# SDLink Software Manual  [Ver 1.2]
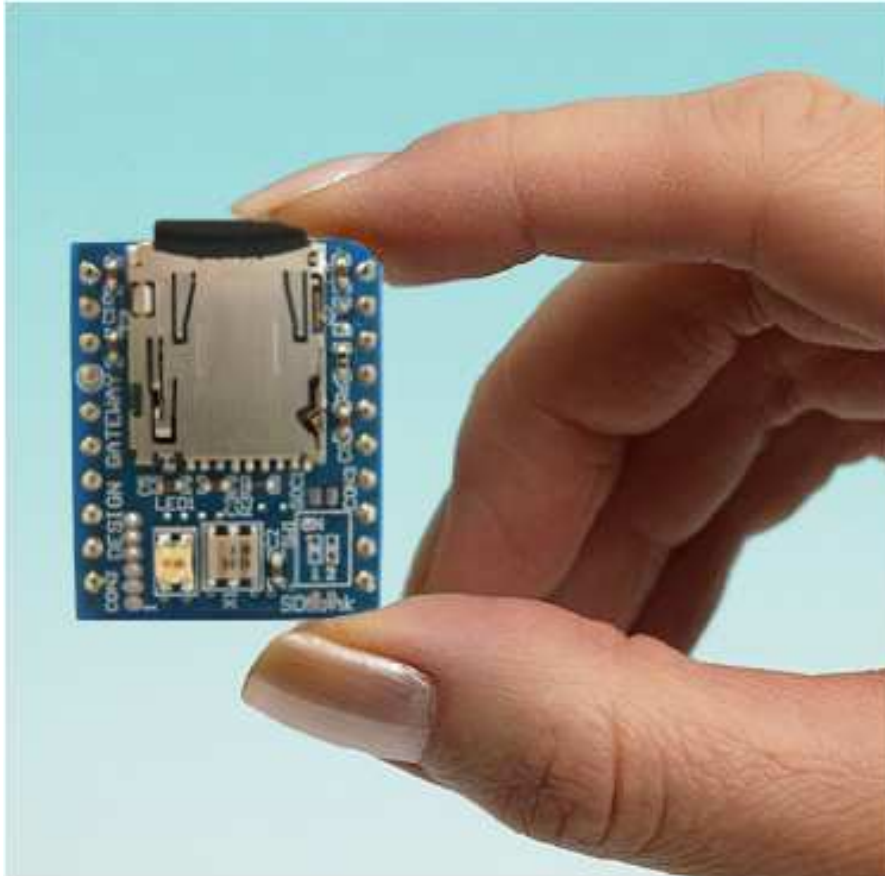
# Table of Contents

# 1. **Introduction**
## 1.1. **Operating Condition**
Thank you for choosing SDLink. This SDLink software executes programming or verifying configuration files to/from microSD card. This software transfers data with microSD card via microSD card reader/writer as removable disk from PC.

Table 1 shows operation condition of SDLink software.

| No | Item | Operating Condition | Remarks |
|---|---|---|---|
| 1 | Supported OS | WindowsXP, Windows Vista | For Windows Vista, please always run the software as administrator (more details are described in "2.4. Using on Windows Vista"). |
| 2 | HDD capacity | More than 5 MByte available space | Program capacity only. Data capacity is not included |
| 3 | Memory capacity | More than 64 MByte | Recommend: 128 MByte or more |
| 4 | Necessary tools | microSD card reader/writer | (micro)SD card slot is also possible |
| 5 | Supported Devices | Altera/Xilinx FPGA | Check device list at SDLink web site below. |
| 6 | Supported configuration files | RBF file (Altera) BIT / BIN file (Xilinx) | - |

Table 1 Operating condition of SDLink software

## 1.2. **Support and Exemption Clause**
SDLink software can be applied to SDLink module only. The software can be downloaded from following URL:

> http://www.design-gateway.com/english/productdetail.php?id=60
> or
> http://www.dgway.com/SDLink (Japanese)

Design Gateway Co., Ltd. shall be exempted from any responsibility or liability for any error or damages to the user's property including hardware, software and microSD card that may be caused by this software. And also we shall be exempted from any responsibility or liability for data lost in microSD or other removable disk that may be caused by incorrect selecting removable disk from this software.

## 2. Installation

### 2.1. Install

After download SDLink software, please extract zip file on your PC. In zip file there is only one executable file (SDLink.exe) and it can start without any drivers and registries.

### 2.2. Uninstall

To uninstall this software, delete SDLink.exe and setting file "SDLINKDEFAULT.sls" which is automatically generated in the same directory. PC will completely recover to the original condition because the software never accesses to any registry or Windows setup file.

### 2.3. How to restore to initial software setting

This software saves setting parameters such as language, current selecting configuration file, configuration mode, configuration speed to setting file "SDLINKDEFAULT.sls" when closing the software. Next time that software start, it will automatically load the setting file to run with the latest setting condition.

To recover to the initial condition, delete "SDLINKDEFAULT.sls" file which is in the same directory of this software. This file will be automatically generated at same location when the software is closed.

### 2.4. Using on Windows Vista

To use SDLink software on Windows Vista, user needs to run the software as administrator. Otherwise, the software will be unable to access all removable drives. To run as administrator, please follow these steps:

1) Right click at the software icon and then select the "Properties" option.
2) Then choose "Compatibility" tab. In the "Privilege Level" session, check the box "Run this program as an administrator", as shown in Figure 2-1. Then click OK.
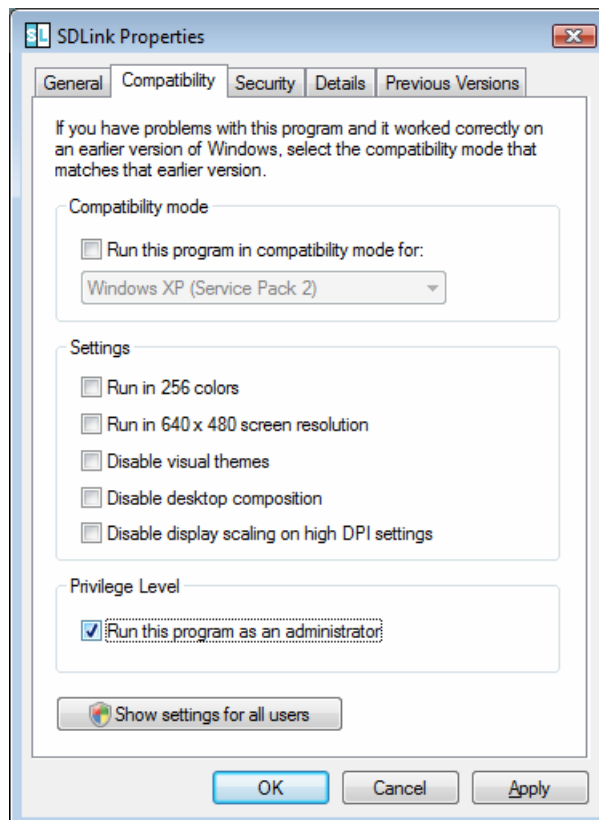


Figure 2-1 Compatibility Tab on Windows Vista

# 3. SDLink software overview
## 3.1. Objective
The main objective of SDLink software is to write/verify configuration file and other hardware settings to microSD card.
- Configuration file:

  This software supports *.rbf, *.bit, and *.bin file. It can program up to 8 configuration files. Configuration file must be generated by Altera or Xilinx software such as QuartusII, ISE before. (About configuration file generation, see more details in "6. Appendix")
- SDLink hardware settings:

  Set suitable hardware configuration condition for user board (configuration speed, retry count, configuration delay time adjustment, etc).
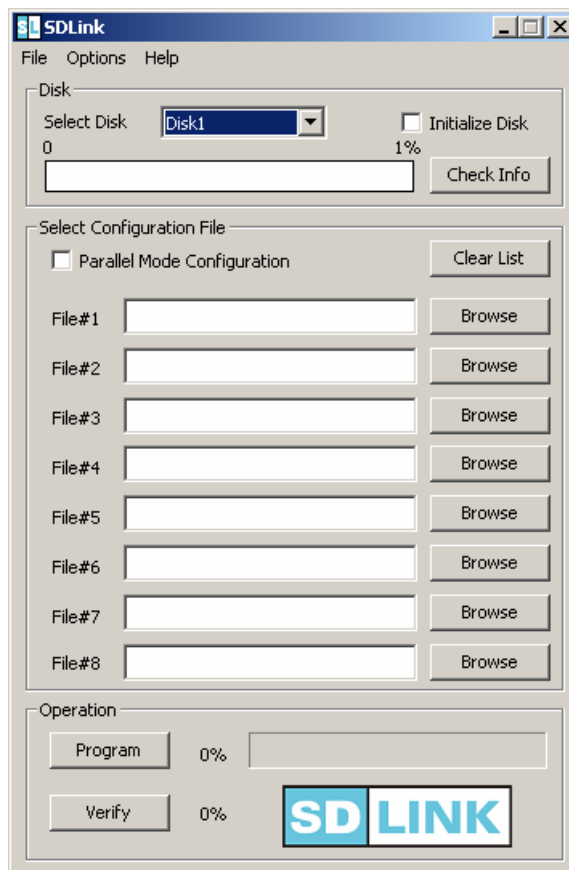
## 3.2. Software interface



Figure 3-1 SDLink software interface

※ The interface will be possibly changed by software version-up.

SDLink software interface is shown in Figure 3-1 and detail of interface is described in Table 2.

| # | Item | Description |
|---|------|-------------|
| 1 | Menu | The menu of commands to the software |
| 2 | Disk | Display selectable removable disk and the memory status |
| 3 | Select Configuration File | Select configuration file and configuration mode |
| 4 | Operation | Execute to program and verify configuration file to microSD |

Table 2 SDLink software interface area description

# 4. Usage

## 4.1. Safety insert and remove microSD card

Before start this software, make microSD card available by following steps.
1. Insert microSD card to microSD card reader/writer and plug it to USB port on PC.
2. Check that PC detects microSD as removable disk (USB mass storage device).
3. Start SDLink software.

In case of removing microSD card from PC, follow these steps as below.
1. Close SDLink software.
2. Left click at [Safely remove USB Mass Storage Device – Drive(*)] icon on Windows task bar and select removable drive which connected with microSD card.
3. Check that Windows displays "Safe To Remove Hardware" and then remove microSD card (or card reader/writer from PC).

## 4.2. microSD card selection and initialization

When start this software with detected microSD card, [Disk] shows selectable disks such as Figure 4-1. All removable disks detected by PC become selectable disks on the software. **So Please be careful of disk selection if multiple removable disks are connected with PC.**

If microSD is used for SDLink first time, check [Initialize Disk] to be on. Extra initialization process will be executed firstly when user starts programming configuration files.
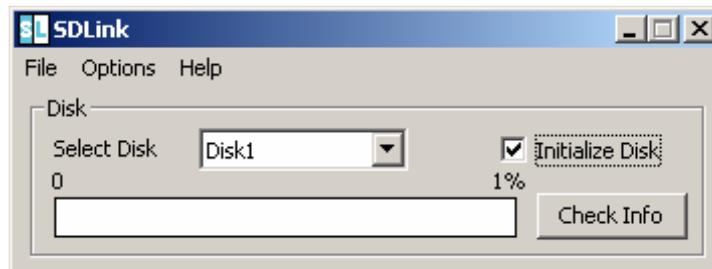


Figure 4-1 Disk detection and checking initialize disk

After checking [Initialize Disk] and selecting configuration file, then click [Program] button, confirmation message such as Figure 4-2 will be displayed. Click [Yes] to start initializing the disk and programming selected configuration files.

Please be careful!! : **If disk is initialized, all data previously stored in the disk will be lost and cannot be recovered.**
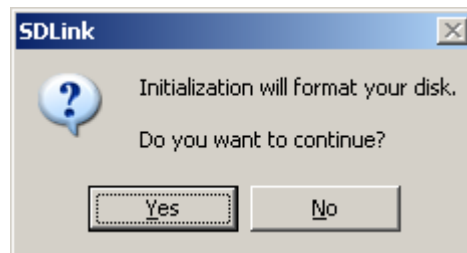


Figure 4-2 Confirmation message for disk initialization

The disk that is already initialized for SDLink by programming configuration data will be displayed "Disk# [SDLink]" on [Select Disk] combo box such as Figure 4-3. For the next programming, it does not require checking [Initialize Disk] anymore.
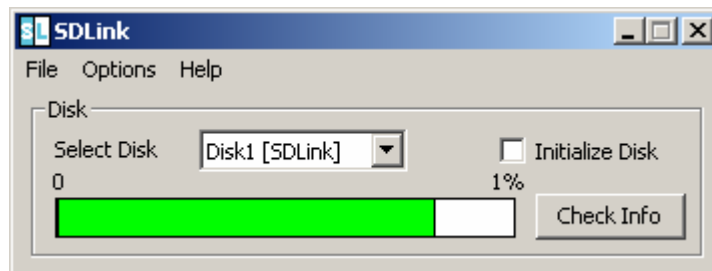


Figure 4-3 Initialized and programmed disk

## 4.3. Configuration mode and file selection

1. **Serial Mode** (Altera: Passive-Serial mode / Xilinx: Slave-Serial mode)

In this mode, it can select and configure up to 8 configuration files (for 8 FPGAs).

Files can be selected by clicking [Browse] button on [Select Configuration File] area. User can also type or copy/paste file name on each edit box of File#1-8. Selectable file type are *.rbf, *.bit, and *.bin (*.bit and *.bin file can be mixed) as shown in Figure 4-4.

To cancel selected file, delete file name on each edit box by [Delete] or [Back Space] key. In case of all clear files, use [Clear List] button.
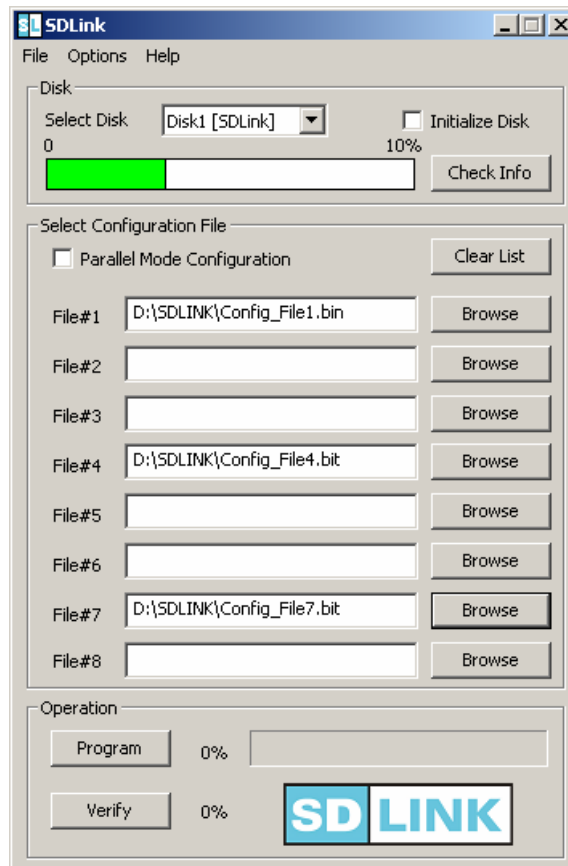


Figure 4-4 Configuration files selection

Table 3 shows relation between selected configuration files and SDLink Pin map. For more detail, please refer to SDLink data sheet.

| Configuration file | SDLink Pin number | SDLink Pin name |
|---|---|---|
| File#1 | 5 | DATA0/DIN0 |
| File#2 | B | DATA1/DIN1 |
| File#3 | C | DATA2/DIN2 |
| File#4 | D | DATA3/DIN3 |
| File#5 | F | DATA4/DIN4 |
| File#6 | G | DATA5/DIN5 |
| File#7 | H | DATA6/DIN6 |
| File#8 | K | DATA7/DIN7 |

Table 3 Relations between configuration file and SDLink pin map

2. **Parallel Mode** (Altera:Fast Passive-Parallel mode / Xilinx: Slave-Parallel (SelectMAP8) mode)
By checking [Parallel Mode Configuration] in [Select Configuration File] area to be on, parallel mode configuration data programming will be enabled. In this mode, it can configure only one FPGA (can select only configuration File#1) as shown in Figure 4-5.
Details about file selection/cancellation and selectable file type are the same as Serial mode.
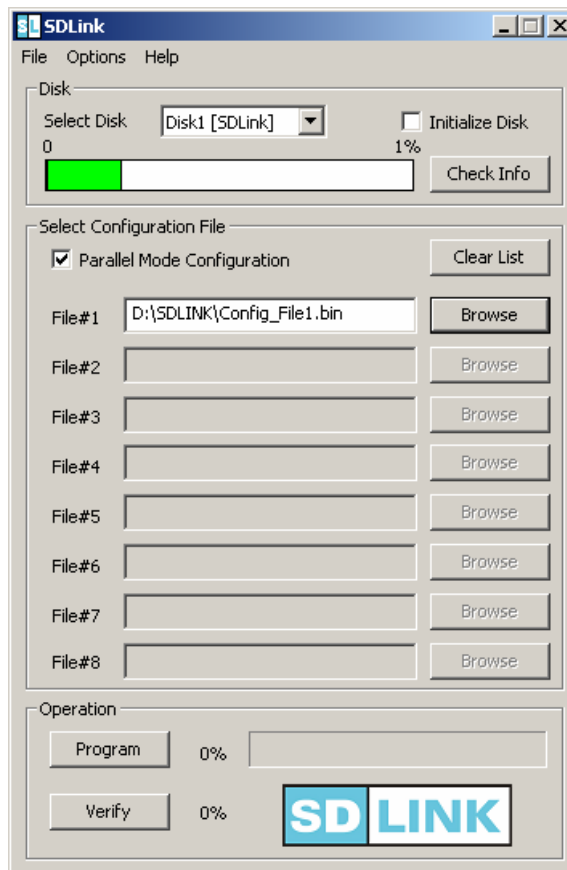


Figure 4-5 File selection in Parallel Mode configuration

## 4.4. Program and Verify

### 1. Programming

Click [Program] button in [Operation] area to program configuration files which are selected in [Select Configuration File] area to the disk which is selected in [Select Disk] combo box. Programming status will be displayed by percentage bar as shown in Figure 4-6. This percentage bar is also used to show verification status.
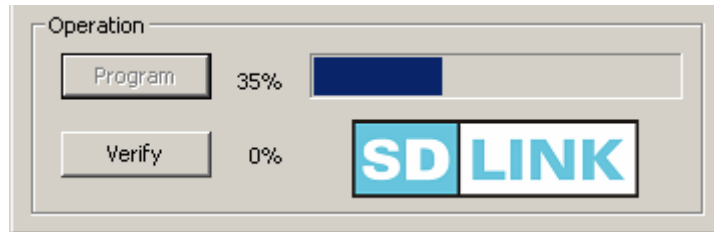


Figure 4-6 Programming status

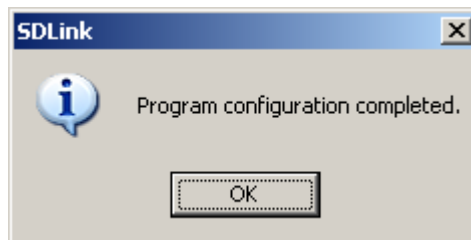After programming completed, the message such as Figure 4-7 will be displayed.



Figure 4-7 Programming complete

If Auto Verify setting is ON by [Options]->[Operation Setting], verification is automatically executed after programming. After programming/verification completed, the message such as Figure 4-8 will be displayed.
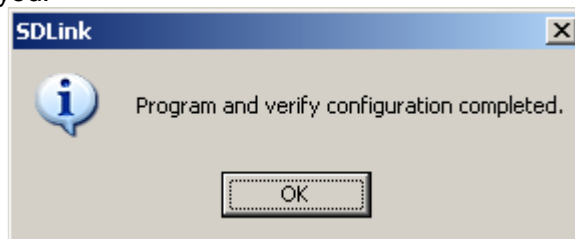


Figure 4-8 Programming/Verification complete

### 2. Verification

Click [Verify] button to verify configuration file stored in the selected disk with current selecting file in [Select Configuration File] area. If mismatch is detected because different file is selected in the software or file updating, error message such as Figure 4-9 will be shown. In this case, user can check and compare between programmed file and current selecting file using [Check Info] button in [Disk] area (About [Check Info], refer to "4.5. Information display" and "2. File Information")
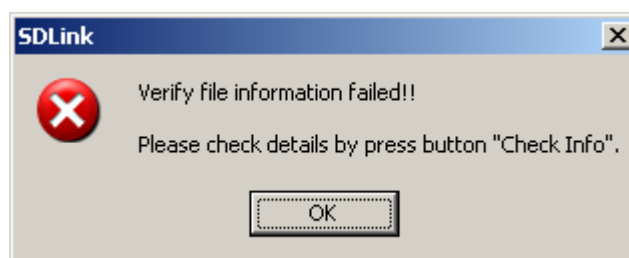


Figure 4-9 Verify error message

## 4.5. Information Display

### 1. Used/Free disk space

[Disk] area shows used/free disk space of selected disk in percent. Percent bar has 3 scale steps: 1%, 10%, and 100% of disk size. This software will automatically adjust the scale, depending on memory size used on disk. Figure 4-10 displays example of 10% scale (memory used more than 1% and less than 10% of total disk size).
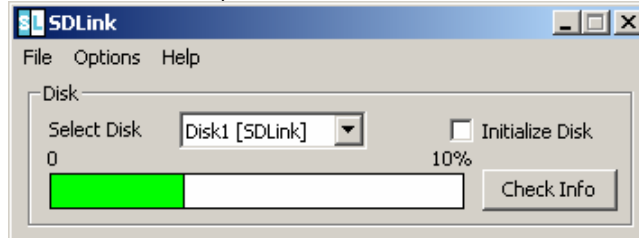


Figure 4-10 Used/Free disk space (at 10% scale)

### 2. File information

Click [Check Info] button in [Disk] area to show file name, file size, modified date/time and configuration mode of the files stored in selected disk and current selecting files in [Select Configuration File] area. This function is useful to check and compare files and for version management, as shown in Figure 4-11 and Figure 4-12.
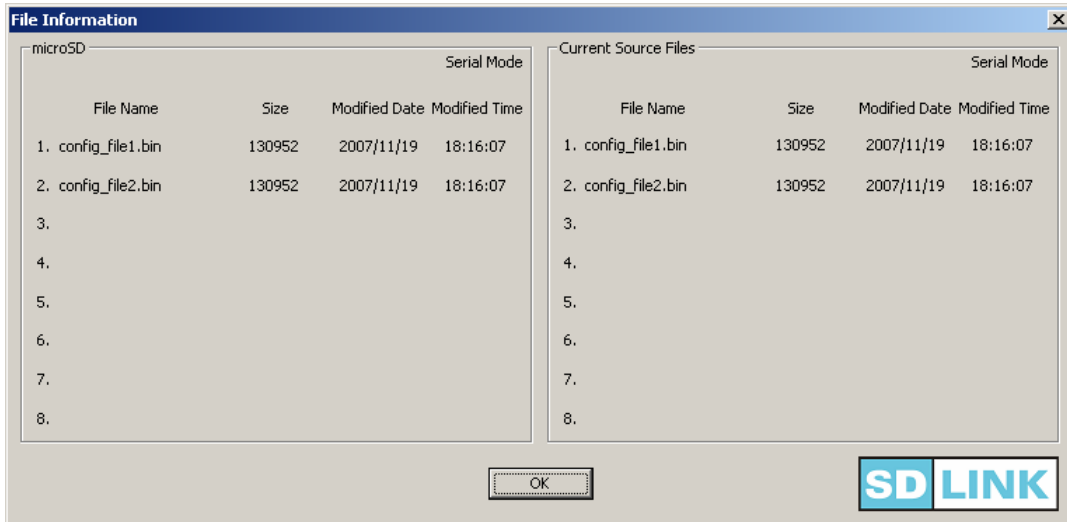


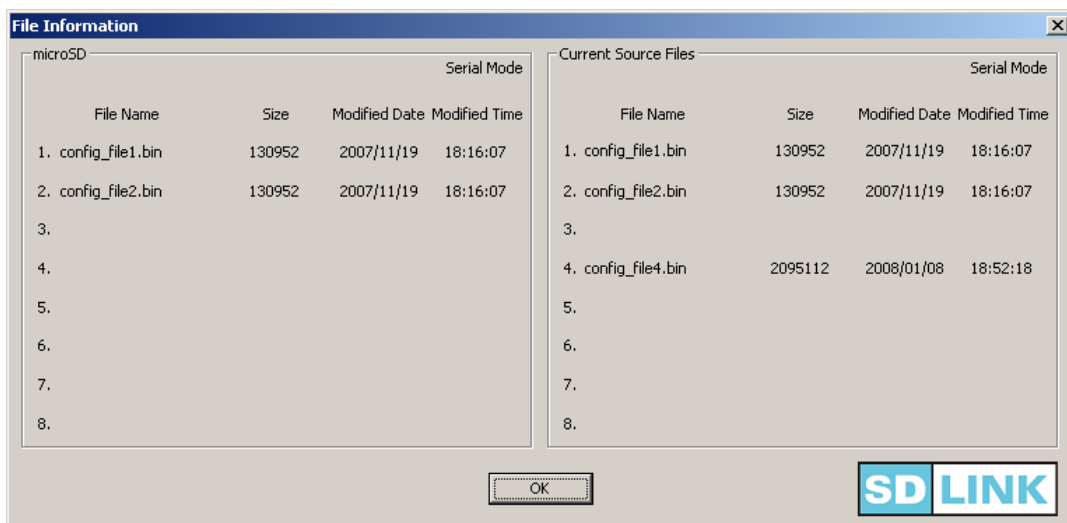Figure 4-11 File information (files on PC and disk are matched)



Figure 4-12 File information (different file selection)

# 5. Menu Bar

This topic explains commands in menu bar. Menu bar has 3 items [File] for file operations, [Options] for parameter settings and [Help] for software version information.

## 5.1. File menu

With [File] menu, user can use [Open Setting] and [Save Settings] to open and save SDLink settings file respectively, and can also close this software using [Exit] (Figure 5-1).
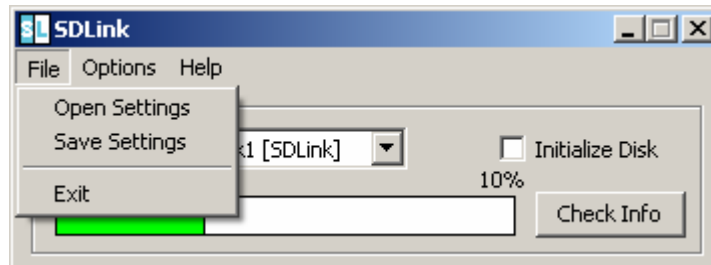


Figure 5-1 File menu

- About SDLink setting file (*.sls)

This software automatically save settings (language, current selecting configuration file, configuration mode, configuration speed etc.) to file "SDLINKDEFAULT.sls" when it is closed (please refer to "2.3.How to restore to initial software settings").

Moreover this software can save more configuration setting as SDLink setting file (*.sls). User can manage many projects, user boards, and configuration environments using each *.sls file.

## 5.2. Options menu

This menu can set settings for display and operation, and settings about configuration condition (Figure 5-2). There are 2 settings menus:
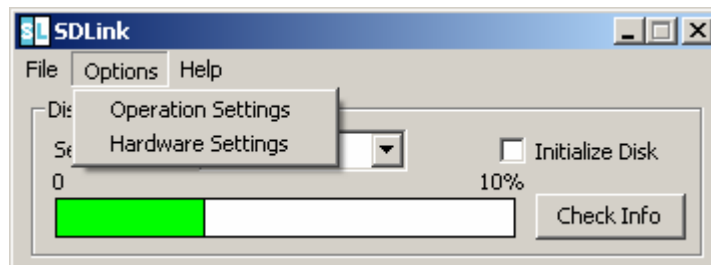


Figure 5-2 Options menu

### 1. Operation Settings

This menu is used for language selection and automatic verify selection (Figure 5-3).
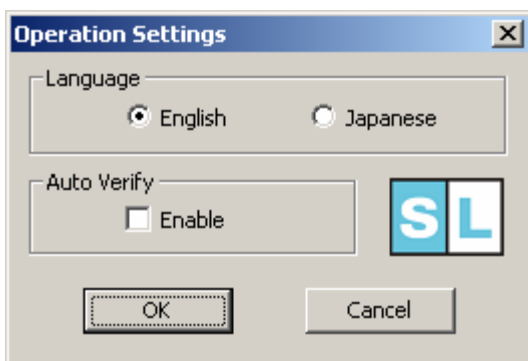


Figure 5-3 Operation Settings menu

- Language
  Select language between English and Japanese
  Default is English.

- Auto Verify
  Check this box if automatic verification after programming configuration is required.
  Default value is OFF (disable).

## 2. Hardware Settings

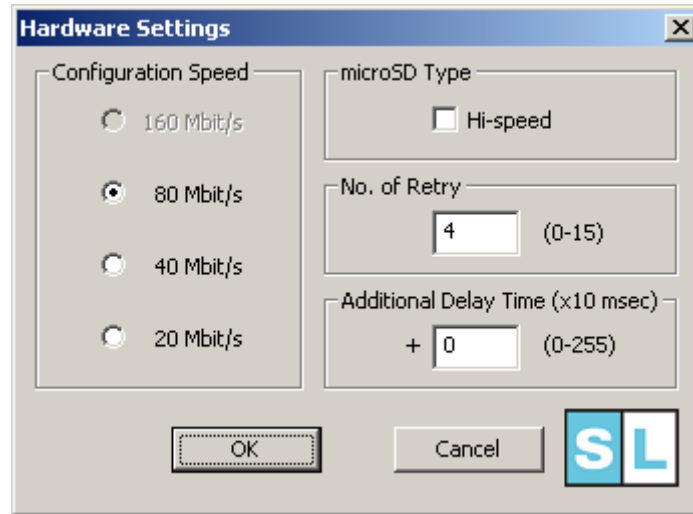This menu is used for configuration condition and parameters settings, as shown in Figure 5-4.



Figure 5-4 Hardware Settings dialog

- Configuration Speed

    Set configuration speed to FPGA. Selectable speed range depends on type of microSD card (normal or high-speed), position of configuration file in [Select Configuration File] area and configuration mode (serial or parallel) as shown in Table 4.

| Configuration Mode | Configuration Speed (Mbit/sec) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 160 | 80 | 40 | 20 | 10 | 5 | 2.5 |
| Serial Mode, File#1-4 | - | - | ○ | ● | ● | ● | - |
| Serial Mode, File#5-8 | - | - | - | ○ | ● | ● | ● |
| Parallel Mode, File#1 | ○ | ● | ● | ● | - | - | - |

※  ○: High-speed type microSD card   ●: High-speed/Normal type microSD card

Table 4 Selectable configuration speed

- microSD Type

    In case of using high-speed type microSD card, check it to be ON. Checking it will support high-speed configuration ("○"in Table 4). Default value is OFF (normal type).

    □"High-speed type" means SD card which is based on SD standard Ver1.1 (or newer) and uses 50MHz operation clock.

- No. of Retry

    The number of re-configuration count to FPGA when configuration failed. Setting range is 0-15, default value is 4.

- Additional Delay Time

    Configuration start time is adjustable as additional delay. After microSD card initialization, SDLink will start configuration to FPGA. SDLink configuration start time can be delayed by setting additional delay time. It is useful for large system which may need long time until power supply is stable.

    Range of additional delay time is 0sec - 2.55sec, set by 10 msec step. Default value is 0.

    □ Time of "Initializing microSD card" depends on each microSD card. The standard SD card specifies it within 1000 msec (1 sec). Normally microSD card takes about 300-400 msec for initialization.

## 5.3. Help menu

This menu shows version information of the software, as shown in Figure 5-5 and Figure 5-6. For the latest version and technical information, please check website:

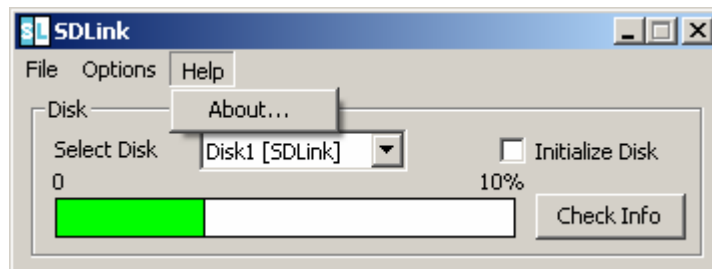http://www.design-gateway.com/english/productdetail.php?id=60
or
http://www.dgway.com/products/SDLink (Japanese)



Figure 5-5 Help menu



Figure 5-6 [About...] Version information

# 6. **Appendix**

## 6.1. **How to generate \*.rbf file by QuartusII software (for Altera)**

1.  On toolbar of QuartusII, click [Assignments]->[Settings].
2.  Select [Device].
3.  Click [Device and Pin Options] button.
4.  Click [Configuration] tab and select [Fast Passive Parallel] or [Passive Serial] in [Configuration Scheme] combo box (Figure 6-1).
5.  Click [Programming Files] tab and check [Raw Binary File (.rbf)] and then click [OK] button (Figure 6-2).
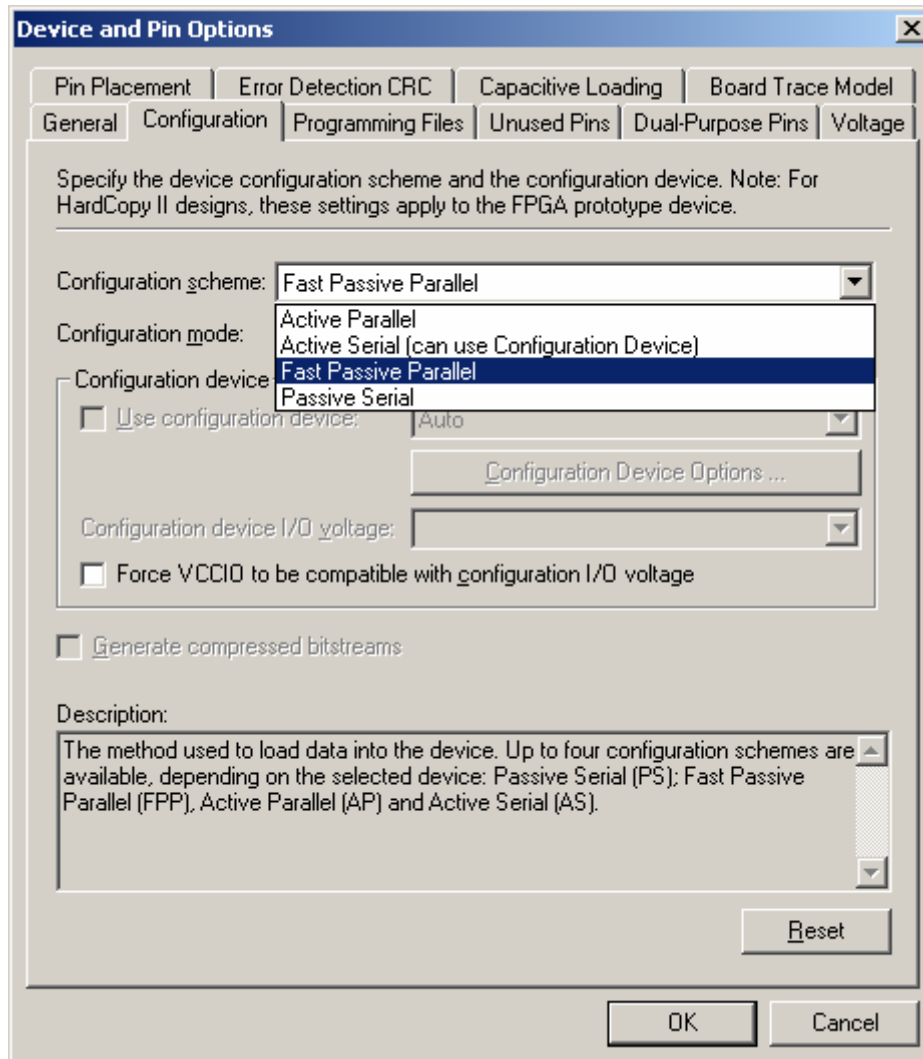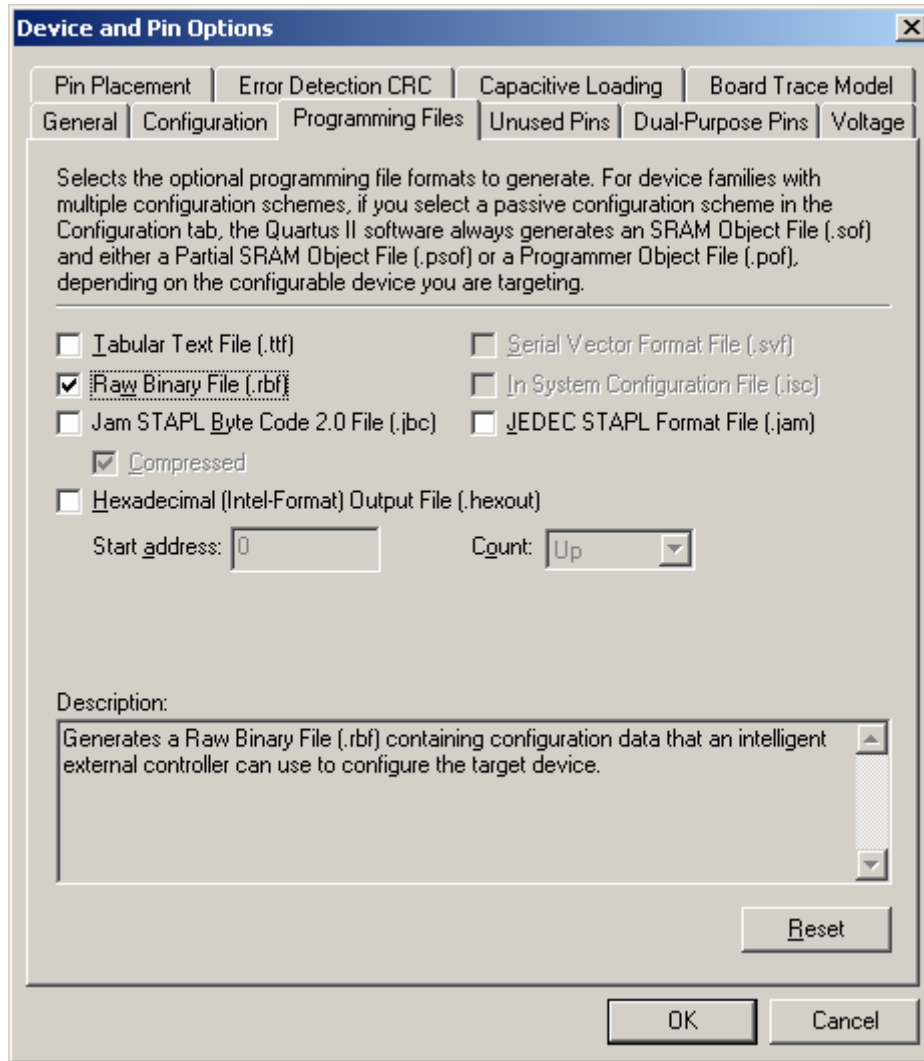


Figure 6-1 Configuration tab

Figure 6-2 Programming Files tab

## 6.2. How to generate *.bin file by ISE software (for Xilinx)

1. On Processes window of ISE, right click at [Generate Programming File].
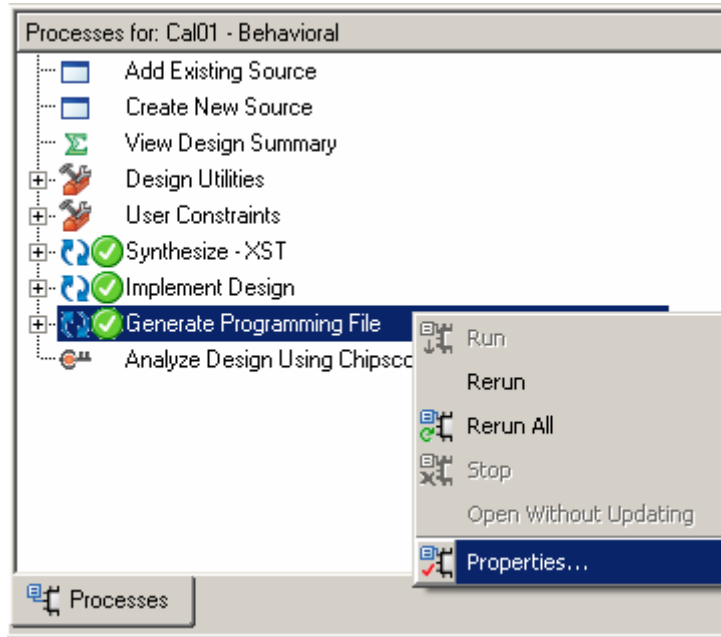2. Select [Properties…] (Figure 6-3).



Figure 6-3 ISE Processes window

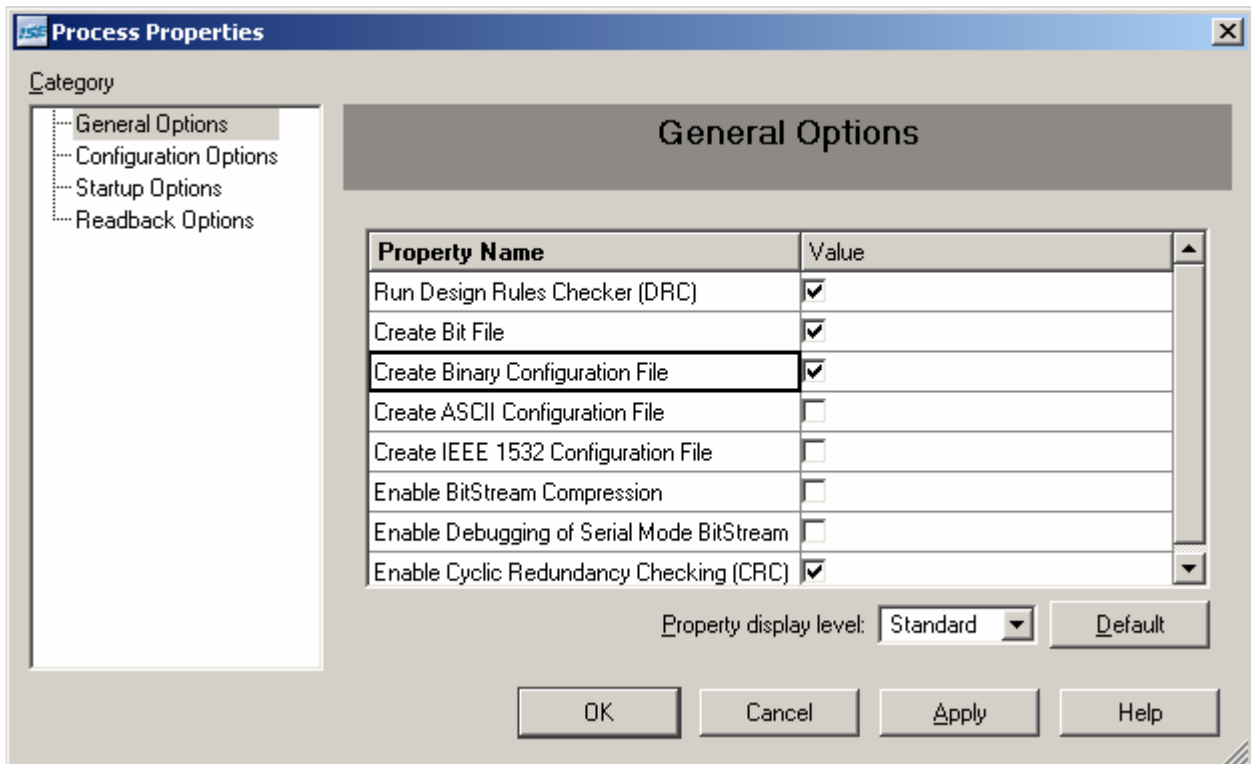3. Check [Create Binary Configuration File] and click [OK] (Figure 6-4).



Figure 6-4 Processes window of ISE

## 7. **Revision History**

| No | Date | Ver. | Note |
|----|------|------|------|
| 1 | 2008/03/01 | 1.0J | Initial release (Japanese) |
| 2 | 2008/03/18 | 1.1E | Initial release (English) |
| 3 | 2008/04/04 | 1.2E | Added description for using on Windows Vista |
| | | | |