# Advantys Configuration Software

## Quick Start Guide for Former Advantys Lite Users

05/2012

Schneider Electric

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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.

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> ### ⚠ 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
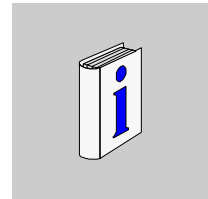
## At a Glance

### Document Scope

This document provides basic information and instructions for getting the Advantys Configuration Software set up and operating. It is intended for users that are already acquainted with the Advantys Configuration Tool.

### Validity Note

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

### Related Documents

| Title of Documentation | Reference Number |
|---|---|
| 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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# Enhancements of the Advantys Configuration Software

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## Introduction

This chapter focuses on those points of the Advantys Configuration Software that make the main difference to the Advantys Configuration Tool. On the one hand, an additional product family allowing a greater variety of functions is available. On the other hand, Islands, even if they contain modules of different product families, can be combined to so-called *Workspaces*. This allows a more complex structure of the production process.

## What Is in This Chapter?

This chapter contains the following topics:

## STB Product Family

### STB Family Description

The Advantys STB product family includes open fieldbus network interface modules (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 |

### 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.

The following NIMs provide different levels of operation:
- basic
- standard
- premium

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.

### Available Fieldbuses

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

### 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

# What is a Workspace?

### Definition

The Workspace is a project environment in the Advantys Configuration Software. The Workspace is where you design a logical Island configuration. Within the Workspace, you can create a new configuration and download it into the physical Island. You can also upload configuration data from a physical Island to a logical Island in the Workspace.

A Workspace is saved as a file with an *.aiw* extension.

### Islands in a Workspace

Within a Workspace, 1 or more logical Islands, up to a maximum of 10, can be created and managed. These Islands can belong to different product families. A Workspace can contain, for example, an Island consisting of STB modules and 1 consisting of FTM modules

The configuration data associated with each Island are stored in its own *.isl* file within the Workspace.

**NOTE:** All Islands a Workspace may contain can be open simultaneously in the Island Editor.

### Functionalities

The modules of the STB product family differ in their functionality from those of the FTB, FTM and OTB product families. Therefore, only the functionalities available for the modules concerned are available within an Island. Functionalities not available are grayed out.

### Workspace Window

Islands are displayed in the Workspace window. The display differs in the following points from that in the Advantys Configuration Tool:
- The Island Browser is replaced by the Workspace Browser, which lists all Islands a Workspace contains.
- The Island Editor displays each of the 10 Islands that can be open simultaneously in a separate tab.
- The Catalog Browser provides access to the modules of all product families.
- The Log Window displaying the results of any operation performed by the software is added.

# Island Structure

### Number of Segments

STB NIMs allow Island extensions to a greater extent than FTM NIMs do.

The following table provides an overview of the Island structures the different product families allow, including the extension possibilities:

| Product Family | Island Structure and Extension Possibilities |
|---|---|
| FTB | An FTB Island consists of exactly 1 FTB module which is a splitter box containing 8 connectors for connecting sensors and actuators. An extension is not possible. |
| FTM | An FTM Island consists of 1 FTM network interface module and at least 1 FTM I/O splitter box. Each NIM is fitted with 4 connectors for connecting splitter boxes, which allows a star architecture that can consist of 4 segments. Each segment can contain up to 4 I/O splitter boxes. |
| OTB | An OTB Island consists of 1 OTB network interface module. Every NIM has built-in inputs and outputs and accepts up to 7 I/O expansion modules, which are mounted on the same rail and thus form 1 segment. |
| STB | An STB Island must contain at least 1 STB 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. Up to 6 extension segments can be added to the primary segment.<br>An STB Island can be extended to<br>● STB I/O modules<br>● preferred modules<br>● enhanced CANopen devices |

### STB Extension and Termination Modules

The STB family contains the following modules with special functions for extending Islands to further segments and terminating Islands:
● STB XBE 1000 EOS and STB XBE 1100 EOS (end-of-segment) modules
● STB XBE 1200 BOS and STB XBE 1300 BOS (beginning-of-segment) modules
● STB XBE 2100 CANopen extension module
● STB XMP 1100 termination plate

### Extending STB Islands to Further Segments

Which extension modules are used depends on the type of the extension:

| If you want to ... | Then use... |
|---|---|
| extend the Island to 1 or more STB I/O modules | an STB EOS module at the end of the current segment and add an STB BOS module to begin the following segment. |
| extend the Island to 1 or more preferred modules | the STB XBE 1100 EOS module at the end of the current segment, add the preferred modules and then the STB XBE 1300 BOS module to begin the next segment. |
| extend the Island to 1 or more enhanced CANopen devices | the STB XBE 2100 CANopen extension module at the end of the current segment and add the enhanced CANopen devices. **Note:** Because enhanced CANopen devices are always the last devices on an Island bus, it must be terminated properly. See below for terminating an Island bus. |

### Terminating STB Islands

The last module on the Island bus determines how the bus must be terminated:

| If the last module on the Island bus is ... | Then the Island bus is terminated using ... |
|---|---|
| an STB I/O module | the STB XMP 1100 termination plate. |
| a preferred module | the TeSys U LU9 RFL15 termination device. |
| an enhanced CANopen device | the STB XMP 1100 termination plate following the STB XBE 2100 CANopen extension module at the end of the segment and a physical termination following the last enhanced CANopen device. |

### Number of Modules

The maximum number of modules depends on the type of NIM and the user-defined maximum node ID. 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. |

### Maximum Length of STB Island Buses

The total length of an STB Island bus, from the NIM to the last device, must not exceed 15 m (49.2 ft). This length includes both the sum of the lengths of all bus extension cables and CANopen cables connecting devices as well as the widths of the hardware modules themselves.

# Additional Functionalities

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## Introduction

This chapter gives an overview and a short description of the functionalities that the Advantys Configuration Software includes additionally to those provided by the Advanyts Configuration Tool.

## What Is in This Chapter?

This chapter contains the following topics:

# Main Menu Entries

### Introduction

The Advantys Configuration Software provides additional functions for all main menus and a new menu containing online functions.

### File Menu

Because the Advantys Configuration Software allows a more complex structure (several Islands combined to a Workspace), the **File** menu includes options related to Workspaces as well as Islands. In addition, an **Export** function and a **Bill of Materials** function are available.

The **File** menu commands provided by the Advantys Configuration Software are described in the table below:

| Command | Description |
|---|---|
| **New Workspace** | creates a new Workspace |
| **Open Workspace** | opens an existing Workspace |
| **Save Workspace** | saves the Workspace including all Islands |
| **Copy Workspace To** | creates a copy of the Workspace with a new name, including all Islands associated with it |
| **Close Workspace** | closes the Workspace |
| **Add New Island** | creates a new Island in the Workspace |
| **Add Existing Island** | adds an existing Island to the Workspace |
| **Copy Island Contents** | copies the contents and settings of an existing Island into the Island currently open in the Island Editor |
| **Save <active Island>** | saves the active Island |
| **Copy <active Island> To** | saves a copy of the active Island to a new file, which is not added to any Workspace |
| **Close <active Island>** | closes the active Island Editor |
| **Remove <active Island>** | removes the active Island from the Workspace |
| **Print** | prints a description of the Workspace and the selectable Islands and items |
| **Print Setup** | changes the printer and printing options |
| **Export <active Island>** | exports a list of accessories needed for the active Island in an appropriate file format based on the type of NIM |
| **Bill of Materials** | exports a description of the active Island in CSV format including comments and alternatives if applicable |
| **Recent Workspaces List** | opens the Workspace that is selected from this list |
| **Exit** | exits the application and prompts for saving changes |

**Edit Menu**

In addition to the commands available in the Advantys Configuration Tool, the Advantys Configuration Software offers the **Revert** option on the **Edit** menu. Issuing this command causes the Island configuration revert to the last saved state. Changes made after the last time the Island configuration was saved are lost and irrecoverable.

**View Menu**

Because Islands are displayed in the Workspace Browser, the Workspace Browser replaces the Island Browser. Accordingly, the **Workspace Browser** option replaces the **Island Browser** option on the **View** menu. Further, a **Log Window** option for displaying or hiding the Log Window is available.

**Island Menu**

The **Island** menu contains several additional functions. Some of them are only available for STB and/or OTB modules.

The **Island** menu commands provided by the Advantys Configuration Software are described in the table below:

| Command | Description |
|---|---|
| **Add Rail** | adds a rail to the active Island if the primary one was deleted for any reason |
| **Add Annotation** | adds an annotation to the active Island |
| **Delete Annotation** | removes the selected annotation from the active Island |
| **Replace NIM** | exchanges the NIM in an existing Island configuration (for STB and OTB only) |
| **Add Module** | opens a submenu that allows the selection of a catalog or a functional family in the Catalog Browser from which modules are to be added to the active Island |
| **Module Editor** | invokes the Module Editor for the selected module |
| **Label Editor** | invokes the User Defined Label Editor (for STB only) |
| **Reflex Editor** | invokes the Reflex Editor (for STB only) |
| **Build** | validates the software configuration of the active Island (for STB only) |
| **Lock** | locks or unlocks the configuration of the active Island |
| **Resource Analysis** | displays or hides the resource utilization chart for the active Island (for STB and OTB only) |
| **I/O Image Overview** | displays the data assignment in the I/O image of the NIM |
| **Baud Rate Tuning** | selects the baud rate for the internal Island bus (for STB only) |

| Command | Description |
|---|---|
| **Temperature Range** | selects the Island's temperature range (for STB only) |
| **Test Mode Settings** | selects the test mode settings (for STB only) |
| **Island Properties** | displays the properties of the selected Island |

**Online Menu**

The Advantys Configuration Software offers a whole new menu containing commands for manipulating an Island in online mode. However, these commands are only available for the STB product family and partly for the OTB product family.

The **Online** menu commands provided by the Advantys Configuration Software are described in the table below:

| Command | Description |
|---|---|
| **Connect** | connects to a physical Island and enables animation |
| **Disconnect** | disconnects from a physical Island and disables animation |
| **Connection Settings** | defines connection parameters |
| **Configuration Port Settings** | invokes the **Configuration Port Settings** dialog box for changing the communication parameters of the NIM (for STB only) |
| **Run** | switches the connected Island to run mode (for STB only) |
| **Stop** | switches the connected Island to stop state (for STB only) |
| **Reset** | switches the connected Island to reset state, i.e. clears input and output data and auto-addresses all modules on the Island bus (for STB only) |
| **Download into the Island** | downloads the configuration of the logical Island currently active in the Island Editor into the connected physical Island |
| **Upload from the Island** | uploads the configuration from the connected physical Island to the logical Island currently active in the Island Editor |
| **Store to SIM Card** | copies the configuration in the connected Island from the RAM to the SIM card (for STB only) |
| **Protect** | defines the protection mode and password for the connected Island (for STB only) |
| **Force Auto-configuration** | forces auto-configuration in the connected Island with defaults (for STB only) |
| **Test Mode** | activates or deactivates the test mode in the connected Island (for STB only) |
| **I/O Image Animation** | provides a dynamic display of the I/O data image of the connected Island (for STB only) |

## Options Menu

The **Options** menu contains an additional function related to the Workspace. You can select the **Workspace Properties** option to invoke the **Workspace Properties** dialog box.

## Windows Menu

The Advantys Configuration Software offers additional options for arranging the Island Editor windows (because a Workspace can contain several Islands and more than 1 can be open at a time).

The additional **Windows** menu commands are described in the table below:

| Command | Description |
|---------|-------------|
| **Maximize** | maximizes the Island Editor windows and puts the active Island Editor into the foreground |
| **Minimize** | minimizes the Island Editor windows |
| **Cascade** | cascades the Island Editor windows |

## Help Menu

On the **Help** menu, the Advantys Configuration Softwares offers additionally the **What's This?** option for displaying the context-sensitive help on the item which is clicked next.

# Shortcut Menu Entries

## Introduction

The Advantys Configuration Software provides additional shortcut menu entries within the following areas of the Workspace window:

- Workspace Browser
- Island Editor
- Log Window

## Workspace Browser

This table lists the shortcut menu entries available within the Workspace Browser:

| If you right-click the ... | Then a shortcut menu is displayed containing: |
|---|---|
| Workspace label | • **Add Island** including the **Add New Island** and the **Add Existing Island** options<br>• **Properties** |
| Island label | • **Add Rail**<br>• **Remove**<br>• **Build**<br>• **I/O Image Overview**<br>• **Connect**<br>• **Disconnect**<br>• **Properties** |
| rail label | • **Cut**<br>• **Copy**<br>• **Paste**<br>• **Delete** |
| module label | • **Cut**<br>• **Copy**<br>• **Paste**<br>• **Delete**<br>• **Module Editor** |

## Island Editor

This table lists the shortcut menu entries available within the Island Editor:

| If you right-click ... | Then a shortcut menu is displayed containing: |
| --- | --- |
| a module | <ul><li>**Cut**</li><li>**Copy**</li><li>**Paste**</li><li>**Delete**</li><li>**Replace NIM** (for STB and OTB NIMs only)</li><li>**Module Editor**</li></ul> |
| a segment (DIN rail) | <ul><li>**Cut**</li><li>**Copy**</li><li>**Paste**</li><li>**Delete**</li></ul> |
| the Island Editor | <ul><li>**Add Annotation**</li><li>**Paste**</li></ul> |

## Log Window

This table lists the shortcut menu entries available within the Log Window:

| If you right-click ... | Then a shortcut menu is displayed containing: |
| --- | --- |
| the Log Window | <ul><li>**Save Log File**</li><li>**Clear**</li></ul> |

## Module Editor

### Introduction

The FTB, FTM and OTB Module Editors have been adapted to the STB Module Editor. The **Parameters** tab contains the configuration parameters, which are displayed in a hierarchical tree view comprising master and slave parameters. The main difference is that the parameters of FTB, FTM and OTB modules are assigned to each single data item, displayed as superordinated. In contrast, parameters of STB modules are listed as superordinated and the data items are assigned to them. The STB Module Editor can also be used for mapping I/Os, whereas FTB, FTM and OTB I/Os are mapped using the **I/O Image Overview** function.

### Module Editor for STB Modules

The table below describes the different tabs of the STB Module Editor and for which modules they are available:

| Tab | Description |
|---|---|
| **General** | This read-only tab displays an illustration of the selected module and provides a brief hardware and functional description. It is available for all STB modules. |
| **Parameters** | This tab displays the operating parameters of the selected module which are currently not mapped. It is accessible for all STB standard I/O modules. |
| **Ethernet Parameters** | This tab displays the Ethernet specific parameters of the selected module. It is only accessible for the STB NIP2311 Ethernet NIM. In online mode, the parameters cannot be changed. |
| **Ports** | This tab displays the actual operating values of certain port parameters. It is only accessible in online mode for the<br>● STB NIP2311 Ethernet NIM<br>● STB NCO2212 CANopen NIM version 3.05 or later |
| **I/O Image** | This tab displays the selected module's I/O data that are currently mapped. It is accessible for all STB I/O modules. In online mode, the live I/O data of the selected module are dynamically displayed. |
| **Diagnostics** | This read-only tab displays any error message generated by the selected module. It is only accessible in online mode for STB NIMs and I/O modules. |
| **Options** | This tab displays optional parameters for the current module. It is accessible for STB NIMs and I/O modules. |
| **I/O Mapping** | This tab displays the I/O mapping for the current module. It is available for STB standard I/O modules. |
| **Information** | This read-only tab displays device parameters in online mode. It is only available for ATV and Tesys U modules in online mode. |

### Functions for STB Modules

It is possible to
- view general module information,
- edit parameters in offline mode,
- assign user-defined labels to parameters and I/O data in offline mode,
- modify the I/O mapping in offline mode,
- monitor I/O data and module diagnostics in online mode and
- set I/O data when the Island is online and in test mode.

### Module Editor for OTB, FTM and FTB Modules

The table below describes the different tabs of the OTB Module Editor and for which modules they are available:

| Tab | Description |
|-----|-------------|
| **General** | This read-only tab displays an illustration of the selected module and provides a brief hardware and functional description. It is available for all OTB, FTM and FTB modules. |
| **Parameters** | This tab displays all input data objects of the selected module including bit level information. It is available for all OTB and FTB modules as well as for all FTM modules except for FTM NIMs. |
| **Counters** | This tab displays the configuration parameters for the counters of the NIMs. Therefore, it is only available for OTB NIMs. |
| **Pulse Generator** | This tab displays the configuration parameters for the pulse generators of the NIMs. Therefore, it is only available for OTB NIMs. |
| **Options** | This tab displays the global configuration parameters for accessing the registers of NIM running on a Modbus protocol-based upstream fieldbus network. It is available for the OTB Ethernet and Modbus NIMs, not for the OTB CANopen NIM. It is not available for FTM and FTB modules. |

### Functions for OTB, FTM and FTB Modules

In offline mode, it is possible to
- view general module information,
- edit parameters and
- assign user-defined labels to I/O data.

# I/O Image

## Introduction

The Advantys Configuration Software allows to view and edit the I/O image layout of the NIM by using the **I/O Image Overview** function. Depending on the NIM and the fieldbus type, the **I/O Image Overview** dialog box contains up to 5 tabs providing different views and types of access to the I/O image.

## I/O Image Overview for STB Modules

The table below describes the different tabs of the **I/O Image Overview** dialog box and for which STB modules they are available:

| Tab | Description |
|---|---|
| **Modbus Image** | This tab displays the I/O image layout of Islands that feature a Modbus register-oriented arrangement of I/O data. It is available for all STB Islands, regardless of the NIM. |
| **Fieldbus Image** | This tab displays the I/O image layout of Islands with a network interface connecting to a fieldbus other than Modbus register-oriented. It is available for all STB Islands, except those containing Ethernet or Modbus Plus NIMs because it equals their Modbus view. |
| **HMI <-> PLC** | This tab lists the HMI-to-PLC and PLC-to-HMI data items. It is available for STB Islands containing Ethernet, Ethernet/IP and Modbus Plus NIMs. For all other fieldbuses, these data are included in the Modbus and the fieldbus view. |
| **TxPDOs** | These tabs display the current process data objects (PDO) layout presented by the NIM on the upstream fieldbus. It is only available for STB Islands containing CANopen NIMs. |
| **RxPDOs** | |

For STB modules, the **I/O Image Overview** function provides an overview of the input/output image. However, mapping the I/Os is performed in the **I/O Mapping** tab of the Module Editor of the corresponding module.

When the Island is online and in test mode, it is possible to write I/O data using the **I/O Image Animation** function.

**I/O Image Overview for FTB, FTM and OTB Modules**

The table below describes the different tabs of the **I/O Image Overview** dialog box that are available for the CANopen NIMs of the FTB, FTM and OTB product families:

| Tab | Description |
|---|---|
| **TxPDOs** | These tabs display the current PDO layout presented by the NIM on the upstream fieldbus. You can use it for modifying the I/O mapping of your Island. |
| **RxPDOs** | |
| **PDO Configuration** | This tab is for configuring the transmission parameters of the PDO items. |
| **Fieldbus Image** | This tab displays the I/O image layout of CANopen Islands. |
| **Data Ranges** | This tab lists mandatory, manufacturer and optional objects. |

The table below describes the different tabs of the **I/O Image Overview** dialog box that are available for Ethernet and Modbus NIMs of the OTB product family:

| Tab | Description |
|---|---|
| **Registers (read-only)** | These tabs display the read-only and writeable registers. You can use it for modifying the I/O mapping of your Island. |
| **Registers (writeable)** | |
| **Fieldbus Image** | This tab displays the I/O image layout of Ethernet and Modbus Plus Islands (fieldbus view equals Modbus view). |
| **Data Ranges** | This tab contains input, output, parameter and diagnostics registers and I/O modules status registers. Further, special function registers (RFC, RVFC, PLS/PWM) are included. |

## Resource Analysis and Reflex Editor

### Resource Analysis

For STB and OTB Islands, the Advantys Configuration Software includes a feature for monitoring an Island's resource consumption. Using the **Resource Analysis** function, you can access a dialog box with 2 tabs displaying various bar graphs.

In this table, the functions of the different tabs are described:

| Tab | Description |
| --- | --- |
| **Power** | This tab provides a bar graph illustrating the consumption of the logic power and the field power for each module in the Island that acts as a provider of logic and/or field power. The bars are updated dynamically, i.e. after each module update operation. |
| **Configuration** | This tab includes a bar graph representing the current relative configuration sizes for the input and the output process images and for the total configuration. For STB Islands only, the sizes for the HMI-to-PLC and the PLC-to-HMI data images are displayed as well. The bars are updated once when the function is selected. |

You can access the **Resource Analysis** function in online and offline mode.

### Reflex Editor

For STB Islands only, the Advantys Configuration Software offers the Reflex Editor for creating reflex actions. Reflex actions are small routines that perform dedicated logical functions directly on the Island bus. They allow output modules on the Island to act on data and drive field actuators directly, without requiring the intervention of the fieldbus master.

The following reflex action types are available:
● boolean logic
● integer compare
● unsigned compare
● counter
● timer
● analog latch
● digital latch

You can access the Reflex Editor when the STB Island is offline and unlocked.

# Example Application

# 3

## Introduction

This chapter contains an example application 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**.<br>**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`.<br>**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**.<br>**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.<br>**Result:** The NIM is displayed as first module on the DIN rail. |
| 4 | Double-click the label of the<br>• power module group to expand its subtree and then double-click the STBPDT3100 module.<br>• digital input module group to expand its subtree and then double-click the STBDDI3420 module.<br>• digital output module group to expand its subtree and then double-click the STBDDO3410 module.<br>• analog input module group to expand its subtree and then double-click the STBAVI1270 module.<br>• analog output module group to expand its subtree and then double-click the STBAVO1250 module.<br>• accessories module group to expand its subtree and then double-click the STBXMP1100 termination plate.<br><br>**Result:** The modules are displayed on the DIN rail to the right of the NIM in the sequence in which they have been selected.<br>**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<br>● **I/O Image** and **I/O Mapping** tabs of the Module Editor.<br>● **I/O Image Overview** and **I/O Image Animation** dialog boxes in the cell-related information, listed when a cell is selected.<br>● **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.<br>**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.<br>**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.<br>**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:<br><br>**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.<br>**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.<br>or<br>● Click **OK**, to save and close the **User Defined Label Editor**.<br>**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**.<br>**Result:** The **Reflex Editor** dialog box is displayed. |
| 2 | Click the **New** button.<br>**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.<br>**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.<br>**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.<br>**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.<br>**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**.<br>**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.<br>**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.<br>**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.<br>**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
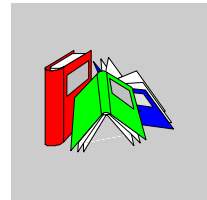
## A

**Auto-Addressing**

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

**Auto-Configuration**

The ability of Island modules to operate with predefined default parameters. A configuration of the Island bus based completely on the actual assembly of I/Os.

## 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.

## 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

**PDO**

In CAN-based networks, PDOs (process data objects) are transmitted as unconfirmed broadcast messages or sent from a producer device to a consumer device. The transmit PDO from the producer device has a specific identifier that corresponds to the receive PDO of the consumer devices.

**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.

**Process Image**

A part of the NIM firmware that serves as a real-time data area for the data exchange process. The process image includes an input buffer that contains current data and status information from the Island bus and an output buffer that contains the current outputs for the Island bus, from the fieldbus master.

# S

**Segment**

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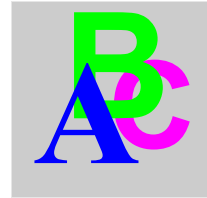
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