Advantys Configuration Software

Quick Start Guide for Advantys Users

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When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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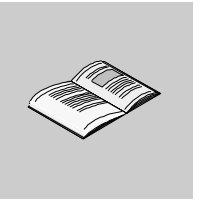
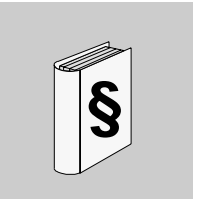


Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION
CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

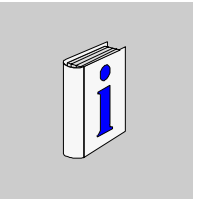
CAUTION
CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved.

About the Book



At a Glance

Document Scope

This document provides basic information and instructions for getting the Advantys Configuration Software set up and operating.

Validity Note

This documentation is valid for Advantys Configuration Software 4.5 and later.

Related Documents

Title of Documentation	Reference Number
Advantys FTB CANopen IP67 monobloc input/output splitter box User guide	1606218 02 A04
Advantys FTM CANopen IP67 Modular Input/Output Splitter box User guide	1606224 02 A04
Advantys OTB CANopen Remote Inputs and Outputs User Guide	1606384 02
Advantys OTB Ethernet Remote inputs and outputs User guide	1606385 02
Advantys OTB Modbus Remote Inputs and Outputs User Guide	1606383 02
The Advantys STB System Planning and Installation Guide	31002947
The Advantys STB System Hardware Components Reference Guide	31002952
The Advantys STB Profibus DP Network Interface Applications Guide	31002957
The Advantys STB INTERBUS Network Interface Applications Guide	31004624
The Advantys STB DeviceNet Network Interface Applications Guide	31003680
The Advantys STB CANopen Network Interface Applications Guide	31003684
The Advantys STB Ethernet TCP/IP Modbus Network Interface Applications Guide	31003688
The Advantys STB Modbus Plus Network Interface Applications Guide	31004629

The Advantys STB Fipio Network Interface Applications Guide	31003692
The Advantys STB Reflex Actions Reference Guide	31004635

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User Comments

We welcome your comments about this document. You can reach us by e-mail at techcomm@schneider-electric.com.

Hardware Products

1

Introduction

This chapter provides an overview of the different hardware products that can be used in combination with the Advantys Configuration Software.

What Is in This Chapter?

This chapter contains the following topics:

General

Introduction

The Advantys Configuration Software can be used to represent the architecture of Islands consisting of Advantys modules. An Island is an assembly of distributed I/O and Island bus communication modules that function together as 1 node on a fieldbus. Depending on the product family, power distribution and extension modules can or must be added.

Island Description

In the Advantys Configuration Software, a distinction is drawn between a physical Island in the real world and a logical Island in the context of the software.

The mounted Advantys modules and devices constitute the physical Island which can be modeled using the Advantys Configuration Software. The software model is called logical Island. It is a file that contains a description of the physical Island including all the modules on the Island and all the operating parameters associated with each module that may be defined in the software.

As you develop a logical Island, the software provides warnings if you make any mistakes in the model, and usually it prevents you from creating an invalid configuration.

Workspace Description

All logical Islands are part of a Workspace, which constitutes a project environment in the Advantys Configuration Software. You can create multiple Workspaces and each one can contain up to 10 Islands of different product families.

Within a Workspace, you can
- configure Islands,
- download the configurations of logical Islands into physical ones and/or
- upload configuration data from physical Islands to logical ones.

Product Families

The Advantys Configuration Software supports the following 4 hardware product families:
- Advantys FTB family
- Advantys FTM family
- Advantys OTB family
- Advantys STB family

Each product family includes modules of different groups and types, offering various performances. Thus, you can select the product family that best fulfills your demands.

FTB Family

FTB Family Description

The Advantys FTB (field terminal block) family consists of I/O splitter boxes including a network interface for CANopen.

All FTB modules possess an Ingress Protection (IP) rating of 67 according to IEC 60529.

FTB Island Description

An Advantys FTB Island always consists of 1 FTB module. Depending on the module, the number of pre-configured and configurable digital inputs and outputs varies.

The CANopen splitter boxes provide the following digital inputs and outputs:

Splitter Box Reference	Available Inputs and Outputs
FTB 1CN08E08CM0	8 inputs and 8 configurable inputs or outputs
FTB 1CN08E08SP0	8 inputs and 8 outputs
FTB 1CN12E04SP0	12 inputs and 4 outputs
FTB 1CN16CM0	16 configurable inputs or outputs
FTB 1CN16CP0	16 configurable inputs or outputs
FTB 1CN16EM0	16 inputs
FTB 1CN16EP0	16 inputs

FTM Family

FTM Family Description

The Advantys FTM (field terminal module) family includes network interface modules (NIMs) for CANopen and various I/O splitter boxes.

As with the FTB modules, all FTM modules are IP67 modules.

Overview of the Module Groups

The modules belonging to the FTM family are divided into the following groups:

Module Group	Description
Networking	fieldbus network interface modules
Digital Input Compact	non-extensible 24 VDC digital input modules
Digital Input Extensible	extensible 24 VDC digital input modules
Digital I/O Configurable Compact	non-extensible 24 VDC digital configurable I/O modules
Digital I/O Configurable Extensible	extensible 24 VDC digital configurable I/O modules
Analog Input Compact	non-extensible analog voltage and current input modules
Analog Output Compact	non-extensible analog voltage and current output modules

FTM Island Description

An Advantys FTM Island consists of 1 FTM network interface module and at least 1 FTM I/O splitter box.

Each NIM is fitted with 4 M12-type connectors for connecting splitter boxes. This allows a star architecture that can consist of 4 segments. Each segment can contain up to 4 I/O splitter boxes, connected in a daisy chain (line architecture). Thus, an FTM Island can include a maximum number of 4 analog I/O splitter boxes, i.e. 1 per segment as they are non-extensible, or 16 digital I/O splitter boxes, i.e. 3 extensible and 1 compact per segment.

Depending on the reference, each channel of the digital I/O splitter boxes is exclusively 1 of the following kind:

- input channel
- output channel
- diagnostic channel

OTB Family

OTB Family Description

The Advantys OTB (optimized terminal block) family includes network interface modules with built-in I/Os and expansion I/O modules.

All OTB modules possess an Ingress Protection (IP) rating of 20 according to IEC 60529.

Overview of the Module Groups

The modules belonging to the OTB family are divided into the following groups:

Module Group	Description
Networking	fieldbus network interface modules
Digital Input	24 VDC and 120 VAC digital input modules
Digital Output	24 VDC digital output modules
Digital I/O	24 VDC digital I/O modules
Analog Input	analog voltage and current input modules
Analog Output	analog voltage and current output modules
Analog I/O	analog voltage and current I/O modules
Thermocouple / RTD	temperature measurement modules
Accessories	terminators

OTB Island Description

An Advantys OTB Island consists of 1 OTB NIM. Every NIM has 12 built-in inputs and 8 built-in outputs and accepts up to 7 Twido or TM2 I/O expansion modules.

OTB NIMs support the following fieldbuses or networks:
- CANopen fieldbus
- Modbus fieldbus
- Ethernet communication network

OTB NIMs provide the following specific functions:
- fast counter (RFC)
- very fast counter (RVFC)
- pulse generator (RPLS)
- pulse generator with pulse width modulation (RPWM)
- programmable input filter

STB Family

STB Family Description

The Advantys STB family includes open fieldbus NIMs, power distribution modules, standard and special I/O modules, extension modules and special modules. These constitute the core Advantys STB modules. In addition, an STB Island can be extended to non-STB devices. These can be preferred modules and/or enhanced CANopen devices.

Overview of the Module Groups

The following table shows how these modules are grouped:

Module Group	Description
Networking	fieldbus network interface modules
Power	auxiliary power supply module and modules distributing field power to I/O modules
Digital Input	24 VDC and 115/230 VAC digital input modules
Digital Output	24 VDC and 115/230 VAC digital output modules
Analog Input	analog voltage and current input modules
Analog Output	analog voltage and current output modules
Special-Purpose	counters, gateways, safety modules, etc.
Accessories	terminators and Island bus extension modules
Preferred	auto-addressable modules with non-STB form factor
Enhanced CANopen	non-auto-addressing CANopen devices with enhanced parameter display

STB Island Description

An Advantys STB Island must contain at least 1 NIM, 1 STB I/O module, a power distribution module and a terminator. The NIM resides in the primary segment which is the mandatory part of an STB Island. In addition, every Island can consist of up to 6 extension segments. All STB modules, except for the NIMs, are mounted in base units interconnected on DIN rails, thus forming the Island bus structure. NIMs are directly attached to DIN rails.

Depending on the type of extension, the maximum number of modules supported by an STB Island bus varies as follows:

If the Island is extended to ...	Then the Island bus maximally supports ...
Advantys STB modules	32 STB I/O modules.
preferred modules	31 preferred modules.
enhanced CANopen devices	12 enhanced CANopen devices.

Advantys STB Modules

The core Advantys STB modules are designed to fulfill specific Advantys STB form factors and fit into the base units on the Island bus. They are auto-addressable and take full advantage of the Island's communication and power distribution capabilities. The operating capabilities of an Island depend on the type of NIM. Different NIM models are available to support the various open fieldbuses and different operational requirements.

The following NIMs provide different levels of operation:

- basic
- standard
- premium

There is a NIM type to support each of the following fieldbus networks:

- CANopen
- DeviceNet
- Ethernet and Ethernet/IP
- Fipio
- Interbus
- Modbus Plus
- Profibus DP

All NIMs have a built-in power supply. In addition, auxiliary power supplies are available. For extending and terminating Islands, end-of-segment (EOS) modules, beginning-of-segment (BOS) modules and a termination plate must be used.

Preferred Modules

A preferred module is a device from another Schneider Electric catalog, or potentially from a third-party developer, that fully complies with the Advantys STB Island bus protocol. Preferred modules are developed and qualified under agreement with Schneider Electric; they completely conform to Advantys STB standards and are auto-addressable.

For the most part, the Island bus handles a preferred module as it does standard Advantys STB I/O modules, with the following key differences:

- A preferred module is not designed in the standard form factor of an Advantys STB module and does not fit into 1 of the standard base units. It therefore does not reside in an Advantys STB segment.
- A preferred module requires its own power supply. It does not get logic power from the Island bus.

Preferred modules are configured using the Advantys Configuration Software. They can be placed between segments of STB I/O modules or at the end of the Island. If a preferred module is the last module on the Island bus, it must be terminated.

You can use preferred modules only with the following NIMs:

- standard
- premium

Enhanced CANopen Devices

CANopen devices are not auto-addressable on the island bus. Therefore, they must be manually addressed, usually with physical switches built into the devices. They are configured using the Advantys Configuration Software. CANopen devices must be installed at the end of the Island. Termination must be provided both at the end of the last Advantys STB segment and at the last CANopen device.

Enhanced CANopen devices are CANopen devices with an enhanced parameter display and generated from the core catalog, as Advantys STB modules and preferred modules.

You can use CANopen devices only with the following NIMs:

- standard
- premium

Communication

2

Introduction

This chapter provides an overview of the different fieldbus or network types that are supported by the Advantys hardware products and configuration software.

What Is in This Chapter?

This chapter contains the following topics:

Available Communication Types

Introduction

Depending on the product family, the following fieldbus or network types are available:

Product Family	Available Fieldbus Type
FTB	CANopen
FTM	CANopen
OTB	• CANopen • Modbus • Ethernet
STB	• CANopen • DeviceNet • Ethernet • Ethernet/IP (based on DeviceNet) • Fipio • Interbus • Modbus Plus • Profibus DP

Main Characteristics

To help you choosing the fieldbus or network that best suits your needs, the main characteristics of each type are described on the following pages.

The features that are described include the following topics:
- fieldbus/network architecture
- communication model
- maximum number of node IDs
- register limits
- bit-packing
- cable/network lengths
- transmission rates

Fieldbus Characteristics for STB

Overview of Fieldbus Characteristics

This table lists some of the main characteristics of the fieldbus or network types available for Advantys modules:

Fieldbus Type	Fieldbus Architecture and Communication Model	Node Limitations	Maximum Data Image Size [Words]	Use of Bit-Packing
CANopen	serial bus system based on a producer/consumer model	127 (IDs 1–127)	input/output: 120 each HMI-to-PLC data: 120 (*) PLC-to-HMI data: 120 (*)	on the basis of byte boundaries
DeviceNet	connection-based network based on CAN, operating within a producer/consumer model	64 (IDs 0–63)	input/output: 128 each HMI-to-PLC data: 32 (*) PLC-to-HMI data: 32 (*)	on the basis of byte boundaries
Ethernet	frame-based bus or star topology based on a Modbus master/slave model	no limit	input/output: 4,096 each HMI-to-PLC data: 512 (*) PLC-to-HMI data: 512 (*)	not supported
Fipio	time-critical open fieldbus protocol based on a master/slave model with cyclic data exchange	128 (IDs 0–127, except 63)	input/output: 32 each HMI-to-PLC data: 32 (*) PLC-to-HMI data: 32 (*)	on the basis of word boundaries
Interbus	serial bus system with active ring topology based on a master/slave model with cyclic data exchange	512	input/output: 16 each HMI-to-PLC data: 15 (*) PLC-to-HMI data: 15 (*)	on the basis of word boundaries
Modbus Plus	logical token bus based on a master/slave model with a cyclic data exchange	64 (IDs 1–64)	input/output: 125 each HMI-to-PLC data: 125 (*) PLC-to-HMI data: 125 (*)	not supported
Profibus DP	serial bus system based on a master/slave model with a cyclic data exchange	125 (IDs 1–125)	input/output: totaling 120 HMI-to-PLC data: 120 (*) PLC-to-HMI data: 120 (*)	on the basis of byte boundaries
(*) = For standard and premium STB NIMs only. The maximum sizes for HMI-to-PLC and PLC-to-HMI data given here are included in the maximum data image sizes for inputs and outputs.				

For transmission rates and networks lengths, see *Transmission Rates and Network Lengths, page 20*.

Transmission Rates and Network Lengths

Introduction

The cable or network length supported within an Island depends on the transmission rate and vice versa.

Overview of Transmission Rates and Network Lengths

This table lists the maximum transmission rates of each fieldbus or network type and the corresponding maximum cable or network lengths:

Fieldbus Type	Maximum Transmission Rates	Physical Layer
CANopen	1 Mbit/s at a maximum cable length of ● 25 m for STB modules ● 20 m for FTB, FTM and OTB modules	a differentially driven 2-wire bus line
DeviceNet	500 kbit/s at a maximum cable length of ● 100 m (thick and thin trunks) ● 75 m (flat trunks)	2 twisted pairs of shielded wires
Ethernet	10 Mbit/s at a maximum segment length of 100 m Advantys OTB Ethernet NIMs additionally support a transmission rate of 100 Mbit/s.	a twisted pair cable
Fipio	1 Mbit/s at a maximum network length of ● 1 km for a single fieldbus segment ● 15 km with repeaters between the segments	a twisted pair of shielded wires
Interbus	500 kbit/s at a maximum of ● 12.8 km network length and ● 400 m distance between devices	a twisted pair of shielded wires
Modbus Plus	1 Mbit/s at ● a maximum network section length of 450 m, with a section supporting up to 32 nodes, and ● a minimum distance of 3 m between devices	a twisted pair of shielded wires
Profibus DP	12 Mbit/s at a maximum network length of 100 m	a twisted pair of shielded wires

Example Application with STB Modules

3

Introduction

This chapter contains an example application with STB modules used to explain how

- Islands are created,
- labels are assigned,
- reflex actions are configured and
- a connection between the logical and the physical Island is made and a configuration is loaded.

What Is in This Chapter?

This chapter contains the following topics:

Creating an Island

Introduction

In this example, a Premium PLC is connected to an Advantys STB Island using the Profibus DP fieldbus protocol.

The physical Island consists of the following modules:

- STBNDP2212 Profibus network interface module
- STBPDT3100 power distribution module
- STBDDI3420 4-channel digital input module
- STBDDO3410 4-channel digital output module
- STBAVI1270 2-channel analog input module
- STBAVO1250 2-channel analog output module
- STBXMP1100 termination plate

The name of the Island shall be *Island1*. The name of the Workspace in which this Island resides shall be *Workspace1*.

Mounting the Physical Island

The modules must be mounted on the DIN rail in the same sequence as they are listed above. The DIN rail must be connected to a power supply providing 24 V.

For mounting the modules on the DIN rail, for proper embedding the Island within the Workspace and for proper cabling, see the Advantys STB System Planning and installation Guide *(see Advantys STB, System Planning and Installation Guide)*.

Creating the logical Island consists of the following steps:

- creating a new Workspace and a new Island
- adding modules to the Island

Creating a New Workspace

Having started the Advantys Configuration Software, perform the following steps to create a new Island in a new Workspace:

Step	Action
1	From the **File** menu, select **New Workspace**. **Result:** The **New Workspace** dialog box is displayed.
2	In the **Name:** field of the **Workspace File** area, type `Workspace1`.
3	In the **Name:** field of the **Island File** area, type `Island1`. **Note:** Some menu commands contain placeholders which are replaced by the name of the Island. The command for saving this Island, for example, would read **Save Island1**.
4	Click **OK**. **Result:** A new Workspace screen is displayed containing the new Island, which is displayed in the Island Editor as an empty DIN rail.

Adding Modules to the Island

To add modules to the new Island, perform the following steps:

Step	Action
1	In the Catalog Browser, double-click the label of the STB Catalog to expand the subtree of this product family.
2	Double-click the label of the networking module group to expand its subtree.
3	Double-click the STBNDP2212 Profibus NIM. **Result:** The NIM is displayed as first module on the DIN rail.
4	Double-click the label of the • power module group to expand its subtree and then double-click the STBPDT3100 module. • digital input module group to expand its subtree and then double-click the STBDDI3420 module. • digital output module group to expand its subtree and then double-click the STBDDO3410 module. • analog input module group to expand its subtree and then double-click the STBAVI1270 module. • analog output module group to expand its subtree and then double-click the STBAVO1250 module. • accessories module group to expand its subtree and then double-click the STBXMP1100 termination plate. **Result:** The modules are displayed on the DIN rail to the right of the NIM in the sequence in which they have been selected. **Note:** Adhere to the sequence. For a successful download of the configuration into the physical Island, the module sequences of the physical and the logical Island must match.
5	From the **File** menu, select **Save Island1** to save the configuration.

Labeling Data Objects

Introduction

The Advantys Configuration Software allows you to assign meaningful names not only to Workspaces, Islands and their segments, but also to module parameters and I/O data objects.

The names you assign either replace the generic names completely (as for Workspaces, Islands and segments) or are appended to the generic names (as for data objects).

Depending on the data object, the labels are edited and displayed as follows:

Labels for ...	**Are appended using the ...**
module parameters	**Parameters** tab in the Module Editor, which is also the only place where they are displayed.
I/O data objects	**I/O Image** tab in the Module Editor. The labels are displayed in the • **I/O Image** and **I/O Mapping** tabs of the Module Editor. • **I/O Image Overview** and **I/O Image Animation** dialog boxes in the cell-related information, listed when a cell is selected. • **User Defined Label** column of the **User Defined Label Editor**.

NOTE: The labels must not be duplicates and they must be compliant to the IEC61131 rules:

- Only alphanumeric and underscore characters can be used.
- The first character must be an alphabetic character.
- Blanks and non-ASCII characters are not allowed.
- The overall length of the label must not exceed 24 characters.

In the following, it is described how data objects are labeled.

Description of the Example Labels

In the example Island *Island1*, a module parameter and the output data objects of the digital output module shall get labels. Data objects and labels are listed below:

Data Object	**Label**
Fallback Mode (as superordinate parameter)	Timeout
Fallback Mode, Channel 1	MainChannel
Output Data (as superordinate data item)	Station1
Output Data, Channel 2	Engine
Output Data, Channel 3	FrontEngine

Labeling the Module Parameter

Before you can perform the following steps to assign lables to a module parameter, make sure the Island is offline and unlocked:

Step	Action
1	Select the STBDDO3410 digital output module.
2	Open the Module Editor by right-clicking the module and selecting **Module Editor** from the shortcut menu.
3	Click the **Parameters** tab.
4	In the **Data Item Name** column, expand the **Fallback Mode Settings** tree by clicking the plus sign in the box left to the name. **Result:** The tree expands to the **Fallback Mode** tree.
5	Expand the **Fallback Mode** tree by clicking the plus sign in the box left to the name. **Result:** The 4 channels belonging to the fallback mode parameter are listed.
6	In the **User Defined Label** column, double-click the **Fallback Mode** row.
7	Type `Timeout`.
8	Press ENTER.
9	In the **User Defined Label** column, double-click the **Channel 1** row.
10	Type `MainChannel`.
11	Press ENTER.

Labeling the Output Data Objects

Having assigned labels to the module parameter, perform the following steps to assign the labels to the output data objects:

Step	Action
1	In the Module Editor of the STBDDO3410 digital output module, which is still open, click the **I/O Image** tab.
2	In the **Data Item Name** column, expand the **Output Data** tree by clicking the plus sign in the box left to the name. **Result:** The 4 channels belonging to the output are listed.
3	In the **User Defined Label** column, double-click the **Output Data** row.
4	Type `Station1`.
5	Press ENTER.
6	In the **User Defined Label** column, double-click the **Channel 2** row.
7	Type `Engine`.
8	Click **OK** to save the label and close the Module Editor.

The second method to assign the labels to the output data objects is given in the following steps:

Step	Action
1	Open the **Label Editor** from the **Island** menu, or click the following icon on the Island toolbar:  **Result:** The **User Defined Label Editor** is displayed.
2	In the **User Defined Label** column, click the row **Channel 3 [Output Data]** of the STBDDO3410 digital output module. **NOTE:** This is only possible if the Island is offline and unlocked.
3	Type `FrontEngine`.
4	Press ENTER, or click another cell of the output data object you want to assign the label. Continue until all the output data ojects you wanted to assign labels is complete.
5	• Click **Apply**, to apply the assigned labels. or • Click **OK**, to save and close the **User Defined Label Editor**. **NOTE:** The assigned labels are neither applied nor saved if you have typed duplicate labels.

Creating Reflex Actions

Introduction

For the present example Island, which is an STB Island, it is possible to create reflex actions.

In the following, the creation of a boolean logic reflex action is described.

Description of a Boolean Logic Reflex Action

The Advantys Configuration Software supports these 3 boolean logic action types:

- 2-input AND
- 3-input AND
- 2-input XOR

Boolean logic blocks require 2 types of inputs, an enable input and 2 or 3 operational inputs. All the inputs need to be digital (boolean) values from sources that you must specify in the Reflex Editor. These sources can be derived, for example, from another input module on the Island bus or from a constant value that you specify. The output from any of these action types is also a boolean value. It is mapped to the action module, which is always 1 of the output modules of the Island. The channel to which the output of the reflex action is mapped becomes dedicated to the reflex action and can no longer use data from the fieldbus master to update its field device. Furthermore, you have the possibilities to negate both the inputs and the output.

The truth table below shows the possible outputs of the 2-input AND operation:

If input 1 is ...	**and input 2 is ...**	**Then the output is ...**
0	0	0
0	1	0
1	0	0
1	1	1

Description of the Example Reflex Action

The example Island shall contain a 2-input AND reflex block with an enable input and 2 operational inputs from the following sources:

Input	Function	Source
Enable Input	turns the block on or off	the constant value *always enabled*
Operational Input 1	sends a boolean value to the block	channel 1 of module STBDDI3420
Operational Input 2		the constant value *high*

The result of this reflex action shall be mapped to channel 4 of the digital output module of the example Island.

Creating a Boolean Logic Reflex Action

Before you can perform the following steps to create a reflex action, make sure the Island is offline and unlocked:

Step	Action
1	From the **Island** menu, select **Reflex Editor**. **Result:** The **Reflex Editor** dialog box is displayed.
2	Click the **New** button. **Result:** The several list boxes are accessible.
3	From the **Action group:** list, select **Boolean Logic** as the reflex action group.
4	From the **Action type:** list, select **2-Input AND** as the reflex action type.
5	From the **Action module:** list, select the digital output module STBDDO3410 as the reflex action module. **Note:** The module you specify here is automatically displayed in the **Physical output:** list.
6	In the **Enable:** row, select **Always Enabled** from the **Module** list. **Note:** The **Channel** list is disabled.
7	In the **Input 1:** row, select the STBDDI3420 module from the **Module** list and **Channel 1** from the **Channel** list.
8	In the **Input 2:** row, select **High - 1** from the **Module** list. **Note:** The **Channel** list is disabled.
9	From the **Physical output:** lists, select **Channel 4** for the STBDDO3410 output module.
10	Click the **OK** button. **Result:** A number is automatically assigned to the reflex action and the **Action no.:** field is updated. The data of the reflex action are displayed in the table at the bottom.
11	Click **Close** to close the dialog box.

Outputs of the Created Reflex Action

The truth table below describes the input/output behavior of the 2-input AND operation configured above for the example Island *Island1*:

If input 1is ...	**and input 2 is ...**	**Then the output is ...**
0	1	0
1	1	1

Loading the Island Configuration

Introduction

For any loading operation, the logical Island must be in online mode. A logical Island is considered online if it has been successfully connected to a physical Island that is under power and able to operate. As a precondition for an online connection, you must physically connect the programming panel running the configuration software with the configuration port of the NIM using a Modbus cable.

Connecting to the Physical Island

In the present example, the following steps are necessary to connect the logical Island to the physical one:

Step	Action
1	From the **Online** menu, select **Connect**. **Result:** A build is performed automatically. The first time you establish a connection in a session, the **Connection Settings** dialog box is displayed. By default, **Serial** is selected in the **Connection Type**.
2	Select the port, the baud rate and the other connection settings that match those set on the physical port via which you want to connect. **Note:** The Advantys Configuration Software also provides a feature that automatically searches for the correct connection settings.
3	Click **OK** in the **Connection Settings** dialog box. **Result:** The software attempts to connect to the physical Island. If a configuration mismatch between the logical and physical Island occurs, a message box will be displayed.
4	Click **Download** to copy the configuration from the software to the physical Island. **Result:** After the download, the configurations of the logical and the physical Island are identical and the connection is established.

Downloading the Configuration

The **Download** command allows you to transfer a configuration file previously built in the Advantys Configuration Software to the connected physical Island. For a download, the physical Island must be in reset state. If this is not the case, a message box is displayed informing you that the Island is automatically set to reset state. During the download process, a progress bar is displayed, tracking the status of the download. The configuration file is downloaded into the NIM's RAM and flash, where it can then be saved to a removable memory card.

Example Application with OTB Modules

4

Introduction

This chapter contains an example application with OTB modules used to explain how

- Islands are created,
- labels are assigned,
- parameters are configured and
- a connection between the logical and the physical Island is made and a configuration is loaded.

What Is in This Chapter?

This chapter contains the following topics:

Creating an Island

Introduction

In this example, a Premium PLC is connected to an Advantys OTB Island using the CANopen fieldbus protocol.

The physical Island consists of the following modules:

- OTB 1C0DM9LP CANopen network interface module
- OTB TWDDDI16DT 16-channel digital input module
- OTB TWDDMM8DRT 4-channel digital input / 4-channel digital output module
- OTB TWDAMI2HT 2-channel analog input module
- OTB TWDAMO1HT 1-channel analog output module
- OTB TWDALM3LT thermocouple

The name of the Island shall be *Island2*. The name of the Workspace in which this Island resides shall be *Workspace1*.

Mounting the Physical Island

The modules must be connected in the same sequence as they are listed above. and provided with a power of 24 V.

Because a Workspace can include Islands of different product families, the example Island *Island2* is added to *Workspace1*, which was created in the preceding chapter. Thus, creating the logical Island consists of the following steps:

- opening a new Island in an existing Workspace
- adding modules to the Island

Opening a New Island in an Existing Workspace

Having started the Advantys Configuration Software, perform the following steps to open a new Island in an existing Workspace:

Step	Action
1	From the **File** menu, select **Open Workspace**. **Result:** The **Open Workspace** dialog box is displayed.
2	Double-click the folder containing *Workspace1*, select the Workspace file *Workspace1.aiw* and click **Open**. **Result:** The Workspace screen is displayed and the Island last active before the Workspace has been closed is opened.
3	From the **File** menu, select **Add New Island**. **Result:** The **New Island** dialog box is displayed.
4	In the **Name:** field, type `Island2`.
5	Click **OK**. **Result:** The new Island is displayed in the Island Editor as an empty DIN rail.

Adding Modules to the Island

To add modules to the new Island, perform the following steps:

Step	Action
1	In the Catalog Browser, double-click the label of the OTB Catalog to expand the subtree of this product family.
2	Double-click the label of the networking module group to expand its subtree.
3	Double-click the OTB 1C0DM9LP CANopen NIM. **Result:** The NIM is displayed as first module on the DIN rail.
4	Double-click the label of the • digital input module group to expand its subtree and then double-click the OTB TWDDDI16DT module. • digital I/O module group to expand its subtree and then double-click the OTB TWDDMM8DRT module. • analog input module group to expand its subtree and then double-click the OTB TWDAMI2HT module. • analog output module group to expand its subtree and then double-click the OTB TWDAMO1HT module. • thermocouple/RTD module group to expand its subtree and then double-click the OTB TWDALM3LT thermocouple. **Result:** The modules are displayed on the DIN rail to the right of the NIM in the sequence in which they have been selected. **Note:** Adhere to the sequence. For a successful download of the configuration into the physical Island, the module sequences of the physical and the logical Island must match.
5	From the **File** menu, select **Save Island2** to save the configuration.

Labeling Data Objects

Introduction

The Advantys Configuration Software allows you to assign meaningful names not only to Workspaces, Islands and their segments, but also to I/O data objects, counters and pulse generators. Unlike for STB modules, you are not able to assign labels to module parameters.

The names you assign either replace the generic names completely (as for Workspaces, Islands and segments) or are appended to the generic names (as for data objects).

Depending on the data object, the labels are edited and displayed as follows:

Labels for ...	Are appended using the ...
I/O data objects	**Parameters** tab in the Module Editor. The labels are displayed in the **I/O Image Overview** dialog box in the cell-related information, listed when a cell is selected
counters	**Counters** tab in the Module Editor, which is also the only place where they are displayed.
pulse generators	**Pulse Generator** tab in the Module Editor, which is also the only place where they are displayed.

NOTE: The labels must not be duplicates and they must be compliant to the IEC61131 rules:

- Only alphanumeric and underscore characters can be used.
- The first character must be an alphabetic character.
- Blanks and non-ASCII characters are not allowed.
- The overall length of the label must not exceed 24 characters.

In the following, it is described how data objects are labeled.

Description of the Example Labels

In the example Island *Island2*, the input data objects of the analog input module, and a counter shall get labels. Data objects and labels are listed below:

Data Object	Label
Input 0 (as superordinate entry)	AnalogInputA
Input 1 (as superordinate entry)	AnalogInputB
RFC 0 Settings (as superordinate entry)	CounterA

Labeling the Input Data Objects

Before you can perform the following steps to assign lables to the analog input data objects, make sure the Island is offline and unlocked:

Step	Action
1	Select the OTB TWDAMI2HT analog input module.
2	Open the Module Editor by right-clicking the module and selecting **Module Editor** from the shortcut menu. **Result:** The Module Editor is displayed with the **Parameters** tab selected.
3	In the **Data Item Name** column, expand the **Analog Inputs** tree by clicking the plus sign in the box left to the name. **Result:** The tree expands to the **Input 0** and **Input 1** trees.
4	In the **User Defined Label** column, double-click the **Input 0** row.
5	Type `AnalogInputA`.
6	Press ENTER.
7	In the **User Defined Label** column, double-click the **Input 1** row.
8	Type `AnalogInputB`.
9	Press ENTER.
10	Click **OK** to close the Module Editor.

Labeling the Counter

Having assigned the labels to the analog input data objects, perform the following steps to assign the label to the counter:

Step	Action
1	Select the OTB 1C0DM9LP network interface module.
2	Open the Module Editor by right-clicking the module and selecting **Module Editor** from the shortcut menu. **Result:** The Module Editor is displayed with the **Parameters** tab selected.
3	Click the **Counters** tab.
4	In the **User Defined Label** column, double-click the **RFC 0 Settings** row.
5	Type `CounterA`.
6	Press ENTER.
7	Click **OK** to close the Module Editor.

Configuring Parameters

Introduction

For OTB Islands, you can configure parameters for I/O data items, for counters and for pulse generators. Parameters for I/O data objects are configured for each item separately.

In the following, the parameters of an analog input data item and a counter are configured.

Description of the Example Parameters

In the example Island *Island2*, the analog input data item labeled *AnalogInputA* shall get the following parameter values:

Parameter	Function	Value
Mode	range mode for the input	*4..20mA*
Upper Limit Threshold	enabling the upper limit	*Checked* (default)
Upper Limit	value for the upper limit	*20*
Lower Limit Threshold	enabling the lower limit	*Checked* (default)
Lower Limit	value for the lower limit	*5*
Delta Interrupt	enabling the difference	*Unchecked*
Delta Interrupt Value	value for the difference	-
Range	value range that is used by the module during A/D conversion	*Custom* (default)
Min	minimum value for the custom range	*0* (default)
Max	maximum value for the custom range	*440*

In the example Island *Island2*, the counter labeled *CounterA* shall get the following parameter values:

Parameter	Function	Value
Mode (RFC.M)	operating mode of the counter	*Count Up*
Trigger: Input Change	enabling input changes as trigger	*Off* (default)
Trigger: Overflow	enabling overflows as trigger	*On* (default)
Trigger: Delta Value	enabling a delta value as trigger	*On*
Error Mode (RFC.EM)	error mode	*Reset* (default)
Preset Value (RFC.P)	preset value	*50*
Delta Value	delta value if configured as trigger	*5*

Configuring the Parameters for the Analog Input

Before you can perform the following steps to configure the parameters for the analog input data item, make sure the Island is offline and unlocked:

Step	Action
1	Select the OTB TWDAMI2HT analog input module.
2	Open the Module Editor. **Result:** The Module Editor is displayed with the **Parameters** tab selected.
3	In the **Data Item Name** column, expand the **Analog Inputs** tree by clicking the plus sign in the box left to the name. **Result:** The tree expands to the **Input 0** and **Input 1** trees.
4	Expand the **Input 0** tree by clicking the plus sign in the box left to the name. **Result:** The parameters of this input are displayed.
5	Expand the master parameter trees by clicking the plus signs in the boxes left to the name. **Result:** The slave parameters are displayed.
6	In the **Configured Value** column, double-click the **Mode** row and select *4..20mA* from the list.
7	Double-click the **Upper Limit Threshold** row and select *Checked* from the list.
8	Double-click the **Upper Limit** row and type `20`.
9	Double-click the **Lower Limit Threshold** row and select *Checked* from the list.
10	Double-click the **Lower Limit** row and type `5`.
11	Double-click the **Delta Interrupt** row and select *Unchecked* from the list.
12	Double-click the **Range** row and select *Custom* from the list.
13	Double-click the **Min** row and type `0`.
14	Double-click the **Max** row and type `440`.
15	Click **OK** to confirm the changes and close the Module Editor.

Configuring the Parameters for the Counter

Perform the following steps to configure the parameters for the counter:

Step	Action
1	Select the OTB 1C0DM9LP network interface module.
2	Open the Module Editor. **Result:** The Module Editor is displayed with the **Parameters** tab selected.
3	Click the **Counters** tab.
4	In the **Data Item Name** column, expand the **RFC 0 Settings** tree by clicking the plus sign in the box left to the name. **Result:** The parameters of this counter are displayed.
5	Expand the **Trigger** tree by clicking the plus sign in the box left to the name. **Result:** The slave parameters of this master parameter are displayed.
6	In the **Configured Value** column, double-click the **Mode** row and select *Count Up* from the list.
7	In the **Configured Value** column, double-click the **Input Change** row of the **Trigger** tree and select *Off* from the list.
8	In the **Configured Value** column, double-click the **Overflow** row of the **Trigger** tree and select *On* from the list.
9	In the **Configured Value** column, double-click the **Delta Value** row of the **Trigger** tree and select *On* from the list.
10	Double-click the **Error Mode** row and select *Reset* from the list.
11	Double-click the **Preset Value** row and type `50`.
12	Double-click the **Delta Value** row and type `5`.
13	Click **OK** to confirm the changes and close the Module Editor.

Loading the Island Configuration

Introduction

Online operations are only available for OTB Islands if the NIM supports Ethernet or Modbus. In these cases, the connection is established via the upstream network. Because the example Island *Island2* contains a CANopen NIM, you are not able to connect to a physical Island. Therefore, the **Online** menu is disabled and you are not able to download your configuration.

Connecting to a Physical Island

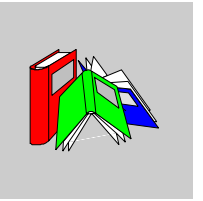
If your Island contains an OTB Ethernet or Modbus NIM, the following steps are necessary to connect the logical Island to the physical one:

Step	Action
1	From the **Online** menu, select **Connect**. **Result:** A build is performed automatically. The first time you establish a connection in a session, the **Connection Settings** dialog box is displayed. By default, **Serial** is selected in the **Connection Type**.
2	In the **Connection Type**, select **TCP/IP**.
3	In the **Remote IP Address** field, type the NIM's IP address.
4	If you want to search for the remote IP address name, click **IP <-> Name**.
5	Click **OK** in the **Connection Settings** dialog box. **Result:** The software attempts to connect to the physical Island. If a configuration mismatch between the logical and physical Island occurs, a message box will be displayed.
6	Click **Download** to copy the configuration from the software to the physical Island. **Result:** After the download, the configurations of the logical and the physical Island are identical and the connection is established.

Downloading the Configuration

The **Download** command allows you to transfer a configuration file previously built in the Advantys Configuration Software to the connected physical Island. For a download, the physical Island must be in reset state. If this is not the case, a message box is displayed informing you that the Island is automatically set to reset state. During the download process, a progress bar is displayed, tracking the status of the download. The configuration file is downloaded into the NIM's RAM and flash, where it can then be saved to a removable memory card.

Glossary



A

Auto-Addressing

The assignment of an address to each Island bus I/O module and preferred device.

B

Basic Network Interface

A low-cost Advantys STB network interface module that supports up to 12 Advantys STB I/O modules. A basic NIM does not support the Advantys Configuration Software, reflex actions, nor the use of an HMI panel.

I

IP Rating

Ingress Protection rating according to IEC 60529.

IP20 modules are protected against ingress and contact of objects larger than 12.5 mm. The module is not protected against harmful ingress of water.

IP67 modules are completely protected against ingress of dust and contact. Ingress of water in harmful quantity is not possible when the enclosure is immersed in water up to 1 m.

N

NIM

The NIM (network interface module) is the interface between an Island bus and the fieldbus network of which the Island is a part. A NIM enables all the I/O on the Island to be treated as a single node on the fieldbus. The NIM also provides 5 V of logic power to the Advantys STB I/O modules in the same segment as the NIM.

P

Preferred Module

An I/O module that functions as an auto-addressable node on an Advantys STB Island but is not in the same form factor as a standard Advantys STB I/O module and therefore does not fit in an I/O base. A preferred device connects to the Island bus via an STB XBE 1100 EOS module and a length of STB XCA 100*x* bus extension cable. It can be extended to another preferred module or back into a standard Island segment. If it is the last device on the Island, it must be terminated with a 120 Ω terminator.

Premium Network Interface

An Advantys STB network interface module designed at a relatively high cost to support high module densities, high transport data capacity (for instance for web servers), and more diagnostics on the Island bus.

S

Segment

A group of interconnected I/O and power modules. An Island must have at least 1 segment and, depending on the type of NIM used, may have 7 segments at most.

Regarding STB Islands, the first (leftmost) module in a segment needs to provide logic power and Island bus communications to the I/O modules on its right. In the primary or basic segment, that function is filled by a NIM. In an extension segment, that function is filled by an STB XBE 1200 or an STB XBE 1300 BOS module.

Standard Network Interface

An Advantys STB network interface module designed at moderate cost to support the configuration capabilities, multi-segment design and throughput capacity suitable for most standard applications on the Island bus. An Island run by a standard NIM can support up to 32 addressable Advantys STB and/or preferred I/O modules, up to 12 of which may be standard CANopen devices.

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