



SiS On-Board BIOS update solution

Applicable with SIS968

Powered by DediProg SF100 ISP Programmer

Developer's Guide

(Document also available on [www.dediprogram.com/chipset/dpsis.pdf](http://www.dediprogram.com/chipset/dpsis.pdf))

## Introduction

SiS and DediProg has collaborated together to introduce an easy way of BIOS update with serial flash memories soldered on the motherboard. The purpose of this collaboration is to offer a convenient and low cost method for Bios development as well as BIOS repairing without unsoldering the part from the motherboard. With SiS's profession in south bridge chipset and DediProg's expertise in ISP programming, the two companies introduce you here the optimal on-motherboard BIOS update solution.

## Benefits Highlight:

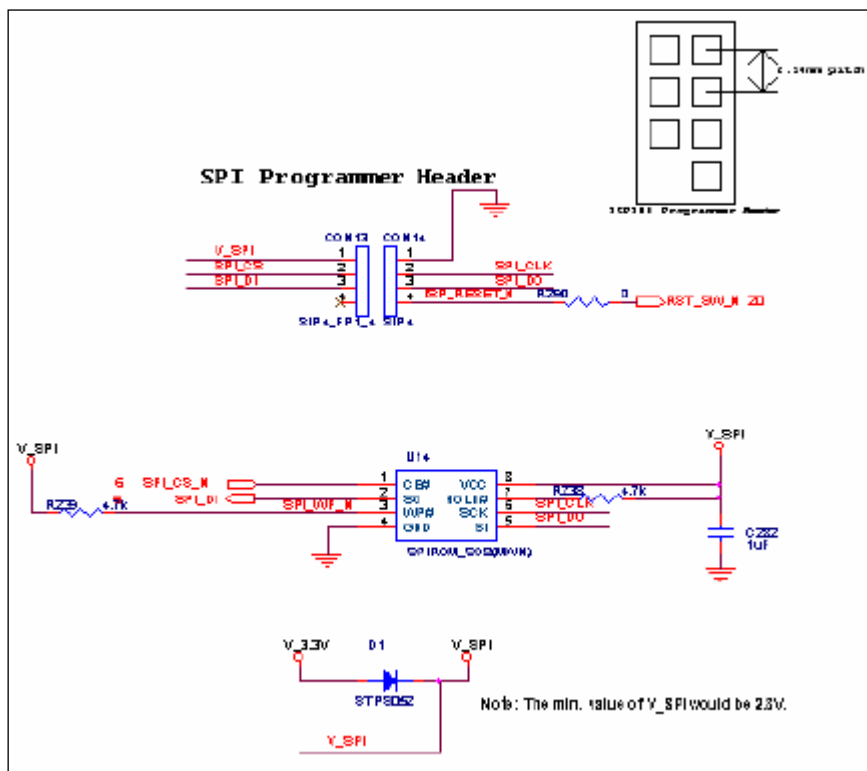
- **Low Cost solution:**
  - No socket needed, no backup Flash needed, no additional chipset isolation needed
  
- **Flexible solution:**
  - You can update your Bios at any time and any location.
  - Update with Motherboard ON is convenient for Bios development.  
Programmer can be kept connected during normal use of the motherboard (transparent)
  - Update with Motherboard OFF is adapted for repairing channel and production.
  - No need of computer assistance with the Stand Alone mode (SF100+) where Bios version can be stored on Flash Card memories (perfect for field and operator operations)
  - No need of technical expertise (operator click only one button for update)
  
- **Reliable solution:**
  - No failure rate caused by socket contact problem.
  - DediProg programmer has been optimized according to SiS Chipset requirement and the method is approved and qualified by SiS.
  
- **High performance solution:**
  - 4Mb Serial Flash updated in less than 6sec
  - 8Mb Serial Flash updated in less than 10sec

# On-Board BIOS update Methodology

**Applicable chipsets:** SIS968

In order to perform on-board programming to the serial flash soldered on motherboard, south bridge SPI bus has to be in high impedance states while applying external SPI signals to the soldered serial flash memory. SIS968 embeds such high impedance capability. The following figure details the reference schematic for serial flash on-board solution with SIS968 chipset.

**Figure 1: Serial Flash and ISP Header (please refer to SIS968 reference schematic)**



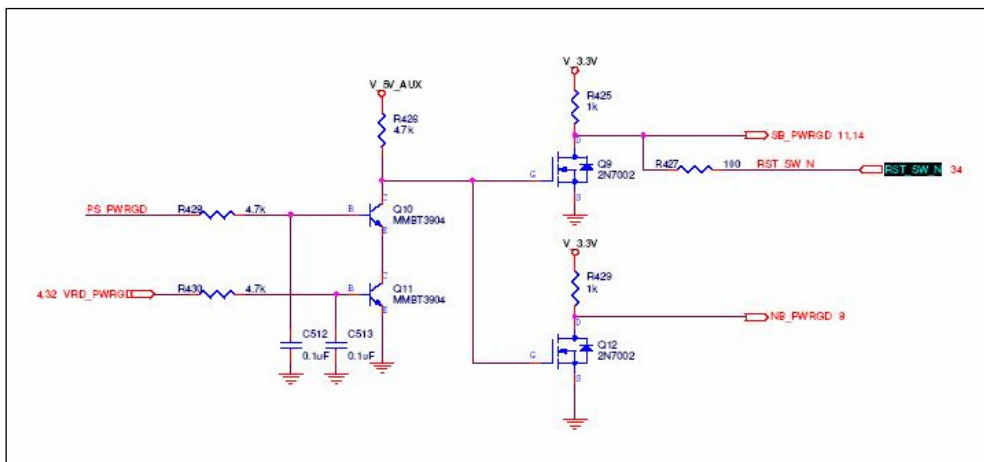
**Note 1:** The SPI Programmer Header 2x4 is designed to connect the DediProg SF100 programmer (refer to fig 4).

**Note 2:** The SPI Programmer Header pin 7 may be removed to offer a mistake proof pin and avoid bad connection of the programmer. The corresponding hole of the SF100 cable connector must be filled with glue or a pin.

**Note 3:** The diode on Vcc is needed in order to perform in-system BIOS update in motherboard OFF scenario so that SF100 programmer supplies Vcc to the serial flash only and not the rest of the motherboard.. The diode must be selected with a low threshold drop down of 0.1-0.2V (like the STPS052) or replaced by a Mosfet supplied by the motherboard (+5V/+12V) and offering a small drop down (small Ron).

**Note 4:** The SiS968, SPI Programmer Header and Serial Flash must be close to minimize the SPI capacitance.

**Figure 2: ISP Programmer Reset Signal Connection (please refer to SiS968 reference schematic)**



**Note 1:** The pin 8 of the SPI Programmer Header in Fig 1 is connected to RST\_SW\_N signal allowing the

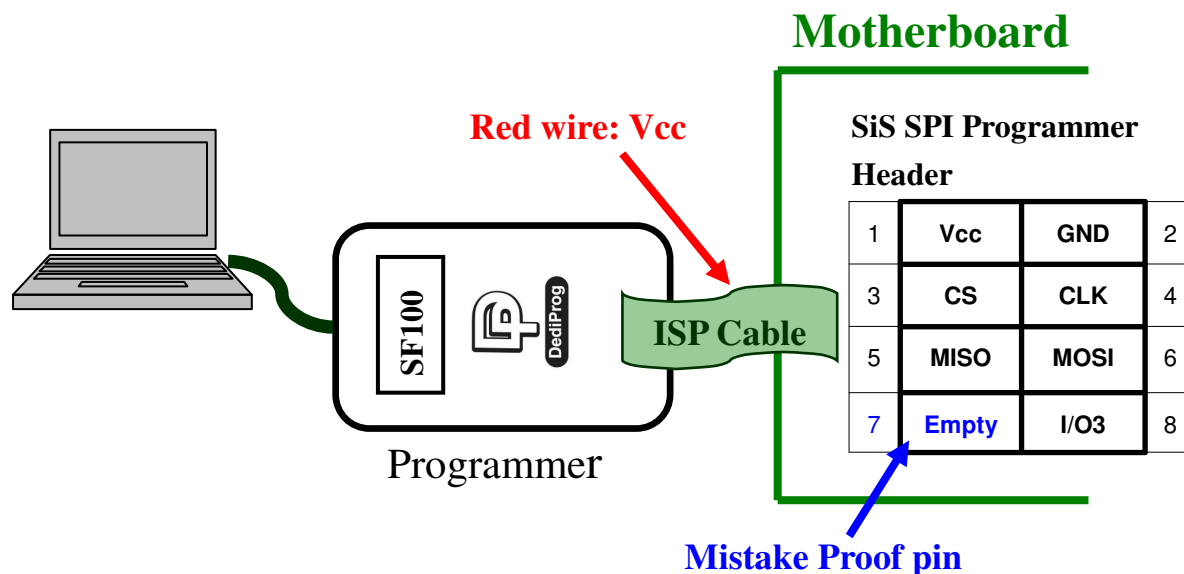
SF100 programmer to reset the Southbridge (function the same as pressing the reset button) when DediProg software is in operations). After the operations completed, the programmer releases the reset signal automatically so that motherboard will boot on the new bios version.

**Figure 3: DediProg SF100 ISP header assignment**

SF100 ISP Header				Pins description:		
1	I/O1	I/O4	2	Pins	Signals	Description
3	I/O2	Vdd	4	1, 2, 3, 12	General I/O	General I/O are used to control optional pins of the memory (hold, Wp) or switch the application in specific mode (reset Chipset or switch OFF MOSFET)
5	<b>Vcc</b>	<b>GND</b>	6	4	Vdd	Vdd is used to supply the programmer with 5V from the application to work in Stand alone mode when the motherboard is ON.
7	<b>CS</b>	<b>CLK</b>	8	5	Vcc	Vcc is used to supply the application memory
9	<b>MISO</b>	<b>MOSI</b>	10	6	<b>GND</b>	GND is the common ground shared between application and programmer
11	<b>Vpp</b>	<b>I/O3</b>	12	7	<b>CS</b>	SPI Chip Select of the Application memory
13	SCL	SDA	14	8	<b>CLK</b>	SPI clock signal for the application memory
				9	<b>MISO</b>	Data out from the Application memory: MISO
				10	<b>MOSI</b>	Data In of the Application memory: MOSI
				11	<b>Vpp</b>	High voltage applied on the memory to speed up the operation
				13, 14	SCL, SDA	I2C bus unused

**Note 1:**  
Green Bold signals are applied to SIS968 reference board.

**Note 2:**  
Black signals are not used and not connected to motherboard.

**Figure 4: DediProg SF100 Programmer to SiS968 reference motherboard connection**

### Scenario 1: Motherboard power ON

The user can connect the SF100 programmer on the SiS Motherboard SPI Programmer Header without any consequences on the application behavior. The programmer is designed to be transparent so that, motherboard can boot on the Serial Flash freely if no Serial Flash operation is launched by the user from the DediProg software. If the user asks for a memory bios update or read then the SF100 programmer drives the IO3 low to reset the chipset and switches the SPI bus in High Impedance during the operations. When the operation is completed, the programmer will release the SPI bus and the Chipset reset signal so that the motherboard can boot on the new Bios version. Programmer is then transparent to the motherboard and can be kept connected for any other trials.

#### Steps:

**Step 1:** connect SF100 ISP cable to SiS reference board SPI Programmer header

(see fig 1 and fig 4)

**Step 2:** power on the motherboard

**Step 3:** Launch Serial Flash operation commands from the DediProg software (when DediProg software launches a command, SF100 IO3 is driven low in order to reset SIS968 chipset. This auto reset works the same as a user manually presses the reset button of SIS968 during DediProg software operations)

**Step 4:** Continue your Motherboard trial (boot, Setup, OS.. ) with the programmer connected  
Loop on Step 3 if needed

## Scenario 2: Motherboard power OFF

SIS968 chipset is designed to provide high impedance on SPI bus when power off. DediProg SF100 programmer will provide Vcc to the serial flash in order to perform in-system programming. The diode in fig 1 ensures that the Vcc from SF100 programmer is only supplied to the serial flash and not the rest of the motherboard.

### Steps:

**Step 1:** Motherboard OFF (no ATX power supply required)

**Step 2:** connect SF100 ISP cable to SiS reference board SPI Programmer Header (see fig 1 and 4)

**Step 3:** Launch Serial Flash operation commands from the DediProg software

## DediProg products portfolio:

DediProg provides customers with a series of serial flash programming solutions.

- **SF100:** serial flash in-system-programming solution
- **SF200:** serial flash off-line programming solution
- **SF100+:** SF100 with standalone capability
- **SF200+:** SF200 with standalone capability
- **Power 5 programmers:** low cost super performance programmer kit to program five serial flash memories at a time
- **Back up boot flash kit:** allows on-board BIOS emulation and repair with back up boot flash kit no matter the south bridge chipset has the embedded high impedance capability or not. The South Bridge will boot automatically from a backup Bios memory connected to the package of the main Serial Flash soldered on board with a DediProg SO Test clip.

Please visit [www.dediprogram.com](http://www.dediprogram.com) for details.