UM0892
User manual

STM32 ST-Link Utility

Introduction

The STM32 ST-Link Utility software facilitates fast In-System Programming of the STM32 microcontroller families in both development and production environments via the ST-Link tool.

This is the STM32 ST-Link Utility user manual, describing its software functionality. When working with the STM32 ST-Link Utility tool, you are encouraged to download the ST-Link In-circuit debugger/programmer for STM8 and STM32 which provides more information about the ST-Link tool.

1 Getting started

This section describes the requirements and procedures needed to install the STM32 ST-Link Utility software.

1.1 System requirements

The STM32 ST-Link Utility PC configuration requires as a minimum:

- PC with USB port and Intel Pentium processor running a 32-bit Microsoft® OS that supports USB:
  - Windows® XP
  - Windows 2000
  - Windows 98SE
  - Windows ME
- 32 MB RAM
- 10 MB hard disk space available

Note: Windows 95, Windows 98 First Edition and NT4.0 ® do NOT support USB.

1.2 Hardware requirements

The STM32 ST-Link Utility is designed to work with:

- low density, medium density, high density, connectivity line, value line STM32 devices,
- an ST-Link.

1.3 Installing the STM32 ST-Link Utility

Follow these steps and the on-screen instructions to install the STM32 ST-Link Utility.

1. Download the compressed STM32 ST-Link Utility software from the ST website.
2. Extract the contents of the *.zip* file into a temporary directory.
3. Double-click the extracted executable, *setup.exe*, to initiate the installation, and follow the on-screen prompts to install the STM32 ST-Link Utility in the development environment. This executable installs all the necessary files for running the STM32 ST-Link Utility.
   Documentation for the utility is located in the subdirectory *Docs* where the STM32 ST-Link Utility is installed.

1.4 Uninstalling the STM32 ST-Link Utility

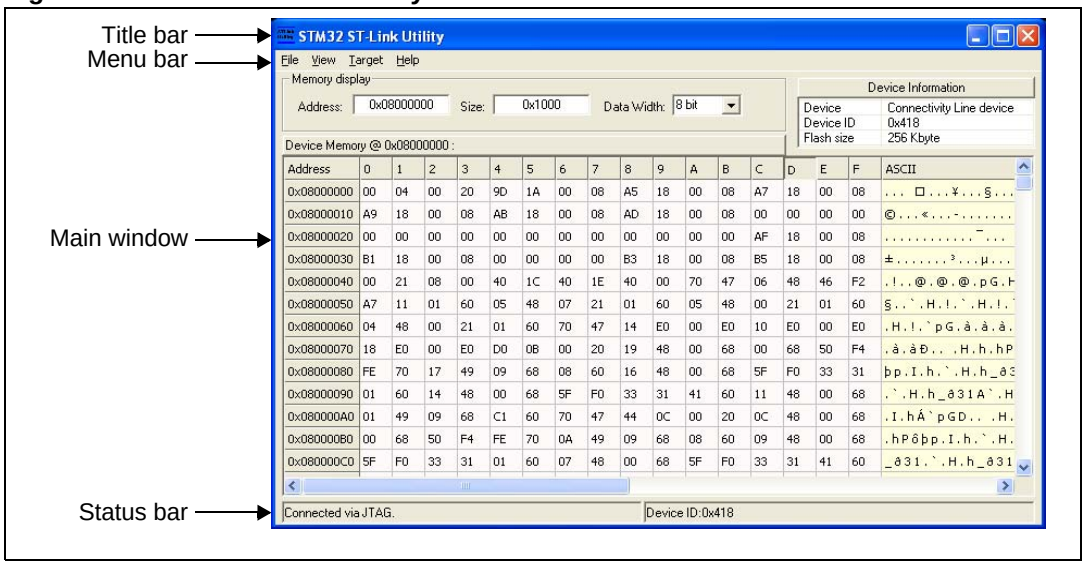
Follow these steps to uninstall the STM32 ST-Link Utility.

1. Select **Start | Settings | Control Panel**.
2. Double click on **Add or Remove Programs**.
3. Select **STM32 ST-Link Utility**.
4. Click on the **Remove** button.

2 STM32 ST-Link Utility user interface

2.1 Main window

Figure 1. STM32 ST-Link Utility user interface main window



The main window is composed of three zones and three bars as illustrated in *Figure 1*:

- Memory display zone
- Device information zone
- Memory contents zone
- Title bar: The name of the current menu.
- Menu bar: Use the menu bar to access the following STM32 ST-Link Utility functions:
  - File menu
  - View menu
  - Target menu
  - Help menu

  (These menus are described in more detail in *Section 2.2*)
- Status bar: The status bar displays:
  - Connection status and debug interface.
  - Device ID

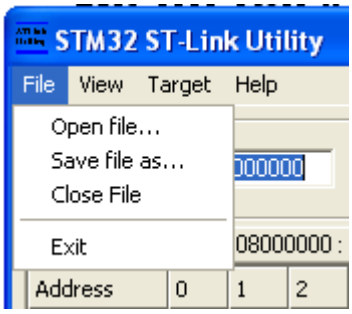
The STM32 ST-Link Utility user interface also provides additional forms and descriptive pop-up error messages.

2.2 Menu bar

The Menu bar allows users to execute the STM32 ST-Link Utility software features.

2.2.1 File menu

Figure 2. File menu



Open File Opens a binary file.

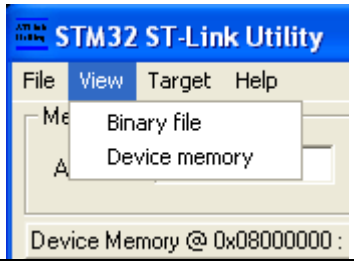
Save File as… Saves the content of the memory panel into a binary file.

Close File Closes the loaded binary file.

Exit Closes the STM32 ST-Link Utility program.

2.2.2 View menu

Figure 3. View menu

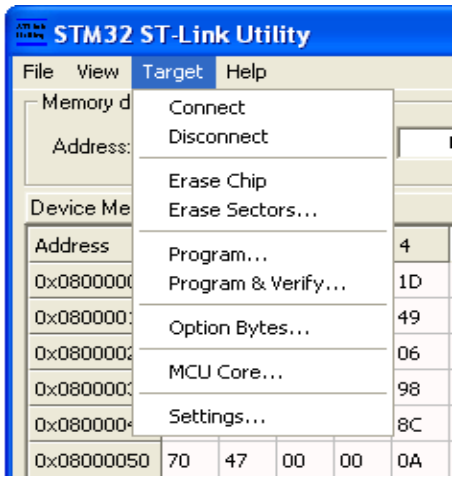


Binary file Displays the content of the loaded binary file.

Device memory Displays the content of the device memory.

2.2.3 Target menu

Figure 4. Target menu



Connect Connects to the target device and displays the Device Type, Device ID and the Flash size in the *Device information* zone.

Disconnect Disconnects from target device.

Erase Chip Performs a Flash mass erase and then displays the Flash memory content in the memory panel.

Erase Sectors… Selects sector(s) to erase using the erase sector dialog window, erases the sector(s) and display (See *Section 3.3: Flash memory erase* for more details).

Program… Loads a binary file into the device memory (Flash or RAM). To do this, select a binary file, enter the start address (where to put the file in the device) in the program dialog window and then click on program button (see *Section 3.4: Device programming*).

Program & Verify… Loads a binary file into the device memory (Flash or RAM) then performs a verification of the programmed data.

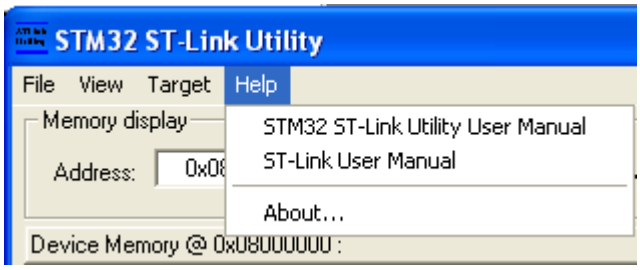
Option Bytes… Opens the Option Bytes dialog window (See *Section 3.5: Option bytes configuration* for more details).

MCU Core… Opens the MCU Core dialog window (See *Section 3.6: MCU core functions* for more details).

Settings... Opens the Settings dialog box to select the debug interface (JTAG or SWD).

2.2.4 Help menu

Figure 5. Help menu



STM32 ST-Link Utility User Guide Opens the STM32 ST-Link Utility User Guide

ST-Link User Guide Opens the ST-Link Utility User Guide

About... Displays STM32 ST-Link Utility software version and copyright information

3 STM32 ST-Link Utility features

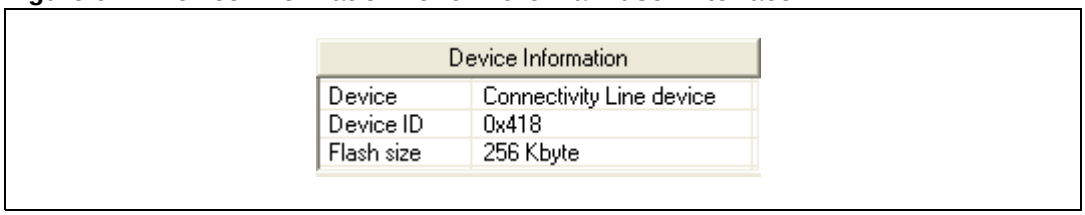
This section provides a detailed description of how to use STM32 ST-Link Utility features:

- *Device information*
- *Memory display and modification*
- *Flash memory erase*
- *Device programming*
- *Option bytes configuration*
- *MCU core functions*

3.1 Device information

The *Device information* zone displays information as shown in *Figure 6* .

Figure 6. Device information zone in the main user interface



Device: Device may be low-density, medium density, high density, connectivity line or value line. Each device type includes many devices with different characteristics (Flash size, RAM size, Peripherals...).

Device ID: MCU device ID code located in the external PPB memory map.

Flash memory size: Size of the on-chip Flash memory.

3.2 Memory display and modification

In addition to the *Device information* zone, the main window contains 2 other zones:

- *Memory display*
- *Memory data*

Memory display: This zone contains three edit boxes:

Address: Memory start address from which you want to read.

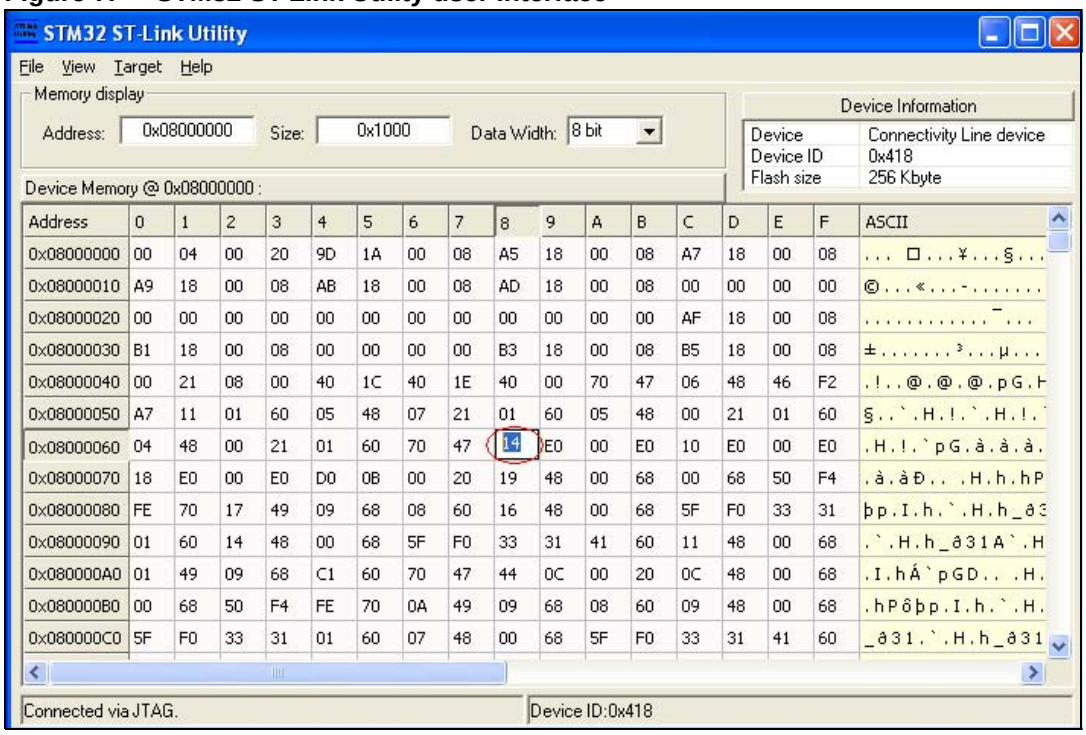
Size: Amount of data to read.

Data width: Width of the displayed data (8-bit, 16-bit or 32-bit).

Memory data: This zone displays the data read from a binary file or the memory content of a connected device to download it to the chip. You can modify the content of the file before downloading.

- To use this zone to display the content of binary file, go to **File | Open file...**
- To use this zone to read and display memory content of a connected device, enter the memory start *Address*, data *Size* and the *Data Width* in the *Memory display* zone and then press **Enter**.
- After reading data, you can also modify each value merely by double clicking on the concerned cell as illustrated by *Figure 7*. You can also save the device memory content into a binary file using the menu **File | Save file as...**

Figure 7. STM32 ST-Link Utility user interface

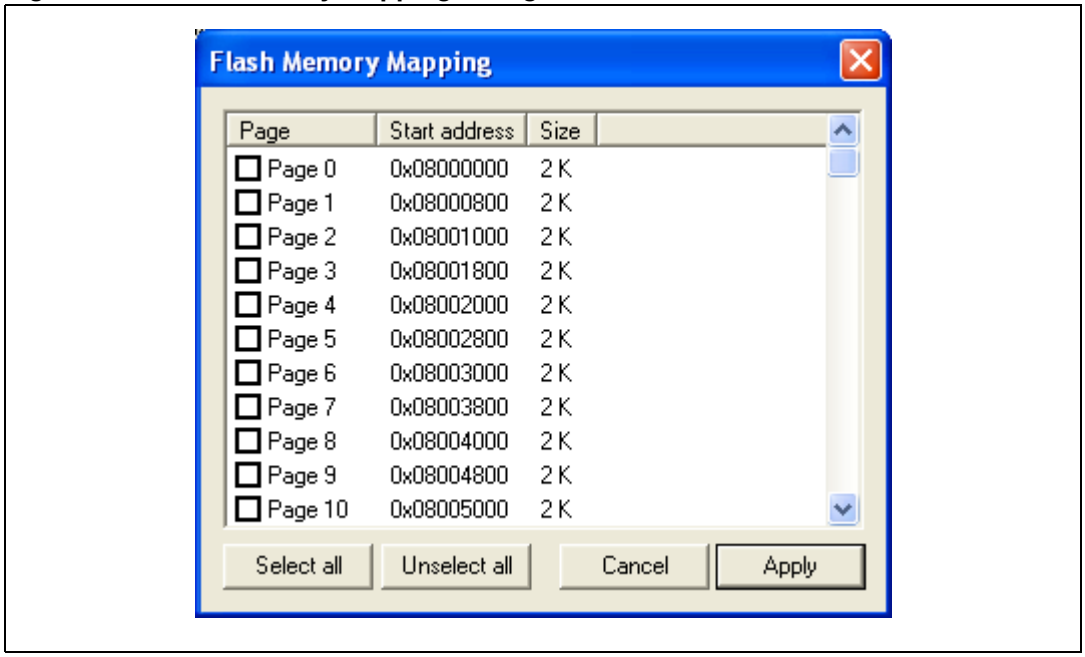


3.3 Flash memory erase

There are two type of Flash memory erase:

- **Flash mass erase**: Erase all the memory Flash sectors of the connected device. This is done by clicking on the menu **Target | Erase Chip**.
- **Flash Sector Erase**: Erase the selected sector(s) of the Flash memory. To select sector(s), go to **Target | Erase Sectors..** which then displays the *Flash Memory Mapping* dialog box where you select the sector(s) to erase as shown in *Figure 8*.
  - **Select all** button selects all the Flash pages.
  - **Unselect all** button unselects all sectioned page.
  - **Cancel** button discards the erase operation even if some pages are selected.
  - **Apply** button erases all the selected pages.

Figure 8. Flash Memory Mapping dialog box

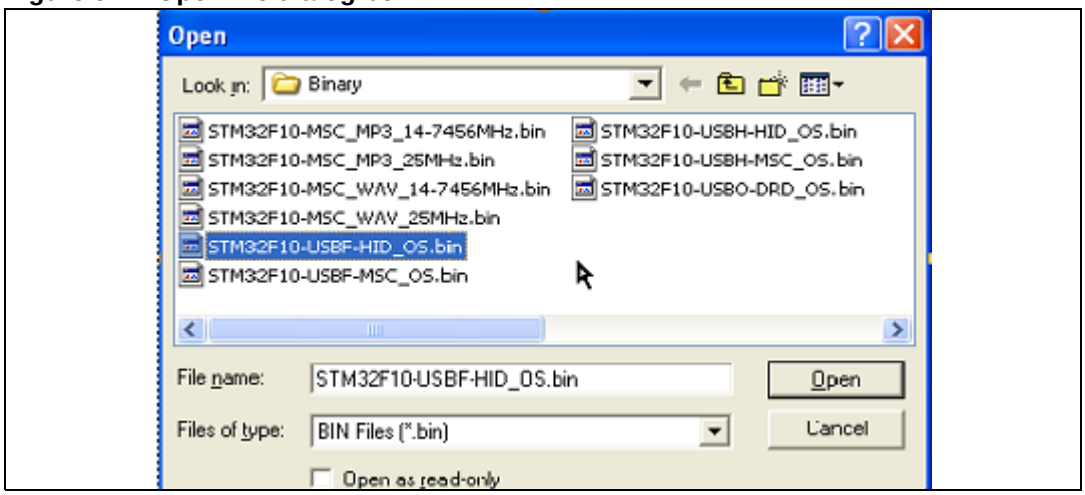


3.4 Device programming

The STM32 ST-Link Utility can download a binary file into Flash or RAM memory. To do this, follow these steps:

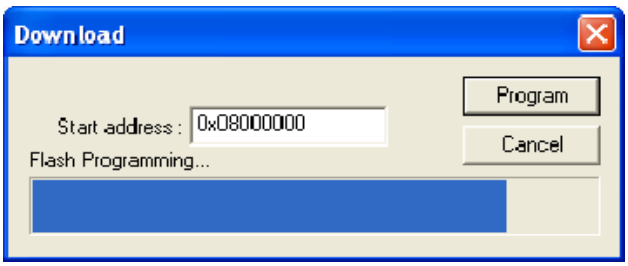
1. Click on **Target | Program...** (or **Target | Program & Verify...** if you want verify the written data) to open the *Open* dialog box as shown in *Figure 9*.
   If a binary file is already opened, go to step 3.

Figure 9. Open file dialog box



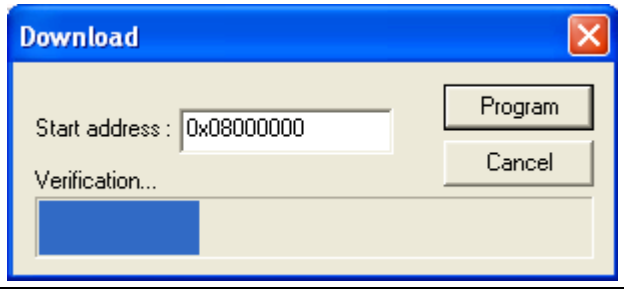
2. Select a binary file and click on the **Open** button.
3. Specify the address from which to start programming as shown in *Figure 10*, it may be a Flash or RAM address.

Figure 10. Device programming dialog box (programming)



4. Finally, click on the **Program** button to start programming. If you selected **Target | Program & Verify...** in the first step, a check is done at the end of the programming operation (see *Figure 11*).

Figure 11. Device programming dialog box (verification)



3.5 Option bytes configuration

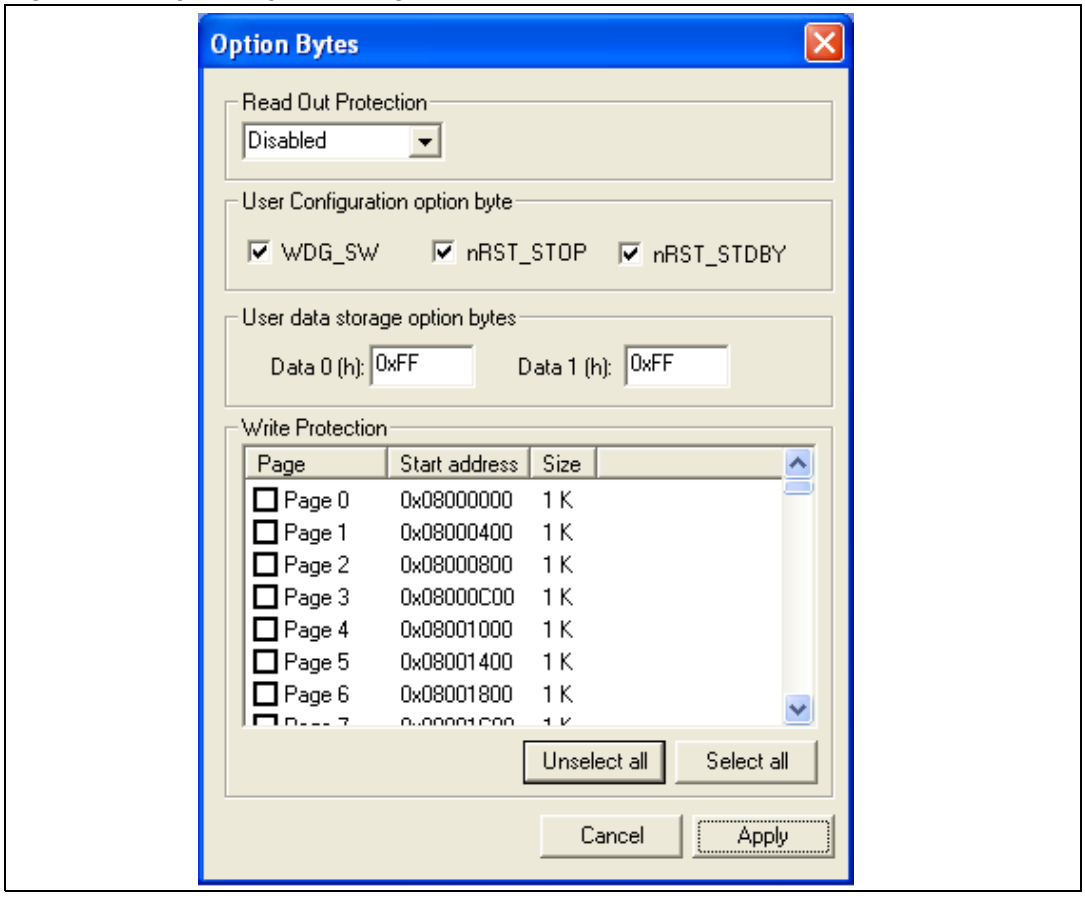
The STM32 ST-Link Utility allows you to configure all the option bytes via the *Option Bytes* dialog box shown in *Figure 12* which is called by **Target | Option Bytes...**.

The *Option Bytes* dialog box contains four sections:

- *Read Out Protection*: In this section, you can modify the read protection state of the Flash memory.
- *User Configuration option byte*: This section contains three options:
  - WDG_SW : If checked, watchdog is enabled by software - otherwise it is automatically enabled at power-on.
  - nRST_STOP: If not checked, Reset generated when entering Standby mode. If checked, no reset generated when entering Standby mode.
  - nRST_STDBY: if not checked, Reset when entering Stop mode. If checked, no reset generated when entering Stop mode.
- *User data storage option bytes*: This section contains two bytes for user storage.
- *Write Protection*: Depending on the device, Flash sectors are grouped by a defined number of sectors. In this section, you can modify the write protection of each Flash sector group.

For more details, please refer to the Option Byte loader section in the STM32F10xxx Flash programming manual (PM0042 available from www.st.com).

Figure 12. Option Bytes dialog box

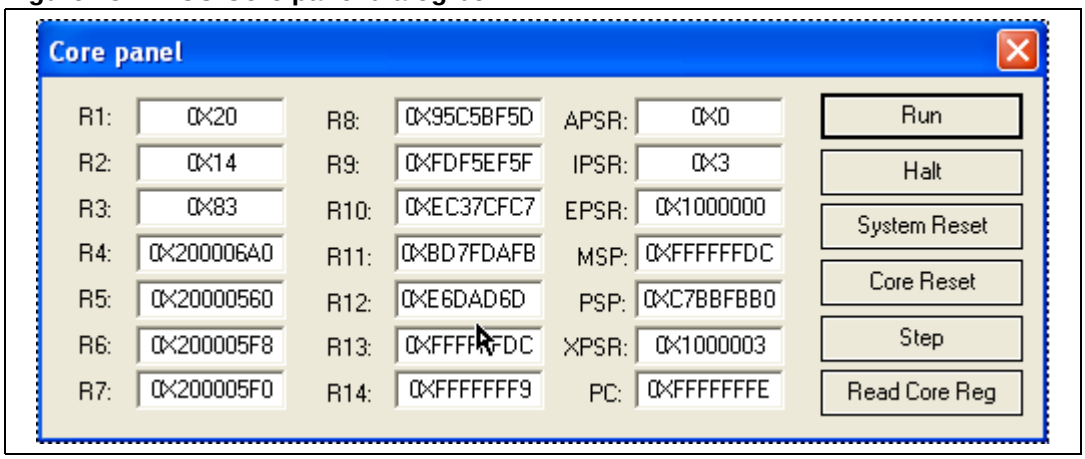


3.6 MCU core functions

The *Core panel* dialog box shown in *Figure 13*, displays the Coretex-M3 core register values. It also allows you to carry out the following actions on the MCU, using the buttons on the right:

- **Run**: Run the core.
- **Halt**: Halt the core.
- **System Reset**: Send a system reset request.
- **Core Reset**: Reset the core.
- **Step**: Step one instruction.
- **Read Core Reg**: Update the core registers values.

Figure 13. MCU Core panel dialog box



4 Revision history

Table 1. Document revision history

Date	Revision	Changes
22-Jan-2010	1	Initial release.
12-Feb-2010	2	Changed Figs 1,2,3,4,5,6 and 7. Added SWD support.

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