.dp Vision

Graphical User Interface

Parameter Programming and Configuration

The 2nd Generation of .dp Products

User manual

Revision 1.2, 2015-07-21

Power Management & Multimarket

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1 About this document

1.1 Scope and purpose

The .dp Vision environment is a software integration platform that brings together all the tools necessary to set, test and burn parameters to create complete environment for application development based on .dp devices. This GUI (Graphical User Interface) application should allow the user to easily define the parameter values in order to set the respective hardware configuration, which will match with given power topology behavior. The .dp Vision software is a JAVA-based GUI for configuration of the 2nd generation of Infineon .dp digital platform products. It supports all functionality necessary to download, burn or patch the parameters during the development phases of a dp-based application.

This User Manual document gives an overview of the requirements, clarifies the installation process and provides a detailed description of all the options and functionalities supported. Dedicated use case descriptions guide the user through configuration details and help in becoming familiar with this powerful tool. One of the components which come with this tool is .dp Vision Assistant. This assistant provides an easy way for the user to input requested parameters for system configuration and it is described at the end of the document.

The screenshots and explanations, provided in this document are referring to version 2.0.4.0. Slightly changes might be visible on newer versions of the .dp Vision (previously called .dp Vision basic mode).

1.2 Intended audience

This document is intended for anyone who needs to select and define the project-specific parameter settings including adaptation and fine-tuning of the firmware behavior with respect to the application hardware configuration and dimensioning, fulfilling the given system requirements.

2 Requirements

To program the .dp device with the desired parameters, a .dp Interface Gen2 programming kit is required. The kit is shown below in **Figure 1**.

Figure 1 .dp Interface Gen2 Programming Kit

When opened, the .dp Interface Gen2 kit is supplied with instructions for downloading the .dp Vision software, a USB cable, and the Interface Gen2 box (also called ***DpIfGen2 Interface board***). The USB key is also supplied with detailed connection information for connecting the Interface Gen2 box with an OTP programming board (see **Figure 2**).

Figure 2 .dp Interface Gen2 Programming Kit Contents

Requirements

To start the application .dp Vision in an appropriate way, it is necessary to fulfill the following requirements:

a) The operating system installed on a PC should be Windows XP (32/64 bit), Windows 7 (32/64-bit), Windows 8 (32/64-bit) or Windows 8.1 (32/64-bit).

b) The .dp Vision software needs to be installed (see Section **3.1**).

c) The Interface Gen2 box should be connected via the provided USB cable to a USB PC port.

The Interface Gen2 box should be connected with a DP OTP programming board via the 3-wire interface as shown in **Figure 3**, or with a target-specific .dp-based application board (see **Figure 4**).

Figure 3 Interface Gen2 Box Connections to a PC and OTP Programming Board

Note: When initially connecting the Interface Gen2 box only the USB green LED lights up. The configuration above shows the device after being powered on.

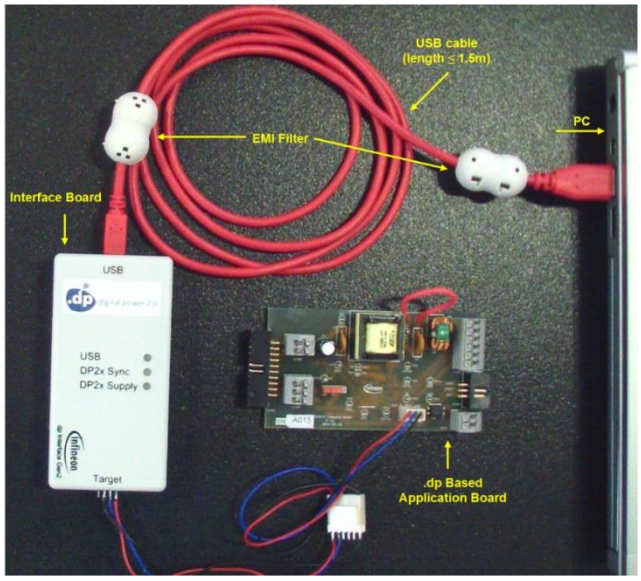


Figure 4 Interface Gen2 Box Connections to a PC and Application Board

3 Installation and Uninstallation

3.1 Installation

The .dp Vision software comes with a user-friendly setup wizard, which enables easy installation of the GUI application. Execute “dpVision_V2.0.x.y.msi” with a double-click. Follow the instructions given in the dialog box to install .dp Vision (illustrated below using the Windows 7 operating system (32-bit)). When “dpVision_V2.0.x.y.msi” is started, the following window appears – see **Figure 5**.

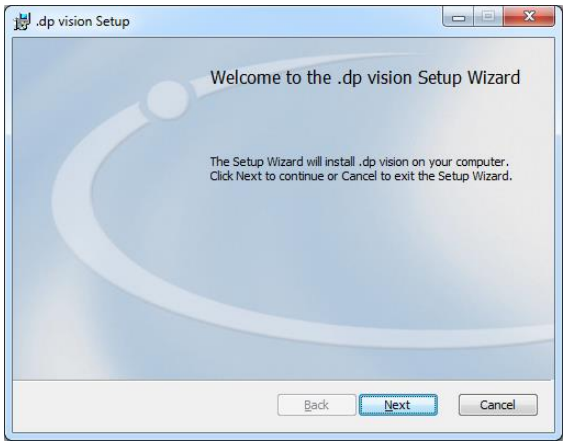


Figure 5 .dp Vision Setup Wizard

The next window (see **Figure 6**) clarifies the software license agreement, which needs to be accepted to continue the installation procedure. Please note that the JRE (Java Runtime Environment) package is required for functioning of the .dp Vision GUI. It will be located in a specific directory (see **Figure 6**) during the installation process. The user will not be able to run this GUI if this installation folder has been removed. The .dp Vision JRE will not affect the operation of pre-installed JRE or existing Java applications.

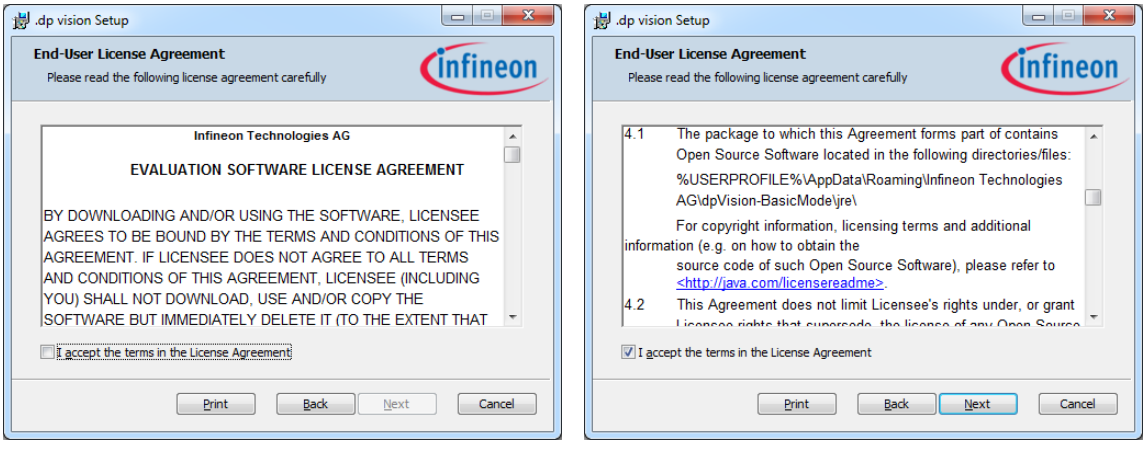


Figure 6 .dp Vision License Agreement

In the next window the user can select the folder in which the .dp Vision application is to be installed, either using a pre-defined suggestion or a user-defined selection by pressing the "**Change**" button (see **Figure 7**).

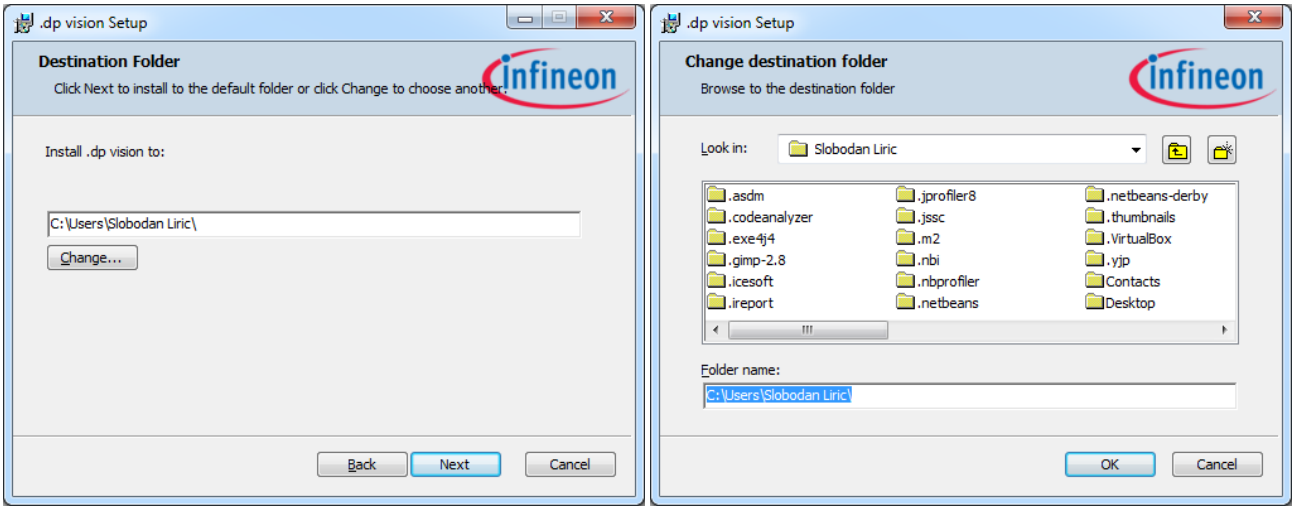


Figure 7 .dp Vision Destination Folder Selection

Note: The installer will append "\Infineon Technologies AG\.dp Vision\" to the user-defined installation folder name

Once all necessary inputs are provided, the installation process can be executed by pressing the "**Install**" button (see **Figure 8**). Please note that the folder structure will be created within the selected destination folder (see **Figure 12**).

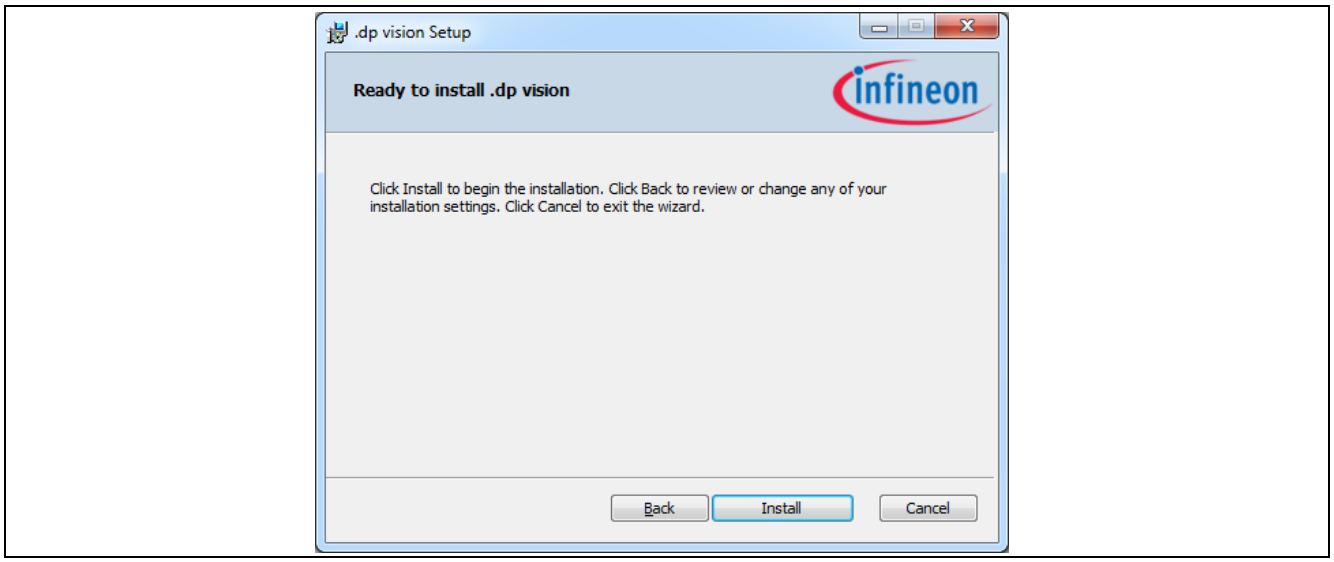


Figure 8 .dp Vision Ready to Install

The progress of the installation can be seen in the following window – see **Figure 9**.

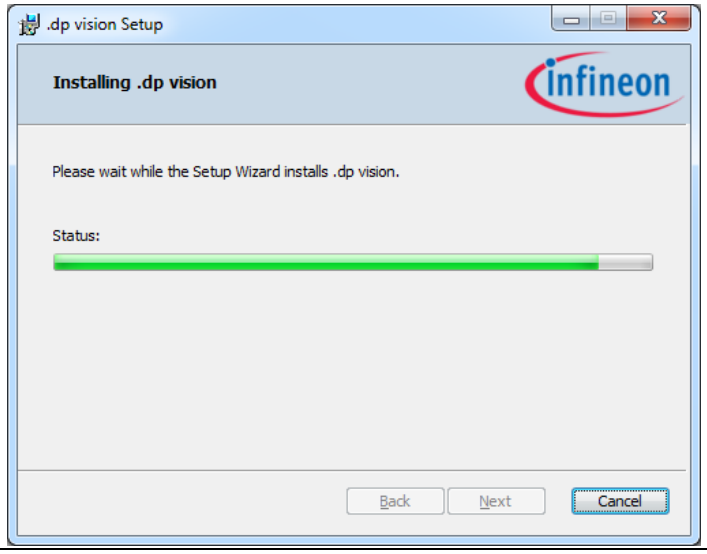


Figure 9 .dp Vision Installation Progress Status

After pressing the "**Finish**" button the .dp Vision tool is successfully installed – see **Figure 10**.

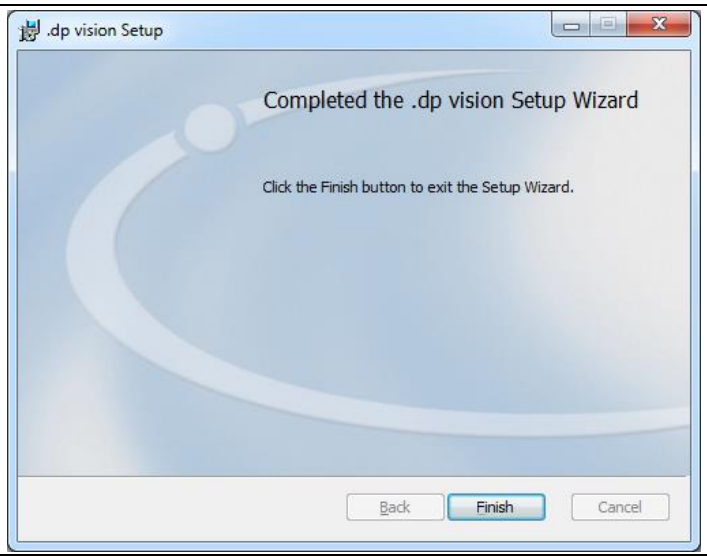


Figure 10 Completing the .dp Vision Installation

After completion of the setup wizard, the .dp Vision tool is available on the Windows start menu (see **Figure 11**) and can be started from there (by selecting .dp Vision). The program can be started by using the available icon located on the Windows desktop. In addition, a link to this User Manual can be found there, as well the uninstall routine (by selecting Uninstall .dp Vision) in case the tool needs to be removed from the PC (see Section **3.3**).

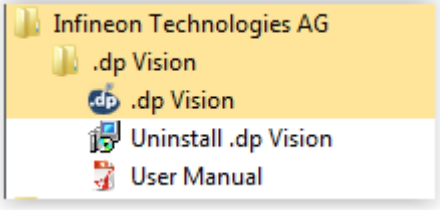


Figure 11 .dp Vision on the Windows Start Menu

3.2 Folder Structure

When executing the setup wizard, a dedicated folder structure is created, which is required for working smoothly with the tool (see **Figure 12**).

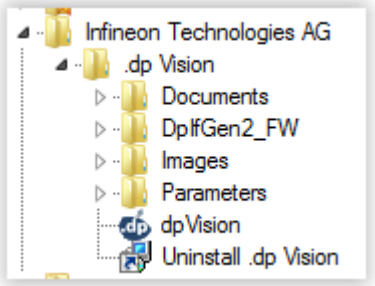


Figure 12 Default .dp Vision folder Structure

Note: Please do not change the folder names and/or structure and do not remove any subfolder. If this is the case, correct functionality cannot be guaranteed.

- Folder "**.dp Vision**":

Besides the subfolders, the .dp Vision executable (dpVision.exe) and uninstall (Uninstall .dp Vision.lnk) shortcut can also be found.

- Subfolder "**Documents**":

Contains this User Manual.

- Subfolder "**DpIfGen2_FW**"

Contains the firmware (hex file) version(s) that can be loaded onto the DpIfGen2 interface board (firmware update – see Section 5).

- Subfolder "**Images**":

Includes all pictures supported by the parameter csv files. Images can be provided by your Infineon representative separately for each project.

- Subfolder "**Parameters**":

Includes IFX-defined application-specific parameter csv (comma-separated values) files that can be loaded into the parameter configuration section of the .dp Vision tool. The csv configuration files can be provided by your Infineon representative separately for each project.

3.3 Uninstallation

There are two options to uninstall (remove) this product from your computer:

1. Double-click the file "dpVision_V2.0.x.y.msi" to start the Setup Wizard. The following window then appears – see **Figure 13**.

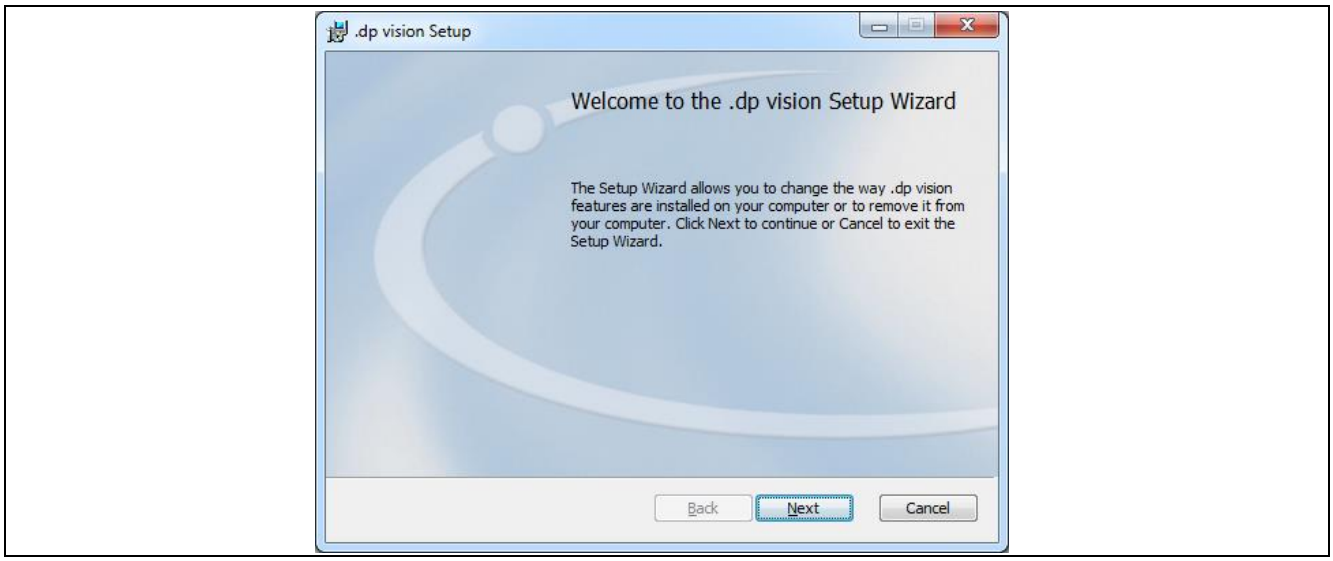


Figure 13 .dp Vision Setup Wizard

The uninstallation can be continued by pressing the "**Remove**" button – see **Figure 14**.

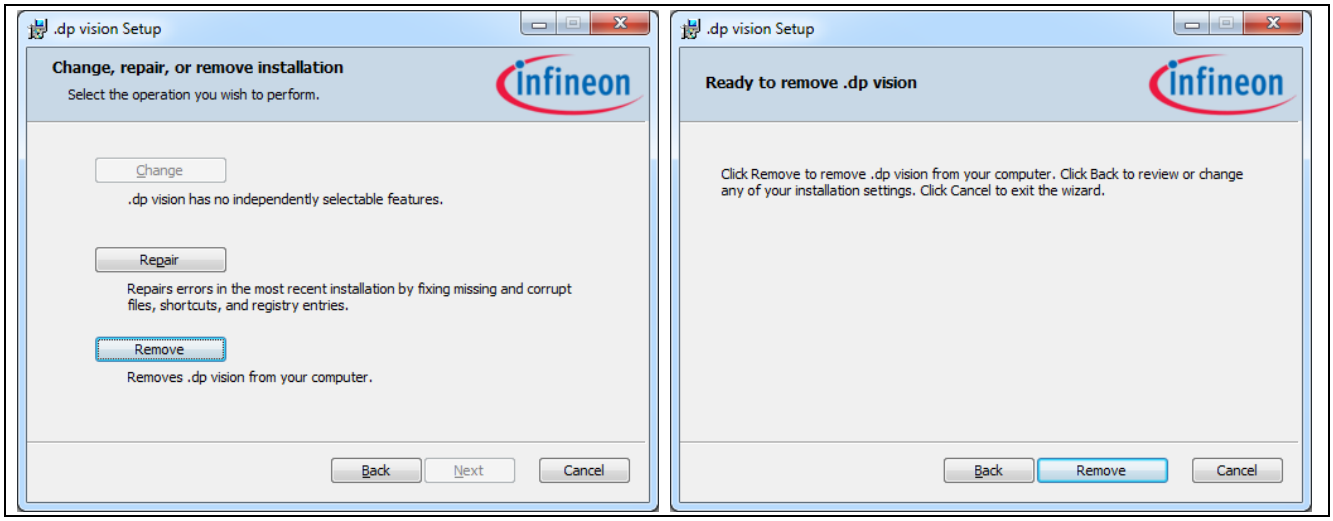


Figure 14 Remove .dp Vision

The progress of the uninstallation can be seen in the following window – see **Figure 15**.

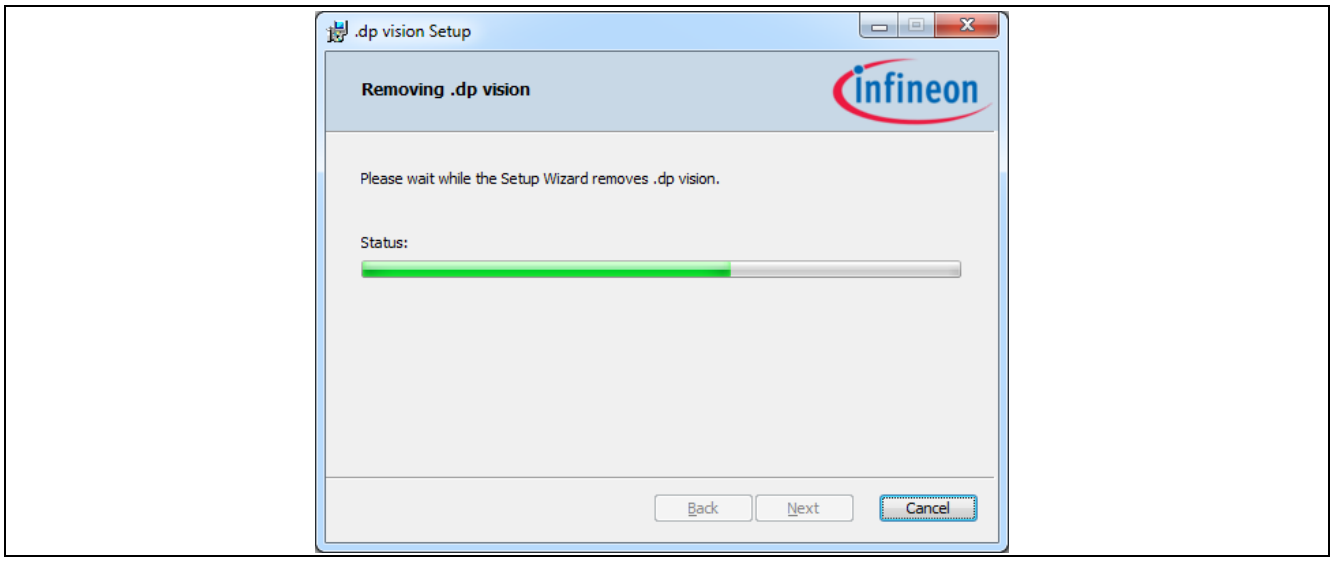


Figure 15 .dp Vision Uninstallation Progress Status

After pressing the "**Finish**" button the .dp Vision tool is successfully uninstalled (**Figure 16**).

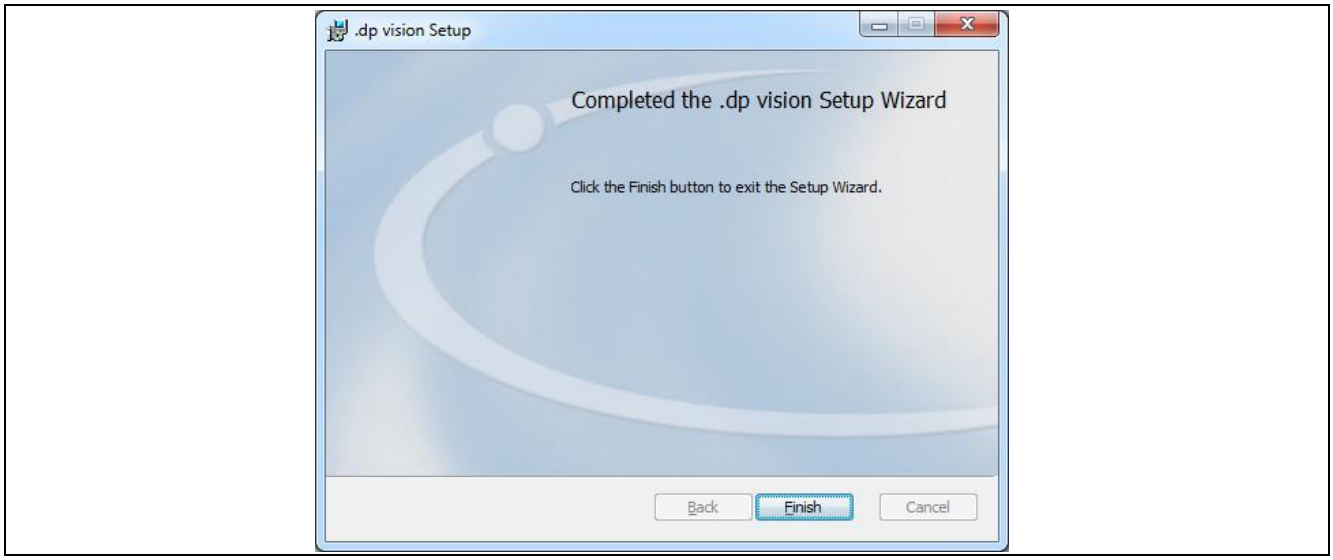


Figure 16 Completing the .dp Vision Uninstallation

2. Double-click "Uninstall .dp Vision.lnk" to launch a complete uninstallation procedure – see **Figure 17**.

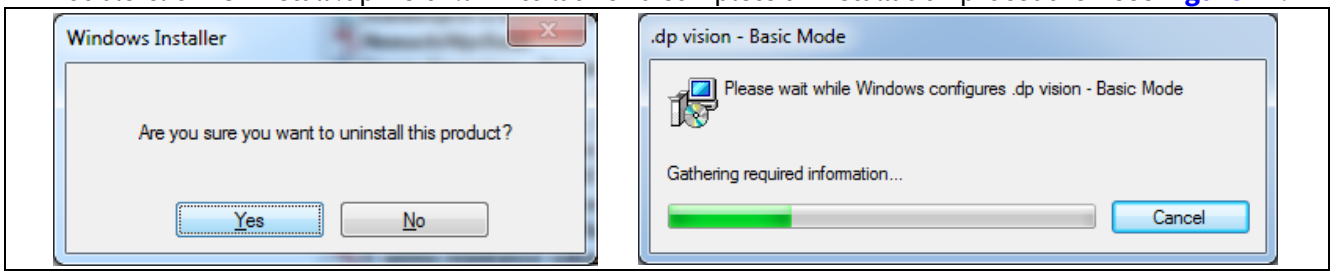


Figure 17 .dp Vision Complete Uninstallation Process

4 .dp Vision Application

After the installation process, all necessary files will be located in the default installation folder *c:\Users\Username\Infineon Technologies AG\.dp Vision* or in *"User Defined Installation Folder Name"\Infineon Technologies AG\.dp Vision*, depending on the option chosen during installation. The application can now be started by running the file "dpVision.exe" (note: V2.0.x.y designates the related version number – see **Figure 18**).

Figure 18 .dp Vision Opening Window

During application startup it will be automatically checked if there is a new version of .dp Vision on the IFX server. There are two types of update: **Mandatory update** (see **Figure 19**), which must be performed otherwise the application will be closed, and **Regular update** (see **Figure 19**), which the user can choose to skip.

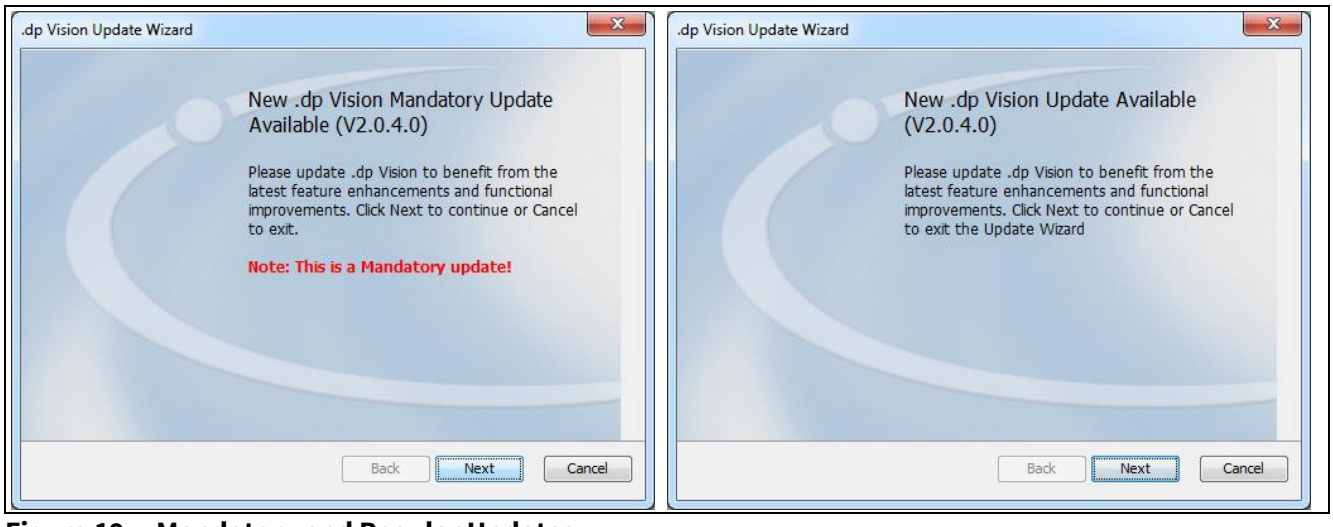


Figure 19 Mandatory and Regular Updates

The next window (see **Figure 20**) declares the software license agreement, which needs to be accepted to continue the update procedure.

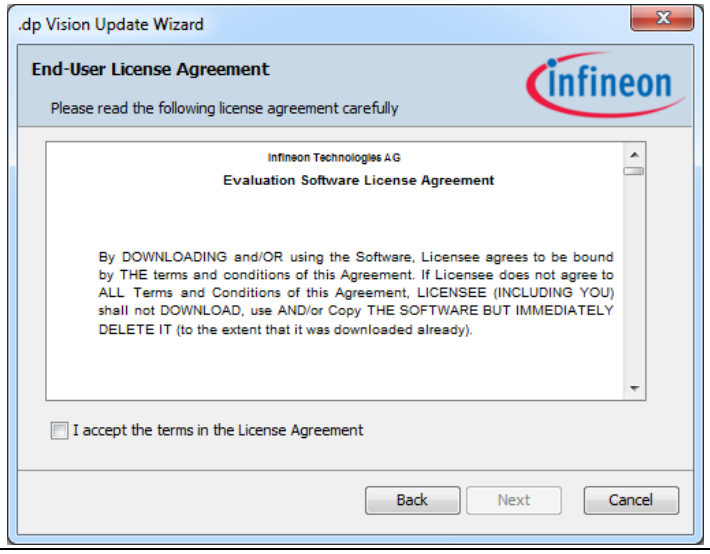


Figure 20 .dp Vision License Agreement

After accepting the terms of the License Agreement, the update procedure is started (see **Figure 21**).

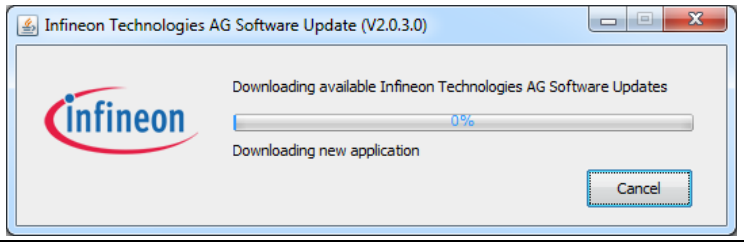


Figure 21 .dp Vision Update

If there is a proxy in the local network, relevant settings can be entered in Tools -> Options (see **Figure 22**):

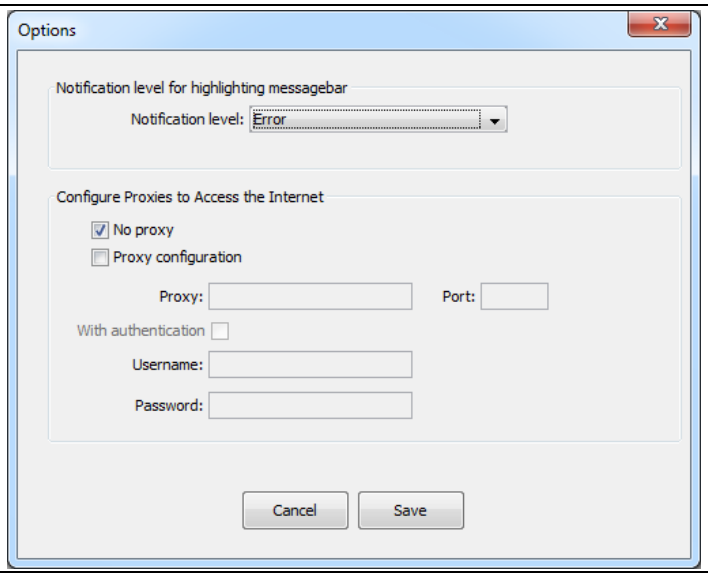


Figure 22 .dp Vision Proxy Configuration

Note: The screenshots are showing .dp Vision version 2.0.4.0, if you use a newer version of .dp Vision, slightly changes might be visible.

4.1 Main Application Window

After a successful launch, the following window will appear (see **Figure 23**).

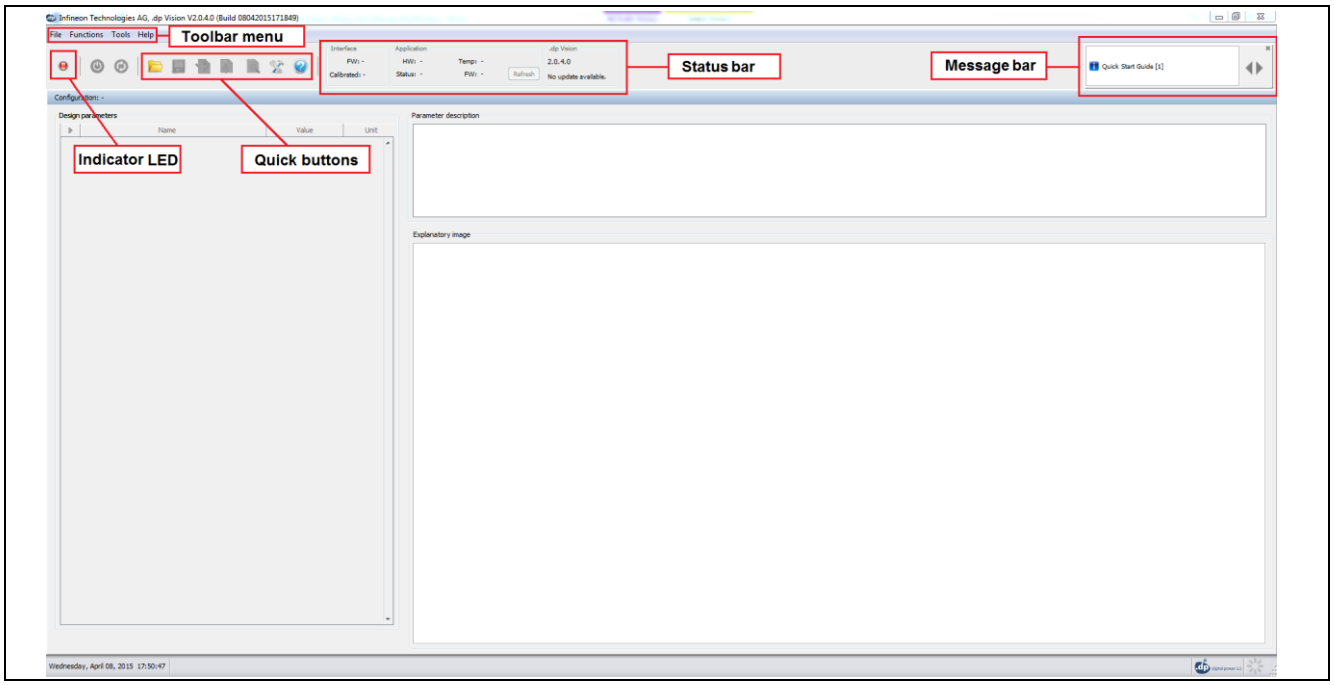


Figure 23 .dp Vision Main Application Window

4.1.1 Indicator LED

The indicator LED (see **Figure 24**) shows that the .dp device is powered up when green (by pressing the power button) and communication has been established between the PC and the .dp firmware (firmware is started). The device can be restarted by pressing the “Restart” button (Quick Start button) which causes a new power-on and synchronization cycles – i.e. firmware execution is started again from the beginning.

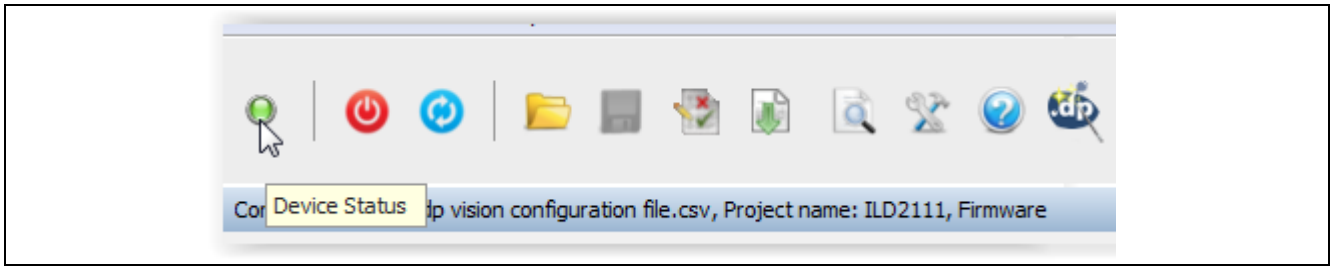


Figure 24 .dp Vision Device Status Indicator LED

4.1.2 Toolbar Menu

The toolbar menu consists of “File”, “Functions”, “Tools”, and “Help”:

3. The File menu (see **Figure 25**) allows the user to open (**Open**) a configuration file, and save edited configurations with the same name (**Save**) or with a different name (**Save As...**) where the parameter values have been edited. The File menu also allows saving of the ahex file (**Save ahex** and **Save**

Production ahex) which can be used for parameter burning during the production procedure. The option "**Exit**" closes the .dp Vision tool.

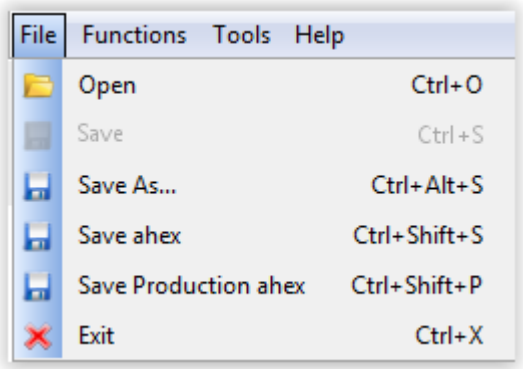


Figure 25 .dp Vision File Menu

4. The Functions menu (see **Figure 26**) provides control to the user to push parameters into the .dp device. There are two mechanisms that are important. Firstly, to test any parameter that has been edited by the user, the "**Test Configuration Set**" option can be selected in order that parameters are written into RAM and checks can be made by the user by making board measurements. This is not permanent, but provides the user with a useful capability when developing parameters for their power topology. The second mechanism is provided by "**Burn Configuration Set**", which permanently burns the parameters into OTP memory. Also within the Functions menu, there is the "**Identify Configuration Set**" option that allows the user to see if the loaded list of configuration parameters is the same as the list of parameters that are burned to the OTP memory of the chip (an appropriate message window will appear). The "**Freeze Configuration Set**" option allows freezing of the current set of parameters after which it is no longer possible to make changes to the parameters. The "**Autostart**" option will setup firmware to be started automatically after powered the chip. The availability of "**Freeze Configuration Set**" and "**Autostart**" is project-dependent.

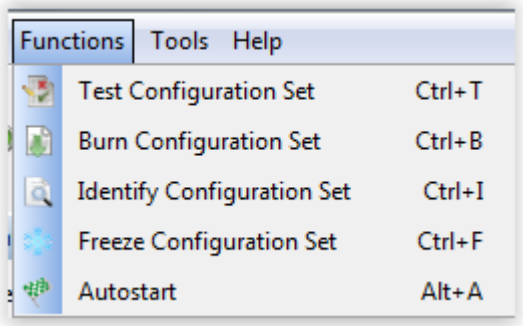


Figure 26 .dp Vision Functions Menu

5. The Tools menu (see **Figure 27**) allows logging and message levels to be displayed (see **Figure 28**) as well as a firmware update option which can be used to update the DpIfGen2 interface board firmware (see Section **5**).

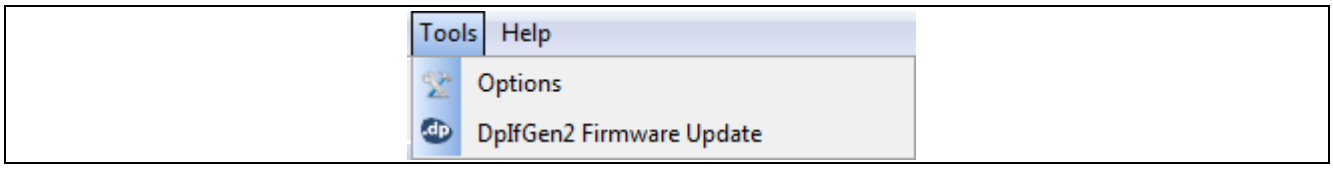


Figure 27 .dp Vision Tools Menu

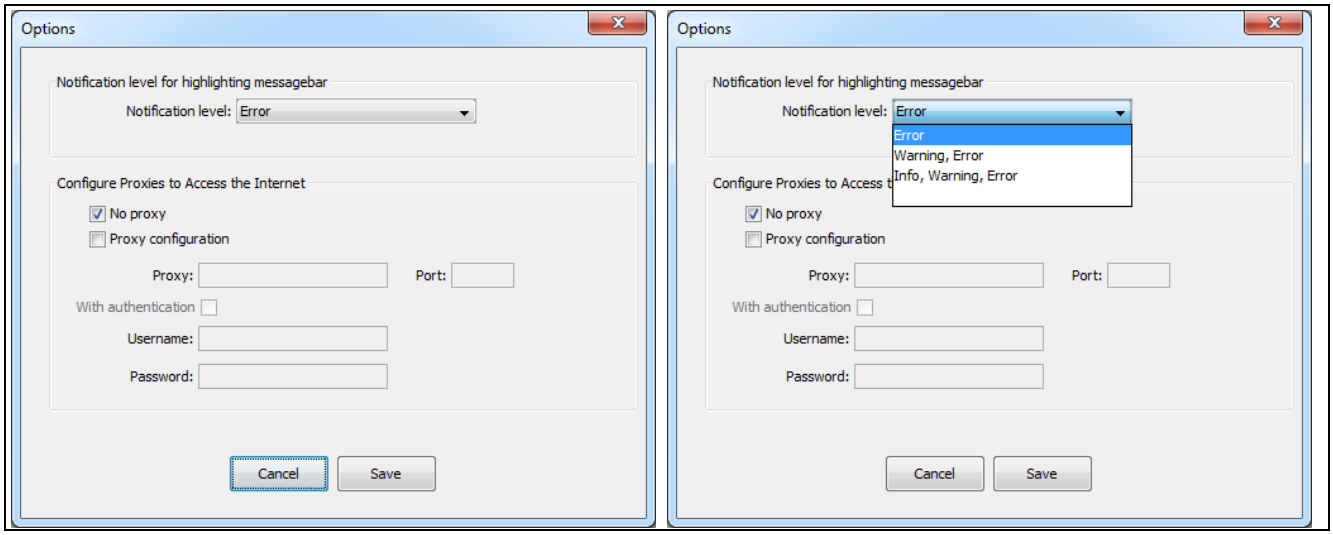


Figure 28 .dp Vision Tools Menu -> Options

6. The Help menu (see **Figure 29**) displays this help manual.

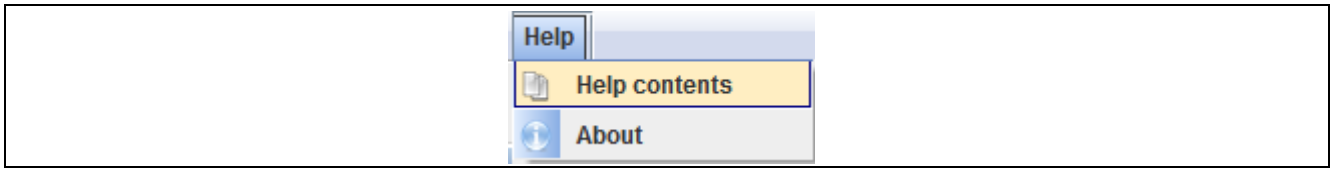


Figure 29 .dp Vision Help Menu

4.1.3 Quick Buttons

The Quick buttons are displayed directly below the toolbar menu. The icons are displayed in **Figure 30**.

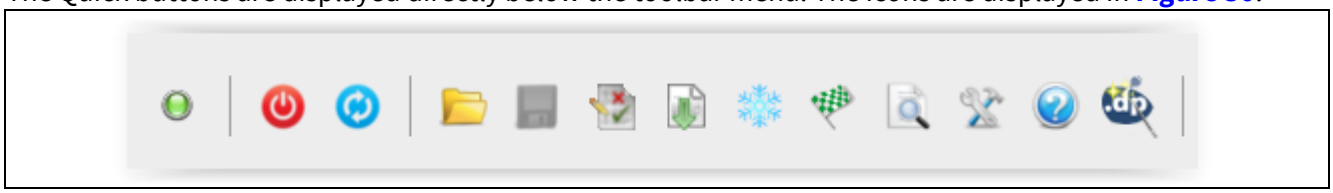


Figure 30 .dp Vision Quick Buttons

The list of Quick buttons is presented below:

- Device Status - see Section **4.1.1**
- Power Device On/Off - see Section **4.1.1**
- Restart Device - see Section **4.1.1**
- Open Configuration Set - see Section **6.1**

- Save Configuration Set - see Section **6.5**
- Test Configuration Set - see Section **6.4**
- Burn Configuration Set - see Section **6.6**
- Freeze Configuration Set (the availability of this option is project-dependent) - see Section **6.7**
- Identify Configuration Set - see Section **4.1.2**
- Options - see Section **4.1.2**
- Help - see Section **4.1.2**
- .dp Vision Assistant - see Section **7**
- Autostart - see Section **4.1.2**

4.1.4 Status Bar

The status bar contains three parts: *Interface*, *Application* and *.dp Vision*, each of which contains different status information.

- **Interface section** contains information about DpIfGen2, the firmware version (**FW**) and calibration information (**Calibrated**).
- **Application section** contains information about the project, hardware version (**HW**), firmware status (**Status**), chip-internal temperature (**Temp**) and firmware version (**FW**). Status information can be updated by pressing the Refresh button. If some of this information is not supported by the project firmware, the status information is left empty.
- **.dp Vision section** contains information about the application version and online update.

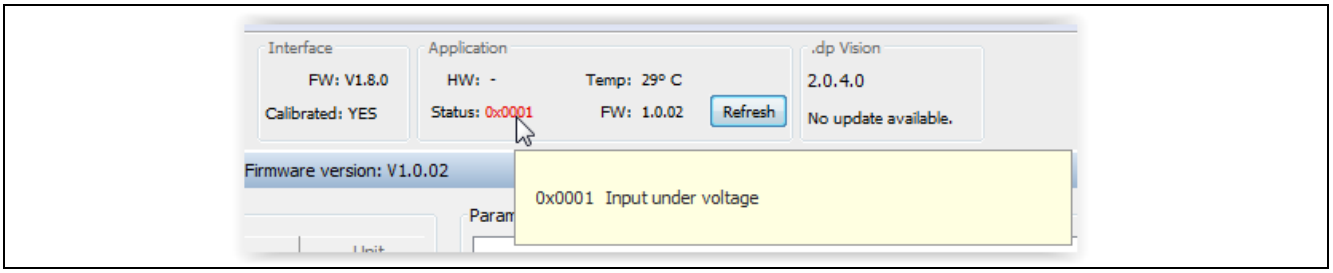


Figure 31 .dp Vision Status Bar

4.1.5 Message Bar

Information, Warning and Error message titles are shown in the message bar located at the top right corner – see **Figure 32**. In order to see a full message description, user should click on the message title. By default, only Error messages are visible, while Warning and Info messages are hidden. To make Warning and/or Info

messages visible, corresponding box (Warning/Info) from the Message description window should be selected.
Browsing through the message stack is performed by using left and right arrows in Message description window (or message bar).

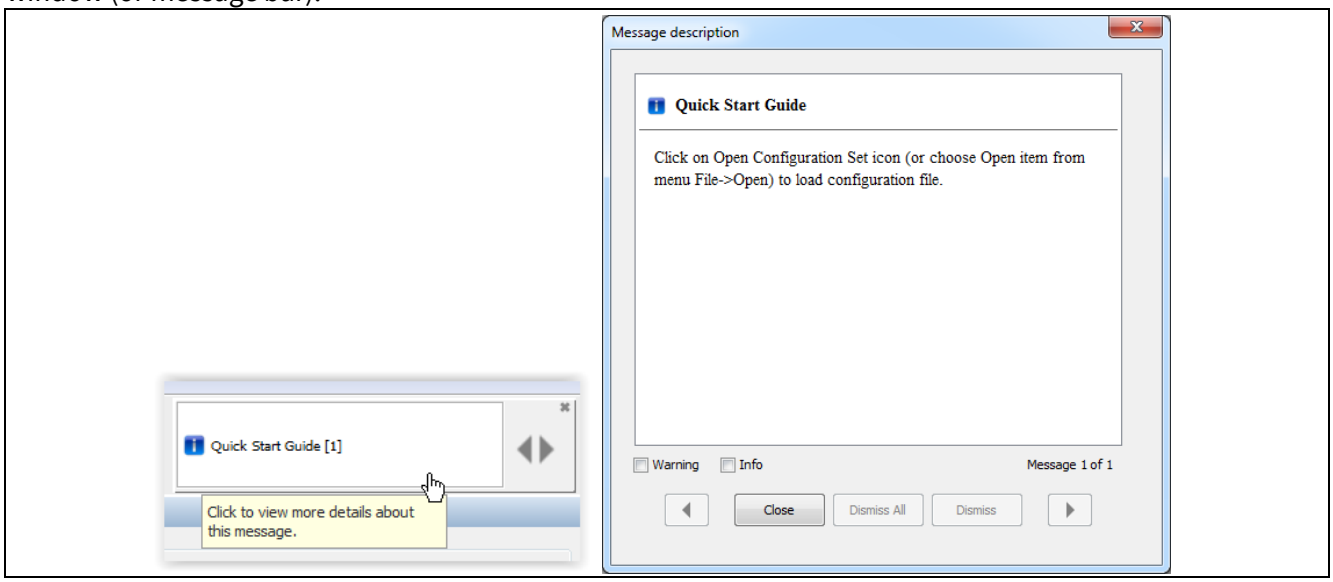


Figure 32 .dp Vision Message Bar

4.2 Design Parameters Table

The rest of the initial window display is entirely for displaying parameters and allowing the user to edit them as desired – see **Figure 33**.

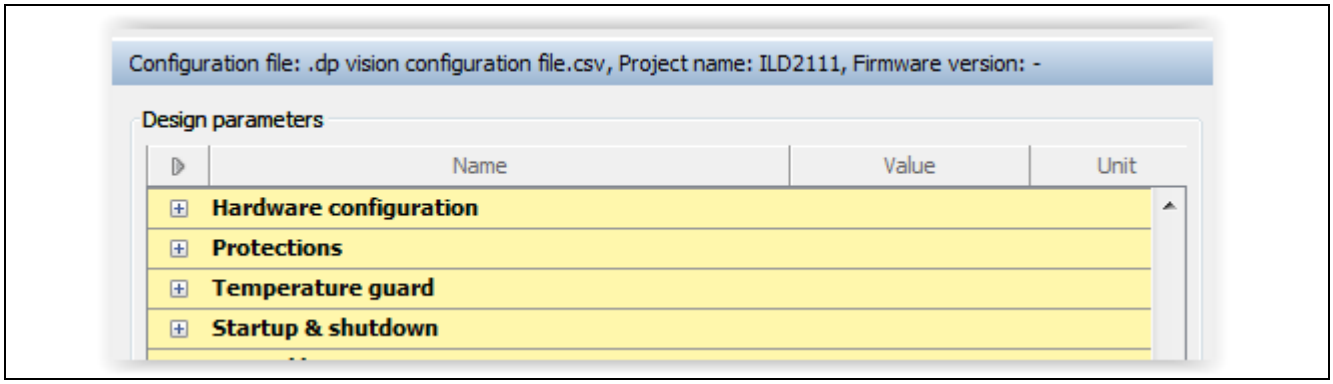


Figure 33 .dp Vision Design Parameter Table

4.3 Parameter Description Pane

The “Parameter description” field displays details on the selected parameter – see **Figure 34**.

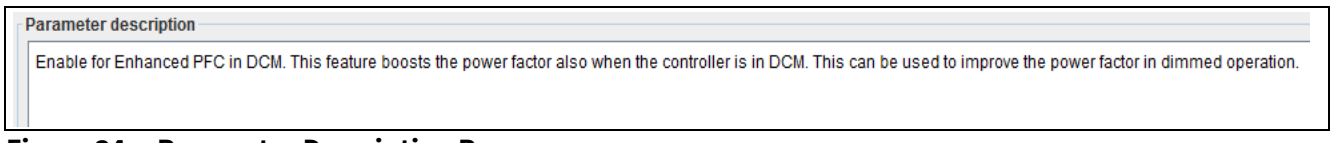


Figure 34 Parameter Description Pane

4.4 Explanatory Image Pane

The “Explanatory image” field expands the description of the selected parameter (if the image is attached to the parameter) – see **Figure 35**.

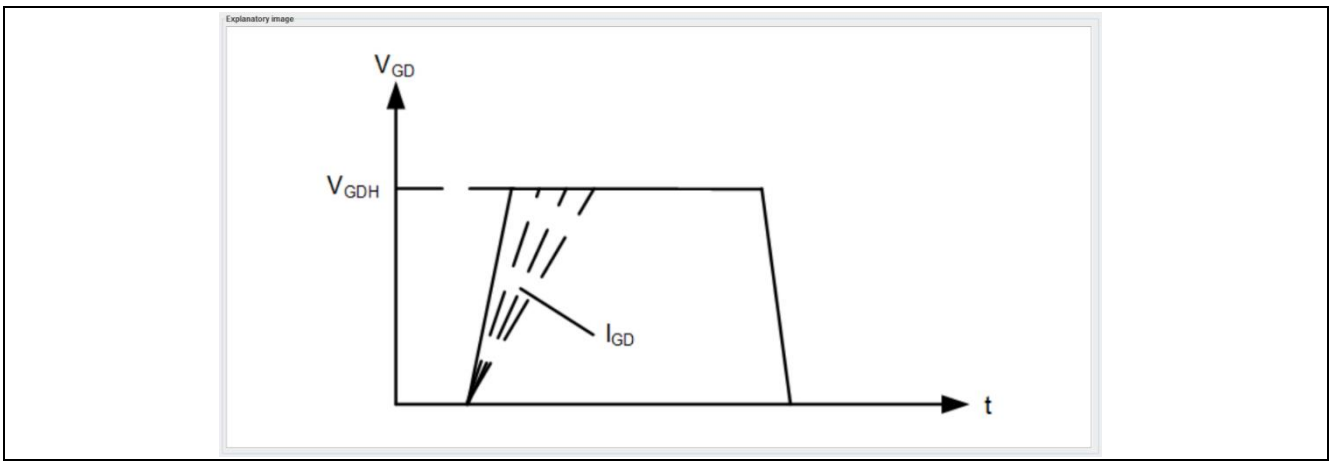


Figure 35 .dp Vision Explanatory Image Pane

5 DpIfGen2 Interface Board Firmware Update

This section describes how to update the existing firmware on the DpIfGen2 interface board by using the .dp Vision tool.

To update the firmware of the Interface board the user has to perform the following steps:

1. From the Tools menu dropdown list select “DpIfGen2 Firmware Update”. The appropriate window will appear (see **Figure 36**).

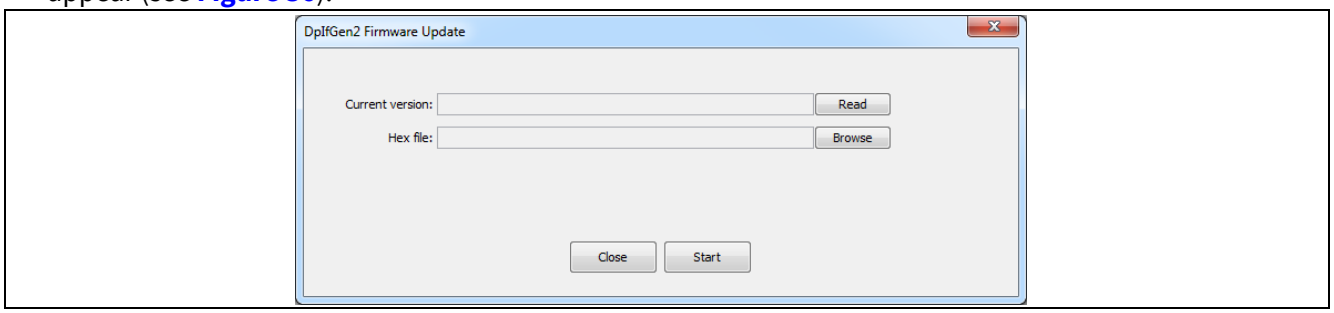


Figure 36 DpIfGen2 Firmware Update

2. The existing firmware version (Current version) can be read by pressing the “Read” button (see **Figure 37**).

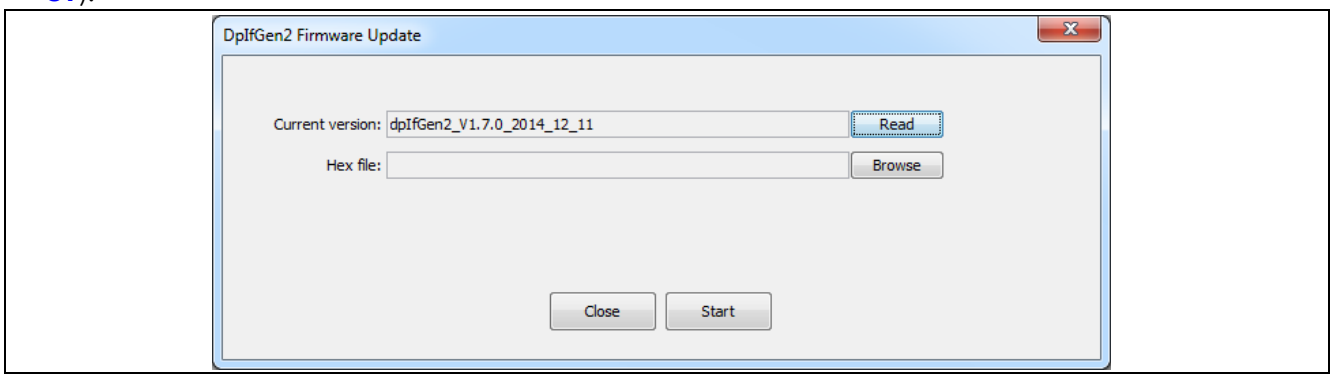


Figure 37 DpIfGen2 Firmware Update – Read Current Firmware Version

3. Find a hex file by pressing the “Browse” button (see **Figure 37**) and select the desired hex file to be downloaded onto the interface board (see **Figure 38**).

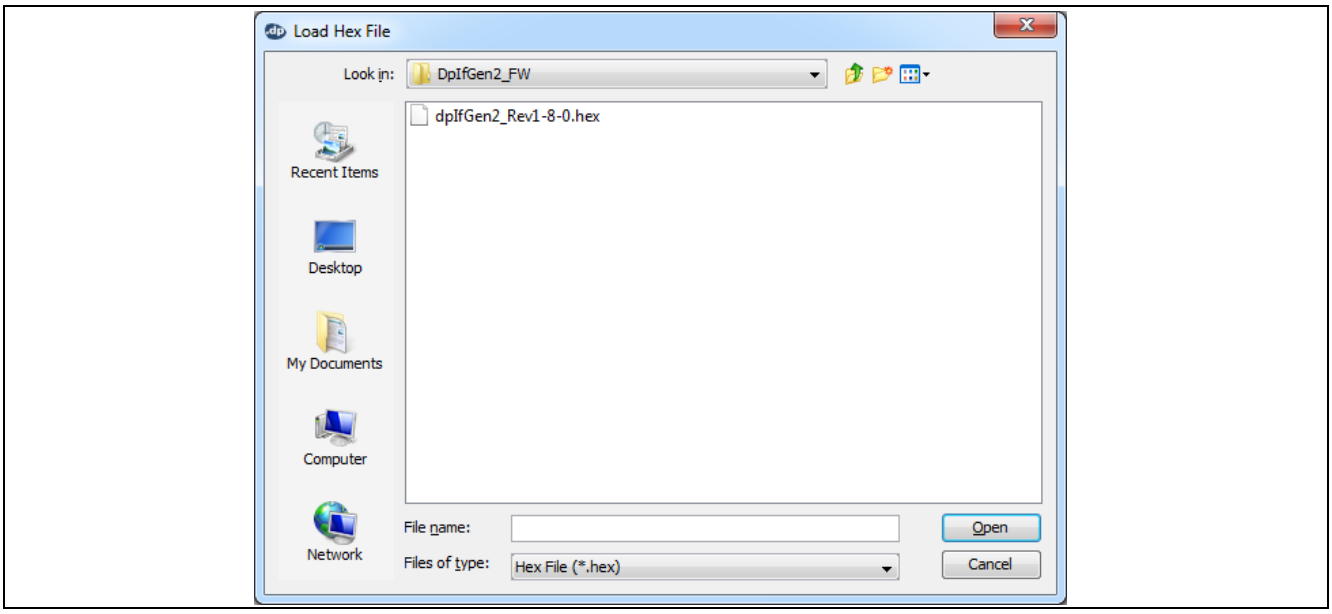


Figure 38 DpIfGen2 Firmware Update – The New hex File Selection

In the following window (see **Figure 39**) press the “Start” button.

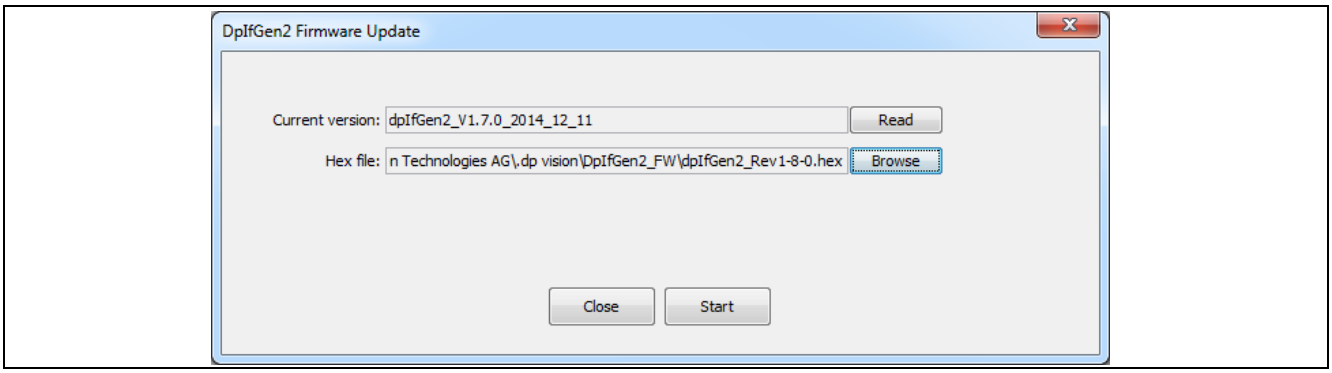
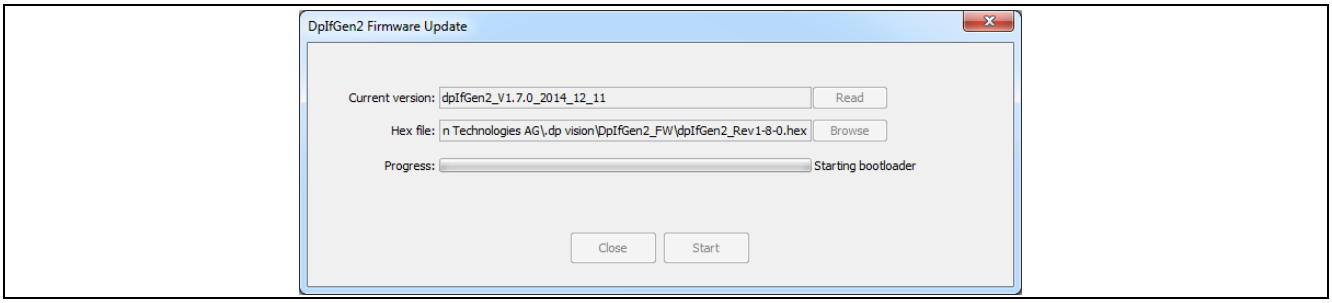


Figure 39 DpIfGen2 Firmware Update – Start Downloading

4. Firmware downloading is performed in four steps (Starting Bootloader, Erasing Flash, Downloading Firmware and Verifying Firmware) as shown in **Figure 40**. During this process the “DP2x Sync” LED starts flashing. After successful downloading, a corresponding information window will appear (see **Figure 41**).



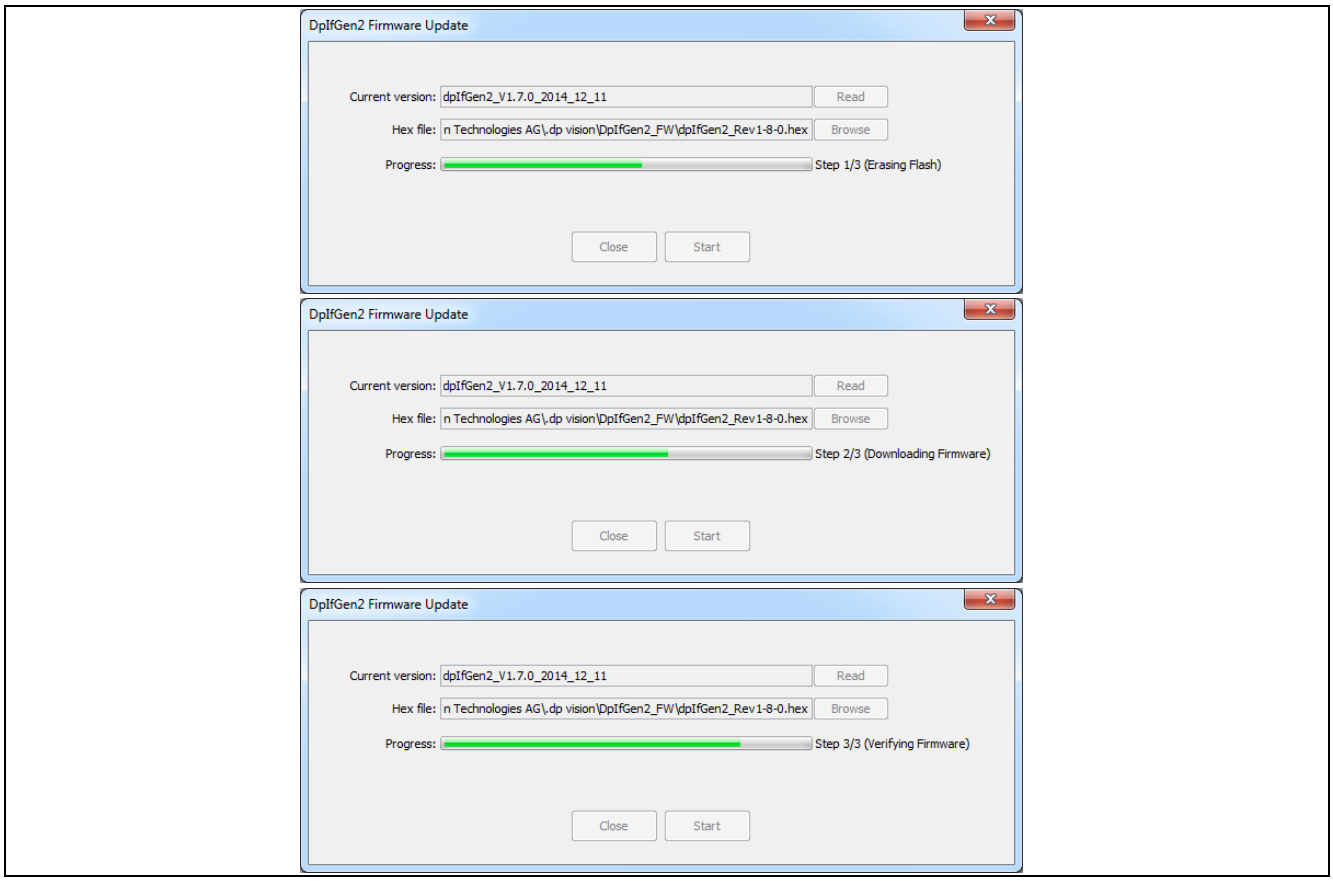


Figure 40 DpIfGen2 Firmware Update – Firmware Downloading Process

Figure 41 DpIfGen2 Firmware Update – Successful Update Message

[1] If for some reason communication between the interface board and evaluation board fails (see the example below) or if an error occurs during firmware downloading, simply repeat the firmware update procedure (see Section **5**).

6 Design Flow

This section describes several steps through which the user needs to pass in order to set (adjust) the parameters that will procure satisfactory behavior of the application.

The general design flow for designing the correct parameter settings for each specific power topology is shown in the following flowchart in **Figure 42**. The power topology configuration files will be available for download from the official Infineon Technologies website. The user can make (generate) a parameter AHEX file (see Section **4.1.2**) that can be used for burning during the production procedure with an appropriate set of parameters and the existing firmware as a final product.

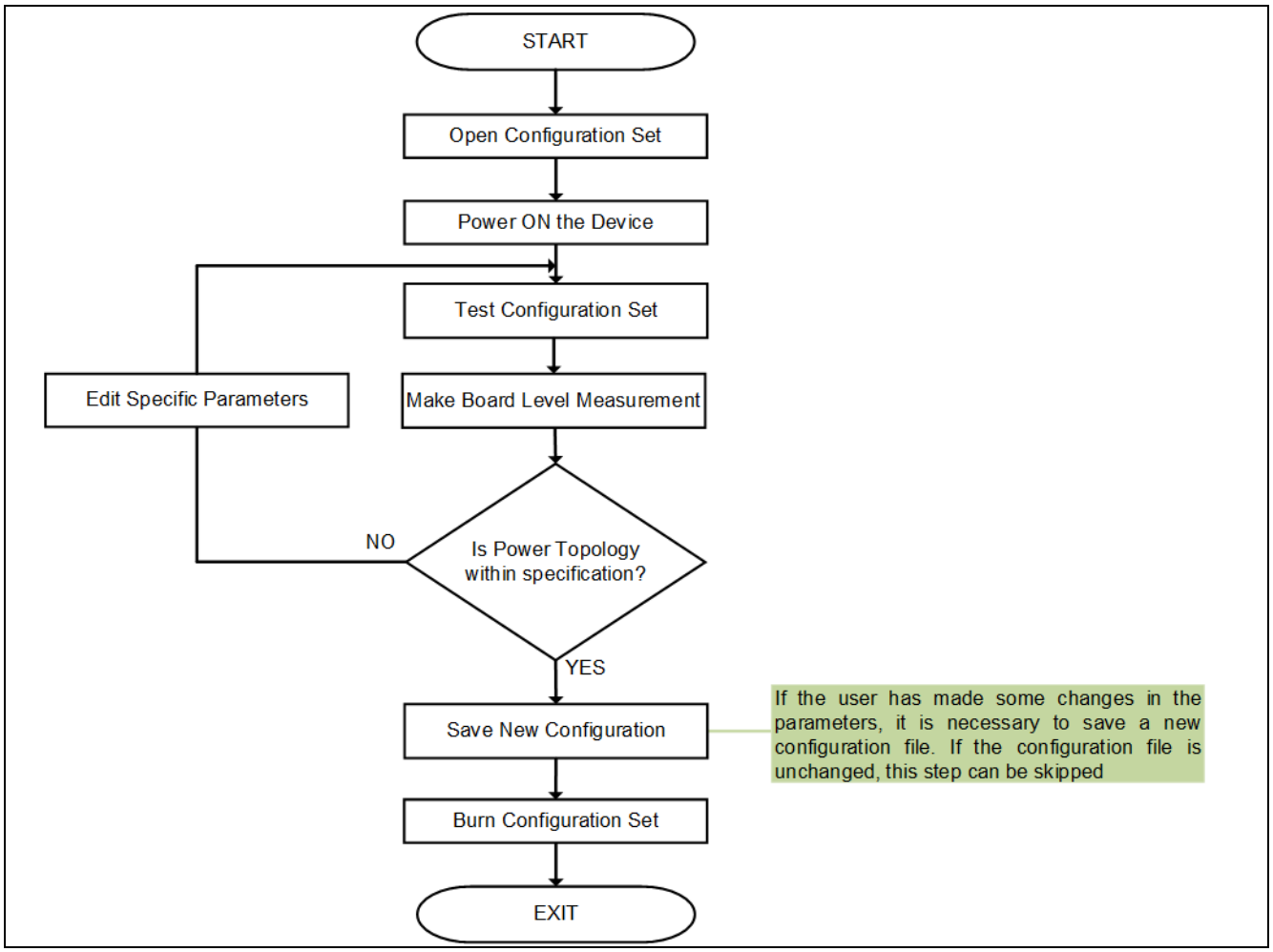


Figure 42 .dp Vision Design Flowchart

6.1 Open Configuration Set

The first thing the user must do is to load a parameter configuration file for the specific topology that is being developed.

The “Open” option can be found (or Quick Button) in the File menu dropdown list. This button is used to load the file containing the configuration for the corresponding application. The configuration file is a file in csv file format in which all project-related information and parameters, along with a description, are stored in a dedicated structure. These can be the pre-defined files from IFX as well as adapted files from the user. Selecting the file and clicking the Open button (see **Figure 43**) causes the configuration to be loaded.

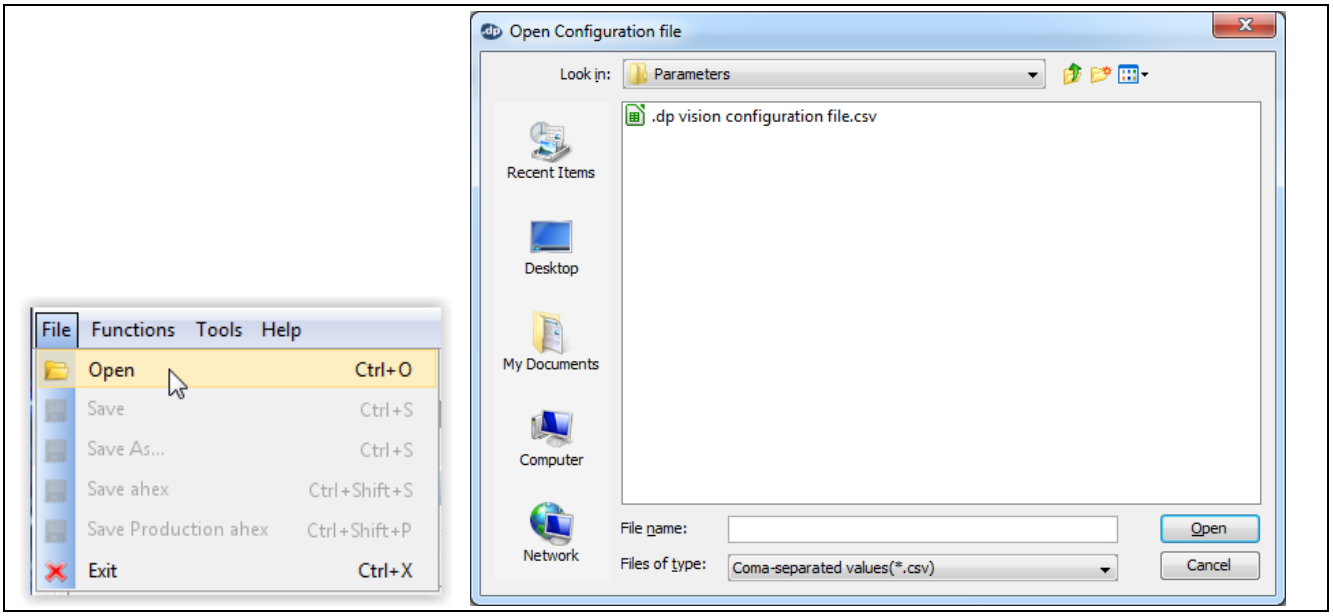


Figure 43 .dp Vision Open Configuration File

The name of the current configuration file is presented above the Design parameters box (see **Figure 33**).

6.2 Powering-on the Device

The power button is used to enable (green status) or disable (red status) the power supply through the IFX Interface Gen2 box to the OTP programming or application evaluation board (see **Figure 44**). If this status is red, the user should press the power button to provide appropriate power to the chip. After successful power-up, the device status LED icon will change color to green and pre-burned generic firmware will be started automatically.

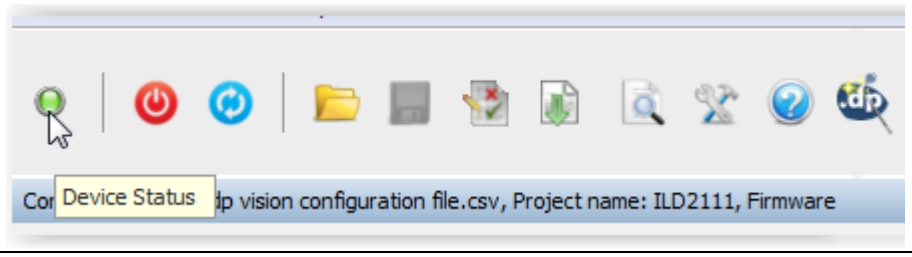


Figure 44 .dp Vision Power On and Device Status

6.3 Editing Specific Parameters

Once the configuration file has been loaded, the available parameters that can be edited are shown in the Design Parameters pane – see **Figure 33**.

Upon moving the mouse cursor over a parameter of interest and selecting it with a click, the “Parameter description” pane will be updated with further information (details on the parameter) – see **Figure 34**. In addition, an image (if available) will be placed in the “Explanatory image” pane – see **Figure 35**. The background color of the row with the selected parameter changes to green (see **Figure 45**) and the value can be changed according to the user’s (application) requirements.

Parameter values can be changed in two ways:

5. By entering a value in the “Value” column (a free text box where the appropriate number can be entered)
6. By selecting a value from the dropdown menu.

After editing, the parameter’s value will be marked in blue and all associated values will be updated and recalculated.

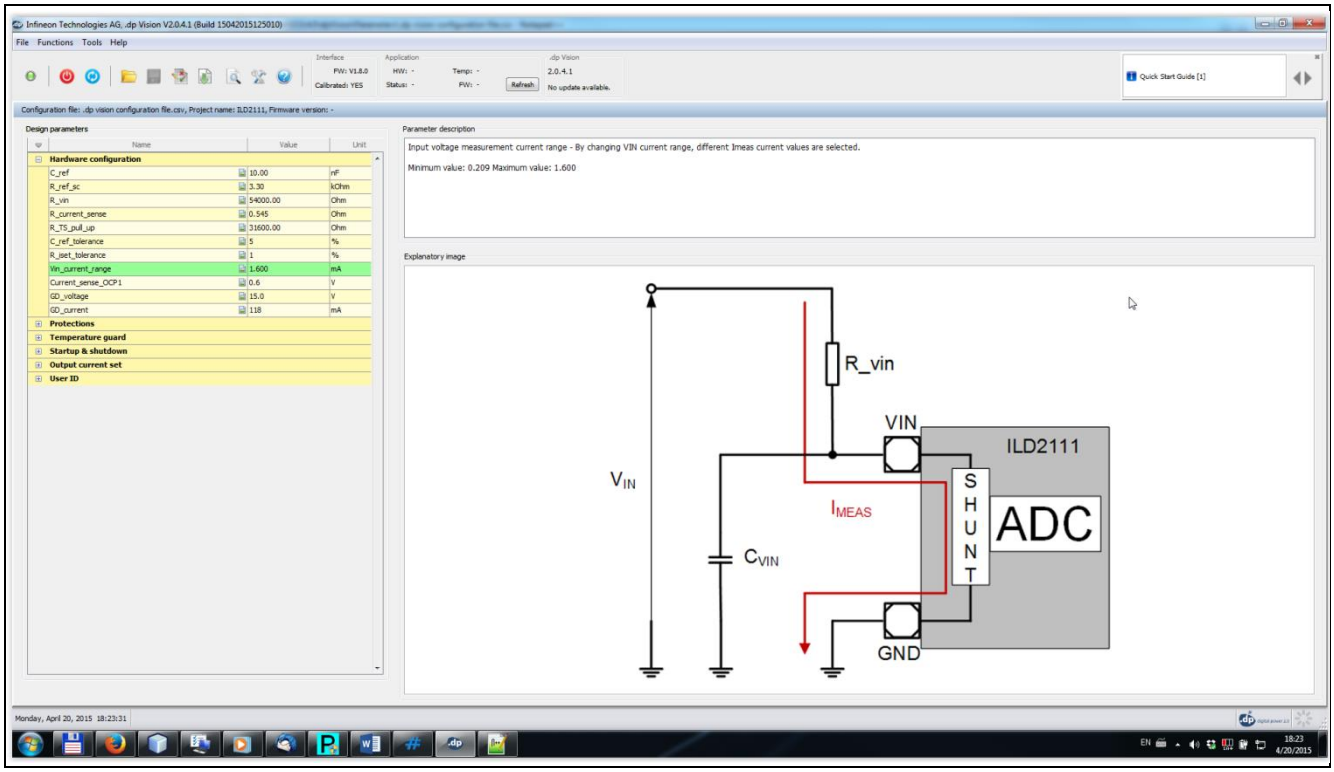


Figure 45 .dp Vision Editing (Adjusting) Parameter Values

6.4 Testing the Configuration Set

The application's behavior with adjusted parameters can be tested with a new configuration parameter set before burning by pressing "Functions -> Test Configuration Set" or by pressing the relevant Quick button (execution with parameters loaded into RAM) – see **Figure 46**. After a short time, a complete list of parameters (with their addresses) that are loaded into RAM will be read and shown in the appropriate user window.

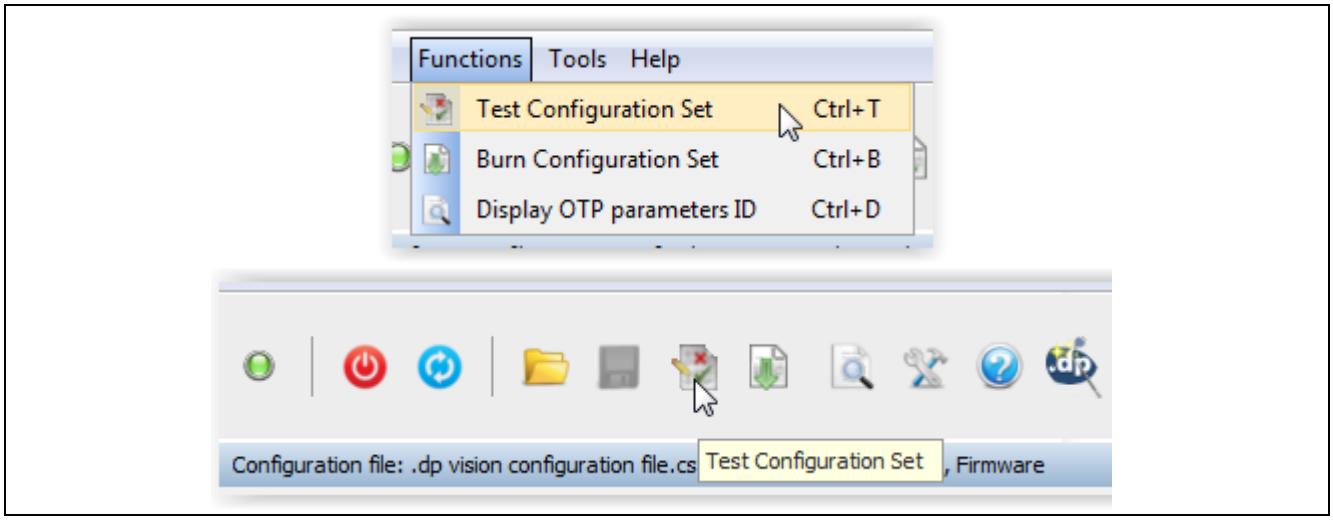


Figure 46 .dp Vision Test Configuration Set

After these steps, the application can be tested in the real environment. If the behavior of the device meets the previously specified requirements, the parameters that are based on the new configuration file can be saved and burned to the OTP memory of the chip.

6.5 Saving a New Configuration File

A new parameter configuration should be saved (see **Figure 47**) after parameter values are adapted according to the user's needs. The user can decide if either the existing csv file will be rewritten (Save) or if a new csv file will be stored with another name (Save As) – see **Figure 47**.

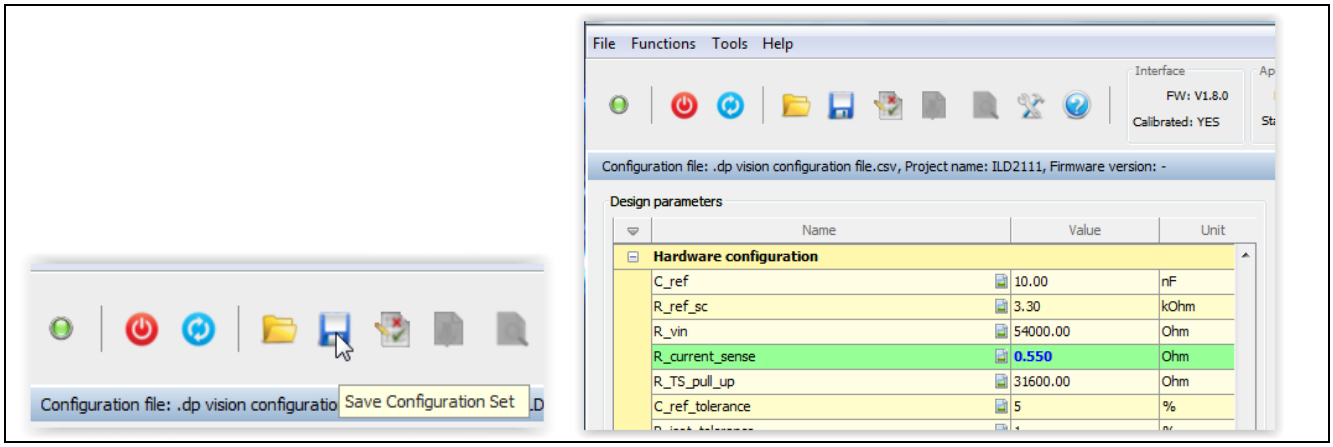


Figure 47 .dp Vision Saving New Configuration Set

6.6 Burning a Configuration Set

Parameters can be burned into the chip's OTP memory and, after a new power-up sequence, the application will be executed with the new user's parameter list. A more detailed explanation is given below.

Press "Functions -> Burn Configuration Set" or Quick Button – see **Figure 48**.The differences between values from the chip and the current configuration set will be displayed in a corresponding window. After a few steps and successful burning, an appropriate message will appear – see **Figure 49**.

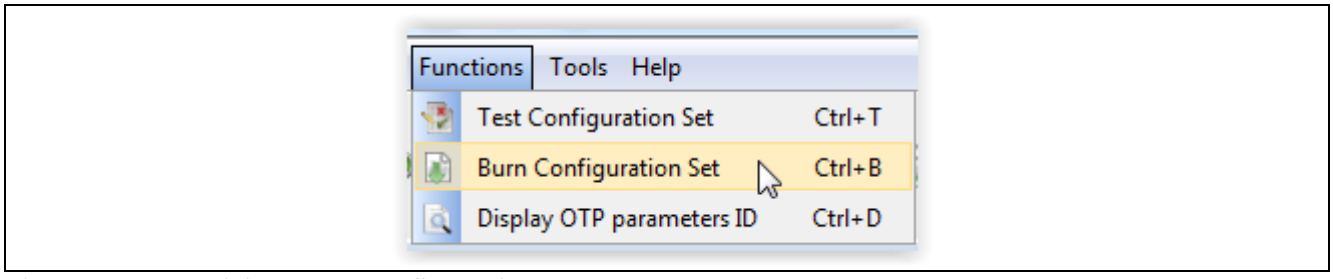


Figure 48 .dp Vision Burn Configuration Set

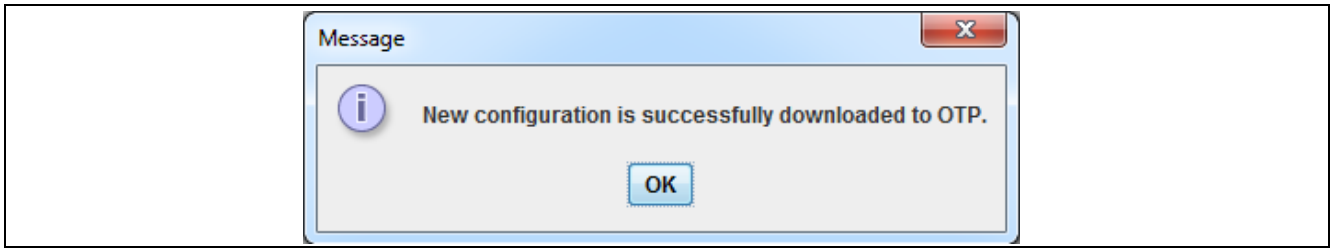


Figure 49 Burning New Parameter Set Message

After an attempt to reburn, the message shown in **Figure 50** will appear.

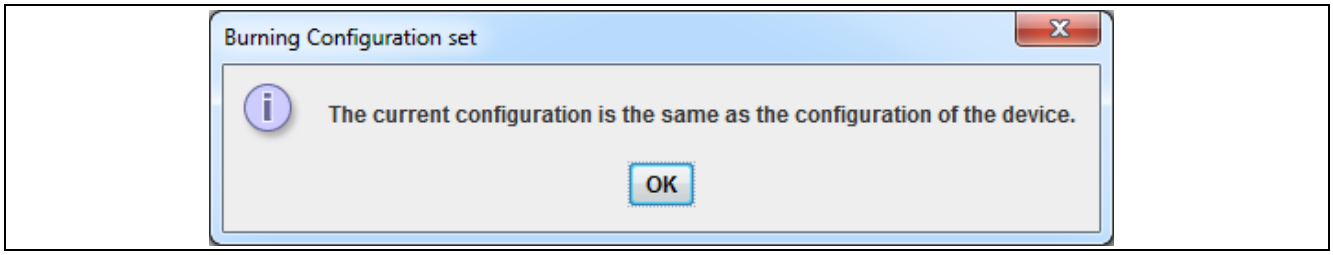


Figure 50 Re-burning Configuration Set Attempt Message

After burning procedure completed successfully complets, configuration file will be copied to the folder BurnedConfigurations/.

6.7 Freezing a Configuration Set

The “Freeze Configuration Set” option allows the user to freeze the existing configuration parameter set. After this action, the parameters cannot be edited (changed). Press “Functions -> Freeze Configuration Set” or the Quick button – see **Figure 51**.

Note: The availability of this option is project-dependent.

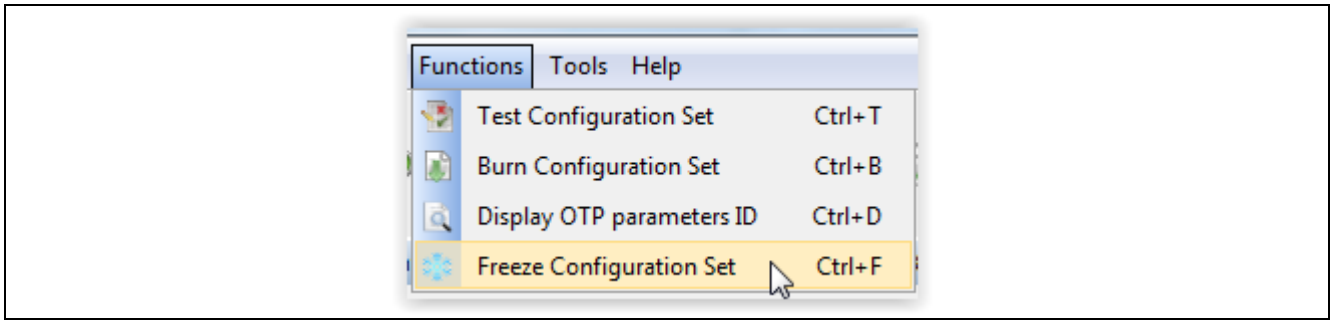


Figure 51 .dp Vision Freeze Configuration Set

The following window message will appear. To continue the procedure press “Yes” button (see **Figure 52**).

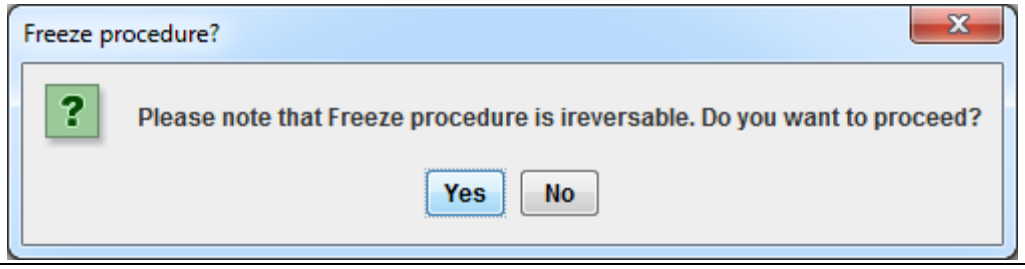


Figure 52 .dp Vision Freeze Configuration Set Message

After successful freezing, an appropriate message will appear.

6.8 Adjusting Previously Burned Parameters – Patching

Sometimes it is very useful to make further updates to parameters that have already been burned into the OTP memory. There may be different reasons to do so:

a) The user is not satisfied with the behavior of the device with the previously burned parameters

b) The user accidentally made a mistake with the previously burned parameters

c) An error occurred during the burning procedure

This is possible for a number of iterations depending upon the amount of free OTP memory space available[1]. This saves having to replace .dp devices every time a small edit is made. This process is completely automatic and the user just edits parameters, saves the new configuration and presses “Burn Configuration Set” again. The patching flowchart is shown in **Figure 53**.

[1] *The number of new changes to parameters inside the OTP memory is dependent on the available space for a specific power topology and the number of parameter that are required.*

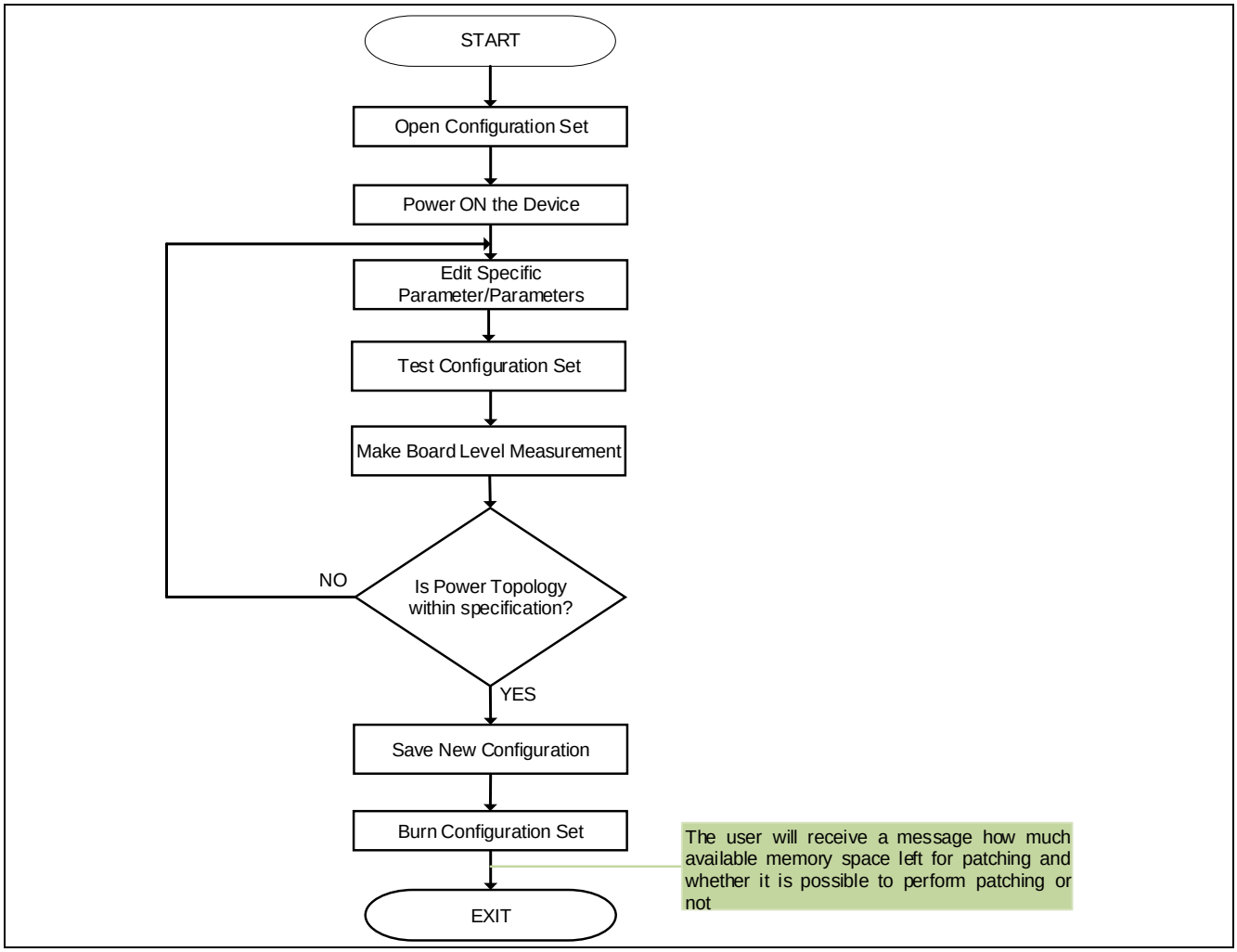


Figure 53 .dp Vision Patching Flowchart

7 .dp Vision Assistant

The .dp Vision Assistant is a software tool with a Graphical User Interface, whose main goal is to provide an easy way for the user to input parameters for system configuration. It is an integral part of the .dp Vision environment.

Page descriptions and imagery inform the user about the meaning of individual parameters. This can be seen in **Figure 54**.

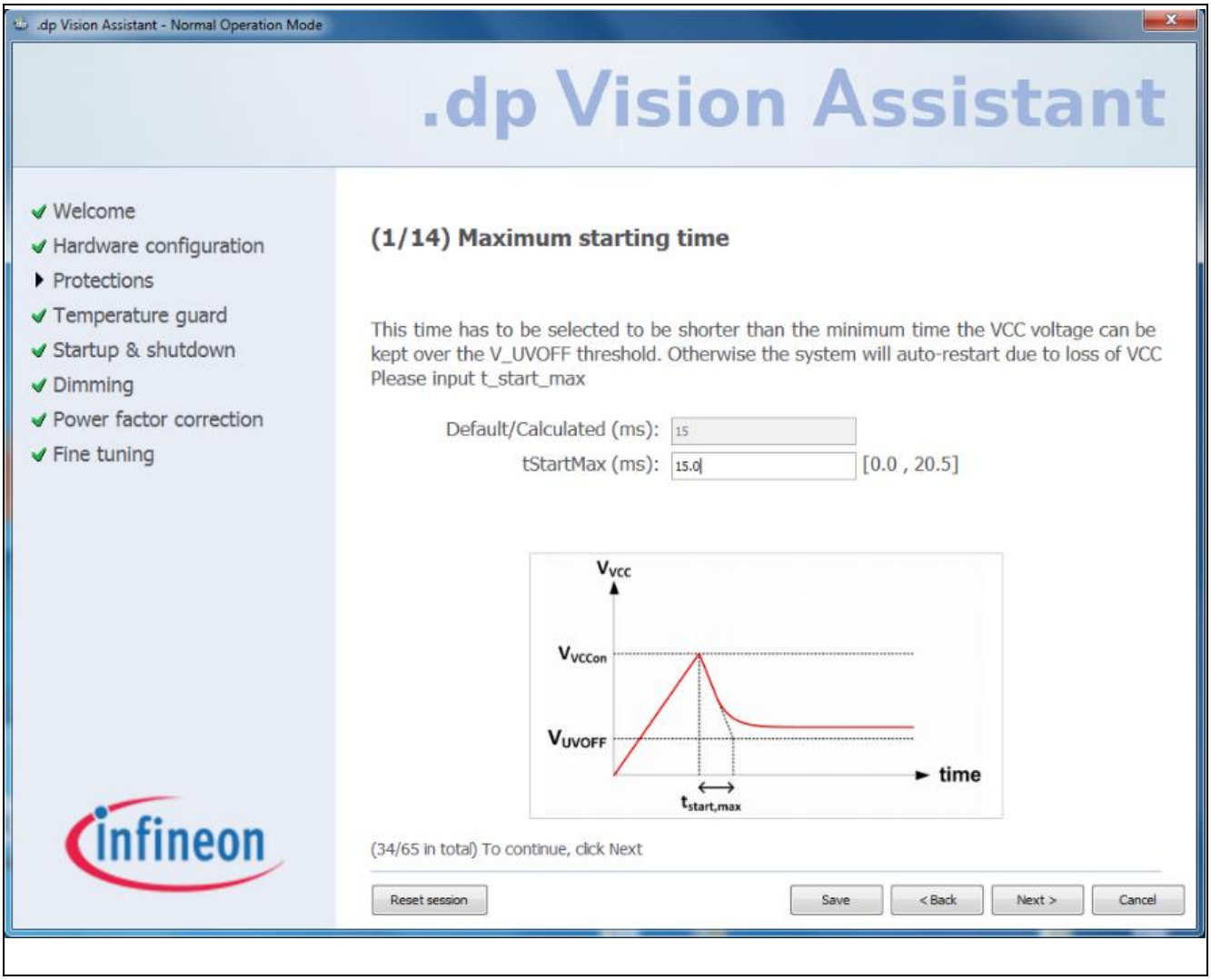


Figure 54 Example of a Question Page

Questions are organized in groups to allow easier understanding and manipulation of parameter items.

Generally, the user fills in the value on the current page and proceeds to the next page by clicking the *Next* button. The value can be a number or a checkbox. Sometimes there is a possibility for the user to use a link to jump directly to some arbitrary page if the following questions can be skipped.

After insertion of all the values is finished, the user can upload the configuration and return to the .dp Vision environment. This means that the insertion phase is over. In the second phase, the user has the ability to jump back to the random group of questions and change values again.

The user can also save the current session to reload it again later. The saved session is associated with its corresponding configuration file.

7.1 Before Starting

First the .dp Vision environment is opened. Then the user must open the configuration set file with the extension .csv in order to enable the .dp Vision Assistant button. If the project file supports the .dp Vision Assistant, the Assistant button will be visible.

7.2 .dp Vision Assistant Page

One assistant page deals with one parameter item. The page is able to represent the following:

- **Group** -> The group is shown in a vertical menu on the left-hand side.
- **Name** -> The name is represented by a label next to the Value text field.
- **Descriptive Name** -> Shown in the page title or, if it is a group, as a vertical menu item.
- **Default** -> The value shown in the Default/Calculated text field.
- **Value** -> Shown in the Value text field.
- **Input Format** -> The inserted value is transformed to the requested input format.
- **Unit** -> Shown between the Name label and Value text field.
- **Min** -> Shown after the Value text field in parentheses, along with a maximum limit.
- **Max** -> Shown after the Value min. limit in parentheses.
- **Description** -> The main text which explains the substance of the page; it can state the bind-item name.
- **Formula** -> The default value can be calculated using the formula and presented to the user in the value text field.
- **Image** -> A page can present an image which helps to explain its purpose.
- **Previous Question** -> Short description with a link to another arbitrary page which came before the current page.
    - **Next Question** -> Short description with a link to another arbitrary page which comes after the current page.

Here is an example of a page with a Group: **Power factor correction**, Name: **Cemi**, Descriptive Name: **Capacitance after the rectifier**, Default: **0.1**, Value: **0.1**, Input Format with four decimal places, Unit: **uF**, Min: **0.0000**, Max: **+∞**, three lines of Description and Image, as shown on **Figure 55**.

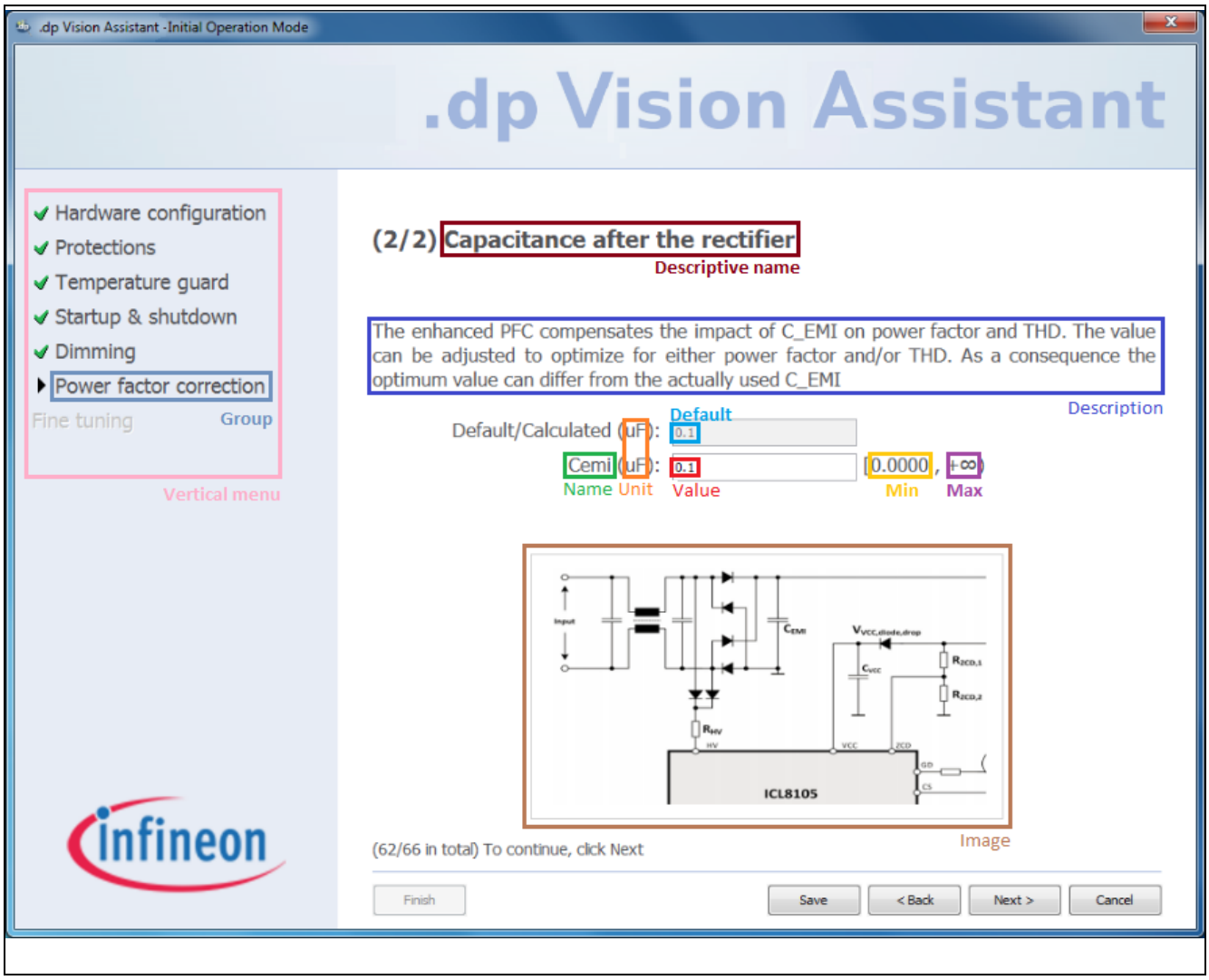


Figure 55 .dp Vision Assistant Page with its Common Elements Marked

The type of items shown in the .dp Vision Assistant is always Question, so it is not shown on the page.

A typical page consists of a title, description, default or calculated value, the name and value of the respective parameter and a vertical menu. Besides these, a page can often have an image, a direct link to another page which is not its direct predecessor or successor, the relevant unit and range.

The title has a counter which shows the current question number in its group. Another counter is shown lower on the page and it shows the absolute question number out of the total number of questions.

Finish, Save, Previous, Next and Cancel buttons are always present.

7.3 Vertical Menu

A vertical menu is always present on the left-hand side as can be seen in **Figure 55**.

Its main purpose is to show the current group, mark finished groups with a check sign and allow jumping from one group to another.

A group is finished when all of its important questions (questions connected to configuration parameters) are filled in.

Jumping to a random group is allowed only in the Normal operation mode.

7.4 Ending a Session

When the Finish button is pressed, several checks need to be performed in order to set the new configuration of the system.

The checks examine the state of mandatory values – are they all filled in and within their range? There are two types of ranges: a question range and a bind-value range; both need to be satisfied.

If any check fails, an explanation dialog window will inform the user of the problem and allow it to be fixed.

When all checks are passed, the session is saved, normal operation mode is set, the .dp Vision Assistant is closed and the new configuration is loaded to the .dp Vision environment.

7.5 Reloading a Session

When the user tries to open the .dp Vision Assistant again, a dialog is shown that provides the option to reload the saved session or delete it and start a new session.

If the choice is to reload the saved session, several checks are performed, some of which are run even when a new session is started for the first time.

The checks that run every time involve the following aspects:

- Examining for the presence of questions
- Searching for empty groups
- Searching for errors in questions
- Unsaved configuration values.

The saved session must match the present configuration regarding the number of groups and number of questions per group, question input format, formula, minimum/maximum limits, unit and image name.

Revision History

Major changes since the last revision

Page or Reference	Description of change
33	Added .dp Vision Assistant

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Last Trademarks Update 2014-07-17

www.infineon.com

Edition 2015-07-21

Published by

Infineon Technologies AG

81726 Munich, Germany

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