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April 1st, 2010
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User's Manual

Renesas FLASH Development Toolkit 3.0 (for Windows® 98/Me, Windows NT® 4.0, Windows® 2000 and Windows® XP)

User's Manual

Renesas FLASH Microcomputer Programming System

HS6400FDIW3S

Renesas Electronics
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Rev.1.0 2003.06

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Contents

Preface

About this guide

This guide explains the use of the Renesas FLASH Development Toolkit (hereafter referred to as FDT).

Chapter 1, Introduction, provides a brief explanation to the tool and lists its key features.

Chapter 2, System Overview, describes how the different facilities make up the FDT Graphical User Interface.

Chapter 3, Basic Operation, describes how FDT is activated and the FLASH ROM is written.

Chapter 4, Configuring the User Interface, provides a way to configure the FDT Graphical User Interface.

Chapter 5, Menus, and chapter 6, Windows, give reference information about the operations and facilities available through these respective areas.

Chapter 7, Upgrading to FDT3.0, describes notes about upgrading to FDT3.0.

Assumptions

It is assumed that the reader is experienced in using Microsoft® Windows® applications on PC-compatible computers.

Abbreviations

Device	Refers to programmable microcontroller or microcomputers
DLL	Dynamic Linked Library
FDT	Flash Development Toolkit
F-ZTAT	FLASH ZTAT
HEW	Renesas High-performance Embedded Workshop
PC	Personal Computer
ZTAT	Zero Turn-Around Technology

Document Conventions

This manual uses the following typographic conventions:

Table 1: Typographic Conventions

CONVENTION	MEANING
[Menu->Menu Option]	Bold text with '->' is used to indicate menu options (for example, **[File->Save As…]**).
'dialog name'	The '' is used to indicate the name of a dialog box or menu.
FILENAME.C	Uppercase names are used to indicate filenames.
"enter this string"	Used to indicate text that must be entered (excluding the "" quotes).
Key+Key	Used to indicate required key presses. For example. **Ctrl+N** means press the **Ctrl** key and then, whilst holding the **Ctrl** key down, press the **N** key.
➲ (The "how to" symbol)	When this symbol is used, it is always located in the left-hand margin. It indicates that the text to its immediate right is describing "how to" do something.

Chapter 1 Introduction

The Renesas FLASH Development Toolkit (FDT) is an on-board FLASH programming tool for Renesas F-ZTAT microcomputers that provides a high-performance and user-friendly Graphical User Interface (GUI).

Embedded software development projects created using the Renesas High-performance Embedded Workshop (HEW) may be programmed into Renesas F-ZTAT devices using FDT.

FDT may also be used as a general purpose S-Record or Binary editor.

1.1 Key Features

- Standard window operation based on the 32-bit Windows® GUI.
- Various online help functions.
- Selectable messaging levels.
- Simple programming environment using an adapter board.
- Serial communication: maximum 115,200 bits/s.
- USB Communications
- USB communications supported to the USB Interface Board.
- USB communications directly to selected target devices.

1.2 New Features

FDT 3.0 has the following new features:-

- Generic 0.18um Wizard
- Updated USB Device Drivers
- Improved user interface
- Additional device support

Chapter 2 System Overview

FDT is a modular software system, utilising self-contained modules for specific tasks. These modules are linked to a general purpose Graphical User Interface, which provides a *common look & feel* independent of the particular modules with which the system is configured.

FDT employs a hierarchical structure so that work can be organised in a logical manner. The top level of the structure is the workspace.

To be useful, the workspace must contain at least one project. In order to create a project, a workspace must be created first.

Each project specifies its own target device configuration (specified when creating the project) and set of target files (S-Record / Binary) that can be used to program the device.

The project settings for the target device connection need only be set once, as they are stored between sessions.

A single project within the workspace is active at any point in time. The Active project is the context to which all ‘Device’ Menu, ‘Project’ Menu and ‘Project’ Toolbar commands will be directed.

When a project has been created, target files can be added to it. These files may be:

- Used to program the device.
- Used to build a Device Image.
- Opened in the binary editor.

When using a project it is possible to take advantage of the following FDT features:

- Advanced messaging levels.
- Device Image builder.
- Uploading data from the target device.

2.1 User Interface

The FDT Graphical User Interface is a Windows® application that presents a work environment, which allows the user to program FLASH memory.

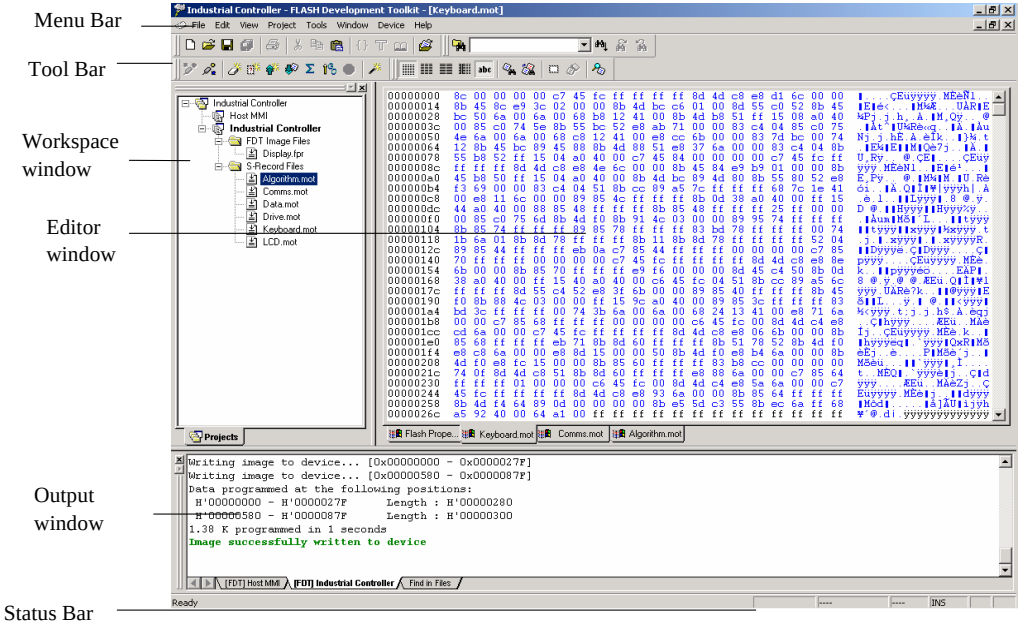


Figure 2-1 FDT Graphical User Interface

Menu bar

Commands are grouped into related areas on the Menu bar as indicated by the menu titles. Using the mouse the user can select a command operation, invoke a dialog box or a window to interact with the system. Clicking the left mouse button on a menu title will pull down that menu, from which a selection can be made.

If a menu item does not perform an action directly, but instead displays a dialog box or window for further user interaction, then its name is appended with an ellipsis (three dots, …).

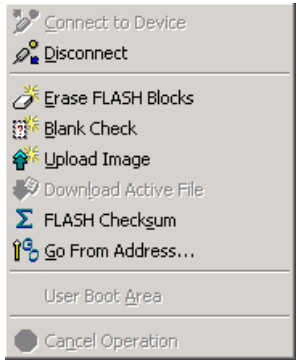


Figure 2-2 Menu Ellipsis

If a menu item can also be invoked by pressing a hot key (a combination of keys), then the hot key is displayed to the right of the item.

If a menu item toggles a feature ON or OFF then a check mark (✓) will be displayed next to its text when it is ON:

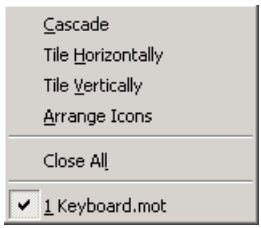


Figure 2-3 Checked Menu Items

If a menu item has the symbol (‣) next to it then a cascading or hierarchical menu is available. Clicking on the menu item will reveal the cascading menu:

Figure 2-4 Cascading Menus

Menus can also be selected directly from the keyboard by pressing the **ALT** key followed by the corresponding key of the underlined letter or number for the menu item that the user wants to select, e.g. press **ALT+F**, **O** in sequence to open a project (**[File->Open]**).

Toolbars

FDT has several toolbars located below the Menu bar. This provides quick access to FDT features by clicking the respective button with the mouse.

Figure 2-5 FDT Toolbars

The buttons on each toolbar are arranged in associated groups.

To find out the function of the button, move the mouse over the button and a hint will be displayed next to the button and in the status bar.

The toolbar buttons can be customized to provide a button for the majority of the features available in FDT and can be arranged in an order that the user finds convenient.

For more details about changing the arrangement of the toolbar buttons and a detailed description of each button's function, see chapter 4, *Configuring the User Interface*.

Edit toolbar

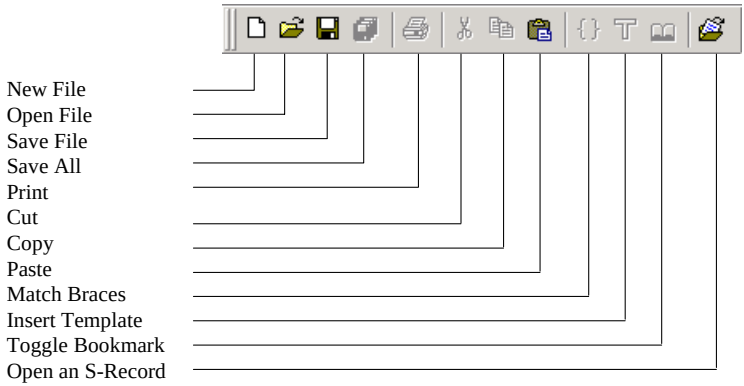


Figure 2-6 Edit Toolbar

New File - launches a new file.

Open File - launches the 'Open' dialog box.

Save File – saves the active file.

Save All – saves all the open files.

Print – prints active file.

Cut – cuts data to the clipboard.

Copy – copies data to the clipboard.

Paste – pastes data from the clipboard.

Match Braces – finds the matching brace.

Insert Template – inserts a template.

Toggle Bookmark – toggles a bookmark.

Open an S-Record – opens an S-Record file.

FDT toolbar

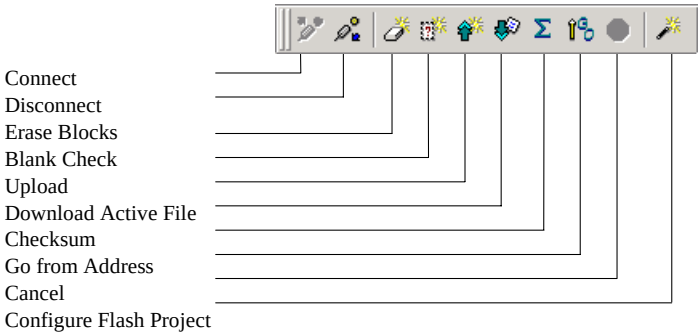


Figure 2-7 FDT Toolbar

Connect - connects the device to the interface.

Disconnect - disconnects the device from the interface.

Erase Blocks - launches the 'Erase Block' dialog box to erase all or individual blocks of the device FLASH memory.

Blank Check - checks whether or not the FLASH section of the target device is blank.

Upload - launches the 'Upload Image' dialog box to allow data to be obtained from the target device.

Download Active File - downloads the current device image.

Checksum – returns a sum of the data in the FLASH.

Go from Address – launches a dialog to select the address to execute from.

Cancel – Cancels the current FLASH operation.

Configure Flash Project - launches the 'Configure Flash Project' dialog box.

S Record toolbar

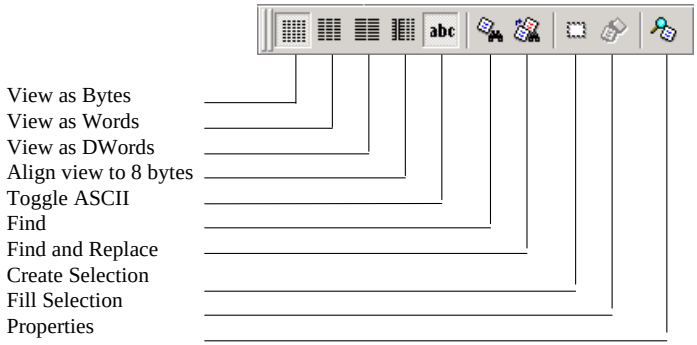


Figure 2-8 S Record Toolbar

View as Bytes - view the file data as 8 bit bytes.

View as Words - view the file data as 16 bit words.

View as DWords - view the file data as 32 bit double words.

Align view to 8 bytes - data is displayed on each line as 8 bytes. The number of bytes that can be accommodated on each line is dependent upon the size of the window.

Toggle ASCII - turns ASCII data ON or OFF

Find - launches the 'Find' dialog box.

Find and Replace - launches the 'Replace' dialog box.

Create Selection - selects a block of the specified size in the active file.

Fill selection - launches the 'Fill' dialog box.

Properties – launches a dialog with information about the active S Record.

Search toolbar

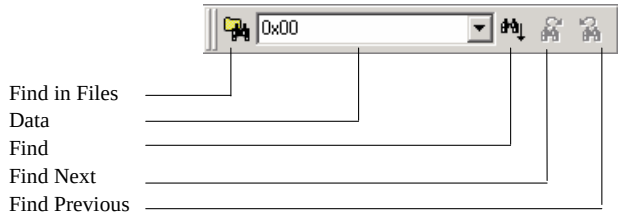


Figure 2-9 Search Toolbar

Find in Files – finds selected data in selected files.

Data – is used for the searches.

Find – locates data in active file.

Find Next – locates next occurrence of search criteria.

Find Previous - locates previous occurrence of search criteria.

Status Bar

The Status Bar is located at the bottom of the FDT application window. It provides the user with information about what the application is doing.

The left section of the Status Bar describes the action of the Toolbar items as the mouse arrow key is positioned over an item or describes the user with information about what the application is doing.

When an action is being performed, the next section gives an increasing bar display.

The rest of sections of the bar indicate the state of the keys of **Caps Lock**, **Num Lock**, or etc.

Pop-up menus

Many windows have local pop-up menus in order to make commonly used features easier to access. These menus are invoked by clicking the right mouse button in the window (or pressing **SHIFT+F10**) and then selecting the required menu option. An example pop-up menu is:

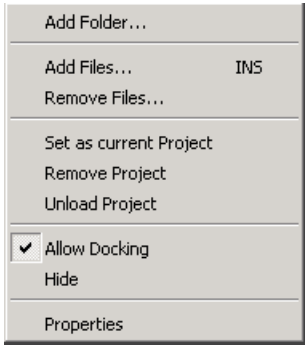


Figure 2-10 Pop-up Menu

The contents and operation of specific pop-up menus are explained in detail in the description of each FDT window, see the chapter 6, *Windows*.

Data entry

When entering data in the ‘Find’, ‘Replace’ or ‘Fill’ dialog boxes only hexadecimal or ASCII values can be used, based on the ASCII Search check box. When entering hexadecimal values a preceding ‘0x’ is fixed in the entry text box, so hexadecimal values are appended.

2.2 Help

FDT provides on-line information for using the system.

Help can be invoked by pressing the **F1** key or via the ‘Help’ menu.

2.3 Hot Keys

There are various hot keys for frequently used operations. These are as follows by category:-

Description	Hot Key
Help	
Help	**F1**
Context Sensitive Help	**Shift+F1**
File Commands	
Open File	**Ctrl+O**
New File	**Ctrl+N**
Close File	**Ctrl+F4**
Open S-Record	**Ctrl+R**
Save All	**Shift+Ctrl+ S**
Save	**Ctrl+S**
Print	**Ctrl+P**
Edit Commands	
Undo	**Ctrl+Z**
Redo	**Ctrl+Y**
Cut	**Ctrl+X**
Copy	**Ctrl+C**
Paste	**Ctrl+V**
Clear	**Del**
Select All	**Ctrl+A**
Find	**Ctrl+F**
Find In Files	**F4**
Replace	**Ctrl+H**
Goto Line	**Ctrl+G**
Match Braces	**Shift+Ctrl+ M**
View	
Workspace	**Alt+K**
Output	**Alt+U**
Window	
View as ASCII	**Alt+A**
View as Bytes	**Alt+1**
View as Word	**Alt+2**
View as Dword	**Alt+4**
Align to 8 Bytes	**Alt+8**

Chapter 3 Basic Operation

3.1 Starting FDT

To start FDT, open the ‘Start’ menu of Windows® and select ‘Renesas’ from ‘Program’, ‘FLASH Development Toolkit 3.0’, and the FDT shortcut. The ‘Welcome!’ dialog box will open by default.

To create a new workspace, select ‘Create a new project workspace’ and click the ‘OK’ button. To open a recent workspace, select ‘Open a recent project workspace’ and click the ‘OK’ button. To open an existing workspace, select ‘Browse to another project workspace’ and click the ‘OK’ button.

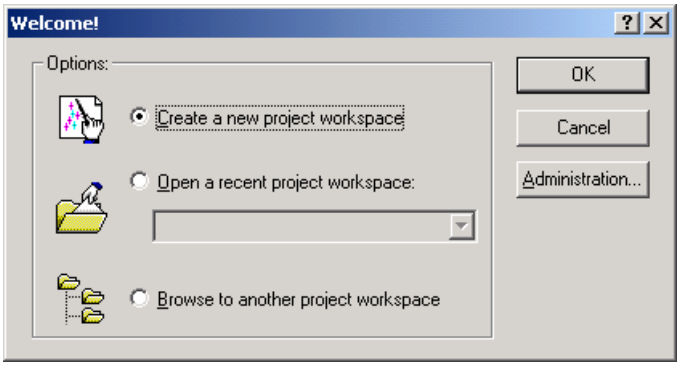


Figure 3-1 Welcome! Dialog

3.2 Creating a New Workspace

(1) Enter the workspace name(Project name is same as a default), then click the ‘OK’ button. (If you wish to change or create a directory, input a directory name or use ‘Browse...’ button)

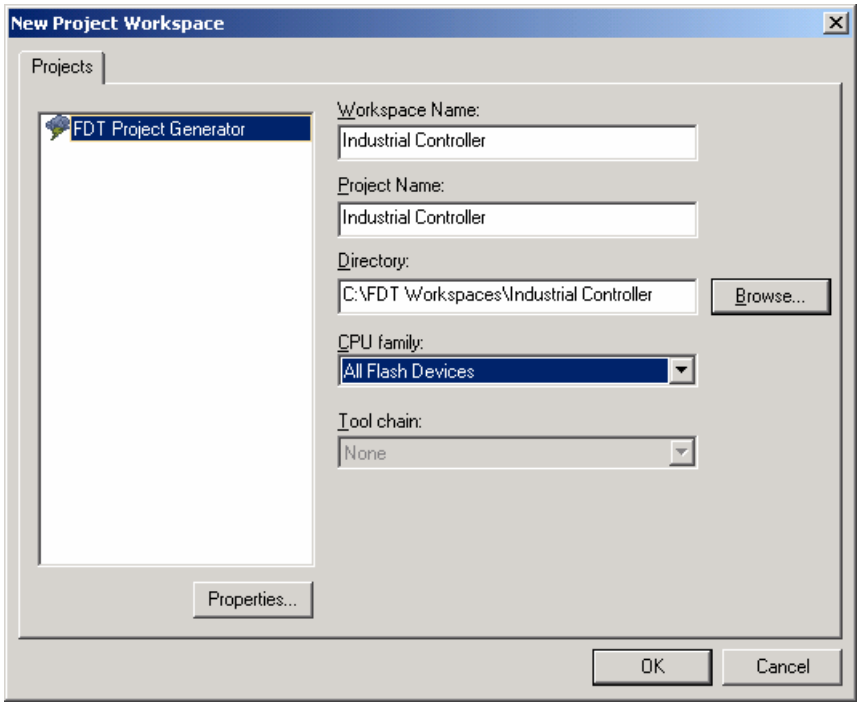


Figure 3-2 New Workspace

(2) Select the device you wish to use from the drop-down list. If there exists a user-created kernel in addition to the default path, select ‘Other…’ to specify the kernel file (.fcf).
It is possible to have more than one kernel option displayed, and double clicking on a kernel will open an optional “readme.txt” file that has information about the kernel (such as the device, version number and the compilers it was created with).

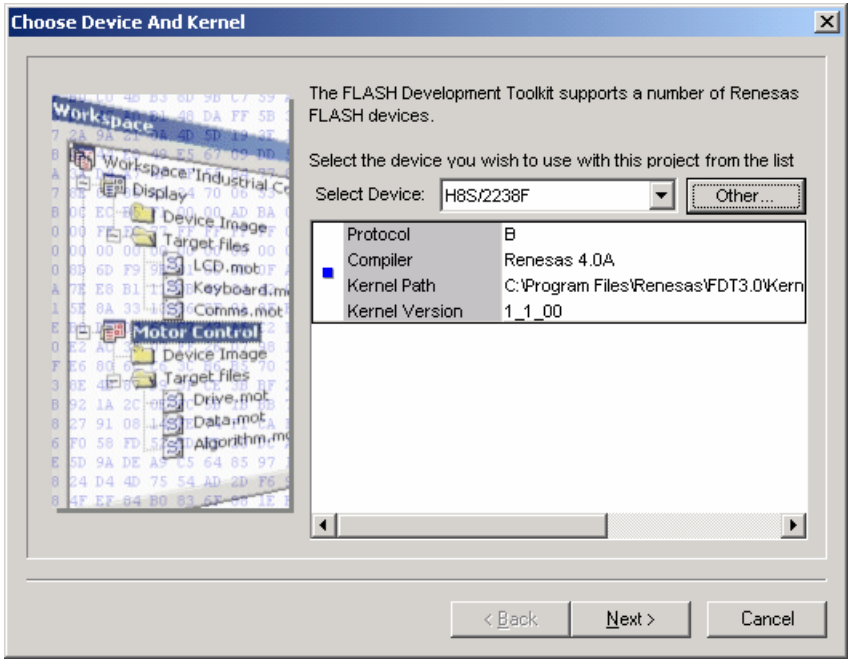


Figure 3-3 Device and Kernel Selection

(3) Select a port from the drop-down lists, then click the ‘Next’ button. In addition to the serial ports, there is also an option to use USB. Note that the USB Flash Development Module interface board (FDM) will appear above ‘COM1’ in the list of ports. If the target is connected directly to the host computer, the connection interface should be selected to ‘Direct Connection’.

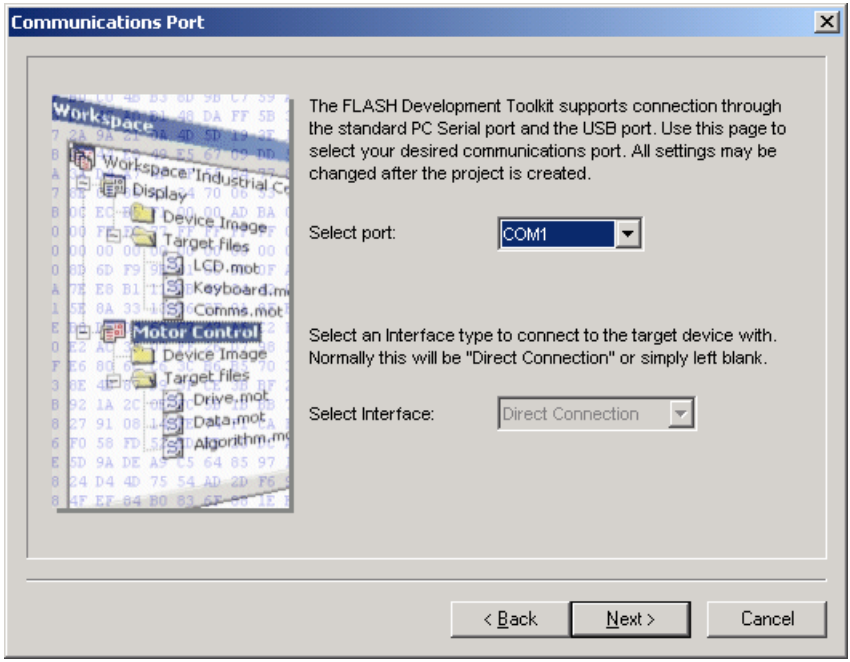


Figure 3-4 Communications Port

If the 0.18um Generic Wizard is being used, then to communicate with the device, if the FDM is also used, the following screen will be shown.

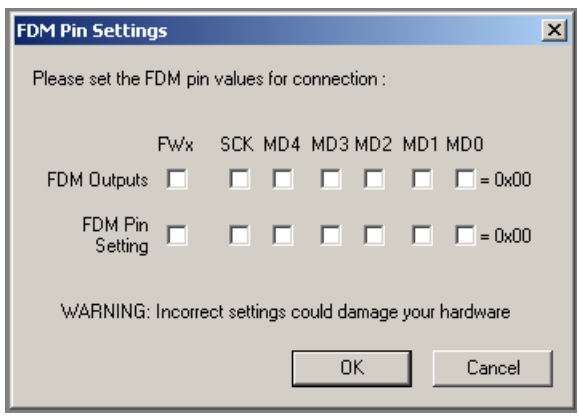


Figure 3-5 FDM Generic 0.18um Setup

Note Setting the FDM pins requires caution. Please confirm the pin settings with the hardware manual even if a default setting is available.

If the FDM is selected, then the user may be able to select the FDM pin settings as determined by the subsequent dialogs.

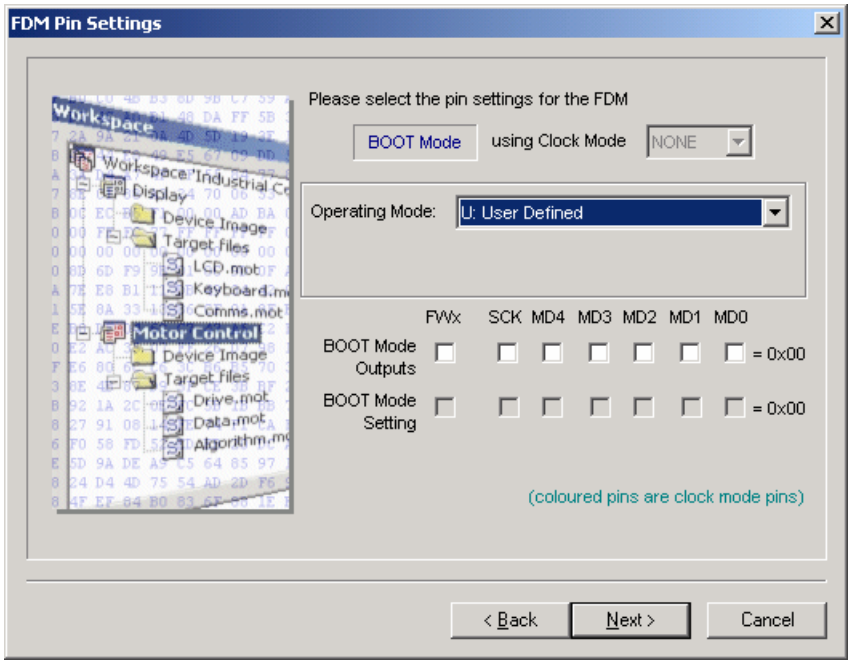


Figure 3-6 FDM Pin Settings

The previous dialog shows the settings for a number of FDM pins. This is for BOOT mode. If there are a number of settings available the ‘Operating Mode’ list box can determine which setting to use.

Note Setting the FDM pins requires caution. Please confirm the pin settings with the hardware manual even if a default setting is available.

The following dialog shows a similar dialog, this time to set the pins after a reset signal has been sent to the device.

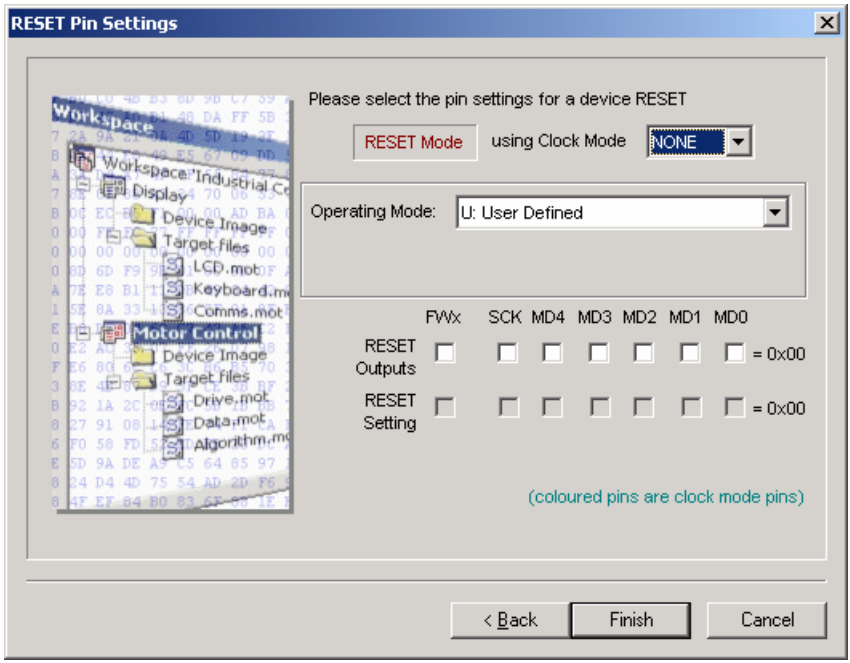


Figure 3-7 RESET Pin Settings

(4) Enter the numerical values for the input clock, select the main or peripheral multiplier from the drop-down list, and click the ‘Next’ button.

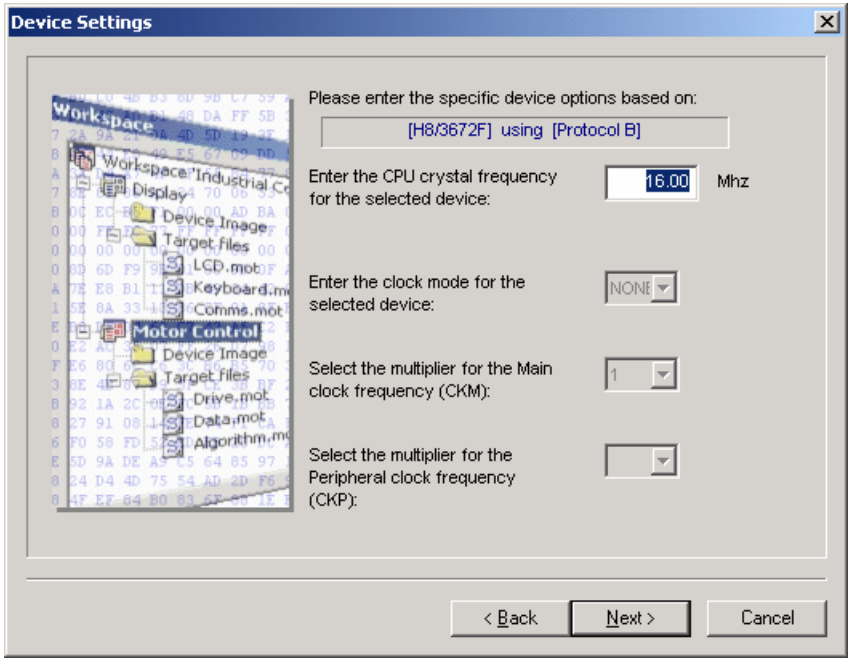


Figure 3-8 Device Settings

Supplementary:

1. CPU Crystal Frequency
   Enter the frequency of the CPU clock or the crystal generator as integers or in a format such as xx.xx. You can only input two digits to the right of the decimal point.
2. Clock Mode
   A clock mode needs to be selected depending on the target device. Select a value from the drop-down list.
3. Multiplier for CKM
   Select the multiplier of the system clock (master clock) for the input clock.
4. Multiplier for CKP
   The frequency rate (CKP) selected depends on the target device. Enter the multiplier of the peripheral clock for the input clock.

Note To enter the clock mode, input clock, and frequency rate, refer to the hardware manual and confirm the range to be set.

(5) Select the operating mode and baud rate from the drop-down lists, then click the ‘Next’ button.

Note For the serial port baud rate, refer to the hardware manual and select a rate where the variance is within 3% for the clock frequency used.

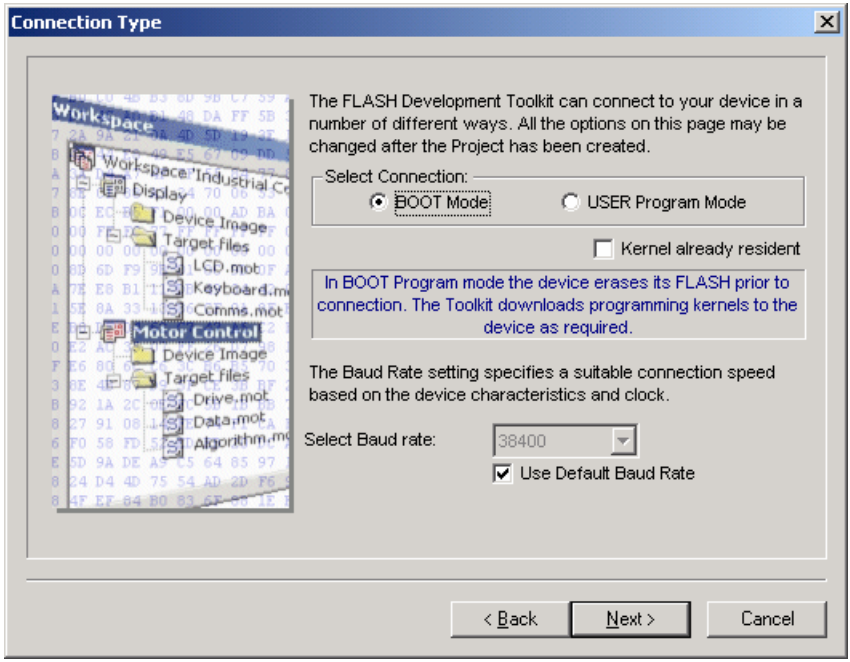


Figure 3-9 Connection Type

Supplementary:

1. Use Default Baud Rate

When this check mark is removed, other than the default value can be selected from the drop-down list.

(6) Select the protection level for programming the FLASH ROM and the messaging level, then click the ‘Finish’ button.

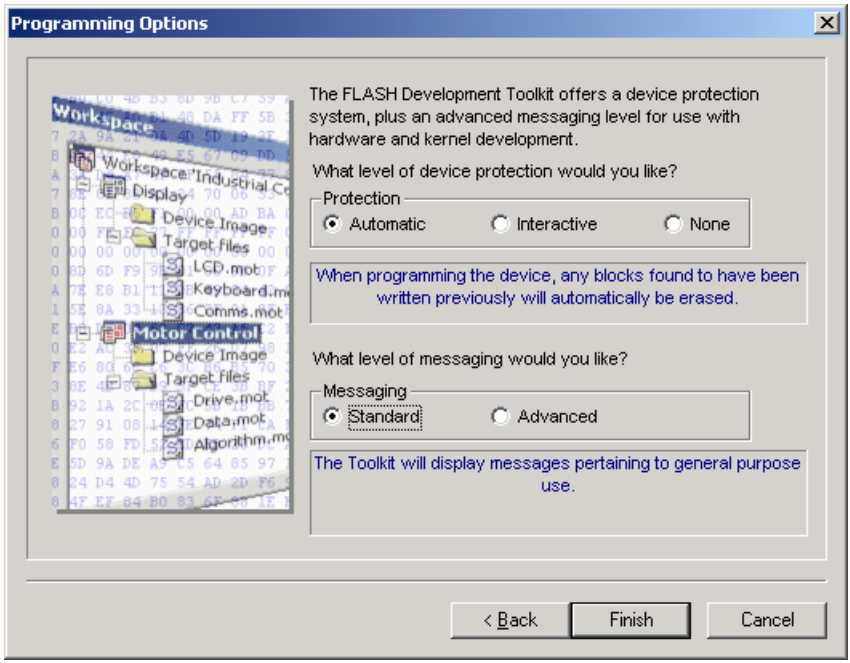


Figure 3-10 Programming Options

(7) If a Generic 0.18um device is selected, then a series of screens appear. Once selected, there is little information available, since FDT will establish the correct information.

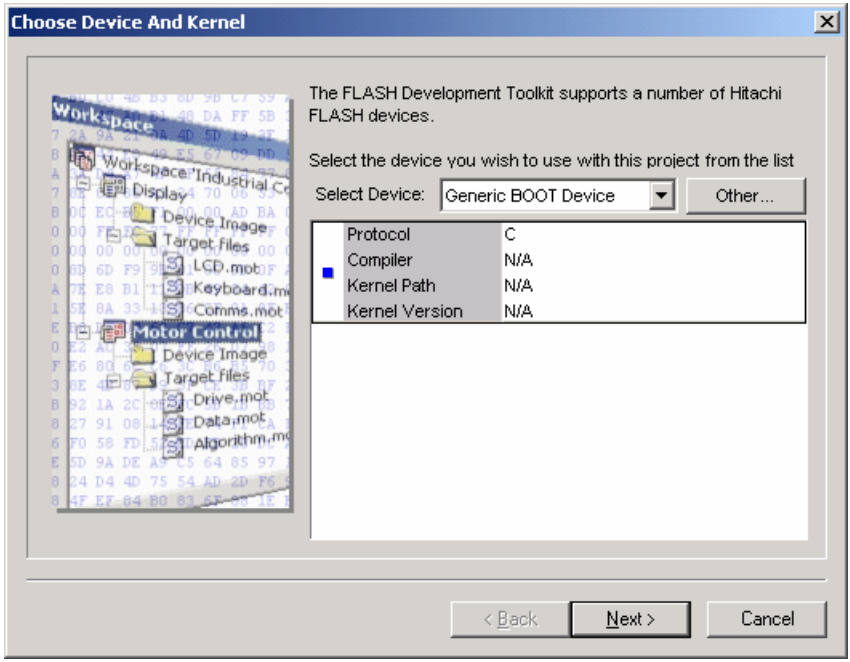


Figure 3-11 Generic Boot Device Selection

Pressing the ‘Next’ button will result in confirmation being required that the process should be continued.

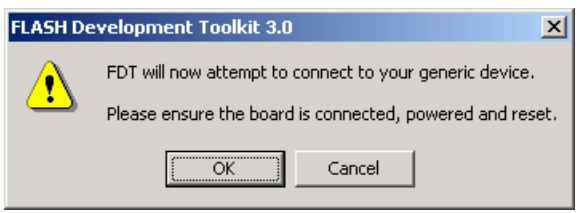


Figure 3-12 Generic Boot Confirmation

After this, FDT displays a dialog that displays the progress, and pauses on the device. Since some devices have a number of similar devices associated with it, a list is provided of compatible devices that the user needs to select the correct device.

A similar process occurs with Clock Modes.

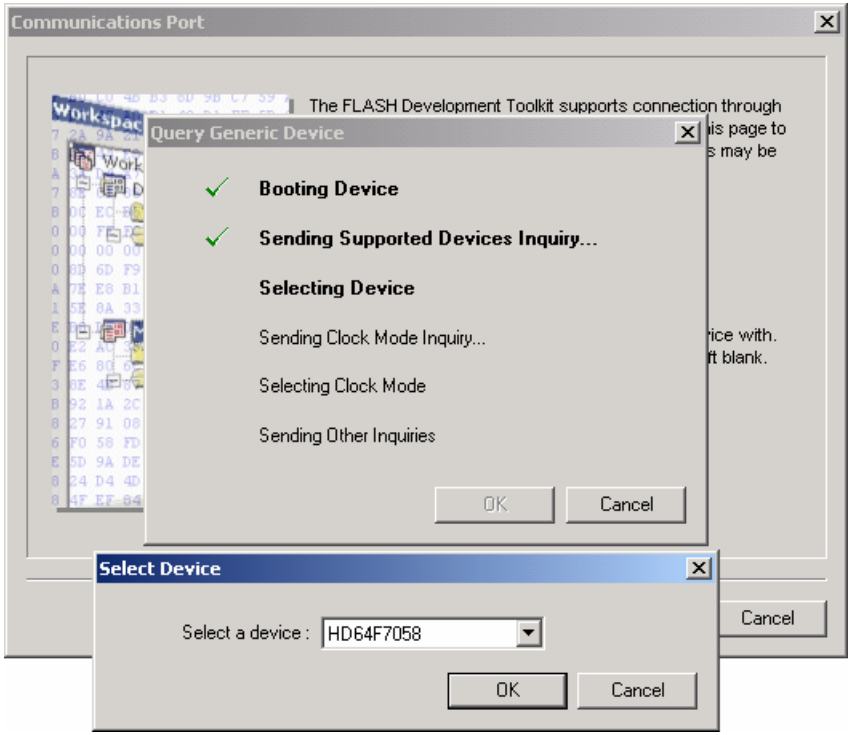


Figure 3-13 Generic Boot - Device

Having selected the Clock Mode, the Generic wizard completes as below.

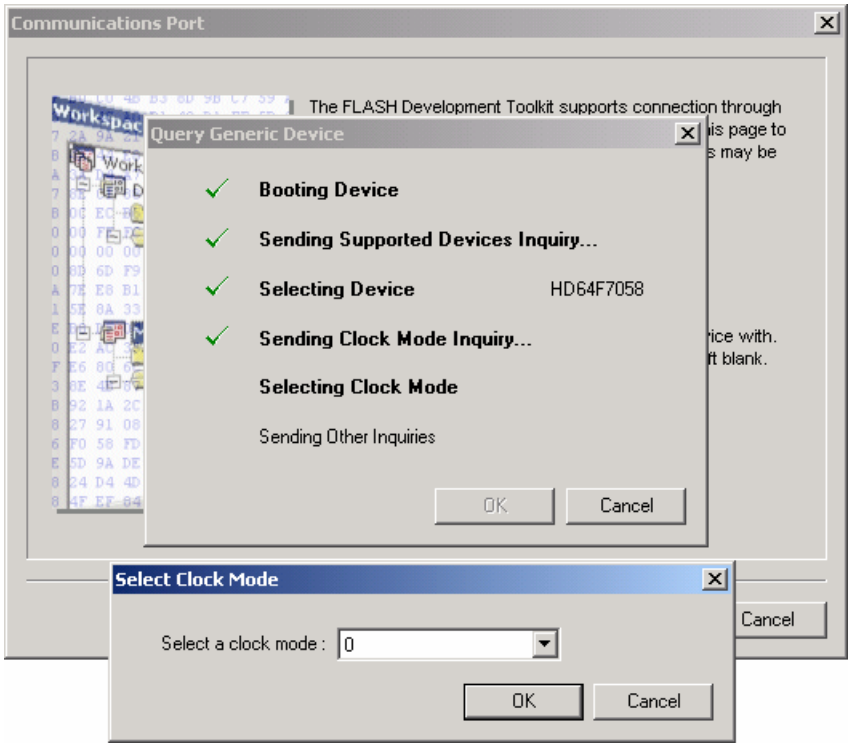


Figure 3-14 Clock Mode

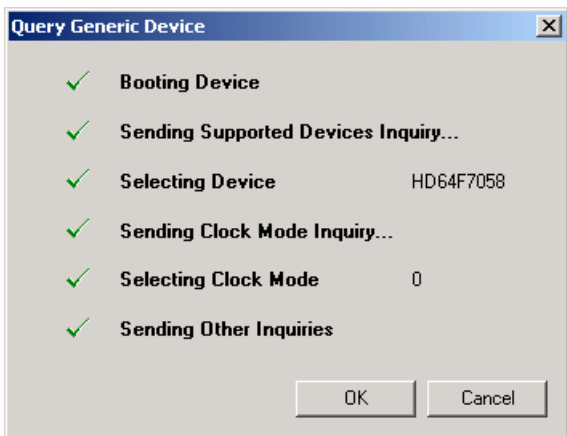


Figure 3-15 Generic 0.18 setup complete

3.3 Saving a Workspace

When the **[File->Save Workspace]** menu option is selected, the FDT workspace can be saved.

3.4 Closing a Workspace

Select **[File->Close Workspace]** to close the FDT workspace. If the workspace or its project has changed, a dialog box asks if the user wishes to save the project. Select 'Yes' if the workspace is to be saved, 'No' if the workspace is not to be saved, and 'Cancel' to return to the workspace.

3.5 Exiting FDT

To exit FDT, select **[File->Exit]**, press the **Alt + F4** key, or select the 'Close' option from the system menu (the system menu can be opened by clicking the icon in the upper-left are of the title bar).

3.6 Programming the Data to the FLASH ROM

(1) When the target file (S-Record file) is downloaded:

1. Select **[Project->Add Files…]** or press the **INS** key to add the file to be downloaded to the project.
2. Click the right mouse button on the file (*.mot) displayed in the workspace window, and select 'Download File'.
3. Programming will be completed when 'Image successfully written to device' is displayed in the output window.

(2) When the device image is downloaded:

1. Add the target file to the project. (Same as item 1 of (1) above.)
2. Click the right mouse button on the file (*.fpr) displayed in the workspace window, and select 'Download Image'.
3. Programming is complete when 'Image successfully written to device' is displayed in the output window.

3.7 Erasing Data from the FLASH ROM

1. Select **[Device->Erase FLASH blocks]** to display the ‘Erase Blocks’ dialog box.
2. Select the block to be erased. (When Name of the block is clicked, the block name is inversely displayed.)*
3. Click the ‘Erase’ button to start erasure.
4. When ‘Erase complete’ is displayed in the message window, erasure is completed.

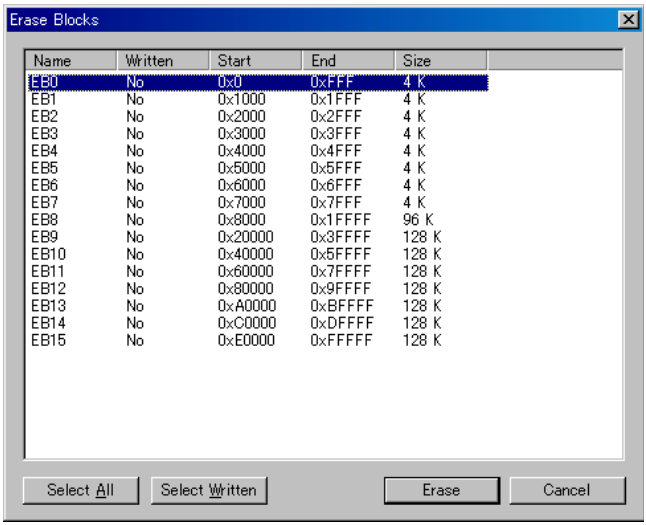


Figure 3-16 Erase Blocks

Note To erase all blocks, clicking the ‘Select All’ button inversely displays all blocks. To erase the programmed block, clicking the ‘Select Written’ button inversely displays the target block.

3.8 Reading the FLASH ROM Data

1. Display the ‘Upload Image’ dialog box from **[Device->Upload Image]**.
2. Enter the start and end addresses.
3. Click the ‘Upload’ button to start reading.
4. When ‘Successfully read xxx bytes from device’ is displayed in the message window, reading is complete.

If the user specifies an Absolute image, the uploaded data will be placed in an image the size of the FLASH memory at the same address it was uploaded from. Use an Absolute Image if the uploaded data needs to be added to the project. It is not possible to upload a region outside of the FLASH into an Absolute Image.

Note When FDT is started in boot mode, the flash memory data has already been erased.

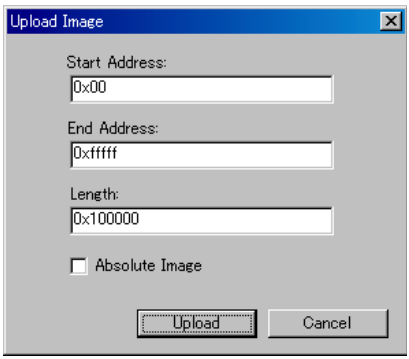


Figure 3-17 Upload Image Dialog

Chapter 4 Configuring the User Interface

When the user interface for FDT was designed an attempt was made to make frequently used operations quickly accessible and have related operations grouped in a logical order. However, when the user is in the middle of a long session he may find it more useful to have a different arrangement of the user interface items. FDT facilitates this user customization. This chapter describes how the user interface can be arranged and how various aspects of the display can be customized.

4.1 Arranging Windows

Minimizing windows

When an operation is finished on an open Editor window but it may be necessary to look at it in its current state later, it can be reduced to an icon, this is called *minimizing* the window. To minimize a window either click on the ‘minimize’ button of the window, or select **[Minimize]** from the window drop-down menu.

The window is minimized to an icon at the bottom of the Editor window.

Note The icon may not be visible if there is another window open over the bottom of the screen.

To restore the icon back to a window either double click on the icon, or click once to pop up the icon menu and select **[Restore]**, or select required window from the Menu bar **[Window]** drop-down menu.

Tiling windows

After some time there may be many windows open on the screen. All the windows can be arranged in a tile format with none of them overlapping each other using the "Tile Windows" option. To invoke this select the **[Window->Tile Horizontally]** or **[Window->Tile Vertically]** menu option.

All currently open windows are arranged in a tile format. Windows that are minimized to icons are not affected.

4.2 Locating Currently Open Windows

When many windows are open in the FDT application window it is quite easy to lose one of them behind the others.

Locating a specific window

There are two methods to find the lost window.

1. To select a specific window, invoke the **[Window]** menu. Click on the required window from the list of open windows at the bottom of the menu. The currently selected window will have a check mark next to it in the window list.

   The window selected will be brought to the front of the display. If it is minimized the icon is restored to a window.
2. A specific window can also be selected by clicking on the tab containing the file name at the bottom of the Editor window. If the window is not minimized it will be brought to the front of the display. If it is minimized, the minimized icon will be brought to the front of the display.

4.3 Enabling/disabling the Toolbar

The user has the option to enable or disable the Toolbar. By default, the Toolbar is displayed at the top of the FDT application window. To disable the display of the Toolbar, select each of the displayed toolbars, and disable their view.

To display the toolbar, use the **[Tools->Customize…]** menu option.

4.4 Enabling/disabling the Workspace

The user has the option to enable or disable the Workspace. By default, the Workspace is displayed. To disable display of the Workspace, select the **Hide** pop-up menu option.

If the disable option is selected, the Workspace will be disabled and removed from the FDT application window display. To re-enable the Workspace display, select the **[View->Workspace]** menu option. The Workspace will be enabled and added to the FDT application window display.

4.5 Enabling/disabling the Output Window

The user has the option to enable or disable the Output Window. By default, the Output Window is displayed. To disable display of the Output Window, select the **Hide** pop-up menu option.

If the disable option is selected, the Output Window will be disabled and removed from the FDT application window display. To re-enable the Output Window display, select the **[View->Output]** menu option. The Output Window will be enabled and added to the FDT application window display.

4.6 Customizing the Toolbar

The selection and arrangement of buttons displayed on the Toolbar can be customized to suit a user's requirements. To change the display invokes the **[Tools->Customize…]** menu option.

The 'Customize' dialog box will be displayed:

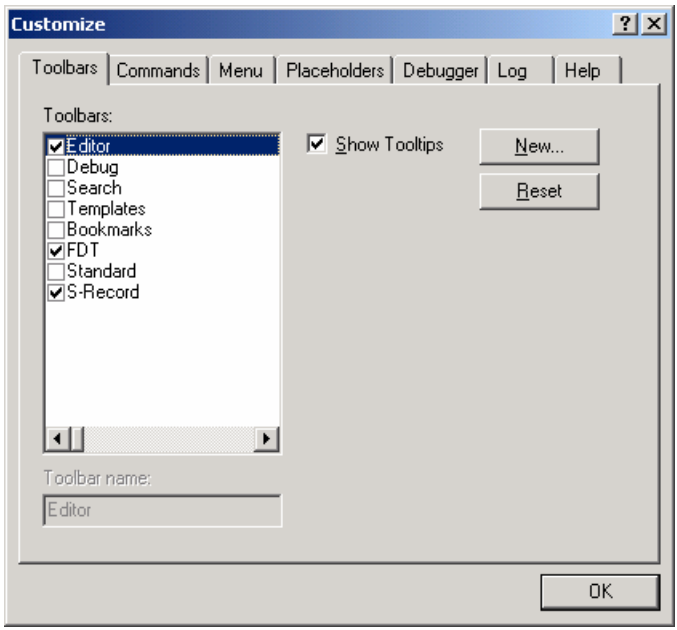


Figure 4-1 Customize FDT

The 'Customize' dialog box has a number of tabs, which are further described in Chapter 6 Windows.

Toolbars

The 'Toolbars' tab allows the user to select a group (e.g. workspace) and to select the functions for that group.

A check mark in the 'Show Tooltips' box indicates that the action of the button will be displayed when the mouse arrow is pointing to the button. If the box is unchecked no action is displayed.

The 'New…' button launches the 'Toolbar Name' dialog box which allows the user to name and generate a new toolbar. After entering the new name and clicking on 'OK', the new name will be added to the 'Toolbars' list and an empty toolbar is displayed on the interface.

Selecting the Commands tab allows the user to select and add buttons to the new toolbar. The user can place the new toolbar anywhere on the GUI by dragging it with the mouse.

When a user created toolbar is selected in the 'Toolbars' list, the 'Reset' button is renamed to 'Delete'. Clicking on this button will remove the new toolbar from the list and from the GUI.

The 'Reset' button resets the selected toolbar to its default settings.

Commands

This tab shows the buttons and describes the action for each button in each group and allows the user to customize the toolbar according to an individual application.

Clicking on an item in the ‘Categories’ box displays the buttons available for that category.

The ‘Buttons’ area displays a picture for each button in the selected category.

To obtain a description of the action of a button, click on that button. The description will appear in the ‘Description’ area.

Adding a button to the Toolbar

➲ To add a button to the Toolbar:

1. Select the button from the appropriate category, by pointing the mouse pointer at the button and press the left mouse button.
2. Drag the button to the required position in the Toolbar.
3. Release the mouse button.

Positioning a button in the Toolbar

➲ To move a button position in the Toolbar order:

1. Select the appropriate button on the Toolbar to move with the mouse as above.
2. Drag the button to the required position on the toolbar.
3. Release the mouse button.

Removing a button from the Toolbar

➲ To remove a button from the Toolbar:

1. Select the button with the mouse as above.
2. Drag the button to the ‘Customize’ dialog box.
3. Release the mouse button.

Chapter 5 Menus

This document follows the standard Microsoft menu naming convention:

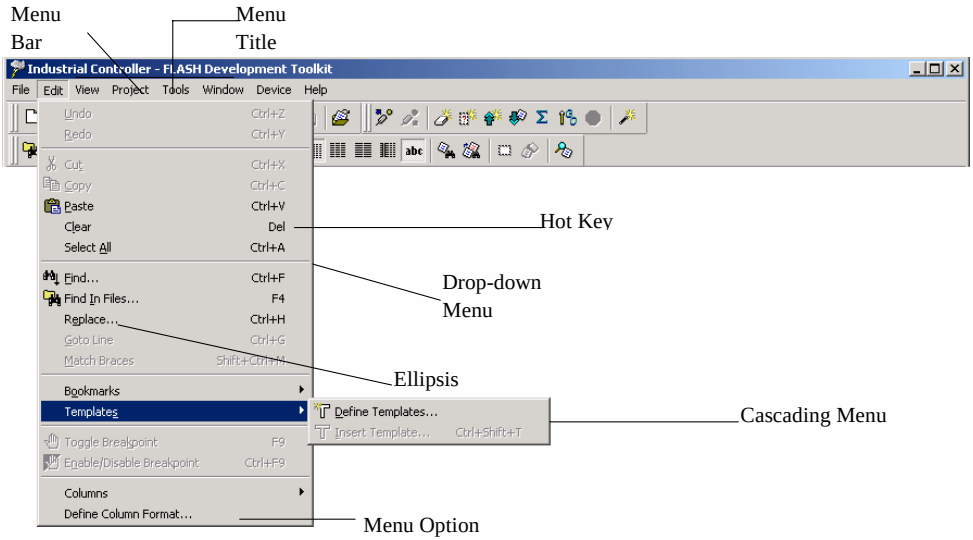


Figure 5-1 FDT Menus

5.1 File

The ‘File’ menu is used for aspects of the program that access data files.

New

This creates a new text file in the editor window.

Open…

This opens a file for display in the editor window. It assumes a text file.

Close

This will close the current active file in the editor window.

New Workspace…

Launches the ‘New Workspace’ dialog box allowing the user to specify the name and location of a new workspace and creates a new workspace directory.

Open Workspace…

Launches the ‘Open’ dialog box allowing the user to open an existing FDT Workspace file (.aws).

Save Workspace

Saves the details of the currently active Workspace.

Close Workspace

Closes the currently active Workspace.

Open an S-Record…

Launches the ‘Open an S-Record’ dialog box allowing the user to open an existing file. The file may be an S-Record file (.rec, .mot, .a20, .a37) or a Device Image file (.fpr).

Save Session

This feature is not used in FDT.

Refresh Session

This feature is not used in FDT.

Save

Saves the current active file.

Save All

Saves all files that have not been saved on the Editor window.

Save As…

Launches the ‘Save As’ dialog box allowing the user to save and name the uploaded Device Image file with a .fpr extension, or if an S-Record file is active to rename and save that file.

Page Setup…

This displays the options available for configuring the page for printing.

Print…

Uses the standard dialog for printing the active file.

Exit

Closes and exits the FDT application.

5.2 Edit

The ‘Edit’ menu is used for aspects of the program that access or alter data in the Editor window.

Undo

Allows the user to reverse the previous editing operation.

Redo

Allows the user to reverse the previous Undo operation.

Cut

This will remove the contents of the highlighted block from the window and place it on the clipboard in the standard Windows® manner. This option is only available if a block is highlighted.

Copy

This will copy the contents of the highlighted block to the clipboard in the standard Windows® manner. This option is only available if a block is highlighted.

Paste

This will copy the contents of the Windows® clipboard into the child window at the current cursor position.

Note If more than one byte is selected, the **Paste** option is not available.

Clear

Deletes selected characters. In an S-Record file, this has no function.

Select All

Selects all the information in the active file in the editor window.

Find…

This will launch the ‘Find’ dialog box allowing the user to enter either hexadecimal or ASCII data. The scope of the search is bounded by the area selected, for the active file in the Editor window. If a match is found, the Editor window is updated to display the found data.

Find In Files…

This launches a dialog to allow data to be located in files external to the active file.

Replace…

This will launch the ‘Replace’ dialog box allowing the user to enter either the hexadecimal or ASCII data to be found and the replacement data, in the same format. The scope of the search is bounded by the area selected, for the active file in the Editor window. If a match is found, the Editor window is updated to display the found data, click on the now enabled ‘Replace’ button to replace the data.

Goto Line

This feature is not used in FDT.

Match Braces

This feature is not used in FDT.

Bookmarks

This feature is not used in FDT.

Templates

This allows standard text to be added an active text files in the editor window.

Toggle Breakpoint

This feature is not used in FDT.

Enable/Disable Breakpoint

This feature is not used in FDT.

Columns

This has no effect with S Records, but with text files allows a gutter on the left hand side.

Define Column Format…

This feature is not currently used in FDT.

5.3 View

The ‘View’ menu is used to display Workspace window and Output winodw.

Workspace

Display Workspace window.

Output

Display Output window.

5.4 Project

The ‘Project’ menu provides high-level control and facilities for projects within the workspace.

Set Current Project

This option allows the user to select the active project where there are multiple projects in the workspace.

Insert Project…

This option allows the user to create a new project, and add it to the workspace.

Dependent Projects…

This creates relationships between projects so that if one project is modified and a file is used in another project, there is a association between the projects.

Edit Project Configuration…

This option is currently not used in FDT.

Create Project Type…

If a project were likely to be reused, creating it as a type of project would reduce the amount of duplicated information required.

Add Files…

Launches the ‘Open’ dialog box allowing the user to add S-Record files (.rec, .mot, .a20, .a37) to the project.

Remove Files…

Removes the selected file from the project.

File Extensions…

This option allows the user to select which file extensions are recognized by FDT.

Components…

This option shows any additional components used in FDT (currently not used).

Download Image

Loads the open Device Image file into the target FLASH memory.

Rebuild Image

Rebuilds the target files into a Device image file (Binary Image) for subsequent downloading to the target FLASH memory.

5.5 Tools

The ‘Tools’ menu is used to launch additional FDT features, which are not related to either projects or target devices.

Administration…

This displays a dialog with the tools available to the user under different categories.

Simple Interface…

Writes the created project to the flash memory by using one button.

Customize…

This allows the user to customize FDT, and is covered in more detail in section 6.13.

Options…

Allows access to additional features, some of which are reserved for future enhancements.

Format Views…

This allows the user to change the appearance of different windows.

Launch External Debugger…

This option is reserved for later enhancements.

Launch Slave FDT…

Allows the user to launch a new copy of FDT.

5.6 Window

The ‘Window’ menu is used to alter the display of currently open windows within the FDT GUI. Files displayed in the Editor window are appended to the following list, these files are identified by their filename and the currently active file is denoted by check mark.

Cascade

This option allows multiple windows to be staggered so that each file is visible.

Tile Horizontally

This option allows the windows to be displayed with maximum possible horizontal width.

Tile Vertically

This option allows the windows to be displayed with maximum possible vertical height.

Arrange Icons

This option arranges the file icons in rows at the bottom of the screen.

Close All

This option closes any files open in the editor window.

‘file name’

This option becomes active when a file name is selected and checked.

5.7 Device

The ‘Device’ menu provides control facilities for interacting with the target device.

Connect to Device

This connects the GUI to the device if it is not connected. Messages will appear in the Output window if the connection cannot be made.

Disconnect

This disconnects the GUI from the device if it is connected. Messages will appear in the Message log if the connection cannot be made.

Erase FLASH Blocks

This launches the ‘Erase Blocks’ dialog box.

The ‘Erase Blocks’ dialog box allows the user to specify which blocks are to be erased. The Written column indicates whether data is present in the block.

To start the operation, select the required block names in the list and then click the ‘Erase’ button.

Blank Check

This launches a blank check on the device FLASH and reports back to the Output window.

Upload Image

This launches the ‘Upload Image’ dialog box, which enables the uploading of a range of data from the target device. This is intended for access with FLASH memory. The data is placed in the Editor window.

Download Active File

This downloads the current active file into the target FLASH memory.

FLASH Checksum

This launches a checksum calculation on the device FLASH and reports back to the Output window.

Go From Address…

This launches a dialog that allows the user to select an address to execute code from. There is an option to select an indirect address mode, so that the address referenced is itself an address of where the code needs to run from.

User Boot Area

This menu is enabled for 0.18µm devices. When User Boot Area is selected (enabled), FDT specifies to write the data to the this area of flash ROM, to upload image and to blank check in the user boot area of the 0.18µm device before programming. The User Boot Area may be used to provide user defined boot sequences different from the factory sequence.

Cancel Operation

Cancels the current FLASH operations of Download, Upload, Erase or a connection attempt, if they are active.

5.8 Help

The ‘Help’ menu is used to access additional information on how to use the functionality provided by FDT.

Help Topics

Launches the Help system for FDT. The ‘Help Topics’ dialog box for FDT is displayed, enabling help to be accessed on required FDT subjects through several methods.

Technical Support

This allows the user to report a problem with FDT.

About FDT…

Launches the ‘About FDT’ dialog box, through which additional information regarding FDT can be accessed:

- FDT version.
- Copyright information.

Chapter 6 Windows

This chapter describes each child window type, the features each supports and the options available through their associated pop-up menus.

There are three main windows - Workspace window, Editor window and Output window.

Most windows have local pop-up menus in order to make commonly used features easier to access. These menus are invoked by clicking the right mouse button within the window (or pressing **SHIFT+F10**) and then selecting the required menu option.

Windows may also be launched from a number of the main menu items.

6.1 Workspace window

The Workspace window contains details of the items in the workspace including the workspace name, projects contained in the workspace and for each project their Device Image files and Target files.

6.2 Workspace

The Workspace is the first item in the window, in the following example this is “Workspace ‘Industrial Controller’”:

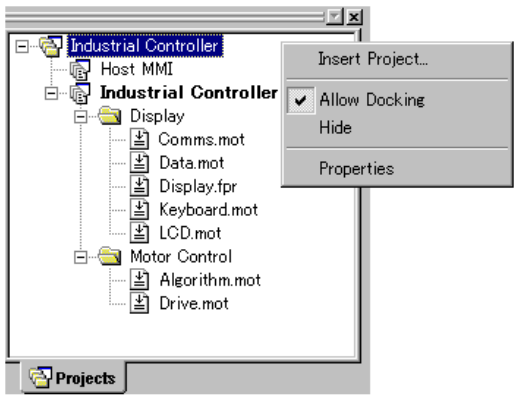


Figure 6-1 Workspace Window

Invoking certain menu items from a pop-up menu in the Workspace window will launch additional windows.

The Workspace window pop-up menu has the following items:

Insert Project…

Invoking this option allows the user to add a project to the Workspace.

Allow Docking

Invoking this option allows the user to select if the window is docked, or if it can “float” around the main window.

Hide

Invoking **Hide** conceals the Workspace window. It is restored by **[View->Workspace]**.

Properties

This option displays information about the Workspace including the file path.

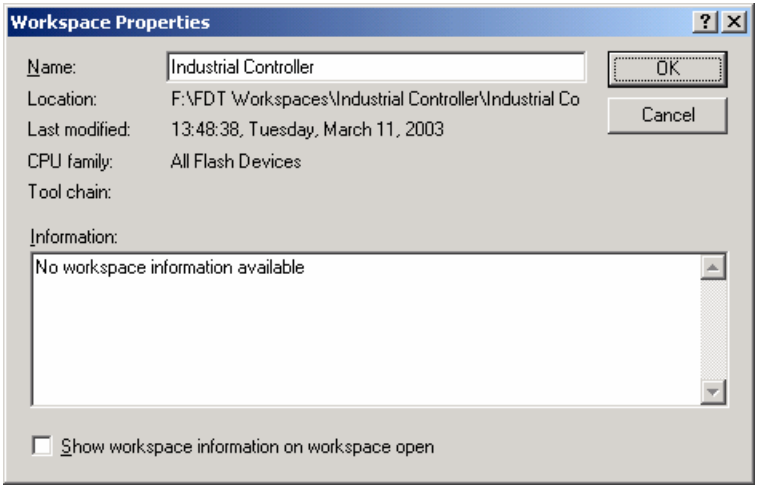


Figure 6-2 Workspace Properties

6.3 Project

The Project is the next item in the hierarchy below the Workspace. In the following example, both “Display” and “Motor Control” are Project names.

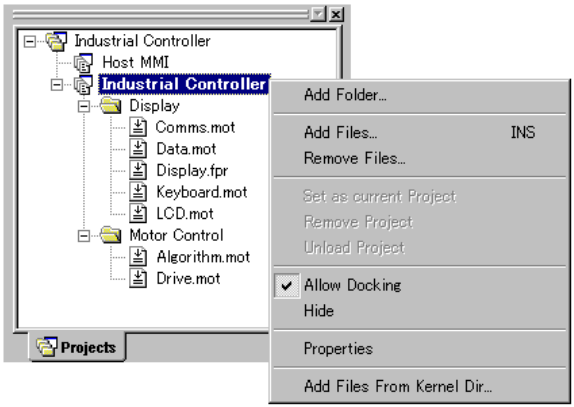


Figure 6-3 Workspace Project

The pop-up menu for Project has the following items:

Add Folder…

Allows an additional folder to be included.

Add Files …

Launches the ‘Open’ dialog box allowing the user to add S-Record files to the project.

Remove Files…

Launches a dialog to select the files to remove.

Set as current Project

Sets the highlighted project as the current active project.

Remove Project

Remove the selected project from the Workspace.

Unload Project

Unloads the selected project from the Workspace.

Allow Docking

Allows the Workspace window to dock or be floating.

Hide

Hides the Workspace window.

Properties

Displays the project properties.

Add Files From Kernel Dir…

This allows the user to select files from the current kernel directory and add those files to the current project.

6.4 Device Image - Folder

This contains the Device Image file the project.

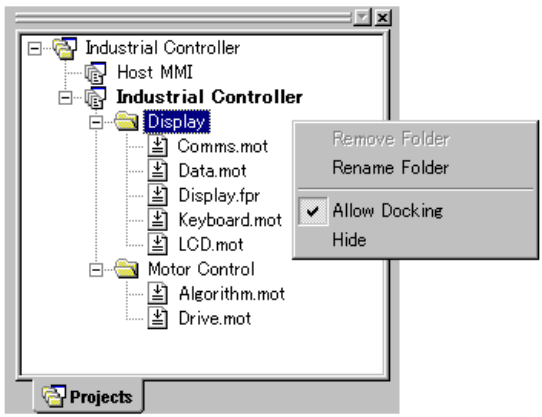


Figure 6-4 Workspace Folder

The Device Image - Sub Folder pop-up menu has the following items:

Remove Folder

Allows the user to delete folders.

Rename Folder

Allows the folder to be renamed.

Allow Docking

Allows the Workspace window to dock or be floating.

Hide

Hides the Workspace window.

6.5 Device File

The Device File is the item containing the data to Flash into the device.

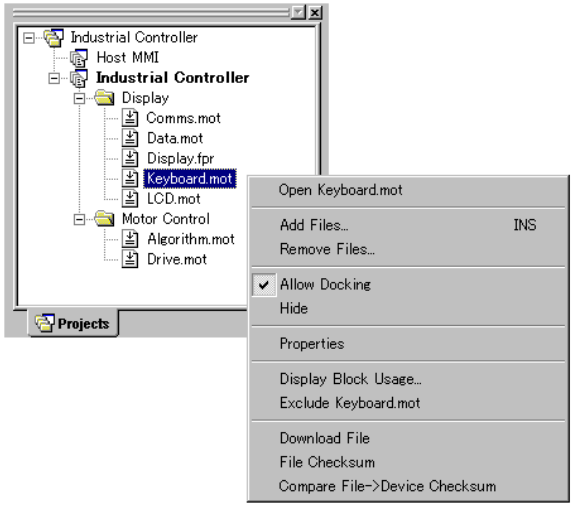


Figure 6-5 Device File

The pop-up menu for Device File has the following items:

Open 'filename'

This feature is not used in FDT.

Add Files…

Allows additional files to be added to the project.

Remove Files…

Removes files from the project.

Allow Docking

Allows the Workspace window to dock or be floating.

Hide

Hides the Workspace window.

Properties

Launches the device file properties dialog box.

Display Block usage…

Launches the ‘S-Record Properties’ dialog box and displays the Block usage tab.

Exclude ‘filename’

If a file is excluded, it will not be used to form the built image if Rebuild Image is selected. Once selected as excluded, using the right mouse click, it is possible to “Include ‘filename’”.

Download File

Downloads the active file to the device FLASH memory.

File Checksum

The file checksum returns the checksum for the file using the algorithm in the kernel (EPROM style) and as a basic checksum. The result is shown in the output window. An example is shown below:-

```
File Checksum:  0x07F5A651 (EPROM style), Raw Checksum:  0x07F5A651
(over address range 0x00000000 - 0x0007FFFF)
```

Compare File->Device Checksum

This command allows the user to swiftly check the contents of the device memory with the file. The output window will show the sum check for both the file and the device. The user may then confirm that they are the same.

An example is shown below:-

```
Calculating device checksum
Flash Checksum: 0x07F5A651 (User Area)
File Checksum:  0x07F5A651 (EPROM style), Raw Checksum:  0x07F5A651
(over address range 0x00000000 - 0x0007FFFF)
```

6.6 Workspace Properties

Invoked from the Workspace pop-up menu item **Properties**.

The ‘Workspace Properties’ dialog box shows details of:

- the Workspace Name
- its filename and path
- the time and date when the workspace was last saved

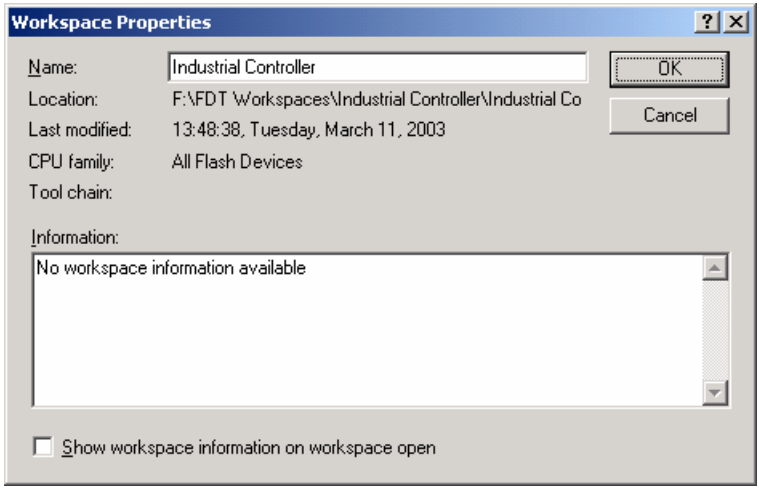


Figure 6-6 Workspace Properties

6.7 Project Properties

The ‘Properties’ dialog box can be invoked from the **Properties** right click action when the mouse is over the project in the workspace window.

The ‘Properties’ dialog box shows details of:

- the name of the project
- the location and the file name of the project file
- its creation date and time

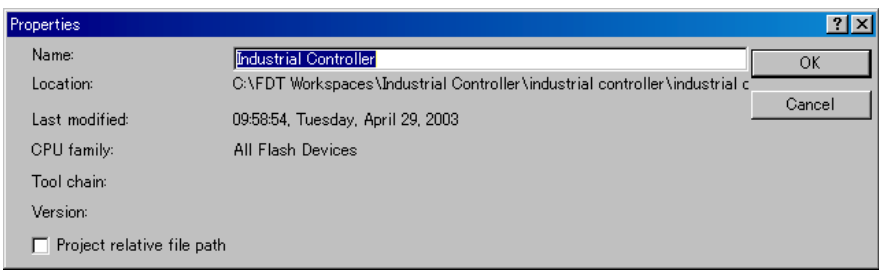


Figure 6-7 Project Properties

6.8 Flash Properties

The ‘Flash Properties’ dialog box can be invoked from **Configure Flash Project** in the FDT toolbar. For the items that can be changed, double-click on them to change those contents.

- **Kernel**

This shows the kernel path, frequency, protocol, multiplier, and clock mode. It also allows the user to change those contents.

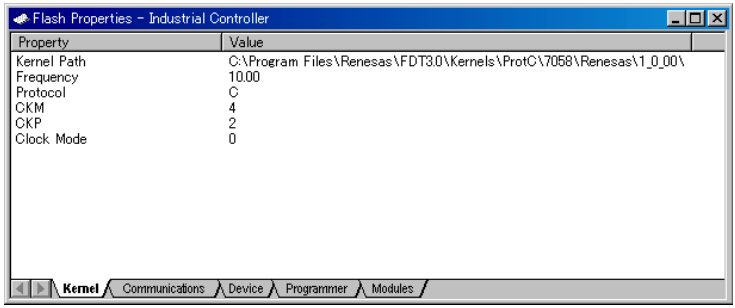


Figure 6-8 Kernel Properties

Kernel Path

This shows the kernel path.

Frequency

This shows the input clock.

Protocol

This shows the type of communication protocols (**B**: 0.35-µm device, **C**: 0.18-µm device).

CKM

This shows the multiplier of the system clock (master clock) for the input clock.

CKP

This shows the multiplier of the peripheral clock for the input clock.

Clock Mode

This shows the clock mode.

- **Communications**

This shows the default and current baud rates and the current port. It also allows the user to change the Port and Baud Rate.

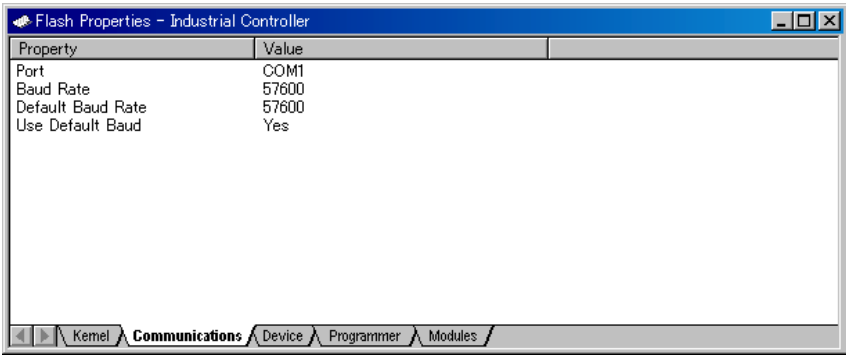


Figure 6-9 Communications Properties

Port

This shows COM ports or USB port for connection to the device.

Baud Rate

This shows the Target Baud Rate for connection.

Default Baud Rate

This shows the default Baud Rate.

Use Default Baud

This shows whether default baud is used or not.

- **Device**

This shows the device information. It also allows the user to select ‘BOOT Mode’ or ‘USER Program Mode’ and the ‘Direct Connection’ interface. In addition, it can specify whether or not the kernel is in the target device.

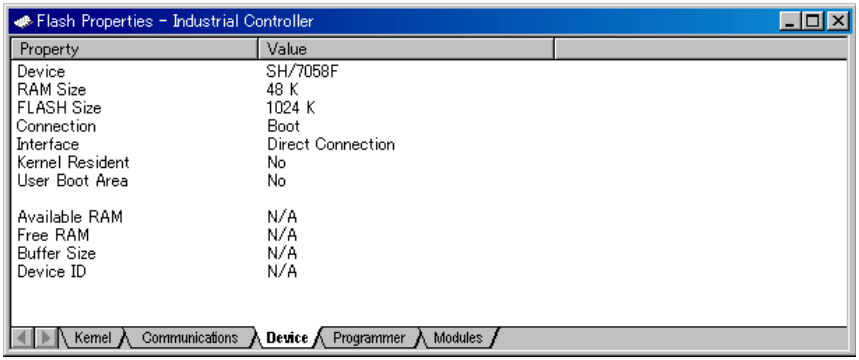


Figure 6-10 Device Properties

Device, RAM Size, and FLASH Size

These show the information on the device.

Connection

Boot mode connection type specifies that the on-board programming BOOT mode sequence is to be initiated if a kernel cannot be found running on the target device. This will cause the entire FLASH memory to be erased and a kernel loaded.

If a kernel is already resident the FLASH is not erased, rather information regarding the block usage is obtained to help prevent accidental overwriting.

User program mode connection type specifies that the on-board programming USER Program mode sequence is to be initiated by a previously loaded user program that is used to reprogram the FLASH memory.

Interface

If the target is connected directly to the host computer, the connection interface should be selected to ‘Direct Connection’.

Kernel resident

This shows whether a main kernel to be already resident on the target device.

User Boot Area

This shows whether the user boot area is selected or not.

Available RAM and Free RAM

These are not used in communication protocol B or C.

Buffer Size

This shows a size of programming the flash memory.

Device ID

This is not used in communication protocol B or C.

- **Programmer**

This shows the state of the Function Map and allows the user to select the Device Protection Option of Automatic, Interactive, or None and the message level option of Advanced or Standard.

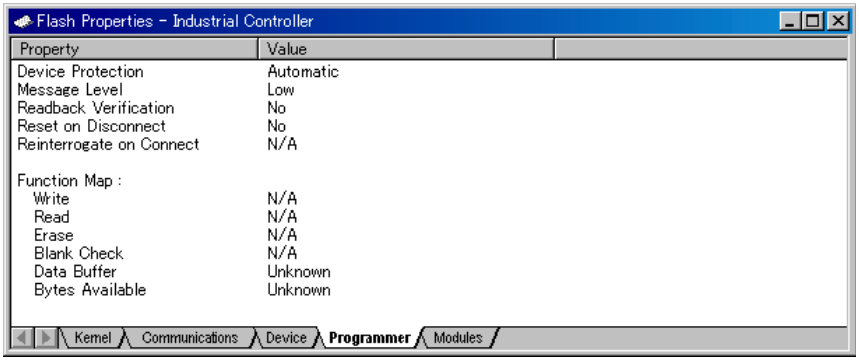


Figure 6-11 Programmer Properties

Device Protection

This allows the user to select either automatic protection (Automatic) or interactive protection (Interactive) to protect the FLASH device from accidental over-erasure and over-programming. Automatic protection will erase blocks from the device prior to programming, as necessary. Interactive protection will ask the user before an erase occurs. FDT can be forced to write to a block containing data. In addition, None can be selected to disable device protection.

Whilst connected to a device FDT keeps track of the state of the FLASH blocks and is able to determine when a programming operation will over-program a region of FLASH memory.

Note If device protection is disabled the user is responsible for erasing the device prior to programming.

Message Level

The user can select either Standard or Advanced message levels. A standard message level generates general FDT/target device status messages regarding high-level communications details. An Advanced message level generates more detailed information regarding lower level communications details.

Readback Verification

After programming, FDT can verify the data was programmed successfully by performing a read-back verification. Use this option to specify whether you would like to perform read-back verification, always, after confirmation, or never.

Reset on Disconnect

When disconnecting from the device when used in combination with a UPB or FDM, FDT can be used to reset the target hardware. Use this option to specify whether you would like to reset the device, always, after confirmation, or never.

Reinterrogate on Disconnect

This option forces FDT to reinterrogate Generic 0.18um devices on connection. With this option set to "No" (default), the device settings are saved in an automatically generated fcf file and re-used. With this option set to "Yes", FDT will always reinterrogate the device for its details upon connection; this allows one project to work with many 0.18um devices. If this option is set to "Query", FDT will ask you to select whether to reinterrogate the device.

Function Map

This is not used in communication protocol B or C.

- **Modules**

This shows each Kernel file name.

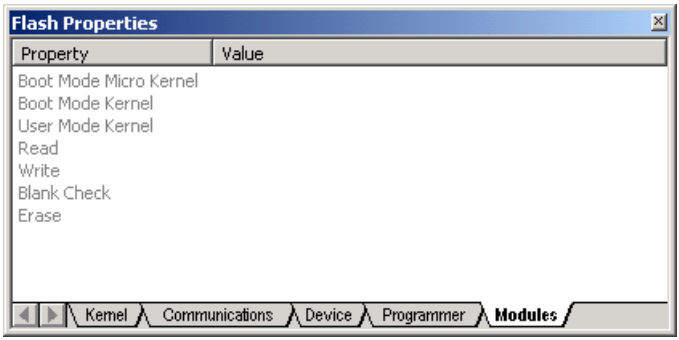


Figure 6-12 Module Properties

6.9 S-Record Properties

Invoked from the Editor pop-up menu item **Properties…**.

Block Usage

This shows the starting, finishing address and sizes of the blocks contained in specified file.

If the file is open in the editor window, double clicking on a range highlights the selected data.

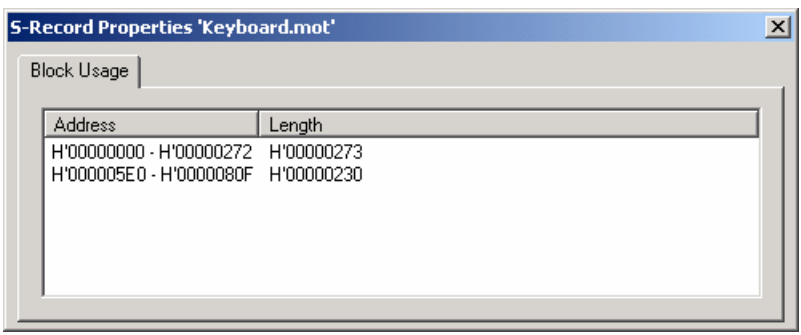


Figure 6-13 S Record Properties

6.10 Output Window

The Output window is one of the main windows contained in the FDT GUI.

Figure 6-14 Output Window

The window has available pop-up menu that contains the following items:

Clear Window

This will clear the Output window.

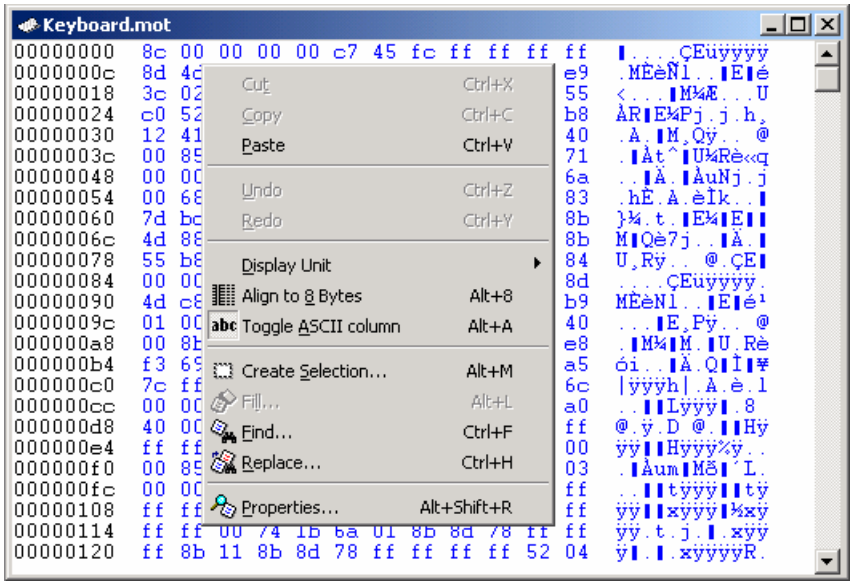
Allow Docking

With this option checked the Output window is capable of being docked within the FDT application window. With the option unchecked the Output window is a floating window.

Hide

Invoking **Hide** conceals the Message log. It is restored by **[View->Output]**.

6.11 Editor Window



The Editor window is one of the main windows contained in the FDT GUI.

Figure 6-15 Editor Window

The window has available pop-up menu that contains the following items:

Cut

This will remove the contents of the highlighted block from the window and place it on the clipboard in the standard Windows® manner. This is only available if a block is highlighted.

Copy

This will copy the contents of the highlighted block to the clipboard in the standard Windows® manner. This is only available if a block is highlighted.

Paste

This will copy the contents of the Windows® clipboard into the child window at the current cursor position.

Note If more than one byte is selected, the **Paste** option is not available.

Undo

Reverses the last editing operation on the selected data.

Redo

Reverses the last undo operation.

Display Unit

Invokes the cascaded menu as follows:

Byte - view the data as 8-bit bytes.

Word - view the data as 16-bit words.

DWord - view the data as 32-bit double words.

Align to 8 Bytes

Data is displayed on each line as 8 bytes. The number of bytes that can be accommodated on each line is dependent upon the size of the window.

Toggle ASCII Column

Allows the ASCII column to be removed or displayed.

Create Selection…

Launches the ‘Create Selection’ dialog box allowing the user to create a selection area by entering its start address, end address and length. The selected area can be used in conjunction with the Clipboard, Fill or Search and Replace.

Fill…

Launches the ‘Fill’ dialog box for the current active file to write the specified data to the selected area. When the ‘ASCII Fill’ check box is selected, the data to be written can be specified with ASCII characters.

Find…

This will launch the ‘Find’ dialog box allowing the user to enter either hexadecimal or ASCII data. The scope of the search is bounded by the area selected, for the active file in the Editor window. If a match is found, the Editor window is updated to display the found data.

Replace…

This will launch the ‘Replace’ dialog box allowing the user to enter either the hexadecimal or ASCII data to be found and the replacement data, in the same format. The scope of the search is bounded by the area selected, for the active file in the Editor window. If a match is found, the Editor window is updated to display the found data, click on the now enabled ‘Replace’ button to replace the data.

Properties…

Launches the ‘S-Record Properties’ dialog box.

6.12 Erase Blocks

'Erase Blocks' dialog box is invoked by **[Device->Erase FLASH blocks]** or the Toolbar **Erase Blocks**.

The 'Erase Blocks' dialog box allows the user to specify which blocks to erase. The Written column indicates whether data exists in the block.

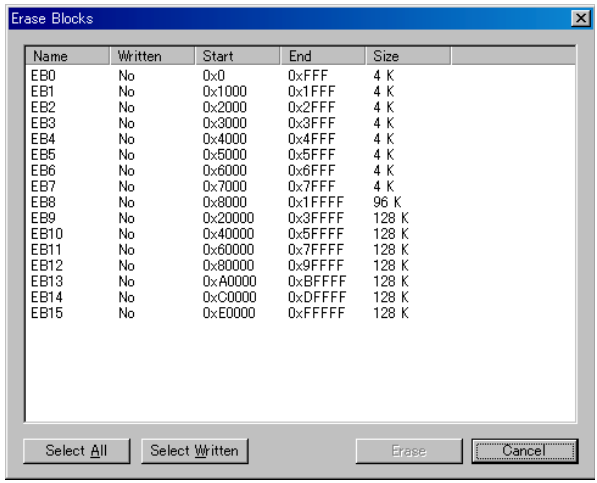


Figure 6-16 Erase Blocks

Select All

Clicking on 'Select All' will select all the blocks of the device FLASH memory.

Select Written

Clicking on 'Select Written' will select only those blocks that are not empty.

Erase

Clicking on 'Erase' will erase the data in the selected blocks and removes the 'Erase Block' dialog box.

Cancel

Clicking on 'Cancel' removes the 'Erase Blocks' dialog box without performing an erase operation.

Note Whilst blocks that contain no data need not be erased, FDT will erase all the specified blocks.

6.13 Customize - Toolbars

Invoked by **[Tools->Customize…]** and then select the Toolbars tab in the 'Customize' dialog box.

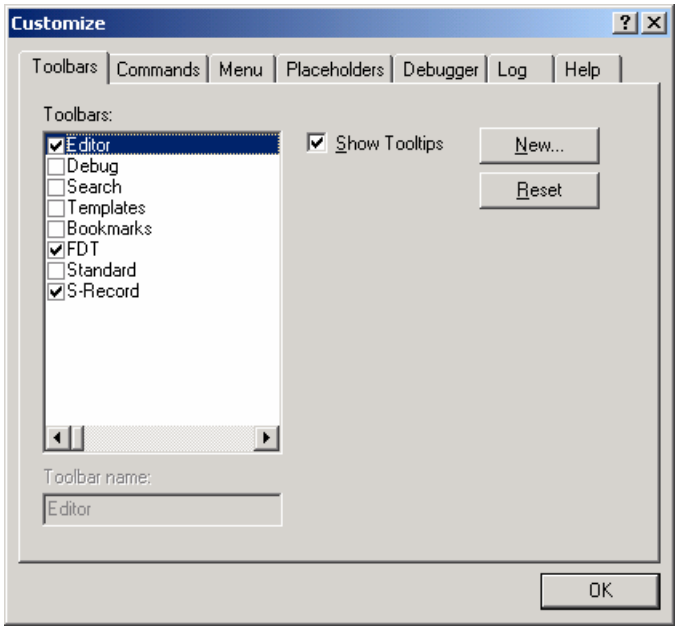


Figure 6-17 Customize Toolbars Dialog

Show Tooltips

A check mark in the 'Show Tooltips' box indicates that the action of the button will be displayed when the mouse arrow is pointing to the button. If the box is unchecked, no action is displayed.

New…

The 'New…' button launches the 'Toolbar Name' dialog box which allows the user to name and generate a new toolbar. After entering the new name and clicking on 'OK', the new name will be added to the 'Toolbars' list and an empty toolbar is displayed on the interface.

Selecting the 'Commands' tab allows the user to select and add buttons to the new toolbar. The user can place the new toolbar anywhere on the GUI by dragging it with the mouse.

Reset

The 'Reset' button resets the toolbar to the default.

Toolbar name

Reflects the toolbar selected in the list.

OK

Clicking on 'OK', in the 'Toolbar Name' dialog box adds the new name to the 'Toolbars' list on the 'Toolbars' window and invokes a blank toolbar on the GUI.

Clicking on ‘OK’ in the ‘Customize’ dialog box saves any changes made and closes the dialog box.

Delete

If a new toolbar has been added to the ‘Toolbars’ list and it is selected, the ‘Reset’ button is renamed to ‘Delete’. Clicking on this button will remove the new toolbar from the list and from the GUI.

6.14 Customize - Commands

Invoked by **[Tools->Customize…]** and then select the ‘Commands’ tab in the ‘Customize’ dialog box.

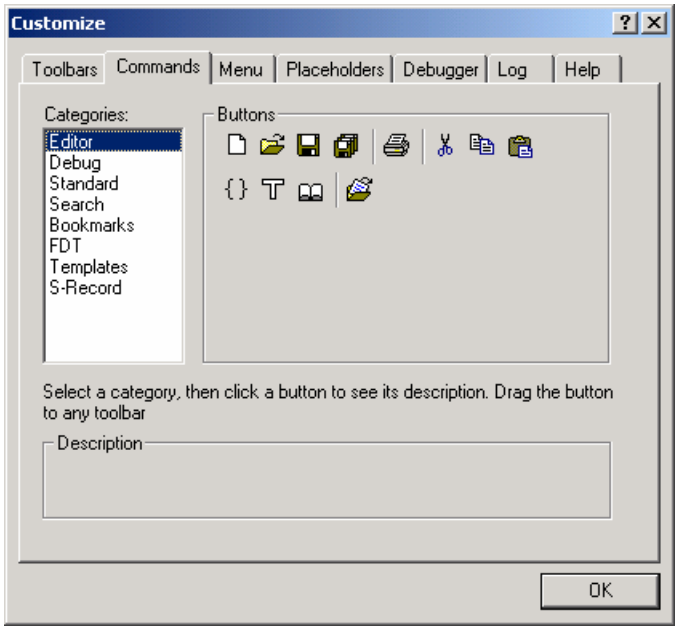


Figure 6-18 Customize Commands Dialog

Categories

Clicking on a Category from the list displays the buttons available for that category.

Buttons

The ‘Buttons’ area displays a picture of each button available for the selected category.

Description

To obtain a description of the action of a button, click on that button.

OK

Clicking on ‘OK’ removes the ‘Customize’ dialog box and saves any changes made.

6.15 Customize – Menu

Invoked by **[Tools->Customize…]** and then select the ‘Menu’ tab in the ‘Customize’ dialog box.

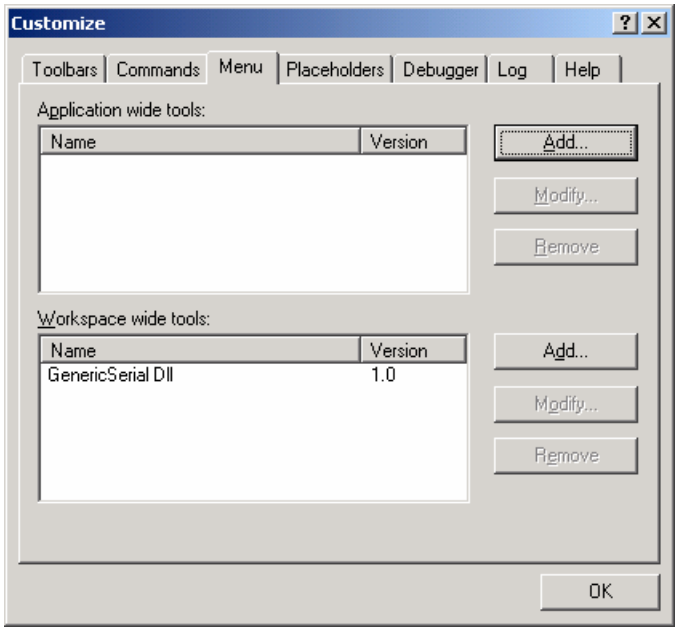


Figure 6-19 Customize Menu Dialog

➲ To add a new menu option:

1. Select **[Tools->Customize…]**. The dialog shown above will be displayed. Select the 'Menu' tab. The first thing for you to decide is whether you are adding a global application wide tool ('Application wide tools'), which will be available to all of your workspaces. Or whether you wish to add a workspace wide tool ('Workspace wide tool'), which is only valid for the current workspace. Once you have made the choice choose the relevant section of the dialog.
2. Click the 'Add…' button. If you would like to add an existing system tool to the menu then select the 'Select from existing system tools' radio button, choose the tool from the drop-down list and then click 'OK'. Alternatively, if you would like to add a tool of your own then follow the remaining steps.
3. Enter the name of the tool into the 'Name' field.
4. Enter the command, excluding arguments, into the 'Command' field.
5. Enter any arguments that you would like to pass to the command into the 'Arguments' field.
6. Enter an initial directory in which you would like the tool to run, into the 'Initial directory' field.
7. Click 'OK' to add the menu option to the 'Tools' menu.

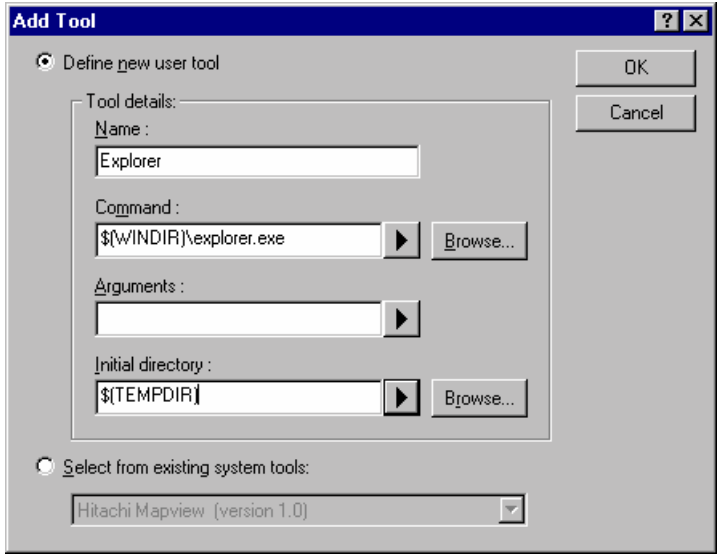


Figure 6-20 Add Tool Dialog

New menu options are added to the bottom of the list (i.e. bottom of the tools menu) by default.

➲ To modify a menu option:

1. Select **[Tools->Customize…]**. The dialog shown below will be displayed. Select the 'Menu' tab.
2. Select the menu option that you would like to modify and then click the 'Modify…' button.
3. Make the desired changes on the 'Modify Tool' dialog and then click 'OK'.

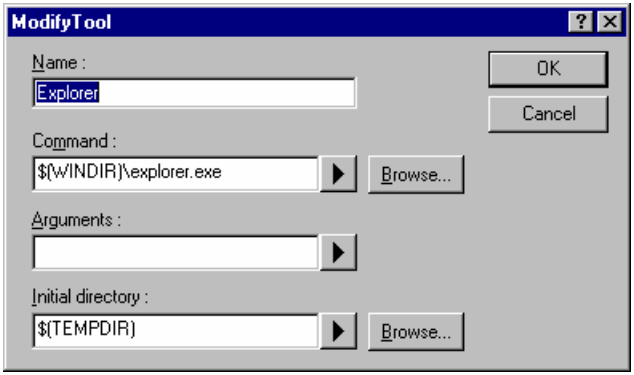


Figure 6-21 Modify Tool Dialog

➲ To remove a menu option:

1. Select **[Tools->Customize…]**. The dialog shown in Figure 6-19 will be displayed. Select the 'Menu' tab.
2. Select the menu option that you would like to remove and then click the 'Remove' button.

6.16 Customize – Placeholders

Invoked by **[Tools->Customize…]** and then select the ‘Placeholders’ tab in the ‘Customize’ dialog box.

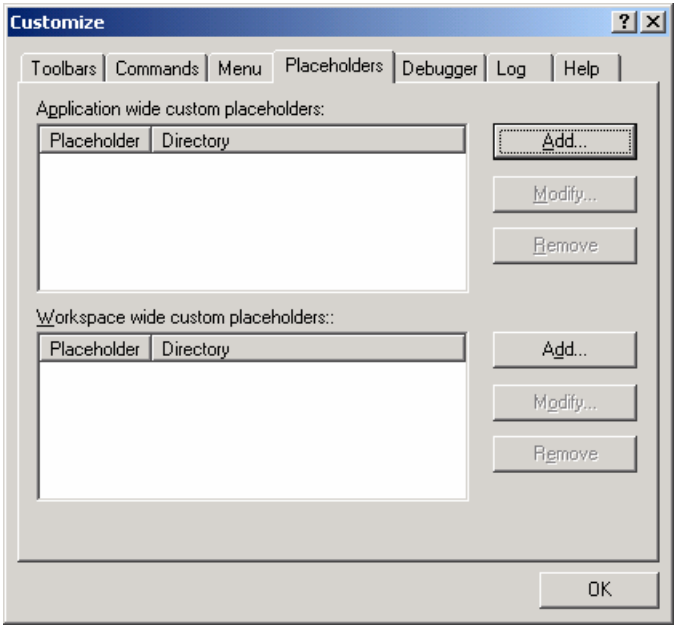


Figure 6-22 Customize Placeholders Dialog

This allows the user to choose placeholders for directories.

6.17 Customize – Debugger

Invoked by **[Tools->Customize…]** and then select the ‘Debugger’ tab in the ‘Customize’ dialog box.

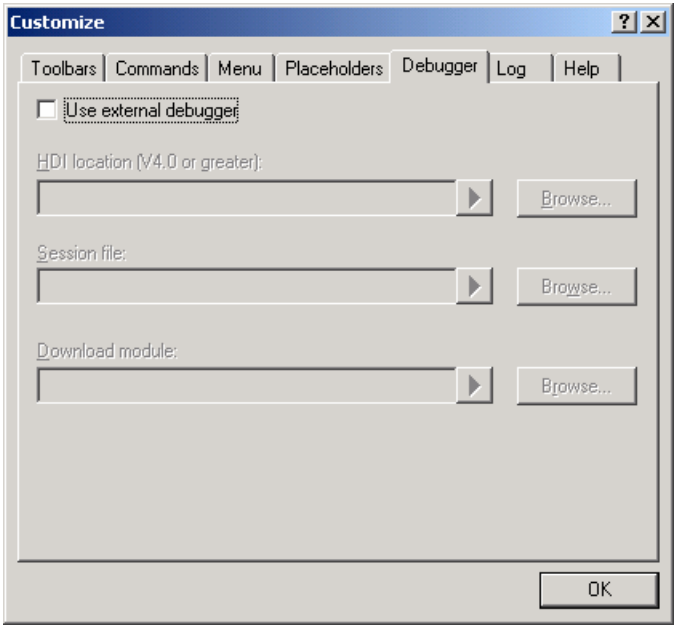


Figure 6-23 Customize Debugger Dialog

This option is not currently used in FDT.

6.18 Customize – Log

Invoked by **[Tools->Customize…]** and then select the ‘Log’ tab in the ‘Customize’ dialog box.

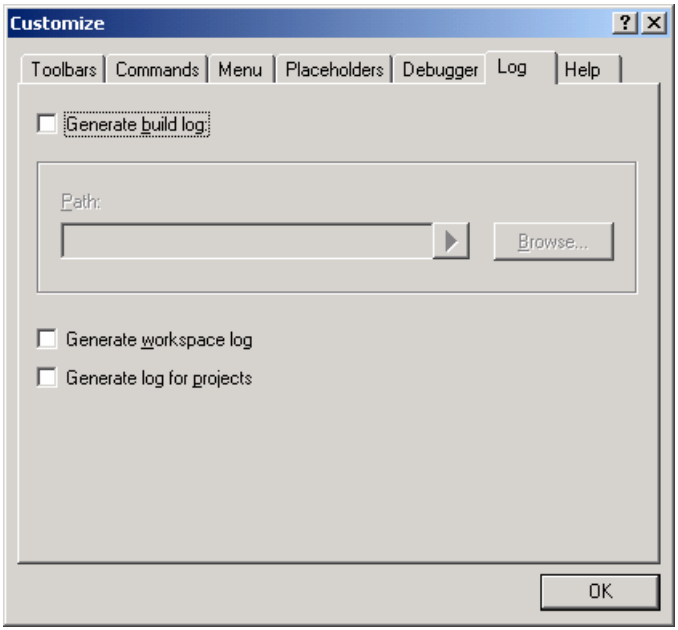


Figure 6-24 Customize Log Dialog

Currently this tab is not used in FDT.

6.19 Customize – Help

Invoked by **[Tools->Customize…]** and then select the ‘Help’ tab in the ‘Customize’ dialog box.

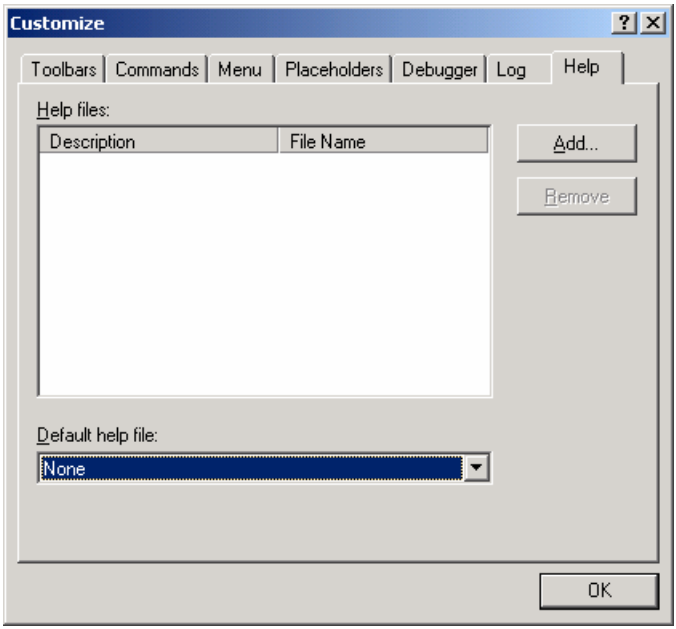


Figure 6-25 Customize Help Dialog

This allows the user to add additional help files.

6.20 Simple Interface

Invoked by **[Tools->Simple Interface…].** Clicking on ‘Back’ displays the previous screen.

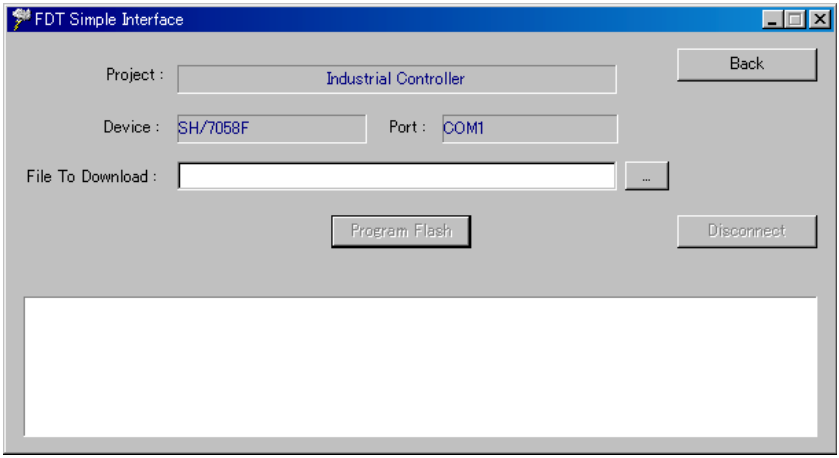


Figure 6-26 FDT Simple Interface

Program Flash

Clicking on ‘Program Flash’ allows FDT to download the specified file to the FLASH memory.

Chapter 7 Upgrading to FDT 3.0

If the project being used needs to be upgraded to FDT 3.0, it is recommended that a new workspace and project is created using the wizard. This will ensure that the new settings are generated as required by FDT. The workspace files used by FDT 2.2 are not compatible with FDT 3.0 due to the enhancements included in FDT 3.0.

If the project specifically requires the kernels distributed from the earlier version of FDT 2.2, it is possible to choose the “Other” option to select the user defined kernel. It is recommended that wherever possible the latest kernels are used.

Renesas FLASH Development Toolkit 3.0
(for Windows® 98/Me, Windows NT® 4.0, Windows® 2000 and Windows® XP) User's Manual

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