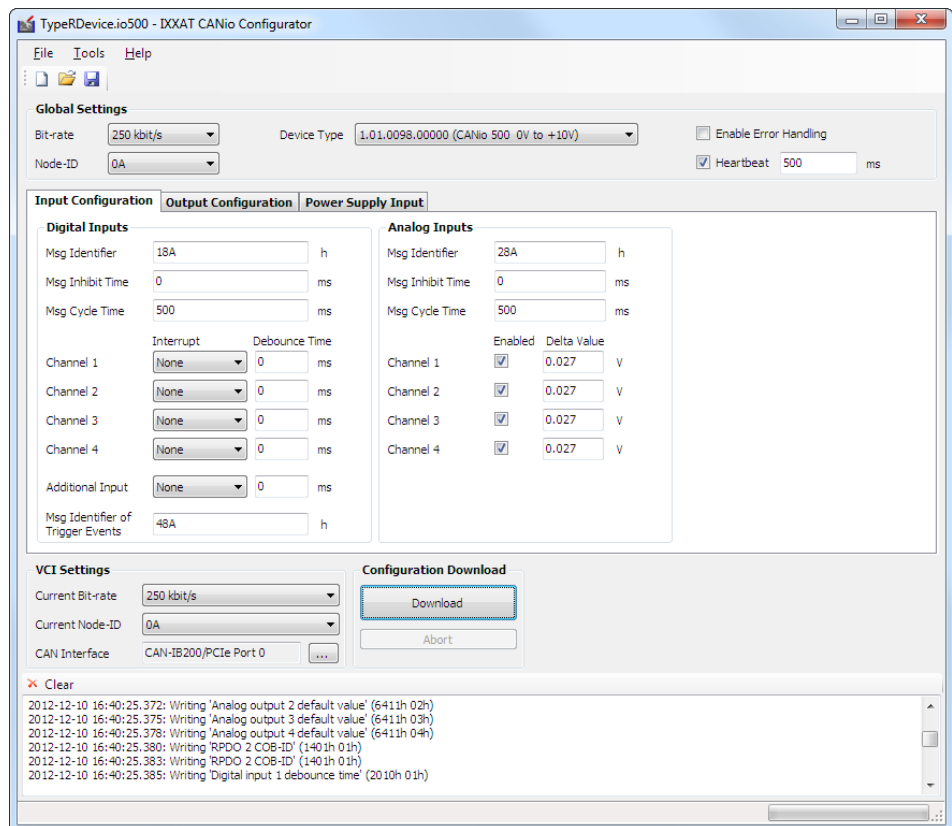


# CANio Configurator

Configuration Tool for CANio 500  
and CANio 250 Devices

SOFTWARE MANUAL  
ENGLISH



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# 1 Introduction

The CANio Configurator offers a graphical way to configure an Ixxat CANio device covering both the CANio 500 and the CANio 250. The GUI provides access to all important communication parameters at a glance. Configurations can be created offline and subsequently downloaded using an Ixxat CAN interface. A configuration can also be stored on disk allowing for easy back up as part of a specific system design. The application also supports firmware update via CAN and is intended to be used together with the CANio 500 / CANio 250 ADK which is part of the CANio Evaluation Kits [1], [3]. The latest version of the CANio Configurator can be downloaded from the homepage [1]. The download does also contain the latest unified firmware for the CANio devices.

## 1.1 References

- [1] [CANio 500 Homepage](http://www.ixxat.com/can_canio500_analog_digital_can_modul_en.html)  
([http://www.ixxat.com/can\\_canio500\\_analog\\_digital\\_can\\_modul\\_en.html](http://www.ixxat.com/can_canio500_analog_digital_can_modul_en.html))
- [2] HMS - CANio500 Hardware Manual
- [3] [CANio 250 Homepage](http://www.ixxat.com/can_canio250_digital_can_io_module_en.html)  
([http://www.ixxat.com/can\\_canio250\\_digital\\_can\\_io\\_module\\_en.html](http://www.ixxat.com/can_canio250_digital_can_io_module_en.html))

## 1.2 Definitions, Acronyms, Abbreviations

<b>CAN</b>	Controller Area Network
<b>ADK</b>	Application Development Kit
<b>GUI</b>	Graphical User Interface
<b>LED</b>	Light-Emitting Diode
<b>VCI</b>	Virtual Controller Interface
<b>USR</b>	Abbreviation: User
<b>Msg</b>	Abbreviation: Message

## **2 Installation and Start-Up**

### **2.1 System Requirements**

To operate CANio Configurator, the following minimal system requirements must be met:

- x86 or x64 type processor, 1 GHz or better
- VCI 3 compatible Ixxat CAN Interface
- Windows XP Service Pack 2, Windows Vista, Windows 7, Windows 8
- At least 256 MB RAM
- Installed .NET Framework 2.0
- Installed PDF Viewer
- Installed Ixxat VCI driver, version 3.x

Before installing the CANio Configurator, the Ixxat VCI driver must be installed. To install the CAN hardware, please consult the corresponding hardware installation manual. For installation of the required Ixxat VCI driver, please consult the VCI installation manual.

### **2.2 Installation**

To install the CANio Configurator start the installation program by running the file **CANioConfigurator\_XXXX\_Setup.exe**, with **XXXX** representing the current version information. Follow the instructions of the installation program.

### **2.3 Start-Up**

The CANio Configurator is started by clicking on the program icon created on the desktop or via the Windows Start menu. The desktop icon might not be available if not selected during installation.

### 3 Overview

The user interface of the CANio Configurator is divided in four primary areas. The menu system with main menu and tool bar, the configuration work space, the CAN download area and the status area.

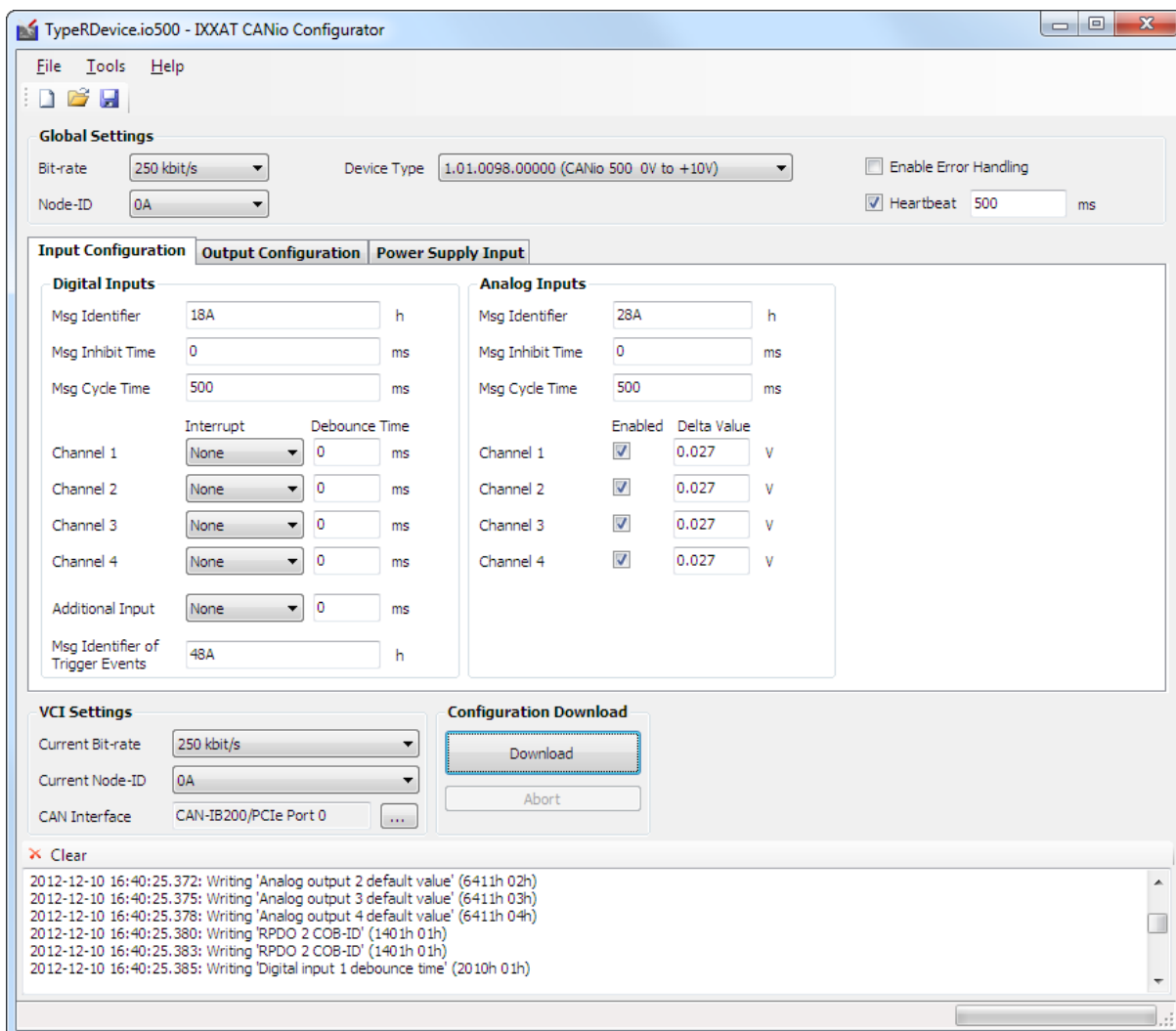





Figure 3-1: Main application window of CANio Configurator

## 3.1 Menu Reference

### File

 <u>N</u> ew	Creates a new configuration project
 <u>O</u> pen...	Opens an existing configuration project
<u>C</u> lose	Closes the current configuration project
 <u>S</u> ave	Saves changes to the current project
Save <u>A</u> s...	Saves changes to the current project under the specified file name
Save As <u>T</u> emplate...	Saves the current project as template
<u>E</u> xit	Closes the application

### Tools

<u>R</u> eset Message Identifiers	Changes all the CAN Message Identifiers to their defaults (which are a function of the Node-ID)
<u>T</u> ools...	Opens the dialog with advanced tools
<u>U</u> ppdate Firmware...	Opens the firmware update dialog
<u>O</u> ptions...	Opens the application options dialog

### Help

<u>C</u> ontents	Displays the manual
<u>A</u> bout...	Displays the About CANio Configurator window

Some of the menu functions can be also accessed by the tool bar (Figure 3-2). Available are New, Open and Save.



Figure 3-2: CANio Configurator tool bar



## 3.2 Status Area

The status area is located at the lower end of the application and contains the log window and the progress bar (Figure 3-3).

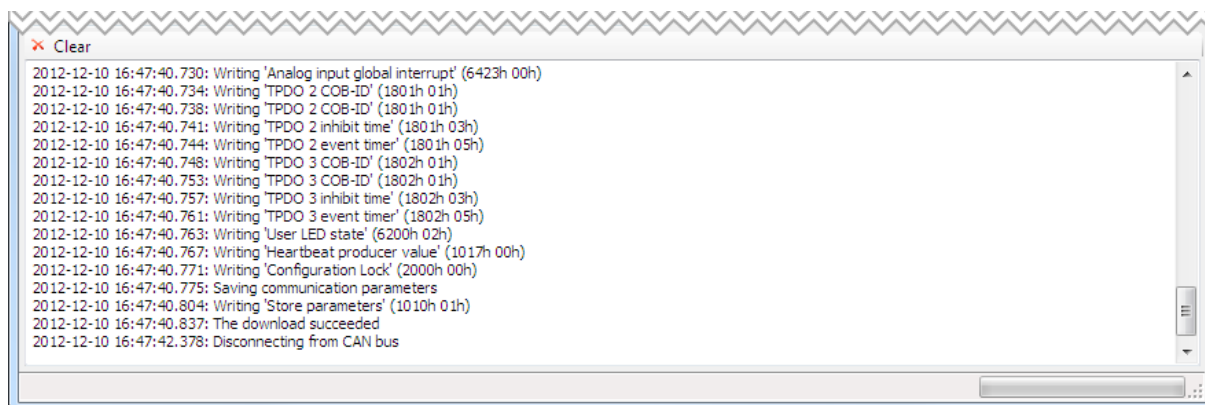


Figure 3-3: Log window and status area

The log window provides detailed information about an executed operation. Especially for troubleshooting failed downloads or updates these messages are helpful. The progress bar is activated during device access and indicates the estimated progress of the download or update operation.

## 3.3 Options

The options can be accessed via the Tools → Options... menu item. The dialog shown in Figure 3-4 will appear.

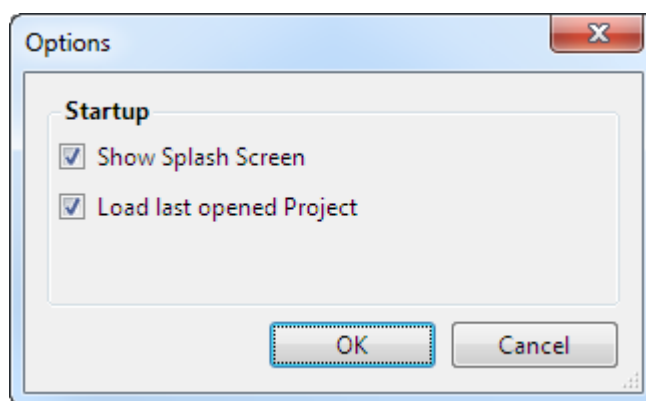


Figure 3-4: Options dialog

The Show Splash Screen option can be used to deactivate the splash screen shown at start up.

The second option is the Load Last opened Project flag. As the name implies selecting this option causes CANio Configurator to load the most recently used project on start up.

### 3.4 VCI Settings

The VCI Settings (Figure 3-5) is located between the configuration area and the status area.

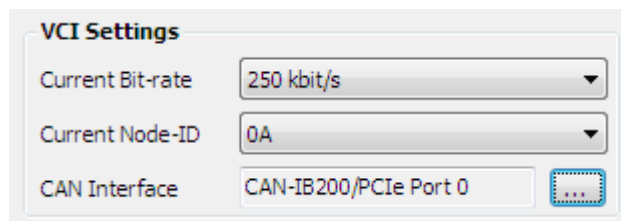


Figure 3-5: VCI Settings

The VCI Settings specifies the communication parameters used for the connection from the local computer to the CANio device. Download, Firmware Update and Tools depend on these settings.

The settings consist of the Bit-rate, the Node-ID and the CAN Interface used for communication. Click on the tree dots button once to select your local CAN Interface and controller (Figure 3-6). The CAN interface used must not be shared with another application. As the CANio configurator requires to change some parameters of the CAN controller during download it is not possible to share control.

The Node-ID parameter is not used for download. But Firmware Update and Tools do require a correct value in order to access the device.

During the download, the Bit-rate and Node-ID of the CANio device will be changed according to the configuration. If the download has succeeded, the VCI Settings will be set automatically to the new values.

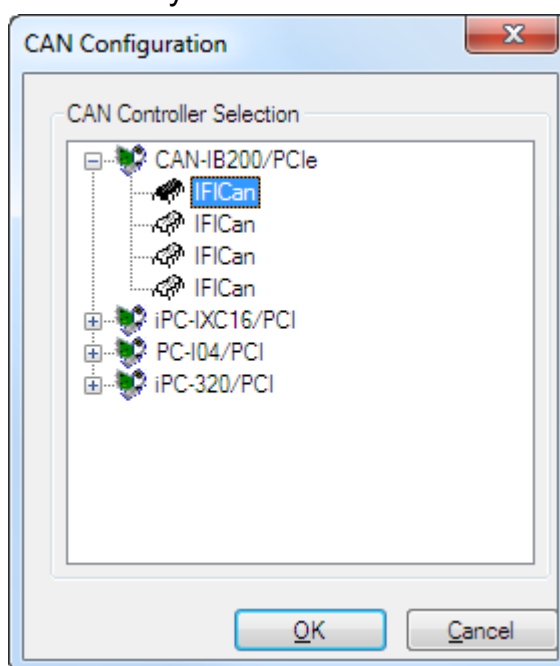


Figure 3-6: Selecting the local CAN Interface and controller

## 4 Configuration

### 4.1 Project Files and Templates

In order to work with the configuration section of the CANio Configurator, at first a project must be created or opened.

Creating a new configuration requires the selection of a template. The application automatically shows a file open dialog offering for selection of a template (Figure 4-1).

Templates provide a common base for similar projects and contain default values for all relevant communication parameters of a project. The CANio Configurator is shipped with default templates for the three CANio 500 device types available and a template for the CANio 250 device at choice. By choosing a template file you determine your actual CANio device.

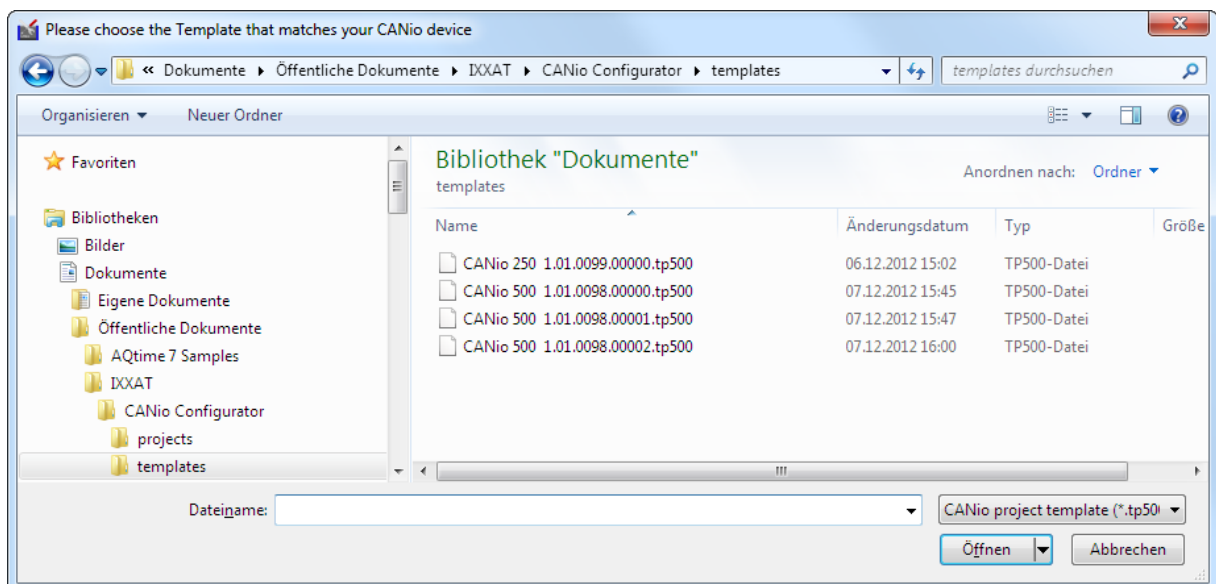


Figure 4-1: Initially choosing a CANio device template

It is also possible to define your own templates. A project is stored as a template via the `Save as Template...` menu item in the `File` menu.

### 4.2 Data Validation

The input fields of the CANio Configurator do provide an on-the-fly data validation. If the entered data is not valid an error symbol (Figure 4-2) is displayed. By moving the mouse over the icon, a tool tip pops up explaining the error.



Figure 4-2: Input field in error state

Some of the input fields also have to deal with rounding and range issues. As the data structures of the CANio device can only hold discrete values, the accuracy of floating point values is limited and depends on the selected value range.



Figure 4-3: Input field in warning state

If a value is entered that cannot be exactly represented by the internal data structure, a warning symbol like shown in Figure 4-3 will appear. Again moving the mouse over the icon will provide detailed information. If the control in this state loses focus the displayed value will automatically change to the rounded value represented by the internal structure.

### 4.3 CAN Message Configuration

Most of the configuration groups described in the subsequent chapters contain a sub-configuration which refers to the CAN message that is used to send or receive the data. This section looks like Figure 4-4 . The inputs contain all three options displayed while the outputs do only have the Msg Identifier field.

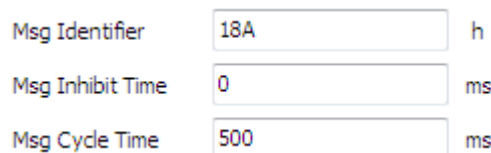


Figure 4-4: CAN message configuration

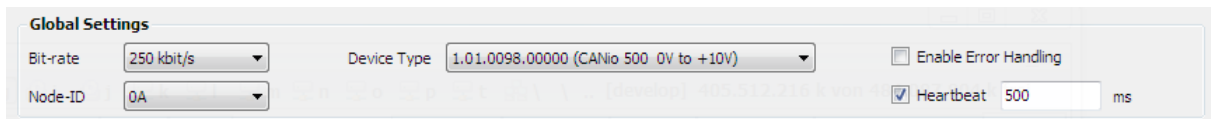
The `Msg Identifier` field refers to the CAN identifier that is used to send or receive the data. The value is limited to the range of 1h to 7FFh as 11bit identifiers are supported only. Some identifiers like 80h or 7E4h resp. 7E5h are not allowed because of the CANopen nature of the CANio device. If such an identifier is entered an error will be stated as described in chapter 4.2. The message will indicate which identifier is conflicting with the one entered. A value of 0h will turn off / disable the message.

The `Msg Inhibit Time` specifies the minimum time span between two send messages. If this value is non-zero a message will only be sent if the elapsed time since the last message was sent is greater than the inhibit time.

The `Msg Cycle Time` specifies a cyclic repetition of a message. If this value is non-zero the message will be sent cyclically within the interval specified, even if the data has not changed.

### 4.4 Global Settings

The `Global Settings` group (Figure 4-5) defines some basic parameters of the device.



The screenshot shows a configuration window titled "Global Settings". It contains several controls: a dropdown menu for "Bit-rate" set to "250 kbit/s", a dropdown menu for "Node-ID" set to "0A", a dropdown menu for "Device Type" set to "1.01.0098.00000 (CANio 500 0V to +10V)", a checkbox for "Enable Error Handling" which is unchecked, and a checkbox for "Heartbeat" which is checked, followed by a text input field set to "500" and the unit "ms".

Figure 4-5: Global settings

The `Bit-rate` and `Node-ID` define the CAN communication parameters the device shall use **after** configuration. The correctness of these parameters is vital as wrong values will prevent the device from communication in the target network. `Device Type` defines the type of the CANio device that is configured by the configuration sections described below. This parameter is actually not downloaded to the device. But it affects the way other parameters are handled. The download will abort if the attached device is of another type then specified here.

If `Enable Error Handling` is checked, the CANio device will override the outputs with the specified default values if a communication or internal occurs. If the flag is not set the output values will be left unchanged on error.

`Heartbeat` specifies the timing of the CANopen heartbeat message. This message is sent cyclically with identifier `700h + Node-ID`. It is intended to be used to monitor the device's state. The check box can be used to activate or deactivate the heartbeat message. The value beside the check box specifies the cycle time in milliseconds. A cycle time of zero will have the same effect as if the message would be disabled.

### 4.5 Digital Inputs

The digital inputs of the CANio device are configured by the corresponding group box (Figure 4-6) at the `Input Configuration` tab. The group of controls looks slightly different for the CANio 500 and the CANio 250.

**Digital Inputs**

Msg Identifier	<input type="text" value="18A"/>	h
Msg Inhibit Time	<input type="text" value="0"/>	ms
Msg Cycle Time	<input type="text" value="500"/>	ms
Channel 1	Interrupt: <input type="text" value="None"/>	Debounce Time: <input type="text" value="0"/> ms
Channel 2	Interrupt: <input type="text" value="None"/>	Debounce Time: <input type="text" value="0"/> ms
Channel 3	Interrupt: <input type="text" value="None"/>	Debounce Time: <input type="text" value="0"/> ms
Channel 4	Interrupt: <input type="text" value="None"/>	Debounce Time: <input type="text" value="0"/> ms
Additional Input	Interrupt: <input type="text" value="None"/>	Debounce Time: <input type="text" value="0"/> ms
Msg Identifier of Trigger Events	<input type="text" value="48A"/>	h

**Figure 4-6: Digital inputs configuration of CANio 500**

**Digital Inputs**

Msg Identifier	<input type="text" value="18A"/>	h
Msg Inhibit Time	<input type="text" value="0"/>	ms
Msg Cycle Time	<input type="text" value="500"/>	ms
Additional Input	Interrupt: <input type="text" value="None"/>	Debounce Time: <input type="text" value="0"/> ms
Msg-ID of Trigger Events Digital A	<input type="text" value="48A"/>	h
Msg-ID of Trigger Events Digital B	<input type="text" value="68A"/>	h

**Figure 4-7: Digital inputs configuration of CANio 250**

The meaning of Msg Identifier, Msg Inhibit Time and Msg Cycle Time is described in chapter 4.3.

Interrupt type	Description
None	No interrupt is created by the input. The value is polled.
High-To-Low	An interrupt occurs on change from high to low
Low-To-High	An interrupt occurs on change from low to high
Any Change	An interrupt occurs any change of the input

**Table 4-1 : Interrupt values**

Each channel has an Interrupt type. The type specifies under which condition an interrupt is generated and subsequently a CAN message is sent. The available values are listed in Table 4-1. The behavior may be modified by the CAN message configuration described in chapter 4.3.

The Debounce Time specifies the time the CANio device will wait after a level change of the digital input until it is considered as valid. Thereby a bouncing input can be prevented from generating an extensive amount of CAN messages.

A second message will be sent containing the so-called Event Triggers of the digital inputs. This one is using a low priority CAN identifier, 48Ah by default. The Event Triggers are byte counters of the level changes prior to definite detection of a digital input's state. In order to disable the CAN message, enter 0h into field Msg Identifier of Trigger Events.

**CANio 250** has two digital ports A and B that can be programmed as Inputs and as Outputs respectively. Following the designation "I / O", by default, Digital A is programmed as Inputs, and Digital B as Outputs. Hence, the digital input controls of group Digital B are greyed out (Figure 4-8). To switch the direction of a digital port, uncheck Enabled of the current direction, change to Output Configuration tab sheet, and check Enabled of the reverse direction (Figure 4-12).

Digital A <input checked="" type="checkbox"/> Enabled			Digital B <input type="checkbox"/> Enabled		
	Interrupt	Debounce Time		Interrupt	Debounce Time
Channel 1	None	0 ms	Channel 9	None	0 ms
Channel 2	None	0 ms	Channel 10	None	0 ms
Channel 3	None	0 ms	Channel 11	None	0 ms
Channel 4	None	0 ms	Channel 12	None	0 ms
Channel 5	None	0 ms	Channel 13	None	0 ms
Channel 6	None	0 ms	Channel 14	None	0 ms
Channel 7	None	0 ms	Channel 15	None	0 ms
Channel 8	None	0 ms	Channel 16	None	0 ms

Figure 4-8: Digital inputs configuration of CANio 250 Groups

## 4.6 Analog Inputs

The second group box on the Input Configuration tab contains the configuration of analog inputs (Figure 4-9). It is only available for the **CANio 500** platforms.

Analog Inputs		
Msg Identifier	28A	h
Msg Inhibit Time	0	ms
Msg Cycle Time	500	ms
	Enabled	Delta Value
Channel 1	<input checked="" type="checkbox"/>	0.027 V
Channel 2	<input checked="" type="checkbox"/>	0.027 V
Channel 3	<input checked="" type="checkbox"/>	0.027 V
Channel 4	<input checked="" type="checkbox"/>	0.027 V

Figure 4-9: Analog inputs configuration

The meaning of Msg Identifier, Msg Inhibit Time and Msg Cycle Time is described in chapter 4.3.

Each channel can be disabled separately. If a channel is disabled a value change of the channel will not trigger a CAN message.



The Unit and value range of the delta value depends on the chosen device type (see chapter 4.4). It may be 0-10 V, -/-5 V or +/-100 mA. The Delta Value specifies the minimum change at the input that is required to occur in order to generate a CAN message. The behavior may be modified by the CAN message configuration described in chapter 4.3.

### 4.7 Digital Outputs

The first group box on the Output Configuration tab contains the configuration of the digital outputs (Figure 4-10). The group of controls looks slightly different for the CANio 500 and the CANio 250.

Digital Outputs

Msg Identifier: 20A h

Default Value

Channel 1: 0

Channel 2: 0

Channel 3: 0

Channel 4: 0

USR LED 1: Off

USR LED 2: Off

Figure 4-10: Digital outputs configuration of CANio 500

Digital Outputs

Msg Identifier: 20A h

Default Value

USR LED 1: Off

USR LED 2: Off

Figure 4-11: Digital outputs configuration of CANio 250

The meaning of Msg Identifier is described in chapter 4.3.

The configuration section contains the digital outputs located at the digital connector of the device. Also, the USR LEDs are configured via this control. The Default Value of the digital outputs Channel 1 to Channel 4 can be set to 0 (Off) and 1 (On). The USR LEDs provide the values Off, Green and Red.

**CANio 250** has two digital ports A and B that can be programmed as Inputs and as Outputs respectively. Following the designation “I / O”, by default, Digital A is programmed as Inputs, and Digital B as Outputs. Hence, the digital output controls of group Digital A are greyed out (Figure 4-12). To switch the direction of a digital port, uncheck Enabled of the current direction, change to Input Configuration tab sheet, and check Enabled of the reverse direction (Figure 4-8).

Group	Enabled	Channel	Default Value
Digital A	<input type="checkbox"/>	Channel 1	0
	<input type="checkbox"/>	Channel 2	0
	<input type="checkbox"/>	Channel 3	0
	<input type="checkbox"/>	Channel 4	0
	<input type="checkbox"/>	Channel 5	0
	<input type="checkbox"/>	Channel 6	0
	<input type="checkbox"/>	Channel 7	0
	<input type="checkbox"/>	Channel 8	0
Digital B	<input checked="" type="checkbox"/>	Channel 9	0
	<input checked="" type="checkbox"/>	Channel 10	0
	<input checked="" type="checkbox"/>	Channel 11	0
	<input checked="" type="checkbox"/>	Channel 12	0
	<input checked="" type="checkbox"/>	Channel 13	0
	<input checked="" type="checkbox"/>	Channel 14	0
	<input checked="" type="checkbox"/>	Channel 15	0
	<input checked="" type="checkbox"/>	Channel 16	0

Figure 4-12: Digital outputs configuration of CANio 250 Groups

## 4.8 Analog Outputs

The last group box on the Output Configuration tab contains the configuration of the analog outputs (Figure 4-13). It is only available for the **CANio 500** platforms.

Msg Identifier	Output Range	Default Value	Unit
30A	0-10V	0	V
Channel 1	0-10V	0	V
Channel 2	0-10V	0	V
Channel 3	0-10V	0	V
Channel 4	0-10V	0	V

Figure 4-13: Analog outputs configuration

The meaning of Msg Identifier is described in chapter 4.3.

For each channel of the analog output the supported voltage Range can be set. The available ranges are listed in Table 4-2.

<b>Voltage Ranges</b>
-5 V to +5 V
-10 V to +10 V
-10.8 V to +10.8 V
0 V to 5 V
0 V to 10 V
0 V to 10.8 V

---

**Table 4-2 : Voltage ranges**

The Default value specifies the initial value of the channel after startup. If the output range is changed the CANio Configurator will try to keep the value. If the value is out of the selected range it will be changed to the nearest border of the new range. Also rounding might occur. In both cases a warning will be stated as described in chapter 4.2.

## 4.9 Power Supply

The last tab sheet contains the configuration of the Power Supply Input (Figure 4-14).

**Power Supply Value**

Msg Identifier	<input type="text" value="38A"/>	h
Msg Inhibit Time	<input type="text" value="0"/>	ms
Msg Cycle Time	<input type="text" value="500"/>	ms
Delta Value	<input type="text" value="0.403"/>	V

msg	5.316	13.09.2011 15:47	←
msg	4.496	04.11.2011 16:27	←
msg	62.102	10.12.2012 15:06	←
msg	6.576	13.09.2011 15:47	←
msg	33.405	15.09.2011 17:22	←
msg	14.020	10.12.2012 15:12	←
msg	9.711	13.09.2011 15:47	←
msg	3.719	13.09.2011 15:47	←
msg	2.322	13.09.2011 15:47	←

Power Supply is a hardwired internal analog input

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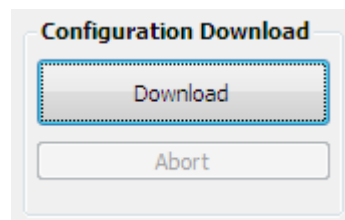
**Figure 4-14: Power Supply Value configuration**

The meaning of Msg Identifier, Msg Inhibit Time and Msg Cycle Time is described in chapter 4.3.

The `Delta Value` specifies the minimum change of the power supply voltage that is required to occur in order to generate a CAN message. The behavior may be modified by the CAN message configuration described in chapter 4.3.

### 4.10 Configuration Download

The currently displayed configuration can be downloaded by using the `Configuration Download` group (Figure 4-15). It is not required to save the configuration before. The tool will always download the configuration that is currently displayed.



---

Figure 4-15: Configuration download

The download relies on the CAN settings specified in the `VCI Settings` group (see chapter 3.4). If the settings do not fit the actual device state the downloader will not be able to access the device.



Make sure the CANio configurator is connected to the CANio device by means of a one-to-one connection before starting the download.

**Never** use the download while connected to a network that contains other devices. Doing so may compromise network stability and might result in undefined network behavior.

The download is started by using of the `Download` button. If the configuration contains errors (indicated by the validation symbols described in chapter 4.2) the download will abort. Also, error messages will be added to the log window. A running download can be aborted by using the `Abort` button. An abort cannot damage the attached CANio device but may leave it in an undefined state. In this case the next download may fail but the device will return to a defined state afterwards.

## 5 Firmware Update

The firmware update functionality is located in a separate dialog (Figure 5-1). The dialog is available via the **Tools** → **Firmware Update...** menu item.

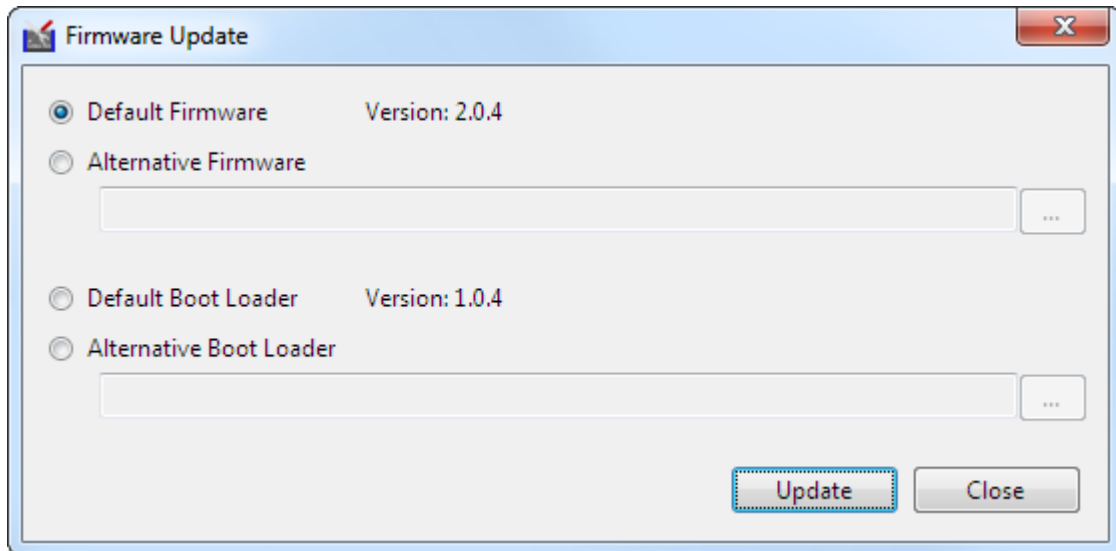


Figure 5-1: Firmware Update dialog

The CANio Configurator provides updating the firmware and the boot loader. Both of these can either be updated using the default firmware or an alternative one. The type of software to download is selected by means of the radio buttons on the left side.

The Default Firmware is shipped with the CANio Configurator. The displayed version refers to this software. It is unified for both CANio 250 and CANio 500 platforms.

Alternative software may be software developed with the CANio 500 ADK [1] or another version of the default software which was not shipped with the application.



If the boot loader is updated with non-default software, the CANio Configurator might no longer be able to update the device. Further updates will only be possible by returning the device to HMS.

If the device contains the default firmware, updating simply requires pressing the Update button. If the device contains alternative firmware please refer to the next chapter.

## 5.1 Updating when Alternative Firmware is on the Device

If alternative firmware is loaded to the device the CANio Configurator cannot automatically switch to boot loader mode.

In order to switch the **CANio 500 device** to the boot loader mode, please perform the following steps:

1. Power off your CANio 500 device
2. Connect PIN 3 and PIN 8 of the digital port (please refer the hardware manual [2] for further information)

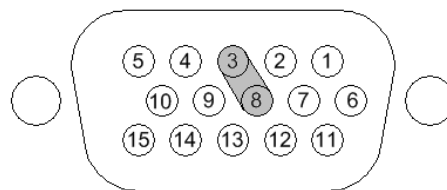


Figure 5-2: Boot loader activation jumper on digital port of CANio 500

3. Switch on power  
The CAN LED should now flash green indicating the boot loader is active
4. Download the firmware as described in the previous section
5. Remove the connection between PIN 3 and PIN 8

In order to switch the **CANio 250 device** to the boot loader mode, please perform the following steps:

1. Power off your CANio 250 device
2. Connect PIN 3 and PIN 8 of the CAN port (please refer the hardware manual [4] for further information)

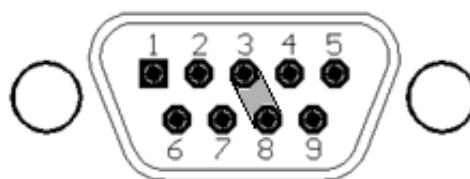


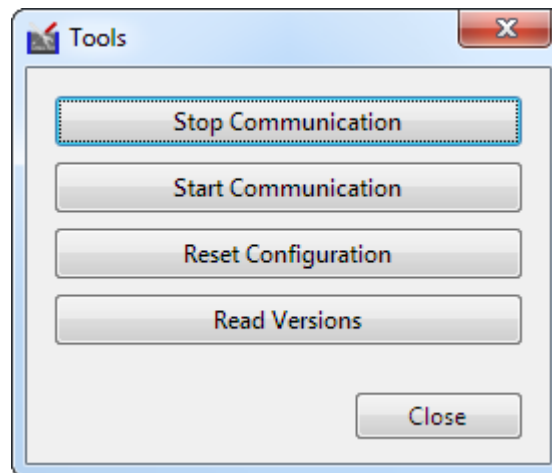
Figure 5-3: Boot loader activation jumper on CAN port of CANio 250

Follow steps 3. to 5. as above.

The boot loader **cannot** be updated using the described steps. In order to update the boot loader, please flash a default firmware first. After the boot loader was updated using the procedure described in the previous chapter, the alternative firmware may be flashed again.

## 6 Additional Tools

The CANio Configurator provides some additional tools that are helpful for troubleshooting and diagnostics. The corresponding dialog (Figure 6-1) can be opened via the `Tools` → `Tools...` menu.



**Figure 6-1: Tools dialog**

All functions in the dialog rely on the values set in the `VCI Settings` group (see also chapter 3.4). In addition, all these functions require default firmware and boot loader to be installed on the device.

`Stop Communication` / `Start Communication` provide a mechanism to change the communication state of the attached CANio device. If the communication is stopped, most CAN messages of the device will no longer be sent. This functionality is intended to be used if a device was misconfigured and is flooding the bus with messages. In this case it is also not possible to reconfigure the device as communication is blocked. Stopping the communication in this case is the only way to regain access to the device.

The `Reset Configuration` button resets the device's values to manufacturer default. This includes also Node-ID and Bit-rate. Thus, CAN options may require adjustments in order to communicate with the device.

`Read Version` reads the current versions of firmware and boot loader from the connected device.

## 7 Support

For more information on our products, FAQ lists and installation hints, please refer to the support area on our homepage (<http://www.ixxat.com>). There you will also find information on current product versions and available updates.

If you have any further questions after studying the information on our homepage and the manuals, please contact our support department. In the support area on our homepage you will find the relevant forms for your support request. In order to facilitate our support work and enable a fast response, please provide precise information on the individual points and describe your question or problem in detail.

If you would prefer to contact our support department by phone, please also send a support request via our homepage first, so that our support department has the relevant information available.