User's Manual

Applilet® EZ for DALI Control Gear

User's Manual

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How to Use This Manual

Readers

This manual is intended for user engineers who want to understand the features of the RL78/I1A in order to design and develop its application systems and programs.

Purpose

This manual is intended to give users an understanding how to use Applilet EZ for DALI Control Gear and of the features described in the Organization below.

Organization

This manual is broadly divided into the following parts.

- Overview
- Installation
- Starting and Ending
- Applilet EZ for DALI Control Gear operation
- Windows reference

How to Use This Manual

It is assumed that the readers of this manual have general knowledge of electrical engineering, logic circuits, and microcontrollers.

To understand the overall features of Applilet EZ for DALI Control Gear

→Read this manual in the order of the CONTENTS. The mark "<R>" shows major revised points. The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

To learn the details of the hardware features of the RL78/I1A

→Refer to RL78/I1A User's Manual (R01UH0169E).

Conventions

Data significance:	Higher digits on the left and lower digits on the right
Active low representation:	$\overline{xxx}$ (overscore over pin or signal name)
Note:	Footnote for item marked with Note in the text
Caution:	Information requiring particular attention
Remark:	Supplementary information
Numerical representation:	Binary ... xxxx or xxxxB
	Decimal ... xxxx
	Hexadecimal ... xxxxH

Related Documents

The related documents indicated in this publication may include preliminary versions. However, preliminary versions are not marked as such.

Documents Related to Devices

Document Name	Document No.	
	Japanese	English
RL78/I1A User's Manual; Hardware	R01UH0169J	R01UH0169E

Documents Related to Development Hardware Tools

Document Name	Document No.	
	Japanese	English
RL78/I1A DC/DC LED Control Evaluation Board User's Manual	R01UH0363J	R01UH0363E

Caution1. For details about DALI-2 EXPANSION BOARD FOR EZ-0012, contact your local Renesas Electronics sales representative.

Caution2. The related documents listed above are subject to change without notice. Be sure to use the latest version of each document for designing.

CONTENTS

CHAPTER 1 OVERVIEW

1. 1 Overview

Applilet EZ for DALI Control Gear is a tool used to automatically generate software for microcontrollers for DALI communication and to write programs.
By specifying mode on the GUI, Applilet EZ for DALI Control Gear can be used to easily generate the programs that control the software for microcontrollers that control DALI communication and LEDs at a constant current. It can also be used to automatically write the generated software to the flash memory in microcontrollers via a USB cable and to check operation by using an evaluation board.
By using Applilet EZ for DALI Control Gear, the labor hours for developing DALI communication software, controlling LEDs, and checking operation can be significantly reduced. In addition, application systems for LED lamps and illumination that use microcontrollers can be evaluated without microcontroller expertise.

<Configuration example>

1. 2 Host Machine, Software, and Hardware Configurations

<R>

The host machine, software, and hardware configurations for using Applilet EZ for DALI Control Gear are shown below.

(1) Host machine

- OS: Windows 10 (32-/64-bit mode)
- CPU, Memory: Must satisfy the recommended requirements for each OS
- USB: USB 1.1 interface or later

(2) Software

- Applilet EZ for DALI Control Gear (this software)
- Compiler/integrated development environment

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Integrated Development Environment: CS+

Compiler: CC-RL Note 1

- Renesas Flash Programmer

…… Software for flash memory programming

- Board driver

…… Driver used to make the host PC recognize the evaluation board (Y-RL78-DCDC-LED / EZ-0012)

(3) Hardware

- Evaluation board

RL78/I1A DCDC LED Control Evaluation Board (Y-RL78-DCDC-LED / EZ-0012)

…… This is an evaluation board for LEDs that uses the RL78/I1A. Red, green, and blue LEDs are mounted on the board. The LEDs can be controlled by using the internal features of the L78/I1A and an FET without the constant-current driver IC.

DALI-2 EXPANSION BOARD FOR EZ-0012

…… This is an optional board that supported DALI-2 Control gear for Y-RL78-DCDC-LED / EZ-0012. This is needed when test using official DALI tester.

Notes1. Applilet EZ for DALI Control Gear may not operate depending on the versions of the complier.

Cautions1. It is recommended that the latest service pack be installed for any OS.

Remarks1. For details about how to obtain compilers, and integrated development environments, contact your local Renesas Electronics sales representative.

2. For details of the evaluation boards, refer to each user's manual.

CHAPTER 2 INSTALLATION

2. 1 Installing Application

The following applications must be installed to use Applilet EZ for DALI Control Gear.

- Microsoft Visual Studio 2013 Visual C++ Redistributable Package
- Applilet EZ for DALI Control Gear
- Compiler, integrated development environment

Remark For details about how to obtain compilers, and integrated development environments, contact your local Renesas Electronics sales representative.

2. 1. 1 Installing Visual C++ Redistributable Package

Install Visual C++ Redistributable Package, which is required for using the Applilet EZ for DALI Control Gear.

(a) Download the required files

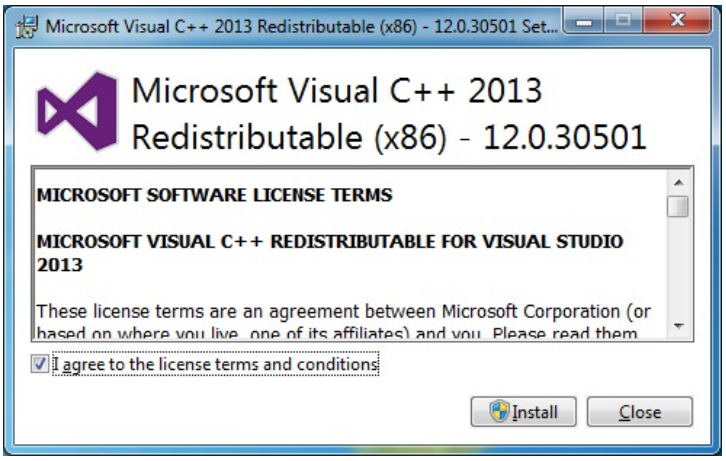
Download following files required for installation from the Microsoft website.

(1) Visual Studio 2013 Visual C++ Redistributable Package installer

Vcredist_x86.exe

(b) Install Visual C++ Redistributable Package

When "Vcredist_x86.exe" is double-clicked, "Visual C++ redistributable package Setup" dialog box is displayed.



After confirming the license terms, when agreeing, check "I agree to the license terms and conditions" and click [Install].

Proceed with the installation by following the instructions that will be displayed in the wizard window.

2. 1. 2 Installing Applilit EZ for DALI Control Gear

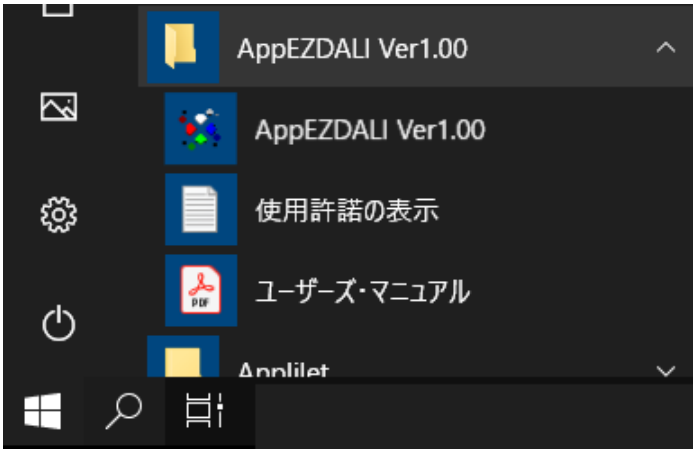
Double-click the AppEZHCD_V90J.msi file to start the installation wizard of Applilet EZ for DALI Control Gear.

Click the [Next] and proceed with the installation by following the instructions that will be displayed in the wizard window.

2. 1. 3 Windows [start] menu and shortcut icon

When installing of the application has been completed normally, the following folder will be copied into the specified installation folder.

Figure2-1 Windows [start] Menu



The following shortcut icon is displayed on the Windows desktop.

Figure2-2 Shortcut Icon

2. 2 Installing USB Driver

USB driver is required when using an evaluation board. The USB driver for evaluation board is stated in the disk media provided or in an e-mail message.

The first time that the host machine is connected to the evaluation board via the bundled USB cable, Windows' [Found New Hardware Wizard] appears, prompting for installation of the USB driver.

Proceed with the installation by following the windows that will be displayed.

2. 3 Uninstall

To uninstall Applilet EZ for DALI Control Gear, Compiler go to the Windows Control Panel and select [Apps & features].

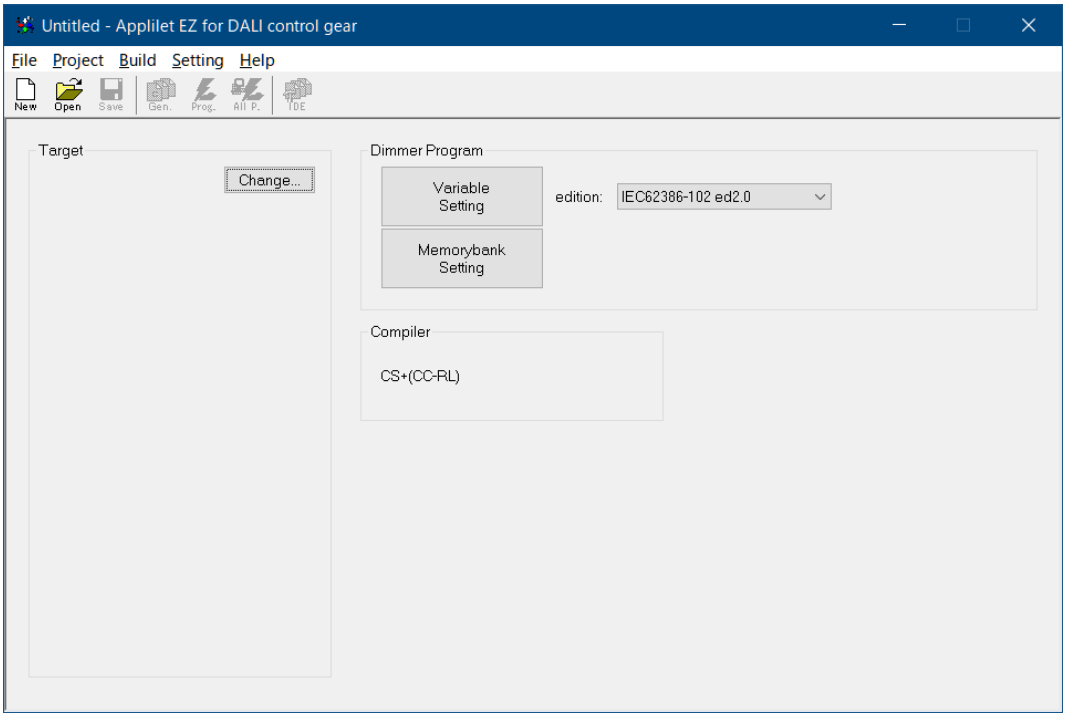
CHAPTER 3 STARTING AND ENDING

3. 1 Starting

To start Applilet EZ for DALI Control Gear, go to the Windows [start] Menu and select [All Programs] →[Programs] →[App EZ DALI Ver1.0] (refer to Figure2-2 Windows [start] Menu), or double click the shortcut icon on the Windows Desktop (refer to Figure2-3 Shortcut Icon).

Once Applilet EZ for DALI Control Gear is started, the following Main window opens.

Figure3-1 Main Window When Starting

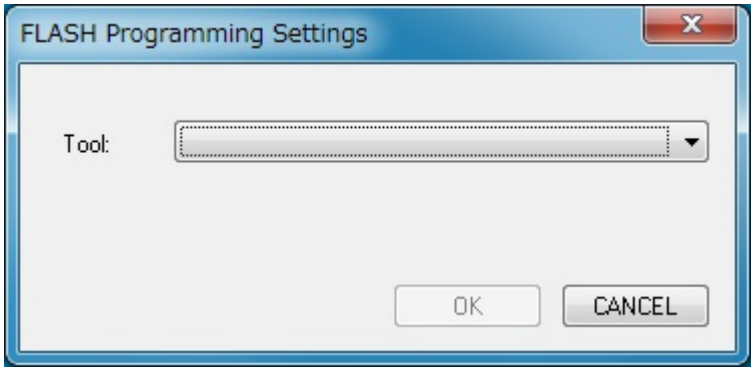


3. 1. 1 Setting up at the first startup

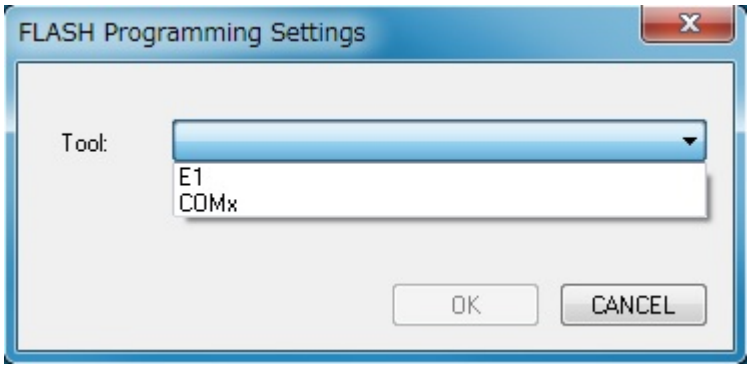
(a) Flash programming setting

The COM Port connected to the flash memory programmer or the board is specified here.

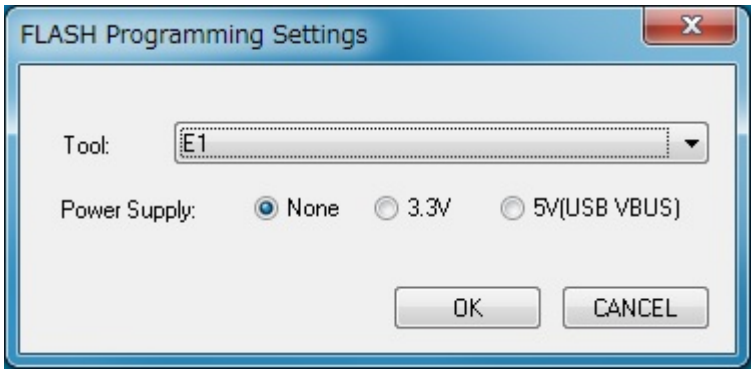
On the [Setting] menu, select [Flash Program…] .The following dialog box will be displayed.



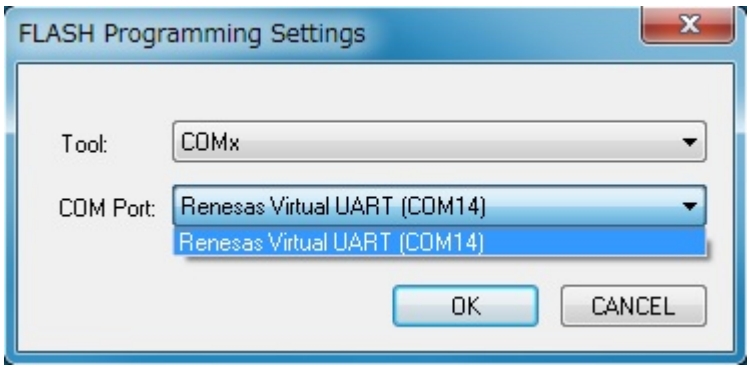
Select the connection method from the list box [Tool:].



When selecting [E1], the [Power supply:] item is displayed.



If not supplying power from the E1, sets the [None], and if supplying, set according to the input voltage of the board to be used.

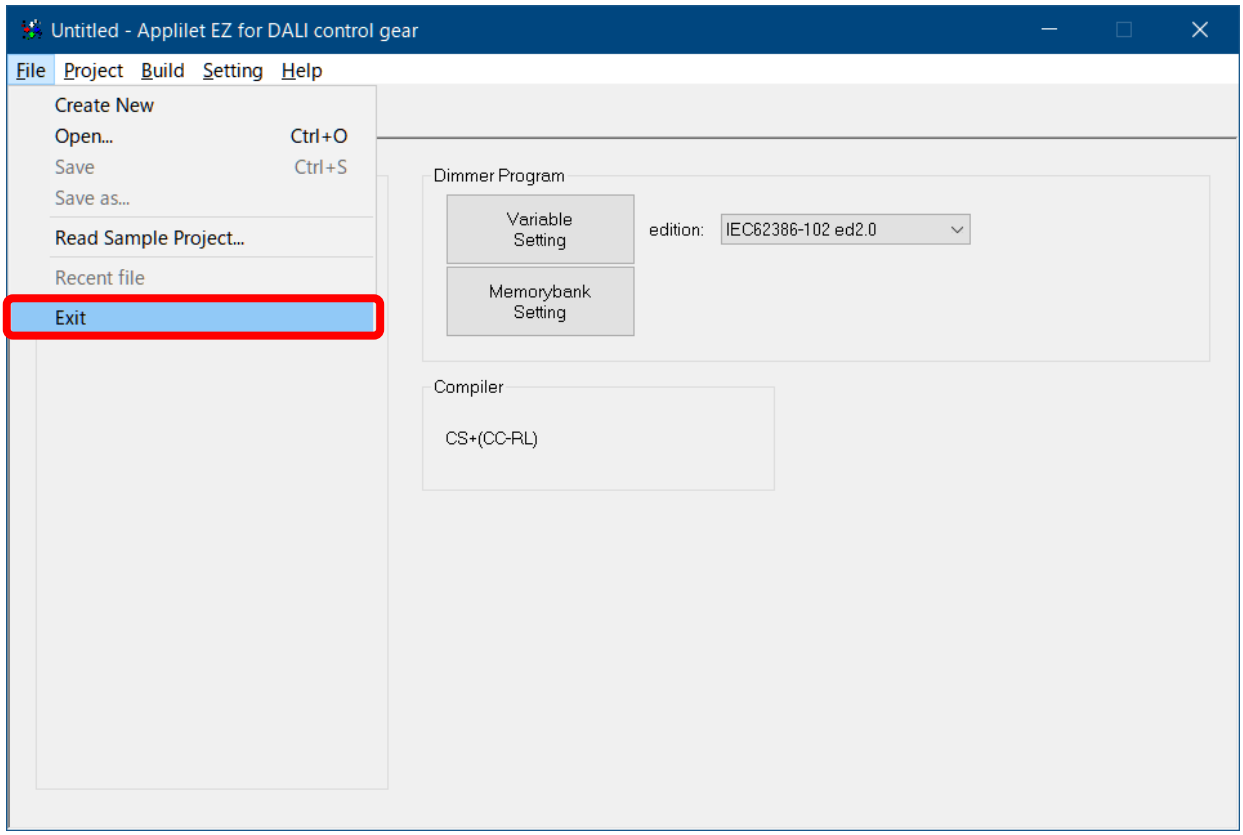


If selecting [COMx], [COM Port:] item is displayed.
COM port that is currently connected to the PC is displayed in the [COM Port] list. Select the COM port to be used.

If setting ends, click [OK].

3. 2 Ending

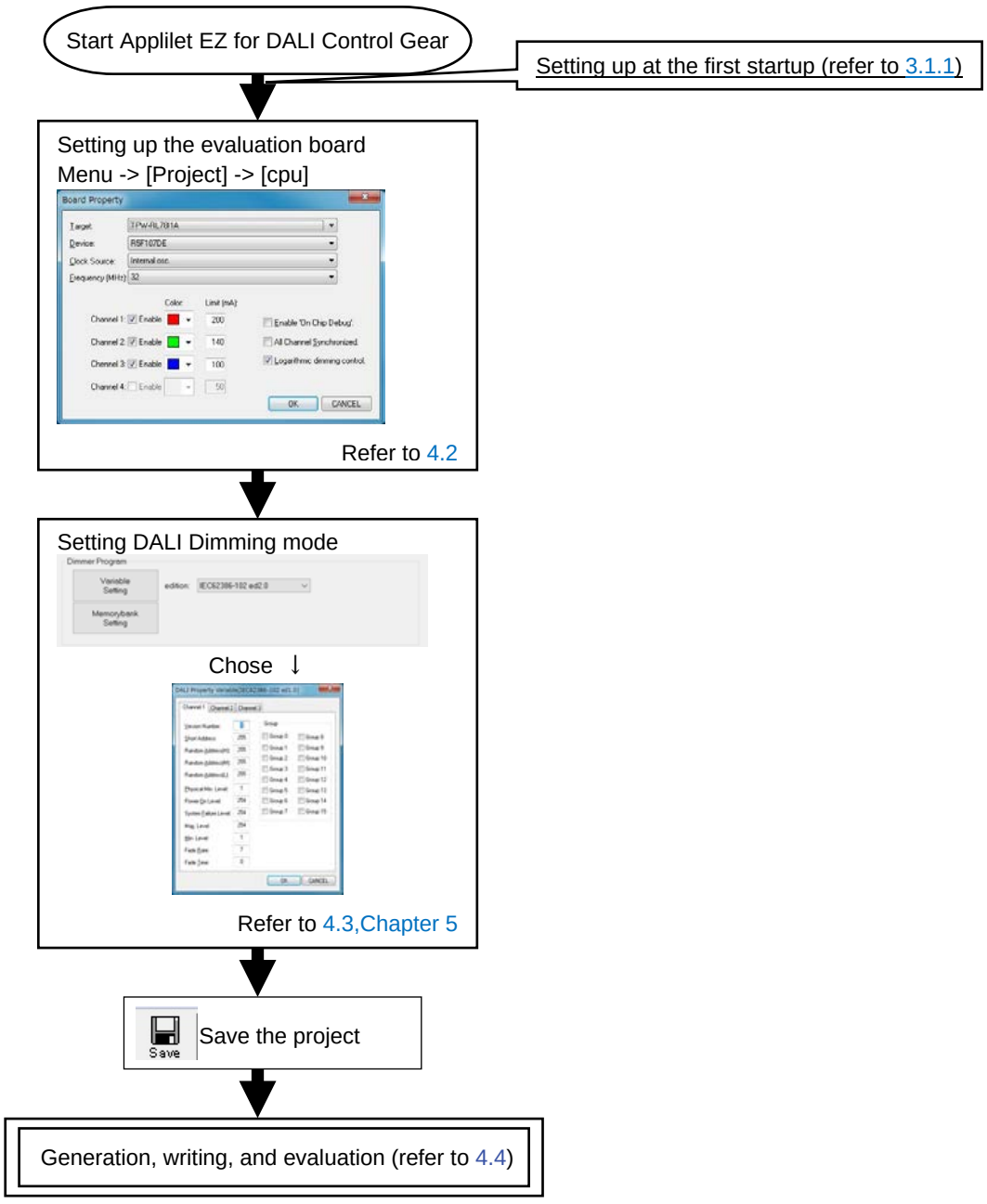
To exit from Applilet EZ for DALI Control Gear, go to the Main window's [File] menu and select [Exit].



CHAPTER 4 APPLILET EZ FOR DALI CONTROL GEAR DALI CONTROL GEAR OPERATION

This chapter describes the operation flow, from automatically generating object codes (*.hex) by using Applilet EZ for DALI Control Gear and writing to the flash memory, up to checking operation by using the evaluation board.

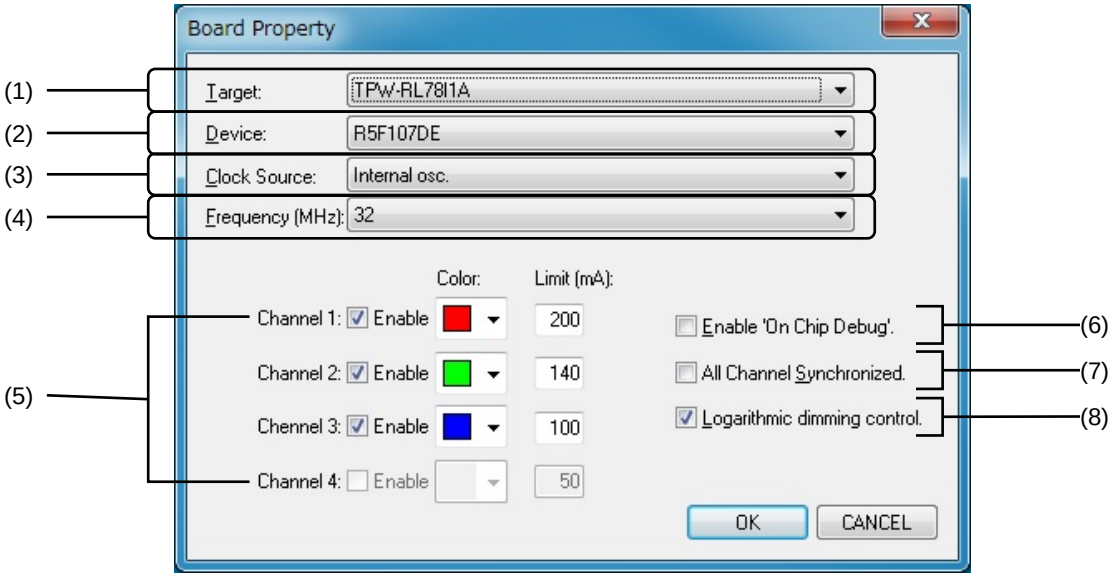
4. 1 Operation Flow



4. 2 Setting Up the Evaluation Board

In the menu, select [Project] and then [CPU] to set up the evaluation board in the dialog box below.

Performing this setup updates the specified mode displayed in the main window.



(1) Target:

Select the evaluation board to use.

(2) Device:

If an evaluation board is selected, the mounted microcontroller is displayed. (This setting cannot be changed.)

(3) Clock Source:

Select the clock to use. This setting might be fixed depending on the setting of (1).

(4) Frequency (MHz):

Select the frequency. This setting might be fixed depending on the setting of (1) and (3).

(5) Channel X:

Specify the channels to enable by selecting their [Enable] checkboxes.

Specify the color of the lighting of each channel by using the [Color] buttons.

These settings might not be selectable or changeable depending on the setting of (1).

Enter the max current level of each channel in [Limit].

* This setting may be unavailable, depending on the board.

(6) Enable ‘On Chip Debug’.:

If this checkbox is selected, a program that enables on-chip debugging is generated.

(7) All Channel Synchronized.:

If this checkbox is selected, the brightness of all selected channels will be the same.

If only one channel is selected, this checkbox is disabled.

(8) Logarithmic dimming control.:

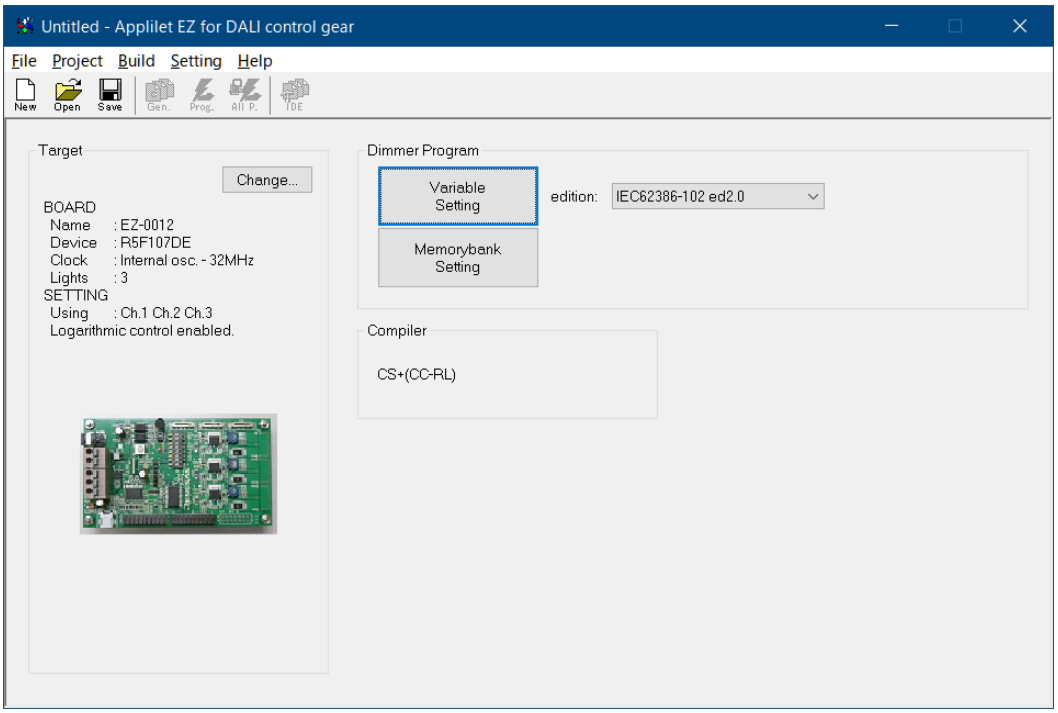
Select this checkbox to logarithmically change the dimming of the LEDs.

If this checkbox is not selected, dimming values are handled as direct values. If the checkbox is selected, the specified value is converted to logarithmic value.

4. 3 DALI Mode Setting

In this mode, the LEDs are dimmed by using the DALI protocol.

DALI (Digital Addressable Lighting Interface) is an international open standard lighting control communication protocol, mainly used for light control of multiple fluorescent lamps or LED lights.



(1) Select the [DALI] button in Dimmer Program.

(2) Open the [DALI Property] dialog box by clicking the [Variable] button, and then specify the parameter. For details about this setting, see the [DALI Property] dialog box described in CHAPTER 5 WINDOW REFERENCE.

(3) IEC62386-102 ed2.0 is available for the setting of the memory bank. Open the [DALI Property Memorybank] dialog box by clicking the [Memorybank] button, and then specify the parameter. For details about this setting, see the [DALI Property Memorybank] dialog box described in CHAPTER 5 WINDOW REFERENCE.

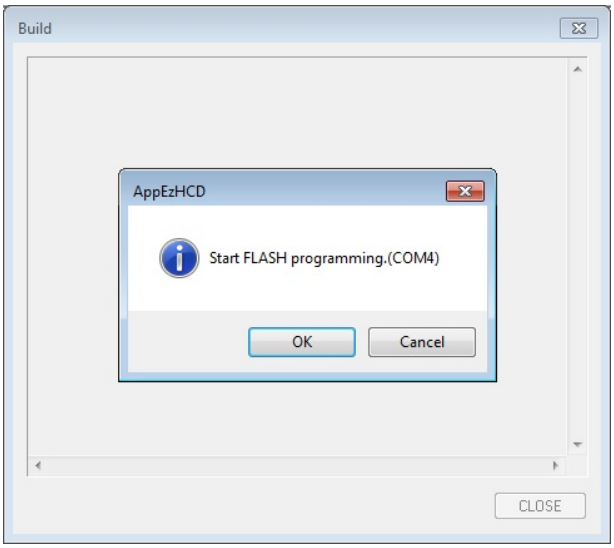
(4) Click 

icon or select Menu → [File] → [Save] to save the project.

4. 4 Generation, Writing, and Evaluation

Object codes (*.hex) are automatically generated and software is written to a microcontroller.
After writing has been completed, the operation can be checked by using the evaluation board.
The writing procedure differs depending on the board used.

(1) Click  icon to open the Build window. Preparation for generating object codes (*.hex) and writing will be performed.



Remark If an abnormality occurs during object code generation (*.hex) or flash writing, an error code may be displayed.

Example: "code = xx"

Take the following countermeasures according to the code number (xx) displayed.

Code No.	Countermeasures
2	Applilet EZ for DALI Control Gear may not be correctly installed. Reinstall it.
3	Data cannot be written because the folder that should be set via the [Folders...] setting on the [Setting] menu does not exist. Re-set an appropriate folder.
4	The compiler or assembler selected via the [Compiler] setting on the [Setting] menu cannot be found. Check whether the compiler or assembler is correctly selected and installed. If it still cannot be found, reinstall the compiler or assembler.
5	The compiler or assembler selected via the [Compiler] setting on the [Setting] menu is not correctly installed. Reinstall the compiler or assembler.
9	The folder set via the [Folders...] setting on the [Setting] menu or the BASEPROJECT folder in the installation folder of Applilet EZ for DALI Control Gear is set as a read-only folder. Cancel the read-only setting for the whole folder.
23	This is a system error of the compiler or assembler selected via the [Compiler] setting on the [Setting] menu or the main body of Applilet EZ for DALI Control Gear. Handle this error by checking the following points. If a read-only folder or file exists under the folder set via the [Folders...] setting on the [Setting] menu, cancel all read-only settings. If the error still cannot be fixed, reinstall the compiler or assembler and the main body of Applilet EZ for HCD Controller.
26	Illegal value of DALI propaty. Details of the error are displayed by text as below. If two or more errors exist, only the first detected error is displayed. "Power-On Level" < "Min. Level", "Power-On Level" > "Max. Level", "System Failure Level" < "Min. Level", "System Failure Level" > "Max. Level" "Min. Level" < "Physical Min. Level", "Min. Level" > "Max. Level", "Min. Level" < 1 "Min. Level" > 254, "Max. Level" < "Min. Level", "Max. Level" > 254, "Max. Level" < 1, "Fade Rate" < 1, "Fade Rate" > 15, "Fade Time" < 1 "Fade Time" >15, "Random Address" < 0x000000, "Random Address" > 0xFFFFFF

(2) Writing preparation

If the board has a USB interface

Check that the PC and the evaluation board are correctly connected with a USB cable.

Depending on the evaluation board, there are those that require switching the features of "write / normal operation" by the DipSW. After checking the manual of each evaluation board, when needing setting change, turn on the power in the state of writing.

If the board is using E1

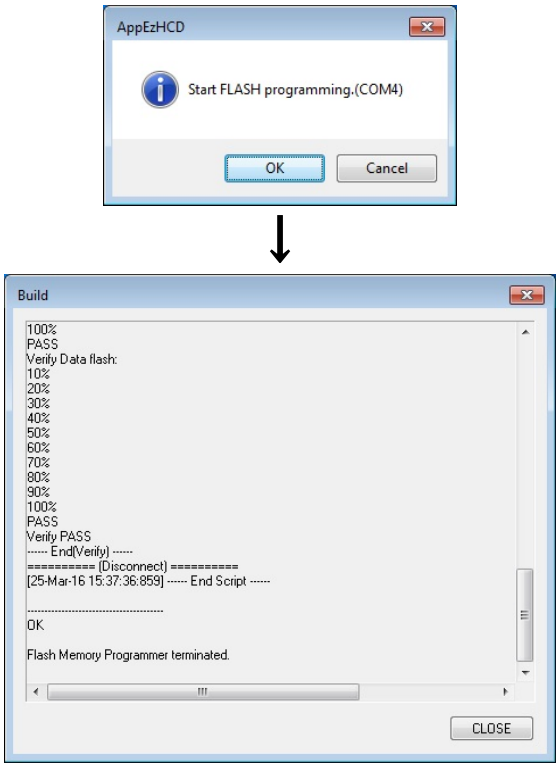
Connect the PC, E1 and the evaluation board to each other correctly.

Depending on the evaluation board, there are those that require switching the features of "write / normal operation" by the DipSW. After checking the manual of each evaluation board, when needing setting change, turn on the power in the state of writing.

(3) Writing

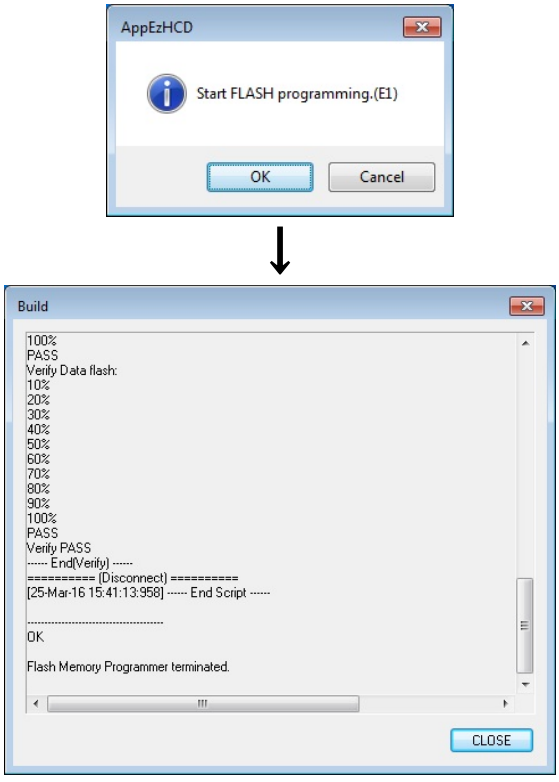
<R> If the board has a USB interface

Click [OK] and flash programming is started.



<R> If the board is using E1

Click [OK] and flash programming is started.



(4) Operating preparation

<R> If the board has a USB interface

When the program has been written normally, turn the evaluation board off.

If it is necessary to switch features of "write / normal operation", turn on the power of an evaluation board again after switching to "normal operation ".

<R> If the board is using E1

After the writing of the program is completed successfully, turn off the power to the board, and then remove the E1.

If it is necessary to switch features of "write / normal operation", turn on the power of an evaluation board again after switching to "normal operation ".

(5) Operating

The operation will start immediately when the power is turned ON.

Remark When only generating object codes (*.hex), click 

icon.

CHAPTER 5 WINDOW REFERENCE

5. 1 Overview of Windows and Dialog Boxes

The following windows and dialog boxes are provided with Applilet EZ for DALI Control Gear.

Table 5-1 List of Windows and Dialog Boxes in Applilet EZ for DALI Control Gear

Window/Dialog Box Name	Description
Main window	This window is opened automatically when Applilet EZ for DALI Control Gear is started. This window is used to select and set all functions to be included in the automatically generated object codes.
[DALI Property] dialog box	This dialog box is used to save variable settings of DALI.
[DALI Property Memorybank] dialog box	This dialog box is used to set memory bank configuration of DALI. It's effective only at the time of selection of IEC62386-102 ed2.0.
[Board Property] dialog box	This dialog box is used to set the evaluation board. For details, refer to 4.2.
[Setting to use Compiler]	Set the installed folder of the compiler to use. For details, refer to 3.1.1.
[FLASH Programming Settings] dialog box	This dialog box is used to set flash programming. For details, refer to 3.1.1.
[Project Folder] dialog box	This dialog box is used to set a folder into which the generated file is to be saved. For details, refer to 3.1.1.

5. 2 Description of Windows and Dialog Boxes

The following format is mainly used to describe Applilet EZ for DALI Control Gear's windows and dialog boxes.

Window/dialog box name

The name of the window or dialog box is indicated in this text frame.
Next, the window or dialog box's functions are described briefly and an illustration of the window or dialog box is shown.

Menu bar

The options that appear in pull-down menus under each item in the window's menu bar are enumerated and described briefly.

Tool bar

The functions corresponding to the buttons in the window's tool bar are described.

Description of function-related areas

The areas corresponding to functions set via the dialog box are described below.

Function buttons

The various function buttons in the dialog box are described.

Other

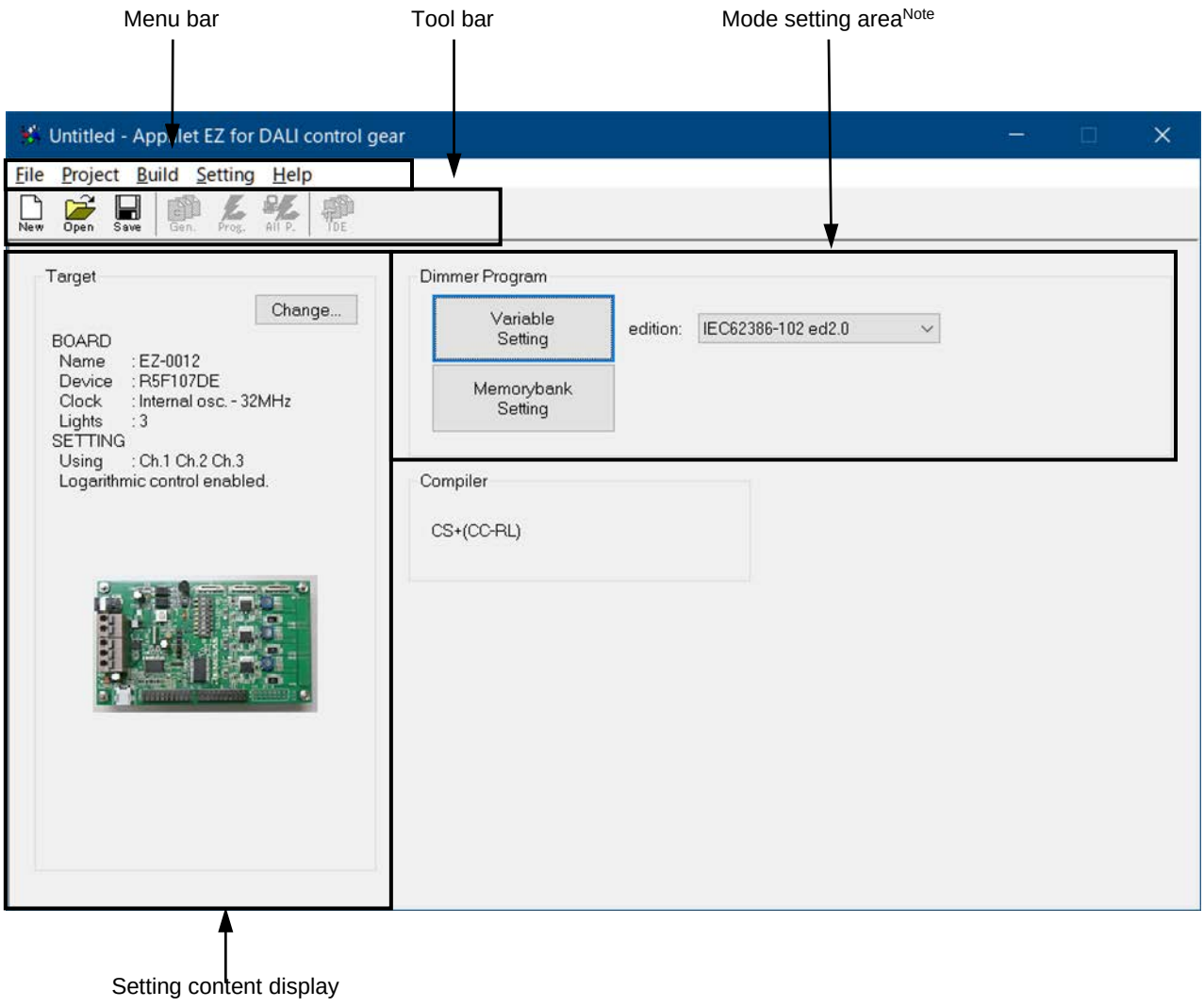
Operation methods, functions, and other noteworthy items or caution points are described.

Main window

This window is opened automatically when Applilet EZ for DALI Control Gear is started.

Setting items (Setting up the evaluation board, mode setting (refer to 4.2 and 4.3), etc.) are sequentially selected in this window to automatically generate object codes (*.hex) that can be directly written to the flash memory of a microcontroller.

Figure5-1 Main Window



The following parts of this window are described below.

- Menu bar
- Tool bar

Note For the mode setting area, refer to 4.3 Mode Setting.

Menu bar

(1) [File] menu

[Create New]	This option is used to create a new setting. Clicking the  button selects the same function.
[Open...]	This option is used to open an existing setting file. Use the dialog box that opens for this option to select the existing setting file (*.xml). Clicking the  selects the same function.
[Save]	This option is used to save the current settings. Clicking the  button selects the same function.
[Save as...]	This option is used to save the current settings with a newly named.
[Exit]	This option is used to close Applilet EZ for DALI Control Gear.
[Read Sample Project…]	This option is used to read a setting file created as a sample. The dialogue box specified the folder that the sample setting file is saved is displayed. Please select the sample setting file to use.

(2) [Project] menu

[Cpu...]	This option is used to open the [Board Property] dialog box which sets an evaluation board.
[DALI...]	This option is used to open the [DALI Property Variable] dialog box which sets DALI.

(3) [Build] menu

[Generate and Build]	Executes automatic generation of object codes (*.hex). Clicking the  button selects the same function.
[FLASH Programming]	Writes an already generated object codes (*.hex). Clicking the  button selects the same function.
[All procedure]	Executes automatic generation and writing of object codes (*.hex). For the procedures from generation to writing, refer to 4.4 Generation, Writing, and Evaluation. Clicking the  button selects the same function.

(4) [Setting] menu

[Select Compiler]	Select the compiler to be used.
[Compiler Folder...]	This option is used to open the [Setting to use compiler] dialog box which sets Compiler installed folder to use.
[FLASH Program...]	This option is used to open the [FLASH Programming Settings] dialog box which sets flash programming.
[Project Folder...]	This option is used to open the [FLASH Programming Settings] dialog box which sets folder to save the generated files.

(5) [Help] menu

[Version...]	This option is used to display version information about Applilet EZ for DALI Control Gear.

Tool bar

The icons on the Tool bar are provided to enable one-click selection of frequently used menu items.

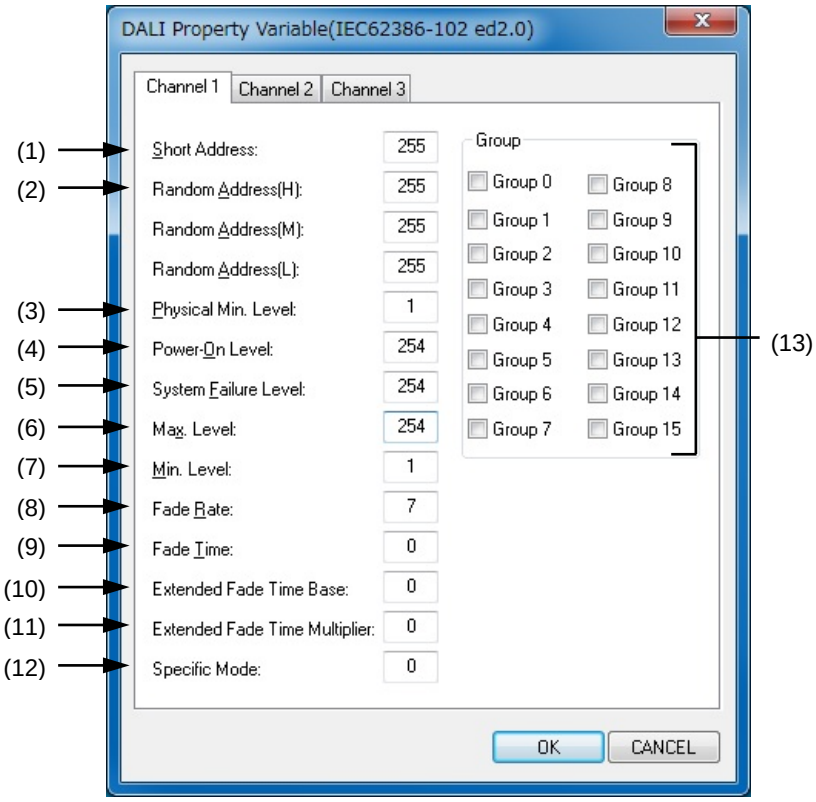
	This selects the same function as when [Create New] is selected in the [File] menu.
	This selects the same function as when [Open...] is selected in the [File] menu.
	This selects the same function as when [Save] is selected in the [File] menu.
	This selects the same function as when [Generate and Build] is selected in the [Build] menu.
	This selects the same function as when [FLASH Programming] is selected in the [Build] menu.
	This selects the same function as when [All procedure] is selected in the [Build] menu.

[DALI Property Variable] dialog box (IEC62386-102 ed2.0)

This dialog box can be opened by clicking [DALI...] in the [Project] menu or clicking [Variable] after selecting the edition to [IEC62386-102 ed2.0].

Set parameter of DALI in this dialog box.

Figure5-5 [DALI Property] dialog box



The following parts of this window are described below.

- Description of function-related areas
- Function buttons

Description of function-related areas

(1) Short Address:

Specify the default address of the evaluation board (as a value from 0 to 63 and 255).

Caution When the short address is assigned to the same address of the mounted LED channels, a right result may not be acquired in command replies such as Query.

(2) Random Address:

Specify a value when assigning a random address to the evaluation board.

Set random address value (0 to 255) to Random Address(H),(M),(L).

Caution When the Random Address(H),(M),(L) are assigned to the same address of the mounted LED channels, a short address cannot be set definitely in Random Address Allocation.

(3) Physical Min. Level:

Specify physical minimum dimming level (as a value from 1 to 254) of the connected lamp on the evaluation board or the evaluation board.

(4) Power-On Level:

Specify the dimming level for when turning on power (as a value from 1 to 255).

(5) System Failure Level:

Specify the dimming level for when a failure occurs (as a value from 0 to 255).

(6) Max. Level:

Specify the maximum dimming level (as a value from the minimum level to 254).

(7) Min. Level:

Specify the minimum dimming level (as a value from the physical minimum level to the maximum level).

(8) Fade Rate:

Specify the amount by which the dimming level is changed by fading (as a value from 1 to 15).

(9) Fade Time:

Specify the time required for the dimming level to be changed by fading (as a value from 0 to 15).

(10) Extended Fade Time Base:

Specify base value of the extended fade time of dimming (as a value from 0 to 15).

(11) Extended Fade Time Multiplier:

Specify multiplier value of the extended fade time of dimming (as a value from 0 to 4).

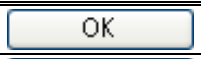
(12) Specific Mode:

Specify the time (0 and as a value from 128 to 255) required for the dimming level to be changed.

(13) Group

Specify the group the evaluation board belongs to. Multiple groups can be specified.

Function buttons

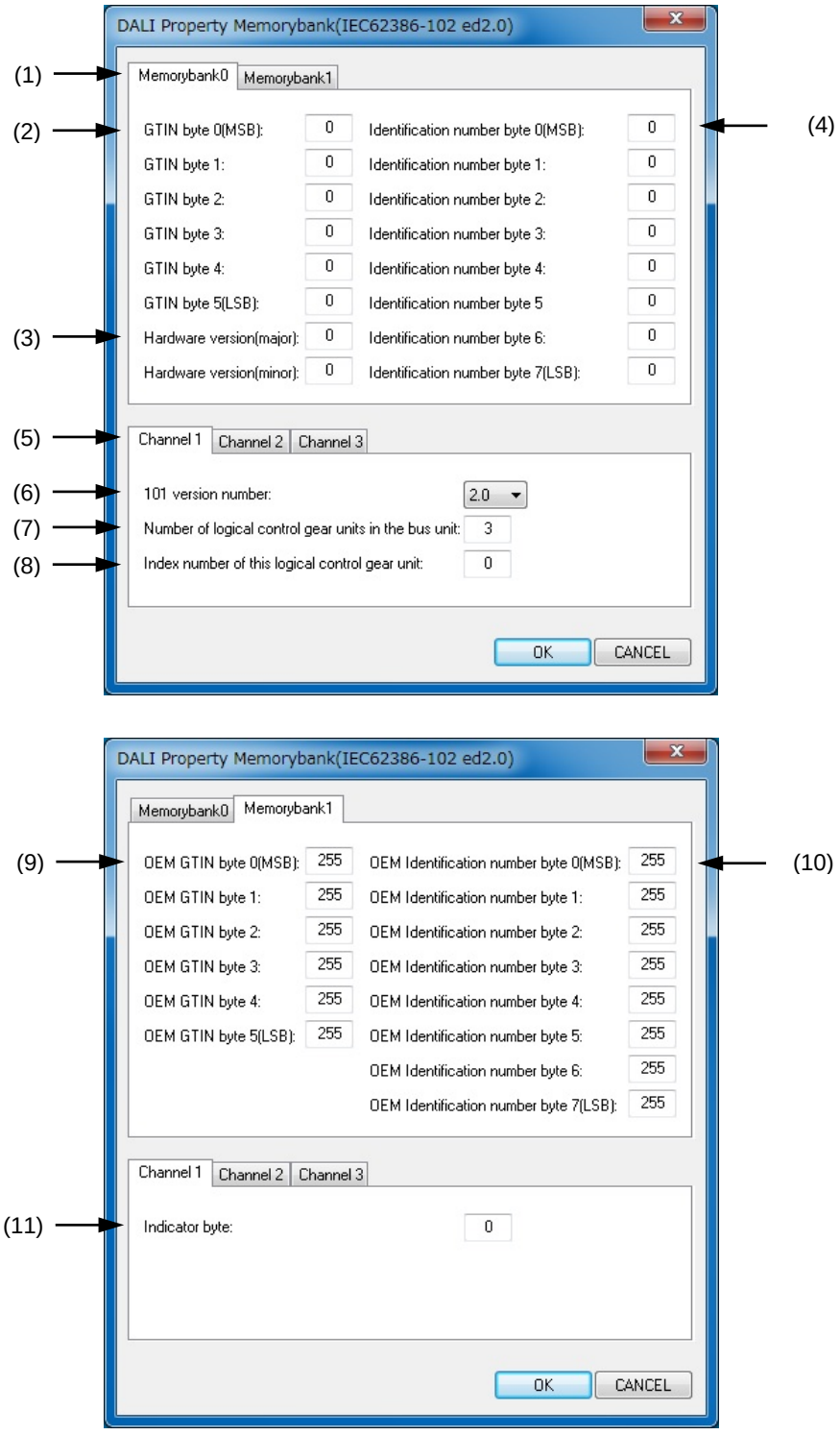
Button	Description
	Click this button to save the current settings and close the open dialog box.
	Click this button to close the open dialog box without saving the current settings.

[DALI Property Memorybank] dialog box (IEC62386-102 ed2.0)

This dialog box can be opened by clicking [Memorybank] after selecting the edition to [IEC62386-102 ed2.0].

Set Memorybank parameter of DALI in this dialog box.

Figure5-7 [DALI Property Memorybank] dialog box



The following parts of this window are described below.

- Description of function-related areas
- Function buttons

Description of function-related areas

(1) Selection Memorybank TAB

Select the Memorybank to be set.

(2) GTIN byte:

Set GTIN: Global Trade Item Number (international standard for product identification code) of evaluation board.

(3) Hardware Version:

Set Hardware Version [major] [minor] of evaluation board.

(4) Identification number byte:

Set the Identification number of evaluation board.

(5) channel TAB :

Select the logical device of the evaluation board.

(6) 101 version number:

Select the IEC62386-101 version number to be used on the evaluation board.

Caution This item is common to all channels. This can be set only on youngest TAB of channel number.

(7) Number of logical control gear unit in the bus unit:

Set the number of connected Control gear on the same BUS unit.

Caution This item is common to all channels. This can be set only on youngest TAB of channel number.

(8) Index number of this logical control gear unit:

Set the index number of Control gear connected on the same BUS unit (as a value from 1 to Number of logical control gear unit in the bus unit - 1).

This number is used as Short Address Number in Random Address Allocation.

Caution As for this number, the overlap on the same BUN unit is not forgiven. When overlapping, it becomes the overlap error in Random Address Allocation and cannot set Short Address Number.

(9) OEM GTIN byte:

Set the GTIN (the international standard for product identification code) that OEM of the evaluation board sets.

(10) OEM Identification number byte:

Set the Identification number that OEM of evaluation board sets.

(11) Indicator byte:

Purpose and the set value of this byte are left to the manufacturer. Set the value the manufacturer has decided (as a value from 0 to 255).

Function buttons

Button	Description
OK	Click this button to save the current settings and close the open dialog box.
CANCEL	Click this button to close the open dialog box without saving the current settings.

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