



SPI Low Level Drivers Guide

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1. Overview



This document describes the functions and features contained in the SPI Low Level Driver (SLLD). The SLLD contains both higher-level “operation” functions and low-level “command” functions. The operation functions implement programming operations, erase operations, and protect operations. Additionally, the “command functions” allow the programmer to easily add new functionality by invoking the lower-level command functions in the desired sequence. Refer to [Section 2.5, Porting Considerations on page 12](#) for more details regarding the SLLD system integration.

1.1 Function Categories

The SLLD functions fall into three categories:

■ Operation Functions:

These functions implement embedded operations by invoking the “command” functions, and then polling for embedded operation completion.

The operation function naming convention is: `s11d_xxxxOp`

For example, `s11d_PPOp`

This function implements Page Programming operation

■ Command Functions:

These functions send flash command sequences to the device.

The command function naming convention is: `s11d_xxxxCmd`

For example, `s11d_ReadCmd`

This function writes a Read Command to Flash Device and read data.

■ Utility Functions:

Several utility functions are available to a calling application as well. These functions do not act directly on the flash device but encapsulate common tasks.

The utility function names do not have a `Cmd` or `Op` suffix.

For example, `s11d_StatusGet`

This function determines the flash device status and returns the information to the caller (for example, device is busy or device is not busy).

1.2 Parameter Description

The following is a list of parameters used in the SLLD.

Parameter	Description
<code>device_num</code>	device number, this parameter will be used on device with multiple chip select.
<code>sys_addr</code>	device address given by system: must be 32 bits
<code>source</code>	a single byte to write to flash
<code>target</code>	variable in which to store read data

Parameter	Description
data_buf	variable containing data to program
len_in_bytes	number of bytes on which to operate
dev_status_ptr	variable to store device status
dev_softwareprotect_status_ptr	variable to store device software protect status
status_val	variable to store status register value
config_val	variable to store configuration register value
asp_val	variable to store ASP register value
bnk_val	variable to store bank addressing register value
abt_val	variable to store Auto Boot register value
mode	variable to the mode bits value

1.3 Data Types

For portability, typedefs are used for basic data types.

```
typedef unsigned char  BYTE; /* 8 Bits wide */
typedef unsigned short WORD; /* 16 Bits wide */
typedef unsigned long  DWORD; /* 32 Bits wide */
typedef BYTE          FLASHDATA; /* 8 Bits wide */
```

These definitions may require modification on the target system.

The following additional typedefs are used in the SLLD:

```
ADDRESS          Used for system-level addressing.
                  Must be implemented as a 32-bit unsigned integer.

PARAM            Used for function options.

BYTECOUNT      Indicates number of bytes on which to operate.
                  Typically implemented as a 32-bit unsigned integer.

DEVSTATUS        an enum listing possible device statuses
                  dev_status_unknown,
                  dev_not_busy,
                  dev_program_error,
                  dev_erase_error,
                  dev_suspend,
                  dev_busy.

DEV_SOFTWARE_PROTECT_STATUS an enum listing possible device software protect statuses
                  FLASH_SOFTWARE_UNPROTECTED
                  FLASH_SOFTWARE_PROTECTED

SLLD_STATUS      an enum listing function return values
                  SLLD_OK,
                  SLLD_E_DEVICE_SOFTWARE_PROTECTED,
                  SLLD_E_HAL_ERROR,
                  SLLD_ERROR.
```

1.4 Functions Returned Value Description

The following returned values are listed in an enum SLLD_STATUS.

SLLD_OK Function finishes successfully.

Note: For some operation functions (e.g., s11d_PPOp, s11d_SEOp, etc) if the target area is protected function returns SLLD_OK but device does not execute the operation. In this case, you will have to check the dev_status_ptr returned value.

```
SLLD_E_DEVICE_SOFTWARE_PROTECTED
```

Command is not accepted because the target device is in the software protect mode.

SLLD_E_HAL_ERROR Error occurs during HAL function.

SLLD_ERROR Error occurs during operation function.

1.5 Hardware Abstraction Layer (HAL)

The Hardware Abstraction Layer is used to adapt the SLLD to the target system.

The SLLD HAL consists of two functions:

FLASH_READ (...) Basic read function – (one CS# cycle).

FLASH_WRITE (...) Basic write function – (one CS# cycle).

These functions return SLLD_OK on success and SLLD_E_HAL_ERROR on failure.

They take the following parameters:

BYTE device_num, /* device number */

BYTE command, /* command to write to the SPI flash */

ADDRESS sys_addr, /* system address to be used */

BYTE *data_buffer, /* Pointer to the data buffer containing data to be written (respectively to be read) */

int Number_Of_Bytes /* number of bytes to be written */

The basic source code for the HAL functions is provided. However, this code is not complete and changes will be required in the HAL functions to adapt them to the target system and optimize them for performance. The provided source code contains comments that will guide you through your customization process.

2. Functions List



For the details, refer to [Appendix – API Details chapter on page 12](#).

2.1 Operation Functions

Command	Description
<i>sllid_WriteOp</i>	Performs a Single / Quad Page Programming Operation
<i>sllid_ReadOp</i>	Performs a Single / Fast / Dual / Quad Read Operation
<i>sllid_PPOp</i>	Performs a Page Programming Operation
<i>sllid_PP_4BOp</i>	Performs a Page Programming Operation using 4-bytes addressing scheme
<i>sllid_QPPOp</i>	Performs a Quad input Page Programming Operation
<i>sllid_QPP_4BOp</i>	Performs a Quad input Page Programming Operation using 4-bytes addressing scheme
<i>sllid_BufferedProgramOp</i>	Performs a Programming Operation. Unlike <i>sllid_PPOp</i> , this function enables program operation over page boundary
<i>sllid_BufferedProgram_4BOp</i>	Performs a Programming Operation using 4-bytes addressing scheme. Unlike <i>sllid_PP_4BOp</i> , this function enables program operation over page boundary
<i>sllid_OTPPOp</i>	Performs a OTP Programming Operation
<i>sllid_SEOp</i>	Performs a Sector Erase Operation
<i>sllid_SE_4BOp</i>	Performs a Sector Erase Operation using 4-bytes addressing scheme
<i>sllid_P4EOp</i>	Performs a Parameter sector Erase Operation. This function erases one of the 4 KB sectors
<i>sllid_P8EOp</i>	Performs a Parameter sector Erase Operation. This function erases two of the 4 KB sectors
<i>sllid_P8E_4BOp</i>	Performs a Parameter sector Erase Operation using 4-bytes addressing scheme. This function erases two of the 4 KB sectors
<i>sllid_BEOp</i>	Performs a Bulk Erase Operation
<i>sllid_WRSROp</i>	Performs a Write Status Register Operation
<i>sllid_WRROp</i>	Writes a Write Registers Command Sequence to Flash Device
<i>sllid_WASPOp</i>	Writes a Write ASP Command Sequence to Flash Device
<i>sllid_WBNKOp</i>	Writes a Write bank addressing Command Sequence to Flash Device
<i>sllid_WABTOp</i>	Writes a Write Auto Boot Command Sequence to Flash Device
<i>sllid_WPWDOp</i>	Writes a Write password Command Sequence to Flash Device
<i>sllid_BlockProtectOp</i>	Performs a Block Protect Operation
<i>sllid_PPB_PGOp</i>	Performs a PPB programming Operation
<i>sllid_DYB_PGOp</i>	Performs a DYB programming Operation
<i>sllid_BE32KBOp</i>	Performs a 32KB Block Erase Operation, used for FLK devices
<i>sllid_WRAR_Op</i>	Performs a Write Any Register Operation
<i>sllid_PPBP_Op</i>	Performs a PPB programming Operation for FSS devices
<i>sllid_DYBWR_Op</i>	Performs a DYB Write Operation for FSS devices

Command	Description
sllid_IRPPOP	Performs a Write IRP Register Operation
sllid_SECRPOP	Performs a Secure Region Programming Operation
sllid_SECREOp	Performs a Secure Region Erase Operation
sllid_HBEOp	Performs a Half Block Erase Operation
sllid_CEOp	Performs a Chip Erase Operation
sllid_CE1Op	Performs an alternative Chip Erase Operation
sllid_IBLOp	Performs a IBL lock Operation
sllid_IBULOp	Performs a IBL unlock Operation
sllid_GBLOp	Performs a GBL lock Operation
sllid_GBULOp	Performs a GBL unlock Operation
sllid_SPRPOP	Performs Set Pointer Region Protection Operation
sllid_BlockEraseOp	Performs Block Erase Operation

2.2 Command Functions

All Command Functions except [sllid_Read_IDCmd](#), [sllid_SPCmd](#) and [sllid_RESCmd](#) check the software protect status of the target device (this information is stored in RAM) before issuing command sequences.

Command	Description
sllid_ReadCmd	Writes a Read Command to Flash Device and reads data
sllid_Read_4BCmd	Writes a Read Command to Flash Device and reads data using 4-bytes addressing scheme
sllid_Fast_ReadCmd	Writes a Flash Read Command Sequence to Flash Device and read data
sllid_Fast_Read_4BCmd	Writes a Flash Read Command Sequence to Flash Device and reads data using 4-bytes addressing scheme
sllid_DualIOReadCmd	Writes a Dual I/O Read Command to Flash Device and reads data
sllid_DualIORead_4BCmd	Writes a Dual I/O Read Command to Flash Device and reads data using 4-bytes addressing scheme
sllid_DualIOHPReadCmd	Writes a Dual I/O High Performance Read Command to Flash Device and reads data
sllid_DualIOHPRead_4BCmd	Writes a Dual I/O High Performance Read Command to Flash Device and read data using 4-bytes addressing scheme
sllid_QuadIOReadCmd	Writes a Quad I/O Read Command to Flash Device and reads data
sllid_QuadIORead_4BCmd	Writes a Quad I/O Read Command to Flash Device and reads data using 4-bytes addressing scheme
sllid_QuadIOHPReadCmd	Writes a Quad I/O High Performance Read Command to Flash Device and reads data
sllid_QuadIOHPRead_4BCmd	Writes a Quad I/O High Performance Read Command to Flash Device and reads data using 4-bytes addressing scheme
sllid_Read_IDCmd	Writes a Read ID Command Sequence to Flash Device and reads Device_ID
sllid_RDIDCmd	Writes a RDID Command Sequence to Flash Device and reads Device_ID
sllid_Read_IdentificationCmd	Writes a Read Electronic ID Command Sequence to Flash Device and reads Device_ID
sllid_RDSRCmd	Writes a Read from Status Register Command Sequence to Flash Device and reads status register
sllid_SRSTCmd	Writes the software reset command to the flash device
sllid_RASPCmd	Writes a Read from ASP Register Command Sequence to Flash Device and reads ASP register
sllid_RBNKCmd	Writes a Read from Bank Addressing Register Command Sequence to Flash Device and reads the bank addressing register
sllid_RABTCmd	Writes a Read from Auto Boot Register Command Sequence to Flash Device and reads Auto Boot register

Command	Description
<i>sllid_RECCCmd</i>	Writes a Read from ECC Register Command Sequence to Flash Device and reads ECC register
<i>sllid_RPWDCmd</i>	Writes a Read from password Command Sequence to Flash Device and reads the password
<i>sllid_RCRCmd</i>	Writes a Read Configuration Register Command Sequence to Flash Device and reads configuration register
<i>sllid_WRENCmd</i>	Writes a Write Enable Command Sequence to Flash Device
<i>sllid_WRDICmd</i>	Writes a Write Disable Command Sequence to Flash Device
<i>sllid_WRSRCmd</i>	Writes a Write Status Register Command Sequence to Flash Device
<i>sllid_WRRCmd</i>	Writes a Write Registers Command Sequence to Flash Device
<i>sllid_WASPCmd</i>	Writes a Write ASP register Command Sequence to Flash Device
<i>sllid_WBNKCmd</i>	Writes a Write bank addressing Command Sequence to Flash Device
<i>sllid_WABTCmd</i>	Writes a Write Auto Boot Register Command Sequence to Flash Device
<i>sllid_WPWDCmd</i>	Writes a write password Command Sequence to Flash Device
<i>sllid_PPCmd</i>	Writes a Page Program Command Sequence to Flash Device
<i>sllid_PP_4BCmd</i>	Writes a Page Program Command Sequence to Flash Device using 4-bytes addressing scheme
<i>sllid_QPPCmd</i>	Writes a Quad input Page Program Command Sequence to Flash Device
<i>sllid_QPP_4BCmd</i>	Writes a Quad input Page Program Command Sequence to Flash Device using 4-bytes addressing scheme
<i>sllid_SECmd</i>	Writes a Sector Erase Command Sequence to Flash Device
<i>sllid_SE_4BCmd</i>	Writes a Sector Erase Command Sequence to Flash Device using 4-bytes addressing scheme
<i>sllid_ERS_SSPCmd</i>	Writes a Sector Erase Suspend command to Flash Device
<i>sllid_ERS_RESCmd</i>	Writes a Sector Erase Resume command to Flash Device
<i>sllid_RCVRCmd</i>	Writes a Initiate Recovery mode command to Flash Device
<i>sllid_RCSPCmd</i>	Writes a Recovery Suspend command to Flash Device
<i>sllid_RCRSCmd</i>	Writes a Recovery Resume command to Flash Device
<i>sllid_P4ECmd</i>	Writes a 4KB Parameter Sector Erase Command Sequence to Flash Device
<i>sllid_P8ECmd</i>	Writes an 8KB Parameter Sector Erase Command Sequence to Flash Device
<i>sllid_P8E_4BCmd</i>	Writes an 8 KB Parameter Sector Erase Command Sequence to Flash Device using 4-bytes addressing scheme
<i>sllid_BECmd</i>	Writes a Bulk Erase Command Sequence to Flash Device
<i>sllid_OTPPCmd</i>	Writes an OTP Program Command Sequence to Flash Device
<i>sllid_OTPRCmd</i>	Writes an OTP Read Command Sequence to Flash Device and reads OTP
<i>sllid_SPCmd</i>	Writes a Software Protect Command Sequence to Flash Device
<i>sllid_RESCmd</i>	Writes a RES Command Sequence to Flash Device
<i>sllid_ClearStatusRegisterCmd</i>	Writes a Clear Status Register Command Sequence to Flash Device
<i>sllid_PPB_PGCmd</i>	Writes a PPB program Command Sequence to Flash Device
<i>sllid_DYB_PGCmd</i>	Writes a DYB program Command Sequence to Flash Device
<i>sllid_DPCmd</i>	Writes a Deep Power down Command Sequence to Flash Device
<i>sllid_BE32KBCmd</i>	Writes a Block Erase 32KB Command Sequence to Flash Device
<i>sllid_WRARCmd</i>	Writes a Write Any Register Command Sequence to Flash Device
<i>sllid_PPBP_Cmd</i>	Writes a PPB Program Command Sequence to Flash Device
<i>sllid_DYBWR_Cmd</i>	Writes a DYB write Command Sequence to Flash Device
<i>sllid_ReadSFDPCmd</i>	Writes a Read SFDPCmd Command Sequence to Flash Device, and read SFDPC values

Command	Description
sllid_RDCR2Cmd	Writes a Read Configuration register 2 Command Sequence to Flash Device, and read register value
sllid_RDCR3Cmd	Writes a Read Configuration register 3 Command Sequence to Flash Device, and read register value
sllid_IRPRDCmd	Writes a Read IRP register Command Sequence to Flash Device, and read register value
sllid_IRPPCmd	Writes a Write IRP register Command Sequence to Flash Device
sllid_QPIENCmd	Writes a Enter QPI Command Sequence to Flash Device
sllid_QPIEXCmd	Writes a Exit QPI Command Sequence to Flash Device
sllid_4BENCmd	Writes a Enter 4 Bytes Address Mode Command Sequence to Flash Device
sllid_4BEXCmd	Writes a Exit 4 Bytes Address Mode Command Sequence to Flash Device
sllid_DORCmd	Writes a Dual Output Command Sequence to Flash Device and read data
sllid_4DORCmd	Writes a 4Byte Dual Output Command Sequence to Flash Device and read data
sllid_DIORCmd	Writes a Dual IO Command Sequence to Flash Device and read data
sllid_4DIORCmd	Writes a 4B Dual IO Command Sequence to Flash Device and read data
sllid_QORCmd	Writes a Quad Output Command Sequence to Flash Device and read data
sllid_4QORCmd	Writes a 4B Quad Output Command Sequence to Flash Device and read data
sllid_QIORCmd	Writes a Quad IO Command Sequence to Flash Device and read data
sllid_4QIORCmd	Writes a 4B Quad IO Command Sequence to Flash Device and read data
sllid_DDRQIORCmd	Writes a DDR Quad IO Command Sequence to Flash Device and read data
sllid_4DDRQIORCmd	Writes a 4B DDR Quad IO Command Sequence to Flash Device and read data
sllid_SECRRCmd	Writes a Secure Region read Command Sequence to Flash Device and read secure region data
sllid_SECRPCmd	Writes a Secure Region program Command Sequence to Flash Device
sllid_SECRECmd	Writes a Secure Region erase Command Sequence to Flash Device
sllid_RUIDCmd	Writes a Read UID Command Sequence to Flash Device and read UID value
sllid_WRENVCmd	Writes a Write Enable for Volatile Register Command Sequence to Flash Device
sllid_HBECmd	Writes a Half Block Erase Command Sequence to Flash Device
sllid_4HBECmd	Writes a 4B Half Block Erase Command Sequence to Flash Device
sllid_4BE	Writes a 4B Block Erase Command Sequence to Flash Device
sllid_CECmd	Writes a Chip Erase Command Sequence to Flash Device
sllid_CE1Cmd	Writes an alternative Chip Erase Command Sequence to Flash Device
sllid_IBLRDCmd	Writes a IBL read Command Sequence to Flash Device and read IBL bit
sllid_4IBLRDCmd	Writes a 4B IBL read Command Sequence to Flash Device and read IBL bit
sllid_IBLCmd	Writes a IBL lock Command Sequence to Flash Device
sllid_4IBLCmd	Writes a 4B IBL lock Command Sequence to Flash Device
sllid_IBULCmd	Writes a IBL unlock Command Sequence to Flash Device
sllid_4IBULCmd	Writes a 4B IBL unlock Command Sequence to Flash Device
sllid_GBLCmd	Writes a Global IBL lock Command Sequence to Flash Device
sllid_GBULCmd	Writes a Global IBL unlock Command Sequence to Flash Device
sllid_SPRPCmd	Writes a Set Pointer Region Protection Command Sequence to Flash Device
sllid_4SPRPCmd	Writes a 4B Set Pointer Region Protection Command Sequence to Flash Device
sllid_PRLCmd	Writes a Protection Register lock Command Sequence to Flash Device
sllid_PRRDCmd	Writes a Protection Register Read Command Sequence to Flash Device and read data
sllid_SBLCmd	Writes a Set Burst Length Command Sequence to Flash Device

Command	Description
sllid_MBRCmd	Writes Mode Bit Reset Command Sequence to Flash Device
sllid_BlockEraseCmd	Write Block Erase Command Sequence to Flash Device
sllid_RDQIDCmd	Writes a RDQID Command Sequence to Flash Device and reads Device_ID in Quad All mode
sllid_RDSR2Cmd	Writes a Read from Status Register 2 Command Sequence to Flash Device and reads status register 2
sllid_RDARCmd	Writes a Read Any Register Command Sequence to Flash Device and reads register value
sllid_DLPRDCmd	Writes a DLPRD Command Sequence to Flash Device and read data
sllid_PNVDLRCmd	Writes a Program NV Data Learning Register Command Sequence to Flash Device
sllid_WVDLRCmd	Writes a Write Volatile Data Learning Register Command Sequence to Flash Device
sllid_EPS_Cmd	Writes a Sector Erase suspend Command Sequence to Flash Device
sllid_EPR_Cmd	Writes a Sector Erase resume Command Sequence to Flash Device
sllid_4BAM_Cmd	Writes a 4-Byte Address Mode Command Sequence to Flash Device
sllid_PASSRDCmd	Writes a Password Read Command Sequence to Flash Device and read password
sllid_PASSPCmd	Writes a Password Write Command Sequence to Flash Device
sllid_PASSUCmd	Writes a Password Unlock Command Sequence to Flash Device
sllid_RSTCmd	Writes a Software Reset Command Sequence to Flash Device
sllid_RSTENCmd	Writes a Software Reset Enable Command Sequence to Flash Device

2.3 Utility Functions

slld_Poll

Polls flash device for embedded operation completion

slld_StatusGet

Determines Flash Status

slld_SoftwareProtectStatusGet

Gets the software protect status from the variable in RAM

slld_GetDevNumFromAddr

Get device number from address

2.4 Files

The SLLD source code is provided as five files (three header files and two C source code files).

File	Description
slld.h	header file containing SLLD function prototypes
slld_hal.h	header file containing HAL function prototypes
slld_target_specific.h	header file containing code customization macros
slld.c	C file containing SLLD function definitions
slld_hal_example.c	C example file containing HAL function definitions

Optionally, we provide the `trace.c` / `trace.h` modules that allow you to enable the software traces, which helps during the debug phases.

2.5 Porting Considerations

Cypress's SPI Low Level Driver (SLLD) is written in ANSI C for easy integration with customer applications. To port the SLLD to a given system, the programmer must modify HAL typedefs #defines and system specific HAL functions.

The `slld_target_specific.h`, `slld_hal.h` and `slld.h` files contain all defines that must be changed when porting the SLLD to your system. You can also find in the `slld_hal.h` header file the API parameters and the HAL function prototypes.

The `slld_target_specific.h` header file allows you to customize the SLLD code by enabling or disabling some features which you might not be using or in case you are worried about the code footprint. You should enable the correspondent macro to the device you are using in your system (FL-A, FL-D, FL-P...).

The S/W Trace feature should be enabled here by un-commenting the line where the 'TRACE' macro is defined. Nevertheless, and to be able to use the S/W trace, make sure to link `trace.c` in your project. This module is made available upon your request through the Cypress technical support web form.

2.6 Typedefs

The following typedefs, located in `slld.h`, may need to be updated for your target system:

```
typedef unsigned char  BYTE;    /* 8 bits wide */
typedef unsigned short WORD;    /* 16 bits wide */
typedef unsigned long  DWORD;   /* 32 bits wide */
```

If these default assignments are convenient for your target system, no modification is required.

On the other hand, `FLASH_READ()` and `FLASH_WRITE()` functions in `slld_hal_example.c` have to be adapted to reflect your controller specifications and requirements, which is going to drive the SPI chip cycles. You can find some helping comments in the locations where your specific target code has to be inserted.

3. Appendix – API Details



3.1 Operation Functions

Function Name	sllD_WriteOp
Purpose	Performs a Single / Quad Page Programming Operation
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	<p>This function programs location to the specified data. If the data size to program is larger than PAGE_SIZE, this function will execute page programming operation.</p> <p>NOTE: If the page boundary is encountered during page programming, additional bytes are wrapped around to the start of the same page.</p> <p>If WriteOp is attempted on the protected area, the function returns SLLD_OK but program operation is not executed.</p>

Function Name	sllD_ReadOp
Purpose	Performs a Single / Fast, Dual / Quad Read Operation
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	<p>This function issues the Read commands (Single / Fast / Dual / Quad) to SPI Flash and reads data from the array. Data size is specified by len_in_bytes.</p>

Function Name	sllid_PPOp
Purpose	Performs a Page Programming Operation
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	<p>This function programs location to the specified data. If the data size to program is larger than PAGE_SIZE this function returns SLLD_ERROR and doe not execute operation.</p> <p>Note: If the page boundary is encountered during page programming, additional bytes are wrapped around to the start of the same page.</p> <p>If PPOp is attempted on the protected area, the function returns SLLD_OK but program operation is not executed.</p>

Function Name	sllid_PP_4BOp
Purpose	Performs a Page Programming Operation using 4-bytes addressing scheme
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	<p>This function programs location to the specified data. If the data size to program is larger than PAGE_SIZE this function returns SLLD_ERROR and doe not execute operation.</p> <p>Note: If the page boundary is encountered during page programming, additional bytes are wrapped around to the start of the same page.</p> <p>If PP_4BOp is attempted on the protected area, the function returns SLLD_OK but program operation is not executed.</p>

Function Name	sllid_QPPOp
Purpose	Performs a Quad input Page Programming Operation
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	<p>This function programs location to the specified data. If the data size to program is larger than PAGE_SIZE this function returns SLLD_ERROR and doe not execute operation.</p> <p>Note: If the page boundary is encountered during page programming, additional bytes are wrapped around to the start of the same page.</p> <p>If QPPOp is attempted on the protected area, the function returns SLLD_OK but program operation is not executed.</p>

Function Name	sllid_QPP_4BOP
Purpose	Performs a Quad input Page Programming Operation using 4-bytes addressing scheme
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	<p>This function programs location to the specified data using 4-bytes addressing scheme. If the data size to program is larger than PAGE_SIZE this function returns SLLD_ERROR and doe not execute operation.</p> <p>Note: If the page boundary is encountered during page programming, additional bytes are wrapped around to the start of the same page.</p> <p>If QPP_4BOP is attempted on the protected area, the function returns SLLD_OK but program operation is not executed.</p>

Function Name	sllid_BufferedProgramOp
Purpose	Performs a Programming Operation
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function programs location to the specified data. There is no limitation on data size to program. If the page boundary is encountered during BufferedProgramOp, additional bytes are written to the start of the next page. If BufferedProgramOp is attempted on the protected area, the function returns SLLD_OK but program operation on the protected area are not executed.

Function Name	sllid_BufferedProgram_4BOp
Purpose	Performs a Programming Operation using 4-bytes addressing scheme
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function programs location to the specified data using 4-bytes addressing scheme. There is no limitation on data size to program. If the page boundary is encountered during BufferedProgram_4BOp, additional bytes are written to the start of the next page. If BufferedProgram_4BOp is attempted on the protected area, the function returns SLLD_OK but program operation on the protected area are not executed.

Function Name	sllid_OTPPop
Purpose	Performs a OTP Programming Operation
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function programs specified data in the OTP region, which is in a different address space from the main array data.

Function Name	sllid_SEOp
Purpose	Performs a Sector Erase Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function erases the data in the specified Sector. Function issues all required commands and polls for completion. If SEOp is attempted on the protected area, the function returns SLLD_OK but erase operation is not executed.

Function Name	sllid_SE_4BOp
Purpose	Performs a Sector Erase Operation using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function erases the data in the specified Sector. Function issues all required commands and polls for completion. If SE_4BOp is attempted on the protected area, the function returns SLLD_OK but erase operation is not executed.

Function Name	sllid_P4EOp
Purpose	Performs a 4 KB Parameter Sector Erase Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function erases the data in one of the 4 KB Parameter Sector. Function issues all required commands and polls for completion. If P4EOp is attempted on the protected area, the function returns SLLD_OK but erase operation is not executed.

Function Name	sllid_P8EOp
Purpose	Performs a 8 KB Parameter Sector Erase Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function erases the data in two of the 4 KB Parameter Sector. Function issues all required commands and polls for completion. If P8EOp is attempted on the protected area, the function returns SLLD_OK but erase operation is not executed.

Function Name	sllid_P8E_4BOP
Purpose	Performs a 8KB Parameter Sector Erase Operation using 4-bytes addressing scheme
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function erases the data in two of the 4 KB Parameter Sector using 4-bytes addressing scheme. Function issues all required commands and polls for completion. If P8E_4BOP is attempted on the protected area, the function returns SLLD_OK but erase operation is not executed.

Function Name	sllid_BEOP
Purpose	Performs a Bulk Erase Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function erases the data in the chip. Function issues all required commands and polls for completion. If BEOP is attempted on the protected area, the function returns SLLD_OK but erase operation is not executed.

Function Name	sllid_WRSROp
Purpose	Performs a Write Status Register Operation
Parameters	
device_num	device number
data_buf	variable containing data to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function writes a new value to status register. Function issues all required commands and polls for completion. If WRSROp is attempted with status register (or part of it) protected, the function returns SLLD_OK but status register is not updated.

Function Name	sllid_WRROp
Purpose	Writes to Registers.
Parameters	
device_num	device number
status_val	variable containing data to program to the status register
config_val	variable containing data to program to the configuration register
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WRR command to SPI Flash. Function issues all required commands and polls for completion. If WRROp is attempted with status/configuration registers protected (or part of them), the function returns SLLD_OK but the registers are not updated.

Function Name	sllid_WASPOp
Purpose	Writes to ASP register.
Parameters	
device_num	device number
asp_val	variable containing data to program to the ASP register
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WASP command to SPI Flash. Function issues all required commands and polls for completion.

Function Name	sllid_WBNKOp
Purpose	Writes to bank addressing register.
Parameters	
device_num	device number
bnk_val	variable containing data to program to the bank addressing register
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WBNK command to SPI Flash. Function issues all required commands and polls for completion.

Function Name	sllid_WABTOp
Purpose	Writes to Auto Boot register.
Parameters	
device_num	device number
abt_val	variable containing data to program to the Auto Boot register
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WABT command to SPI Flash. Function issues all required commands and polls for completion.

Function Name	sllid_WPWDOp
Purpose	Writes to the password.
Parameters	
device_num	device number
target	variable containing data to program to the password
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WPWD command to SPI Flash. Function issues all required commands and polls for completion.

Function Name	sllid_BlockProtectOp
Purpose	Performs a Block Protect Operation
Parameters	
device_num	device number
bpb_value	value of block protect bits. Valid value for bpb_value is: 0x0 - 0x3 : for S25FL001D, S25FL002D 0x0 - 0x7 : for S25FL004D *For detail, please refer to data sheet of target device.
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	Function sets Block Protect bits to protect specified memory area. Function issues all required commands and polls for completion.

Function Name	sllid_PPB_PGOp
Purpose	Performs a PPB Programming Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function programs the PPB at the specified location and polls for completion.

Function Name	sllid_DYB_PGOp
Purpose	Performs a DYB Programming Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function programs the DYB at the specified location and polls for completion.

Function Name	sllid_GBLOp
Purpose	Performs a Global IBL lock Operation
Parameters	
device_num	device number
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Global IBL lock command to SPI Flash, and then polls for completion.

Function Name	sllid_GBULOp
Purpose	Performs a Global IBL unlock Operation
Parameters	
device_num	device number
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Global IBL unlock command to SPI Flash, and then polls for completion

Function Name	sllid_SPRPOp
Purpose	Performs a Set Pointer Region Protection Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the SPRP command to SPI Flash, and then polls for completion.

Function Name	sllid_BlockEraseOp
Purpose	Performs a Block Erase Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Block Erase command to SPI Flash, and then polls for completion.

Function Name	sllid_BE32KBOp
Purpose	Performs a 32KB Block Erase Operation for FLK device
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function sends a 32-KB Block erase command to FLK device and polls for completion.

Function Name	sllid_WRAR_Op
Purpose	Performs a Write any register Operation
Parameters	
device_num	device number
reg_addr	register address given by system
data_buf	variable containing data to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the write any register command and write 1-byte.

Function Name	sllid_PPBP_Op
Purpose	Performs a PPB program Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PPB Program command to SPI Flash and programs it, then polls for completion.

Function Name	sllid_DYBWR_Op
Purpose	Performs a DYB write Operation
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the DYB write command to SPI Flash and programs it, then polls for completion.

Function Name	sllid_IRPPOp
Purpose	Performs a write to IRP register Operation
Parameters	
device_num	device number
irp_val	variable containing data to program to the IRP register
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the write IRP register command to SPI Flash and programs it, then polls for completion.

Function Name	sllid_SECRPOp
Purpose	Performs a Security Region program Operation
Parameters	
device_num	device number
sys_addr	device address given by system
program_buf	variable containing data to program
len_in_bytes	number of bytes
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the write IRP register command to SPI Flash and programs it, then polls for completion.

Function Name	sllid_SECRPOp
Purpose	Performs a Security Region program Operation
Parameters	
device_num	device number
sys_addr	device address given by system
program_buf	variable containing data to program
len_in_bytes	number of bytes
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Security Region program command to SPI Flash and programs it, then polls for completion.

Function Name	sllid_SECREOp
Purpose	Performs a Security Region erase Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Secure Region erase command to SPI Flash, and then polls for completion.

Function Name	sllid_HBEOp
Purpose	Performs a Half Block erase Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Half Block erase command to SPI Flash, and then polls for completion.

Function Name	sllid_CEOp
Purpose	Performs a Chip erase Operation
Parameters	
device_num	device number
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Chip erase command to SPI Flash, and then polls for completion.

Function Name	sllid_CE1Op
Purpose	Performs an Chip erase Operation with alternative instruction
Parameters	
device_num	device number
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Chip erase command to SPI Flash, and then polls for completion.

Function Name	sllid_IBLOp
Purpose	Performs a IBL lock Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the IBL lock command to SPI Flash, and then polls for completion.

Function Name	sllid_IBULOp
Purpose	Performs a IBL unlock Operation
Parameters	
device_num	device number
sys_addr	device address given by system
dev_status_ptr	Pointer to the device status value after polling end
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the IBL unlock command to SPI Flash, and then polls for completion.

3.2 Command Functions

Function Name	sllid_ReadCmd
Purpose	Reads from SPI Flash.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Read command to SPI Flash and reads data from the array. Data size is specified by len_in_bytes.

Function Name	sllid_Read_4BCmd
Purpose	Reads from SPI Flash using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Read command to SPI Flash and reads data from the array using 4-bytes addressing scheme. Data size is specified by len_in_bytes.

Function Name	sllid_Fast_ReadCmd
Purpose	Fast_Read from SPI Flash.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Fast_Read command to SPI Flash and reads data from the array. Data size is specified by len_in_bytes.

Function Name	sllid_Fast_Read_4BCmd
Purpose	Fast_Read from SPI Flash using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Fast_Read command to SPI Flash and reads data from the array using 4-bytes addressing scheme. Data size is specified by len_in_bytes.

Function Name	sllid_DualIOReadCmd
Purpose	Reads from SPI Flash in Dual I/O mode.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Dual I/O Read command to SPI Flash and reads data from the array. Data size is specified by len_in_bytes.

Function Name	sllid_DualIORead_4BCmd
Purpose	Reads from SPI Flash in Dual I/O mode using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Dual I/O Read command to SPI Flash and reads data from the array using 4-bytes addressing scheme. Data size is specified by len_in_bytes.

Function Name	sllD_DualIOHPReadCmd
Purpose	Reads from SPI Flash in Dual I/O high performance mode.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
mode	read mode
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Dual I/O High Performance Read command to SPI Flash and reads data from the array. Data size is specified by len_in_bytes.

Function Name	sllD_DualIOHPRead_4BCmd
Purpose	Reads from SPI Flash in Dual I/O high performance mode using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
mode	read mode
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Dual I/O High Performance Read command to SPI Flash and reads data from the array using 4-bytes addressing scheme. Data size is specified by len_in_bytes.

Function Name	sllD_QuadIOReadCmd
Purpose	Reads from SPI Flash in Quad I/O mode.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Quad I/O Read command to SPI Flash and reads data from the array. Data size is specified by len_in_bytes.

Function Name	sllid_QuadIORead_4BCmd
Purpose	Reads from SPI Flash in Quad I/O mode using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Quad I/O Read command to SPI Flash and reads data from the array using 4-bytes addressing scheme. Data size is specified by len_in_bytes.

Function Name	sllid_QuadIOHPReadCmd
Purpose	Reads from SPI Flash in Quad I/O high performance mode.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
mode	read mode
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Quad I/O High Performance Read command to SPI Flash and reads data from the array. Data size is specified by len_in_bytes.

Function Name	sllid_QuadIOHPRead_4BCmd
Purpose	Reads from SPI Flash in Quad I/O high performance mode using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
mode	read mode
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Quad I/O High Performance Read command to SPI Flash and reads data from the array using 4-bytes addressing scheme. Data size is specified by len_in_bytes.

Function Name	slll_Read_IDCmd
Purpose	Reads ID from SPI Flash
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK or SLLD_E_HAL_ERROR
Details	This function issues the Read_ID command to SPI Flash and reads the device ID

Function Name	slll_RDIDCmd
Purpose	Reads Identification from SPI flash
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK or SLLD_E_HAL_ERROR
Details	This function issues the RDID command to SPI Flash and reads the identification. Note the identification consists of 3 bytes (manufacturer identification byte, memory type byte and memory capacity byte.)

Function Name	slll_Read_IdentificationCmd
Purpose	Reads Identification from SPI flash
Parameters	
device_num	device number
target	variable in which to store read data
addr	address offset for the command
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Read-ID command to SPI Flash and reads the identification. Note the identification consists of 2 bytes (manufacturer identification byte, and Device ID.)

Function Name	sllid_RDSRCmd
Purpose	Reads from Status Register.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RDSR command to SPI Flash and reads the value of status register.

Function Name	sllid_SRSTCmd
Purpose	Writes software reset to the flash.
Parameters	
device_num	device number
Return Values	SLLD_OK or SLLD_E_HAL_ERROR
Details	This function issues the SRST command to the SPI Flash.

Function Name	sllid_RASPCmd
Purpose	Reads from ASP Register.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RASP command to SPI Flash and reads the value of the ASP register.

Function Name	sllid_RBNKCmd
Purpose	Reads from bank addressing Register.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RBNK command to SPI Flash and reads the value of the bank addressing register.

Function Name	sllid_RABTCmd
Purpose	Reads from Auto Boot Register.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RABT command to SPI Flash and reads the value of the Auto Boot register.

Function Name	sllid_RECCCmd
Purpose	Reads from ECC Register.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RECC command to SPI Flash and reads the value of the ECC register per cache-line.

Function Name:	sllid_RPWDCmd
Purpose:	Reads the Password.
Parameters:	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RPWD command to SPI Flash and reads the value of the password.

Function Name	sllid_RCRCmd
Purpose	Reads from Configuration Register.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RCR command to SPI Flash and reads the value of configuration register.

Function Name	sllid_WRENCmd
Purpose	Writes the Write Enable command.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WREN command to SPI Flash.

Function Name	sllid_WRDICmd
Purpose	Writes the Write Disable command.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WRDI command to SPI Flash.

Function Name	sllid_WRSRCmd
Purpose	Write to Status Register.
Parameters	
device_num	device number
data_buf	variable containing data to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WRSR command to SPI Flash.

Function Name	sllid_WRRCmd
Purpose	Writes to Registers.
Parameters	
device_num	device number
status_val	variable containing data to program to the status register
config_val	variable containing data to program to the configuration register
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WRR command to SPI Flash.

Function Name	sllid_WASPCmd
Purpose	Writes to ASP register.
Parameters	
device_num	device number
asp_val	variable containing data to program to the ASP register
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WASP command to SPI Flash.

Function Name	sllid_WBNKCmd
Purpose	Writes to bank addressing register.
Parameters	
device_num	device number
bnk_val	variable containing data to program to the bank addressing register
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WBNK command to SPI Flash.

Function Name	sllid_WABTCmd
Purpose	Writes to Auto Boot register.
Parameters	
device_num	device number
abt_val	variable containing data to program to the Auto Boot register
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WABT command to SPI Flash.

Function Name	sllid_WPWDCmd
Purpose	Writes to password.
Parameters	
device_num	device number
target	variable containing data to program to the password
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WPWD command to SPI Flash.

Function Name	sllid_PPcmd
Purpose	Page Program.
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PP command to SPI Flash.

Function Name	sllid_PP_4BCmd
Purpose	Page Program using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PP command to SPI Flash using 4-bytes addressing scheme.

Function Name	sllid_QPPCmd
Purpose	Quad I/O Page Program.
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the QPP command to SPI Flash.

Function Name	sllid_QPP_4BCmd
Purpose	Quad I/O Page Program using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
len_in_bytes	number of bytes to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the QPP command to SPI Flash using 4-bytes addressing scheme.

Function Name	sllid_SECmd
Purpose	Sector Erase.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the SE command to SPI Flash.

Function Name	sllid_SE_4BCmd
Purpose	Sector Erase using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system

Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the SE command to SPI Flash using 4-bytes addressing scheme.

Function Name	sllid_ERS_SSPCmd
Purpose	Suspend sector erase operation.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the ERS_SSP command to SPI Flash.

Function Name	sllid_ERS_RESCmd
Purpose	Resumes suspended sector erase operation.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the ERS_RES command to SPI Flash.

Function Name	sllid_RCVRCmd
Purpose	Initiates recovery mode.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RCVR command to SPI Flash.

Function Name	sllid_RCSPCmd
Purpose	Suspends the Recovery mode.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RCSP command to SPI Flash.

Function Name	sllid_RCRSCmd
Purpose	Resumes the suspended Recovery mode.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RCRS command to SPI Flash.

Function Name	sllid_P4ECmd
Purpose	4KB Parameter Sector Erase.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the P4E command to SPI Flash.

Function Name	sllid_P8ECmd
Purpose	8KB Parameter Sector Erase.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the P8E command to SPI Flash.

Function Name	sllid_P8E_4BCmd
Purpose	8KB Parameter Sector Erase using 4-bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the P8E command to SPI Flash using 4-bytes addressing scheme.

Function Name	sllid_BECmd
Purpose	Bulk (Chip) Erase.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the BE command to SPI Flash.

Function Name	sllid_OTPPCmd
Purpose	Programs OTP area.
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the OTP command to SPI Flash.

Function Name	sllid_OTPRCmd
Purpose	Reads data from OTP region.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the OTP Read command to SPI Flash and reads data from OTP region. Data size is specified by len_in_bytes.

Function Name	sllid_SPCmd
Purpose	Software Protect (Deep power-Down).
Parameters	
device_num	device number
Return Values	SLLD_OK or SLLD_E_HAL_ERROR

Details	This function issues the DP command to SPI Flash.

Function Name	sllid_RESCmd
Purpose	Exit Software Protection mode (Release from Deep Power-Down mode).
Parameters	
device_num	device number
Return Values	SLLD_OK or SLLD_E_HAL_ERROR
Details	This function issues the RES command to SPI Flash.

Function Name	sllid_ClearStatusRegisterCmd
Purpose	Clears the status register.
Parameters	
device_num	device number
Return Values	SLLD_OK or SLLD_E_HAL_ERROR
Details	This function issues the CLSR command to SPI Flash.

Function Name	sllid_PPB_PGCmd
Purpose	Program PPB.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the program PPB command to SPI Flash.

Function Name	sllid_DYB_PGCmd
Purpose	Program DYB.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the program DYB command to SPI Flash.

Function Name	sllid_PASSUCmd
Purpose	Password Unlock.
Parameters	
device_num	device number
data_buf	variable containing data to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PASSU command to SPI Flash.

Function Name	sllid_RSTCcmd
Purpose	Software Reset
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Software Reset command immediately following a RSTEN command initiates the software reset process.

Function Name	sllid_RSTENCmd
Purpose	Software Reset Enable
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Reset Enable command which required immediately before a Reset command (RST).

Function Name	sllid_DPCmd
Purpose	Deep Power Down
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Deep Power-down command to SPI Flash. This command sets the target device in deep power-down state to reduce power consumption.

Function Name	sllid_PRLCmd
Purpose	Protection register lock (NVLOCK bit write).
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PRL command to SPI Flash.

Function Name	sllid_PRRDCmd
Purpose	Protection register read.
Parameters	
device_num	device number
data_buf	variable containing data to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PRRD command to SPI Flash.

Function Name	sllid_SBLCmd
Purpose	Set Burst Length.
Parameters	
device_num	device number
wrapbit_buf	variable in which to store wrap bit data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Set Burst Length command to SPI Flash.

Function Name	sllid_MBRCmd
Purpose	Mode Bit Reset.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the MBR command to return the device from continuous high performance read mode back to normal standby awaiting any new command.

Function Name	sllid_BlockEraseCmd
Purpose	Block Erase.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Block Erase command to SPI Flash. The Block Erase command sets all bits in the addressed 64 KB block to 1 (all bytes are FFh).

Function Name	sllid_RDQIDCmd
Purpose	Read manufacturer ID in Quad All mode.
Parameters	
device_num	device number
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RDQID command to SPI Flash and read ID data.

Function Name	sllid_RDSR2Cmd
Purpose	Read Status Register-2.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RDSR2 command to SPI Flash and read status register 2.

Function Name	sllid_RDARCmd
Purpose	Read any device register.
Parameters	
device_num	device number
reg_addr	register address given by system
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the read any register command and reads the requested data in 1-byte.

Function Name	sllid_DLPRDCmd
Purpose	Read Data Learning register.
Parameters	
device_num	device number
data_buf	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the read any register command and reads the requested data in 1-byte.

Function Name	sllid_PNVDLRCmd
Purpose	Program NV Data Learning register.
Parameters	
device_num	device number
data_buf	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PNVDRL command to SPI Flash.

Function Name	sllid_WVDLRCmd
Purpose	Write Volatile Data Learning register.
Parameters	
device_num	device number
data_buf	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WVDRL command to SPI Flash.

Function Name	sllid_EPS_Cmd
Purpose	Sector Erase suspend.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the EPS command to SPI Flash.

Function Name	sllid_EPR_Cmd
Purpose	Sector Erase resume.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the EPR command to SPI Flash.

Function Name	sllid_4BAM_Cmd
Purpose	4-Byte Address Mode.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4BAM command to SPI Flash. Used for FSS devices.

Function Name	sllid_PASSRDCmd
Purpose	Password Read.
Parameters	
device_num	device number
data_buf	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PASSRD command to SPI Flash and read password data.

Function Name	sllid_PASSPCmd
Purpose	Program Password.
Parameters	
device_num	device number
data_buf	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PASSP command to SPI Flash.

Function Name	sllid_WRENVCmd
Purpose	Write Enable for Volatile Status and Configure register.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the WRENV command to SPI Flash.

Function Name	sllid_HBECmd
Purpose	Half Block Erase.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the HBE command to SPI Flash.

Function Name	sllid_4HBECmd
Purpose	Half Block Erase 4 bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4HBE command to SPI Flash.

Function Name	sllid_4BECmd
Purpose	Block Erase 4 bytes addressing scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4BE command to SPI Flash.

Function Name	sllid_CECmd
Purpose	Chip erase.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the CE command to SPI Flash.

Function Name	sllid_CE1Cmd
Purpose	Chip erase using alternate instruction.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the CE1 command to SPI Flash.

Function Name	sllid_IBLRDCmd
Purpose	IBL read.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the reading the state of each IBL bit protection.

Function Name	sllid_4IBLRDCmd
Purpose	IBL read - 4 Bytes address.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the reading the state of each IBL bit protection using 4 Bytes address scheme.

Function Name	sllid_IBLCmd
Purpose	IBL lock.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the IBL lock command to sets the selected IBL bit to "0" protecting each related sector / block.

Function Name	sIld_4IBLCmd
Purpose	IBL lock using 4 Bytes address scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the IBL lock command to sets the selected IBL bit to "0" protecting each related sector / block.

Function Name	sIld_IBULCmd
Purpose	IBL unlock.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the IBL unlock command to sets the selected IBL bit to "1" unprotecting each related sector / block.

Function Name	sIld_4IBLCmd
Purpose	IBL unlock using 4 Bytes address scheme.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the IBL unlock command to sets the selected IBL bit to "1" unprotecting each related sector / block.

Function Name	sIld_GBLCmd
Purpose	Global IBL lock.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR

Details	This function issues the global IBL lock command to sets all IBL bit to "0" protecting all sectors / blocks.

Function Name	sIld_GBULCmd
Purpose	IBL unlock.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the global IBL unlock command to sets all IBL bit to "1" unprotecting all sectors / blocks.

Function Name	sIld_SPRPCmd
Purpose	Set Pointer Region Protection.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the SPRP command to sets pointer region protection.

Function Name	sIld_4SPRPCmd
Purpose	Set Pointer Region Protection - 4 Bytes address
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4SPRP command to sets pointer region protection.

Function Name	sIld_DIORCmd
Purpose	Read flash using Dual IO.
Parameters	
device_num	device number
sys_addr	device address given by system

target	variable in which to store read data
modebit	the read mode to be passed to the device
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the dual IO read command and reads the requested data.

Function Name	sllid_4DIORCmd
Purpose	Read flash using 4 Byte Dual IO.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
modebit	the read mode to be passed to the device
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4 byte dual IO read command and reads the requested data.

Function Name	sllid_QIORCmd
Purpose	Read flash using Quad IO.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
modebit	the read mode to be passed to the device
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the quad IO read command and reads the requested data.

Function Name	sllid_4QIORCmd
Purpose	Read flash using 4 Byte Quad IO.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
modebit	the read mode to be passed to the device
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4 byte quad IO read command and reads the requested data.

Function Name	sllid_DDRQIORCmd
Purpose	Read flash using DDR Quad IO.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
modebit	the read mode to be passed to the device
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the DDR quad IO read command and reads the requested data.

Function Name	sllid_4DDRQIORCmd
Purpose	Read flash using 4 Byte DDR Quad IO.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
modebit	the read mode to be passed to the device
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4 byte DDR quad IO read command and reads the requested data.

Function Name	sllid_SECRRCmd
Purpose	Security Region Read.
Parameters	
device_num	device number
sys_addr	device address given by system
read_buf	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the security region read command and reads the requested data.

Function Name	sllid_SECRPCmd
Purpose	Security Region program.
Parameters	
device_num	device number
sys_addr	device address given by system
program_buf	data buffer
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the security region program command to SPI flash.

Function Name	sllid_SECRECmd
Purpose	Security Region erase.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the security region erase command to SPI flash.

Function Name	sllid_RUIDCmd
Purpose	Read Unique ID number.
Parameters	
device_num	device number
read_buf	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the read UID command and reads the requested data.

Function Name	sllid_BE32KBCmd
Purpose	Block Erase 32KB for FLK device.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the Block Erase 32KB command to SPI Flash.

Function Name	sllid_WRARCmd
Purpose	Write any device register command.
Parameters	
device_num	device number
reg_addr	register address given by system
data_buf	variable containing data to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the write any register command to SPI Flash.

Function Name	sllid_PPBP_Cmd
Purpose	PPB program.
Parameters	
device_num	device number
sys_addr	device address given by system
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the PPB Program command to SPI Flash and programs it. The command is followed by the 24 or 32-bit address, depending on the address length configuration CR2V[7].

Function Name	sllid_DYBWR_Cmd
Purpose	DYB write.
Parameters	
device_num	device number
sys_addr	device address given by system
data_buf	variable containing data to program
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the DYB write command to SPI Flash.

Function Name	sllid_ReadSFDPcmd
Purpose	Read Serial Flash Discoverable Parameter.
Parameters	
device_num	device number
sys_addr	device address given by system
read_buf	data buffer
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the read SFDP command to SPI Flash.

Function Name	sllid_RDCR2Cmd
Purpose	Read from configuration register-2.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RDCR2 command to SPI Flash.

Function Name	sllid_RDCR3Cmd
Purpose	Read from configuration register-3.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the RDCR3 command to SPI Flash.

Function Name	sllid_IRPRDCmd
Purpose	Read IRP Register.
Parameters	
device_num	device number
target	variable in which to store read data
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the IRPRD command to SPI Flash.

Function Name	sIld_IRPPCmd
Purpose	Write to IRP Register.
Parameters	
device_num	device number
target	variable containing data to program to the IRP register
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the IRPP command to SPI Flash.

Function Name	sIld_QPIENCmd
Purpose	Enter QPI
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the QPIEN command to SPI Flash

Function Name	sIld_QPIEXCmd
Purpose	Exit QPI.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the QPIEX command to SPI Flash.

Function Name	sIld_4BENCmd
Purpose	Enter 4 byte Address Mode.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4BEN command to SPI Flash. This will sets the volatile Address Length bit (CR2V[0]) to 1 to change most 3-byte address commands to require 4 bytes of address.

Function Name	sllid_4BEXCmd
Purpose	Exit 4 byte Address Mode.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4BEX command to SPI Flash. This will sets the volatile Address Length bit (CR2V[0]) to 0.

Function Name	sllid_DORCmd
Purpose	Read flash using Dual Output.
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the dual output read command and reads the requested data.

Function Name	sllid_4DORCmd
Purpose	Read flash using 4 Byte Dual Output
Parameters	
device_num	device number
sys_addr	device address given by system
target	variable in which to store read data
len_in_bytes	number of bytes to read
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function issues the 4 byte dual output read command and reads the requested data.

3.3 Utility Functions

Function Name	sllid_Poll
Purpose	Polls flash device for embedded operation completion.
Parameters	
device_num	device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function polls the flash device to determine when an embedded operation has finished.

Function Name	sllid_StatusGet
Purpose	Determines Flash Status
Parameters	
device_num	device number
dev_status_ptr	variable to store device status
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function reads the status register of specified device and sets value of dev_status_ptr to the current device status (dev_busy, dev_program_error, dev_erase_error, dev_suspend or dev_not_busy.)

Function Name	sllid_SoftwareProtectStatusGet
Purpose	Gets Flash Software protect Status.
Parameters	
device_num	device number
softwareprotect	
dev_status_ptr	variable to store device software protect status
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function gets the software protect status of the specified device from the variable stored in RAM.

Function Name	sllid_GetDevNumFromAddr
Purpose	Helps user to get device number from address when target device with multiple chip select.
Parameters	
sys_addr	device address given by system
device_num	pointer to device number
Return Values	SLLD_OK, SLLD_E_DEVICE_SOFTWARE_PROTECTED or SLLD_E_HAL_ERROR
Details	This function can help the user to get the device number from the address when target device with multiple chip select. Before using this function, user must ensure the target device has multiple chip selects. The user must also modify BASE_ADDR_MASK and BASE_ADDR_SHIFT_BIT according to their own system configuration.

3.4 HAL Functions

Function Name	FLASH_READ
Purpose	Basic device read (one CS# cycle)
Parameters	
device_num	device number
command	Command byte to be written to the flash
sys_addr	System address to be read from
Data_buffer	Pointer to a data buffer where the read data will be stored
Number_Of_Bytes	Number of bytes to read
Return Values	SLLD_OK or SLLD_E_HAL_ERROR
Details	A call to the read function corresponds to a CS# cycle. The source code of this function must be adapted according to the system platform requirements.

Function Name	FLASH_WRITE
Purpose	Basic device write (one CS# cycle)
Parameters	
device_num	device number
command	Command byte to be written to the flash
sys_addr	System address to be written to
Data_buffer	Pointer to a data buffer containing data to be written
Number_Of_Bytes	Number of bytes to write
Return Values	SLLD_OK or SLLD_E_HAL_ERROR
Details	A call to the write function corresponds to a CS# cycle. The source code of this function must be adapted according to the system platform requirements.

Revision History



Document Revision History

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Revision	ECN#	Issue Date	Origin of Change	Description of Change
**	–	10/05/2010	–	Initial version
*A	4969108	10/16/2015	MSWI	Updated in Cypress template
*B	5028171	11/26/2015	MSWI	Updated in User Guide template
*C	5211120	04/07/2016	PZHU	Updated API description to support FL-L devices