

The Application Note of NX1 C_Module Executes SPI Flash Erasing

Description: When NX1 C_Module uses the C_Module API to erase SPI Flash, set the execution based on the SPI Flash erasing specification used in production.

Reason: Because the brands and types of SPI Flash are various, the erasing time of Sector and Block is different, especially the erasing time of typical value (Typ.) and maximum value (Max.) have a big difference. To erase SPI Flash correctly through the C_Module API, user needs to set the maximum erasing time (Max.) of SPI Flash.

Solution: 1. Check the maximum erasing time (Max.) from the SPI Flash specification.

PARAMETER		Min.	Typ. ⁽¹⁾	Max. ⁽²⁾	Unit
Write Status Register Cycle Time			5	40	ms
Sector Erase Cycle Time (4KB)	VCC: 2.3V-2.7V		75	750	ms
	VCC: 2.7V-3.6V		73	500	ms
Block Erase Cycle Time (32KB)	VCC: 2.3V-2.7V		0.35	4.95	s
	VCC: 2.7V-3.6V		0.34	3.8	s
Block Erase Cycle Time (64KB)	VCC: 2.3V-2.7V		0.65	5.3	s
	VCC: 2.7V-3.6V		0.62	4	s
Chip Erase Cycle Time	VCC: 2.3V-2.7V		7.5	28	s
	VCC: 2.7V-3.6V		7	22.5	s

2. Fill the corresponding Max. parameter in NX1 C_Module nx1_config.h that is shown below.

- To erase Sector by executing SPI_BurstErase_Sector(), the SPI_MODE of Storage Module and SPI Flash Simulate EEPROM, user needs to fill the parameter 750msec, the maximum erasing time (Max.) of Sector, in _SPI_SECTOR_ERASE_MAX_TIME.
- To erase Block by executing SPI_BurstErase(), the SPI Flash Simulate EEPROM, user needs to fill the parameter 5300msec, the maximum erasing time (Max.) of Block, in _SPI_BLOCK_ERASE_MAX_TIME.
- To erase Sector by executing SPI1_BurstErase_Sector(), the SPI1_MODE of Storage Module, user needs to fill the parameter 750msec, the maximum erasing time (Max.) of Sector, in _SPI1_SECTOR_ERASE_MAX_TIME.
- To erase Block by executing SPI1_BurstErase(), user needs to fill the parameter 5300msec, the maximum erasing time (Max.) of Block, in _SPI1_BLOCK_ERASE_MAX_TIME.

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////////////////////////////////////
//-----
// * SPI Module *
//-----
////////////////////////////////////
//-----
// SPI0 Parameter Setting
//-----
#define _SPI_MODULE           ENABLE           // Enable or Disable SPI0. Don't delete this line.
#if _EF_SERIES
    #define _SPI_ACCESS_MODE   SPI_1_4_4_MODE // For NX1 EF series, SPI0 data mode. Don't delete this line.
#else
    #define _SPI_ACCESS_MODE   SPI_1_1_1_MODE // For NX1 OTP series, SPI0 data mode.
#endif
#define _SPI_ADDR_BYTE       3                // SPI0 Address Byte(3 or 4)
#define _SPI_SECTOR_ERASE_MAX_TIME 750        // SPI0 sector erase time max spec, unit:msec
#define _SPI_BLOCK_ERASE_MAX_TIME 5300       // SPI0 block erase time max spec, unit:msec
#define _SPI_INT              DISABLE         // Enable or Disable SPI0 INT
#define _SPI_KEEP_VDD_IN_SLEEP DISABLE        // Keep SPI0_Vdd in sleep, only for NX1 OTP series.
//-----
// SPI1 Parameter Setting
//-----
#define _SPI1_MODULE          ENABLE          // Enable or Disable SPI1. Don't delete this line.
#define _SPI1_USE_FLASH       ENABLE         // Enable or Disable SPI Flash
#define _SPI1_ACCESS_MODE     SPI_1_1_1_MODE_3WIRE // For NX1 EF series, SPI1 data mode. Don't delete this line.
#define _SPI1_ADDR_BYTE       3              // SPI1 Address Byte(3 or 4)
#define _SPI1_SECTOR_ERASE_MAX_TIME 750      // SPI1 sector erase time max spec, unit:msec
#define _SPI1_BLOCK_ERASE_MAX_TIME 5300     // SPI1 block erase time max spec, unit:msec
#define _SPI1_INT              DISABLE       // Enable or Disable SPI1 INT

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3. When erasing Sector /Block by executing C_Module API, the WDT flag is cleared every 10mS to avoid WDT reset (e.g., 750mS period). The C_Module API ends WDT clearing when the SPI Flash erasure is completed or the executing time-out (determined by the max. erase time as defined by customer), depending on which occurs earlier.