DaskConf				
ThinkIO-C_EC1COM.trg				
🗃 ThinkIO-C_EC1COM_128.trg				
🔄 ThinkIO-C_EC1COS.trg				
🖻 ThinkIO-C_EC1COS_128.trg				
MinkIO-C_EC1DNM.trg				
MinkIO-C_EC1DNM_128.trg				
MinkIO-C_EC1DNS.trg				
MinkIO-C_EC1DNS_128.trg				
MinkIO-C_EC1DPM.trg				
MinkIO-C_EC1DPM_128.trg				
MinkIO-C_EC1DPS.trg				
MinkIO-C_EC1DP5_128.trg				
MinkIO-C_NOFB.trg				
ThinkIO-C_NOFB_128.trg				
ThinkIO-P_EC1COM.trg				
ThinkIO-P_EC1COS.trg				
ThinkIO-P_EC1DNM.trg				
MinkIO-P_EC1DNS.trg				
MinkIO-P_EC1DPM.trg				
ThinkIO-P_EC1DPS.trg				
ThinkIO-P_NOFB.trg				
•				Þ
29 Objekt(e)	151 KB	🖳 Arbeitsplat:	z	//

Variations of ThinkIO-P differ depending on the support provided for field busses:

- K-Bus without a field bus (NOFB) in the file "ThinkIO-P\_NOFB.trg"
- K-Bus plus PROFIBUS DP Master on EC1 chip (EC1DPM) in the file "ThinkIO-P\_ EC1DPM.trg"
- etc.

When installing from the KONTRON distribution DVD, all required ThinkIO-P targets will be installed automatically (see files ThinkIO-P\_ ... .trg in the directory above).

### 5.2 Installing the CoDeSys Target Support Package (TSP)

Normally all implemented ThinkIO-P targets are installed automatically when installing CoDeSys from the Kontron DVD.

If for some reason targets are to be installed afterwards, then first deinstall the old targets using the InstallTarget tool from 3S and then delete the empty folders.

Before proceeding, it is recommended to read the "CoDeSys\_V23\_E.pdf" document. The fundamentals of the Target Support Package (TSP) are described in detail in this document.

The variations of ThinkIO-P differ in the support of field busses. There are different variations:

- K-Bus, but no field bus (NOFB)
- K-Bus plus PROFIBUS-DP Master on EC1 chip (EC1DPM)
- K-Bus plus PROFIBUS-DP Slave on EC1 chip (EC1DPS)
- K-Bus plus CAN open Master on EC1 chip (EC1COM)
- K-Bus plus CAN open Slave on EC1 chip (EC1COS)

To install the TSP for one of the supported variations of ThinkIO-P follow these steps:

#### PROCEDURE START: Target Installation

- 1. Start the program "InstallTarget.exe"
  - click the Start button
  - select Programs, then 3S Software, then CoDeSys V2.3, then click InstallTarget

If no targets have been installed, the InstallTarget page is completely empty.

🔁 InstallTarget			x
Installation directory:			
Possible Targets:	Insta	alled Targets:	
	Open	Kontron Modular Computers GmbH 3S-Smart Software Solutions GmbH	
	Install		
	Remove		
		Close	

2. Click Open to select and open a ".tnf" file

Öffnen		<u>? ×</u>
Suchen in:	🔁 KONTRON	- 🗢 🗈 🖶
Browser Error Help Hook Libraries PLCconf	ReadMe TaskConf ThinkIO.TNF ThinkIO_128.TNF	
Dateiname: Dateityp:	ThinkIO_P.TNF Target Information File (*.TNF)	Öffnen Abbrechen

3. Click the file to be installed and then click Open

The ".tnf" file for the ThinkIO-P is "...\Targets\KONTRON\ThinkIO\_P.tnf".

<b>InstallTarget - C:\Program Files\Col</b>	DeSys\CoDeSys_V2	350\Targets\KONTRON\ThinkIO_P 🗙
Possible Targets:	Open Install Remove	Installed Targets:
		Close

4. At the top of the InstallTarget box the installation directory is displayed. Ensure that the path indicated is correct for the CoDeSys installation, i.e.

"C:\Programme\3S Software\CoDeSys V2.3\Targets\KONTRON\THINKIO\"

If it is not correct, revise it as required.

- 5. From the **Possible targets** list, select the target to be installed, then click **Install**
- 6. As required, repeat step 5 for every target to be installed, then click **Close** to exit the **InstallTarget** box

**PROCEDURE END:** Installation of the targets is now complete

# 6. Working with the CoDeSys IDE

The ensuing sections which serve to illustrate how to work with the CoDeSys IDE are based on the following sample system.

![](_page_15_Figure_6.jpeg)

#### Sample System for CoDeSys Application Development

**CoDeSys PLC** 

![](_page_16_Picture_3.jpeg)

#### 6.1 Creating a New Project

To create a new project, perform the following:

PROCEDURE START: Create new project and select target settings

- 1. Click the Start button
- 2. Select Programs, 3S Software, CoDeSys V2.3, and then click CoDeSys V2.3

🥺 CoDeSys	
File Edit Project Insert Extras Online Window Help	
	OV READ

3. Select File and then click NEW

Target Settings						×
Configuration:	None	J [	OK	1 🗆	Cancel	
	Kontron_ThinkIO-C_EC1DPS			· _		
	Kontron_ThinkIO-C_NOFB					
	Kontron_ThinkIO-P_ECICOM					
	Kontron_ThinkIO-P_EC1DNM					
	Kontron_ThinkIO-P_EC1DNS					
	Kontron ThinkIU-P ECIDPM					
	Kontron Thinklo-P NOFB	•				

4. Select the project target and then click **OK** 

Target Settings		×
Configuration:	Kontron_ThinkIO-P_EC1DPM	
Target Platform	Memory Layout General Network functionality Visualization	1
Platform:	Intel 386 compatible	
🔽 Floating po	int processor	
	Default OK Cancel	

5. Select the Visualization tab

Target Settings	×
Configuration: Kontron_ThinkIO-P_EC1DPM	T
Target Platform Memory Layout General Network func	tionality Visualization
Display width in pixel: 640	Supported fonts in the target:
Display height in Pixel: 480	
🔲 Use 8.3 file format	
🔲 Activate system variable 'CurrentVisu'	▼ Target visualization
🗖 Simplified input handling	
✓ Web visualization	
	Keyboard usage for tables
	Default OK Cancel

6. Type or select the resolution of the target system display, select **Target visualization**, select **Web visualization**, then select **OK** 

When designing the Target Visualization, the display resolution should also be considered in the CoDeSys project as well as the ThinkIO-P settings.

ľ

ew POU		×
Name of the new POU:	PLC_PRG	ОК
Type of POU	Language of the POU	Cancel
Program	OL	
C Function Block	O LD	
C Function	C FBD	
Return Type:	C SFC	
BOOL	● ST	
	C CFC	

7. Accept the selections as indicated or revise accordingly, then click **OK** 

🎭 CoDeSys - (Untitled)*	- O ×
File Edit Project Insert Extras Online Window Help	
0001 0002	
0003 0004	
0007	
	F
Lin: 1, Col: 1 ONLINE	OV READ

8. Now select File, then Save and enter an appropriate file name and click OK

**PROCEDURE END:** A new project has been created, given a name, and the target settings have been selected. The screen displayed after step 8 is the starting screen for the procedure in section 6.2.1.

### 6.2 PLC Configuration (I/O)

#### 6.2.1 Configuring K-Bus I/O Modules

On the left side of the CoDeSys main display window there is a box called the resources area, at the bottom of which there are four selection tabs. The right most tab is the **Resources** tab. The following procedure begins with the selection of this tab.

To add and configure K-Bus I/O modules using the K-Bus configurator, perform the following:

PROCEDURE START: Configuring K-Bus I/O modules

- 🍤 CoDeSys MyProj\_01.pro\* File Edit Project Insert Extras Online Window Help 🔄 POU: 🧕 PLC\_PRG (PRG-ST) PLC\_PRG (PRG) ROGRAM PLC PRG 0001 0002 AR 0003 END VAR 0004 • 0000 0003
  0004
  0005
  0006
  0006 0007 0008 0009 • .oading library 'C:\Programme\3S Software\CoDeSys V2.3\Targets\KONTRON\Libraries\ThinklO\SysLibTargetVisu.lib .oading library 'C:\Programme\3S Software\CoDeSys V2.3\Targets\KONTRON\Libraries\ThinklO\Standard.lib .oading library 'C:\Programme\3S Software\CoDeSys V2.3\Targets\KONTRON\Libraries\ThinklO\lecsfc.lib' 📄 P.... 🏪 D.... 🔁 V.... 🖧 R... 1 Lin.: 3, Col.: 1
- 1. Initial screen (same as in section 6.1, after step 8)

2. Click the Resources tab

![](_page_19_Picture_12.jpeg)

3. Double click PLC Configuration in the resources area

CoDeSys - MyProj_01.pro* - [PLC Configuration]     File Edit Project Insert Extras Online Window Help	× ×
Resources     Global Variables     Ibray Standard Ib 7.6.05 15.11     Ibray SYSLIB CALLBACK L     Ibray SysLib Target/Sub 7     Alam configuration     PLC Configuration     PLC Browser     PLC Configuration     Value And Recipe Manager     Vorkspace     Vorkspace     Vorkspace	Settings Automatic calculation of addresses: Check for overlapping addresses: Save configuration files in project: ThinkIO\SysLibTargetVisu.lib' ThinkIO\SysLibTargetVisu.lib' ThinkIO\Standard lib' ThinkIO\Standard lib' ThinkIO\Standard lib' ThinkIO\Standard lib'
	ONLINE OV (READ)

4. Double click **PLC Configuration** in the work space area to the right of the resources area, then right click **K-Bus**, then click the **Append Subelements** 

CoDeSys - MyProj_01.pro* - [PLC	Configuration] Online Window Help	
Besources     Global Variables     Global Var	PLC Configuration     KKBustFXd     Insert Element     Append Subelement     Replace element     Calculate addresses     Cut     Ctrl+X;     Copy     Ctrl+C     Paste     Delete     Del      Loading library 'C:\Programme\38 Software\CoDeSys V2.3\Targets\KONTRON\Libraries\ThinklO\SysLibTarget/Isu.lib' Loading library 'C:\Programme\38 Software\CoDeSys V2.3\Targets\KONTRON\Libraries\ThinklO\Standard.lib' Loading library 'C:\Programme\38 Software\CoDeSys V2.3\Targets\KONTRON\Libraries\ThinklO\Standard.lib'	e id: 11994 e id: 0 ess: %180 ess: %080
]	JONL	NE OV READ

Configuration			
I/O Module Catalogue:		Number of I/O Modules: 0 Selected I/O Modules:	
Digital Input     Digital Output     Analog Output     Counter     Secial Interface     Special Interface	Insert >>	Ѓт К-Ðus	
	Data Sheet		
	Import		

- 5. Select the input or output module which is to be added to the configuration:
  - Select the module to be added from the I/O Module Catalogue list
  - Click Insert
  - If more than one module is to be added to the configuration, repeat the above until all modules have been selected

The following screens indicate the selections required for the sample system.

		Number of 1/O Hoddles, 1	
I/O Module Catalogue:		Selected I/O Modules:	
🖃 🚔 Digital Input		🔁 K-Bus	
0750-0400 2 DI 24 V DC 3.0ms	Insert >>	0750-0400 2 DI 24 V DC 3.0ms	Т
0750-0400/0006-0000 2 DI 24 V DC 3.0ms	< C Delete		
0750-0400/0025-0000 2 DI 24 V DC 3.0ms /	<< Delete		-
0750-0401 2 DI 24 V DC 0.2ms			
0750-0402 4 DI 24 V DC 3.0ms			
0750-0402/0002-0000 4 DI 24 V DC 3.0ms			
0750-0402/0006-0000 4 DI 24 V DC 3.0ms			
0750-0402/0025-0000 4 DI 24 V DC 3.0ms / 1			
0750-0403 4 DI 24 V DC 0.2ms			
0750-0405 2 DI 230 V AC			
0750-0406 2 DI 120 V AC			
0750-0408 4 DI 24 V DC 3.0ms			
0750-0409 4 DI 24 V DC 0.2ms	Data Sheet		
0750-0410 2 DI 24 V DC 3.0ms / Proximity-Sv			
0750-0411 2 DI 24 V DC 0.2ms / Proximity-Sv			
0750-0412 2 DI 48 V DC 3.0ms			
0750-0412/0000-0001 2 DI 48 V DC 3.0ms w			
0750-0414 4 DI 5 V DC 0.2ms			
0750-0415 4 DI 24V AC/DC 20ms			
0750-0416 2 DI 120-230 V AC			
0750-0418 2 DI 24V DC 3.0ms / Diagnosis / A			
0750-0418/0000-0001 2 DI 24V DC 3.0ms / E			
0750-0419 2 DI 24V DC 3.0ms / Diagnosis			
0750-0422 4 DI 24V DC Pulse Extension	Import		
0750-0423 4 DI 24V AC/DC 50ms / Power Co -			
	Export		

#### PROGRAMMING ASSISTANCE GUIDE

		Number of I/O Modules: 2	
I/O Module Catalogue:		Selected I/O Modules:	
🖻 - 🔄 Digital Output		🔁 K-Bus	
0750-0501 2 DO 24V DC 0.5A	Insert >>	0750-0400 2 DI 24 V DC 3.0ms	_
0750-0501/0006-0000 2 DO 24V DC 0.5A	<< Delete	0750-0501 2 DO 24V DC 0.5A	
0750-0502 2 DO 24V DC 2.0A			_
0750-0502/0006-0000 2 DO 24V DC 2.0A			
0750-0504 4 DO 24V DC 0.5A			
0750-0504/0002-0000 4 DO 24V DC 0.5A			
0750-0504/0006-0000 4 DO 24V DC 0.5A			
0750-0504/0025-0000 4 DO 24V DC 0.5A / T			
0750-0506 2 DO 24V DC 0.5A (Diag)			
0750-0506/0006-0000 2 DO 24V DC 0.5A (Di			
0750-0507 2 DO 24V DC 2.0A (Diag)			
0750-0509 2 DO 230V AC 300 mA SolidState			
0750-0509/0006-0000 2 DO 230V AC 300 mA	Data Sheet		
0750-0512 2 DO 250V AC 2.0A Rel 2NO			
0750-0512/0002-0000 2 DO 250V AC 2.0A R			
0750-0513 2 DO 250V AC 2.0A Rel 2NO (Poti			
0750-0513/0000-0001 2 DO 250V AC 2.0A R			
0750-0513/0002-0000 2 DO 250V AC 2.0A R			
0750-0513/0006-0000 2 DO 250V AC 2.0A R			
0750-0514 2 DO 125V AC 0.5A Rel 2CO (Poti			
0750-0514/0006-0000 2 DO 125V AC 0.5A R			
0750-0516 4 DO 24V DC 0.5A (Neg)			
0750-0517 2 DO 230V AC 1.0A Rel 2CO (Poti			
0750-0519 4 DO 5V DC 20mA	Import		
0750-0520 2 DO Relais, 230V AC, 2a, Diode 👻	Event		
	Export		

6. Click OK to add the selected modules to the configuration

Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Help       Image: File Edit Project Inset Extras Online Window Help         Image: File Edit Project Inset Extras Online Window Extra Online Window Extremental Software(CoDeExtra Online Window Extremental Software(CoDe
Perconnection Perco
Percourses     P

- Assign variables to the addresses of the inputs or outputs of the modules for use within the application. (e.g. module 750-400 with variable names KBUS\_IN1, KBUS\_IN2 and module 750-501 with variable names KBUS\_OUT1, KBUS\_OUT2)
  - to assign a variable to an input or output of a module, first expand the module by clicking the plus sign (+) in front of the module designator, click the input/output to highlight it, then click "AT" at the beginning of the address of the module to open a text insertion box
  - type the variable name in the text insertion box, then press <ENTER> to accept the name and close the box
  - repeat the above until all inputs and outputs have been assigned variable names

![](_page_23_Figure_7.jpeg)

![](_page_23_Picture_8.jpeg)

![](_page_24_Figure_3.jpeg)

PROCEDURE END: Configuring of the K-Bus modules is now complete

![](_page_25_Picture_3.jpeg)

#### 6.2.2 Configuring a Fieldbus

Fieldbus devices must be configured before application programs can access them. The CoDeSys IDE programming software is capable of configuring these devices. The following procedure demonstrates how to configure a PROFIBUS DP master device.

PROCEDURE START: Configuring a fieldbus - PROFIBUS DP Master

1. Right click PLC Configuration, select Append Subelement, then click THINKIO-C-FB-PRO-MS...

![](_page_25_Picture_8.jpeg)

![](_page_25_Picture_9.jpeg)

- 2. To add PROFIBUS slaves (in this case Siemens Slaves ET 200B 8DI/8DO ):
  - Right click **THINKIO-C-FB-PRO-MS[VAR]**, select **Append Subelement**, then click **B-8DI/8DO**

![](_page_26_Picture_5.jpeg)

![](_page_26_Picture_6.jpeg)

3. Ensure that the **Station address:** for PROFIBUS specified under tab **DP parameters** is correct

The **Station address:** is automatically generated for the first node. This entry should match the node address set on the PROFIBUS slave DIP switches.

CoDeSys - MyProj_01.pro* - [PL	. <b>C Configuration]</b>		×
File Edit Project Insert Extra:	s Online Window Help		×
CobeSys - MyProj_01.pro* - [PL File Edit Project Insert Extra Edit Project Insert Extra Extra Edit Project Insert Extra Extra Edit Project Insert Extra Extra Extra Edit Project Insert Extra Extr	C Configuration] s Online Window Help → PLC Configuration → KBUS[N] → KBUS_IN1 AT 5 → KBUS_IN1 AT 5 → KBUS_IN2 AT 5 → KBUS_OUT1 AT → KBUS_OUT1 AT → KBUS_OUT1 AT → KBUS_OUT1 AT → KBUS_OUT1 AT → KBUS_OUT1 AT → KBUS_OUT2 AT BInternal Digital I/O[FX] → THINKIO-C-FB-PRO-MS[VAR] → B-8DI/8DO DP[VAR]	Base parameters       DP parameters       Input/Output         Info       Manufacturer:       SIEMENS         Revision:       V1.3         Hv/ Release:       A1.0         SW Release:       Z1.0         File name:       sim000b.gsd         Slave type:       3@TdF@ET200B         Identification:       Station address:         Station name:       B-801/800       DP         Activation       Slave active in current configuration:       Image: Configuration:	GSD file  Standard parameter Identrumber: 0x0008 TSDR (TBit): 11 Lock/Unlock: 2 Watchdog Watchdog Control:
È P ■S D ( V ( R	Loading library 'C:\Programme\38 Software\0	CoDeSys V2.3\Targets\KONTRON\Libraries\Thi	nklo\SysLibTargefVisu.lib'
	Loading library 'C:\Programme\38 Software\0	CoDeSys V2.3\Targets\KONTRON\Libraries\Thi	nklo\Standard.lib'
	Loading library 'C:\Programme\38 Software\0	CoDeSys V2.3\Targets\KONTRON\Libraries\Thi	nklo\Vecsfc.lib'

 Assign variables to the addresses of the fieldbus I/O modules and use the variable names in the application. (e.g. PROFIBUS output with variable name: PROFIBUS\_OUT and PROFIBUS input with the variable name: PROFIBUS\_IN)

![](_page_27_Figure_8.jpeg)

PROCEDURE END: Configuring fieldbus - PROFIBUS DP Master - now complete

**CoDeSys PLC** 

#### 6.3 Writing a Test Application

A new POU "PLC\_PRG" is created using the programming language "ST".

The following simple application will:

- make a simple assignment in the statement part of the program
- count the variable x
- assign bit 0 of variable x to KBUS output 1 (KBUS\_OUT1)
- assign bit 1 of variable x to KBUS output 2 (KBUS\_OUT2)
- read KBUS input 1 (KBUS\_IN1) and assign to variable kbus\_input (bit 0)
- read KBUS input 2 (KBUS\_IN2) and assign to variable kbus\_input (bit 1)
- assign variable x to PROFIBUS output (PROFIBUS\_OUT)
- read PROFIBUS input (PROFIBUS\_IN) and assign to variable profibus\_input

If the test program can be compiled without any problems it can then be loaded into the ThinkIO-P PROFIBUS Master.

PROFIBUS will be automatically initialized when the user program starts. The I/O communication with the slave and reading from and writing to K-Bus modules will start when the program starts.

![](_page_28_Picture_16.jpeg)

![](_page_29_Picture_3.jpeg)

#### 6.4 Creating a Visualization

In the object organizer at the bottom left select the third tab from the left, named Visualization. Use the object organizer's quick menu to call the Add object command. Give the visualisation object a Name. The first visualization object must be named as PLC\_VISU. You can use the visualization object for target visualization and for Web visualization.

#### 6.5 Compiling the Project

The compilation is started by selecting **Project** and then clicking **Rebuild all**.

🈓 CoDeSys - MyProj_01.pro* - [PLC_PRG (PRG-ST		
🍤 File Edit Project Insert Extras Online Windo	w Help	_ 8 ×
Build F11 Rebuild all		
Clean all Load download information Object Disciple distribution	PLC_PRG re local variables: x, kbus_input, profibus_input*) ; pout PVTE-	
Options	s_input: BYTE;	
Translate into other languages		
Document Export		<u> </u>
Import Siemens Import Merge	lt variable x by 1*)	
Compare Project Info Global Search	it 0 of variable x to KBUS output (KBUS_OUT1) *) T1:≕x0;	
Global Replace	it 1 ofvariable x to KBUS output (KBUS_OUT2) *) T2≔x.1;	
View Instance Show Call Tree Show Cross Reference	US input 1 (KBUS_IN1) and assign to variable kbus_input (bit 0) *) 1.0=KBUS_IN1;	
Check	US input 2 (KBUS_IN2) and assign to variable kbus_input (bit 1) *)	
Add Action	t:1:≍KBUS_IN2; '	
User Group Passwords 0018 PROFIBU 0019 0020 (* read PF 0021 profibus_ 0022	ariable x to PROFIBUS output (PROFIBUS_OUT9 *) S_OUT;≕x; ROFIBUS input (PROFIBUS_IN) and assign to variable profibus_input *) input=PROFIBUS_IN;	
Image: Start of Used to Start of Used to Start of Used to D Error(s), 0 V           Image: Prime to Start of Used to D Error(s), 0 V	lata: 697 of 33554432 bytes (0.00%) etain data: 0 of 516096 bytes (0.00%) /arming(s).	
Compiles all POUs	Lin.: 17, Col.: 23	ONLINE OV READ

#### 6.6 Setting Up the Gateway Server for Communication

Any time it is necessary to communicate with a ThinkIO-P (e.g to download a project) a gateway server is required to be operating using preselected communication parameters. When needed, the gateway server will be started automatically (if not already running) by the CoDeSys IDE. Before the gateway server can communicate with the ThinkIO-P, however, certain parameters must be set. This is accomplished as follows.

**PROCEDURE START**: Setting up the communication parameters

1. Select Online, then click Communication parameters

Hie Edit Project Insert Extras	Online Window Help Login Logout	Alt+F8 Ctrl+F8	
POUs L PLC_PRG (PRG)	Download Run Stop Reset Reset (cold) Reset (original)	F5 Shift+F8	Ĩ
	Toggle Breakpoint Breakpoint Dialog Step over Step in Single Cycle	F9 F10 F8 Ctrl+F5	
	Write Values Force Values Release Force Write/Force-Dialog	Ctrl+F7 F7 Shift+F7 Ctrl+Shift+F7	
	Show Call Stack Display Flow Control		
	Simulation Mode Communication Paramete Sourcecode download	rs	
	Create boot project Write file to PLC Read file from PLC Size of used retain data: 0 Error(s), 0 Warning(s).	0.0000 00000 00000 (0.0000) (0.00000 00000 (0.0000) (0.00000 00000 (0.0000) (0.00000 00000 00000) (0.00000 00000 0000) (0.00000 00000 0000) (0.00000 0000) (0.00000 0000) (0.00000 0000) (0.00000 0000) (0.00000) (0.00000) (0.0000)	L L

Communication Parameter	5			×
Channels - 'localhost' via Tcp/Ip		[		 OK
	Name	Value	Comment	Cancel
				New
				Hemove
				Gateway
				Update

2. Click New

C	Communication Parameters: New Channel				
Name l'Iocalhost' via Top/Ip_			OK		
	Device		Cancel		
	Name	Info			
	Tcp/lp (Level 2 Route)	3S Tcp/Ip Level 2 Router Driver			
	•	►			

3. Enter an appropriate name for the connection and then click OK

Communication Parameters: New Channel				
Name new-target		OK		
Device		Cancel		
Name	Info			
Tcp/lp (Level 2 Route)	3S Tcp/lp Level 2 Router Driver			
•	<b>&gt;</b>			

4. Select a device from the Device list, then click OK

Communication Parameter	's			×
Channels - 'localhost' via Tcp/lp	Tcp/lp (Level 2 Ro	ute)		OK
Tewardiger	Name Address Port	Value localhost	Comment IP address or hostname	Cancel
	TargetId Motorola byteorder	0 No		New
				Gateway
				Update

5. Enter the IP address or the target name in Value for the Address, then click OK

Communication Parameter	'S	×
Communication Parameter	Tcp/Ip (Level 2 Route)           Name         Value         Comment           Address         192.168.154.104         IP address or hostname           Port         1200         TargetId         0           Motorola byteorder         No         100         100	Cancel New Remove
	۲	Gateway

**PROCEDURE END**: Setting up of the communication parameters is now complete

Now the communication parameters are stored along with the project currently loaded in the IDE.

#### 6.7 Download the Program

To download the program select **Online** and then click Login.

![](_page_32_Picture_9.jpeg)

![](_page_33_Picture_3.jpeg)

#### 6.8 Start the Program

To start the program select **Online** and then click **Run**.

![](_page_33_Picture_6.jpeg)

# 7. Transfering an Application to the ThinklO-P

One way to transfer a CoDeSys application program to the ThinkIO-P is to log in to the ThinkIO-P from the host PC and transfer the application using the CoDeSys Development Environment. This requires an Ethernet network connection.

Another way is the on-the-fly update of a CoDeSys boot project from an external non-bootable CompactFlash card. First, on the host PC, create a CoDeSys boot project and transfer it to the CompactFlash card to the directory "/data" in the "root" directory. The boot project files must be renamed to: DEFAULT.CHK and DEFAULT.PRG.

Then, after ensuring that the ThinkIO-P is switched off, insert the CF card in the ThinkIO-P and restart it. At boot time the ThinkIO-P detects the files "/data/DEFAULT.CHK" and "/data/DEFAULT.PRG" on the external CompactFlash, and then "/data" will be recursively copied to the onboard Flash memory "/data" directory (read/writable partition). After the copying is finished, halt the system, turn power off, remove the external CompactFlash card, and reboot the system.

A third way is to transfer the boot project using ftp into the "/data" directory on the ThinkIO-P. After the transfer is finished, log in to the ThinkIO-P per telnet or directly from the console. Now run the "sync" command and then reboot the system. This solution can be used only if enough memory is available on the onboard flash.