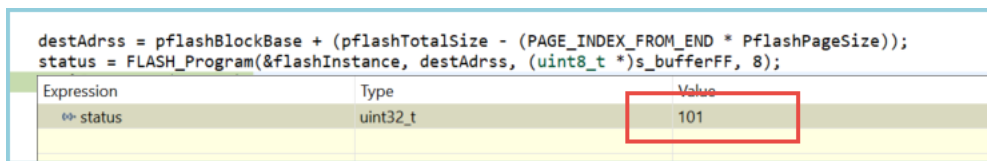# LPC55xx: Why FLASH Program can't Success?

Jennie Zhang

MCUXpresso SDK for LPC55xx uses FLASH API to implement FLASH drivers. Some user may meet issue when executes FLASH program code, for instance:

*status = FLASH_Program(&flashInstance, destAdrss, (uint8_t *)s_bufferFF, 8);*

After execution this code, nothing changed in the destination address, but error code **101** returns:

```
destAdrss = pflashBlockBase + (pflashTotalSize - (PAGE_INDEX_FROM_END * PflashPageSize));
status = FLASH_Program(&flashInstance, destAdrss, (uint8_t *)s_bufferFF, 8);
```

Expression	Type	Value
↔ status	uint32_t	101

This error code looks new, as it doesn't commonly exist in other older LPCs. If we check FLASH driver status code from UM, code 101 means FLASH_Alignment Error:

Table 256. Flash driver status code

Status	Code	Description
kStatus_FLASH_Success	0	The flash operation is successful.
kStatus_FLASH_InvalidArgument	4	Invalid argument detected during executing a FLASH API.
kStatus_FLASH_SizeError	100	Invalid size detected during executing a FLASH API.
kStatus_FLASH_AlignmentError	101	Alignment error detected during executing a FLASH API.
kStatus_FLASH_AddressError	102	Address error detected during executing a FLASH API.
kStatus_FLASH_AccessError	103	Access error detected during executing a FLASH API.
kStatus_FLASH_CommandFailure	105	Command failure detected during executing a FLASH API.

Alignment error Ah ha? ! Go back to the definition of FLASH_Program,

*status_t FLASH_Program(flash_config_t *config, uint32_t start, uint32_t *src, uint32_t lengthInBytes);*

New user often overlooks the UM description of this API "the required *start* and the *lengthInBytes* must be page size aligned". That's to say, to execute FLASH_Program function, both start address and the length must be 512 bytes-aligned. So if we modify

*status = FLASH_Program(&flashInstance, destAdrss, (uint8_t *)s_bufferFF, 8);*

To

*status = FLASH_Program(&flashInstance, destAdrss, (uint8_t *)s_bufferFF, 512);*

FLASH_Program can be successful.

‼ **NOTE**: In old version of SDK2.6.x, the description of FLASH_Program says the start address and length are word-aligned which is not correct. The new SDK2.7.0 has fixed the typo.

Keep in mind: Even you want to program 1 word, the lengInBytes is still 512 aligned, as same as destAdrss!

PS.

I always recommend my customer to check FLASH driver status code when meet problem with FLASH API. We can find it in UM11126, Chapter 9, FLASH API.

I extract here for your quickly browse:

Table 256. Flash driver status code

Status	Code	Description
kStatus_FLASH_Success	0	The flash operation is successful.
kStatus_FLASH_InvalidArgument	4	Invalid argument detected during executing a FLASH API.
kStatus_FLASH_SizeError	100	Invalid size detected during executing a FLASH API.
kStatus_FLASH_AlignmentError	101	Alignment error detected during executing a FLASH API.
kStatus_FLASH_AddressError	102	Address error detected during executing a FLASH API.
kStatus_FLASH_AccessError	103	Access error detected during executing a FLASH API.
kStatus_FLASH_CommandFailure	105	Command failure detected during executing a FLASH API.
kStatus_FLASH_UnknownProperty	106	Unknown property for flash_get_property API.
kStatus_FLASH_EraseKeyError	107	Incorrect EraseKey for flash_erase API.
kStatus_FLASH_CommandNotSupported	111	An unsupported command is detected during executing a FLASH API.
kStatus_FLASH_EccError	116	ECC error detected during executing a FLASH API.
kStatus_FLASH_CompareError	117	Compare error detected during executing flash_erase_verify or flash_program_verify API.
kStatus_FLASH_RegulationLoss	118	Regulation loss detected during executing a FLASH API.
kStatus_FLASH_InvalidWaitStateCycles	119	The wait state cycle set to r/w mode is invalid.
kStatus_FLASH_OutOfDateCfpaPage	132	CFPA page version is out of date.
kStatus_FLASH_BlankIfrPageData	133	Blank page cannnot be read.
kStatus_FLASH_EncryptedRegionsEraseNotDoneAtOnce	134	Encrypted flash subregions are not erased at once.
kStatus_FLASH_ProgramVerificationNotAllowed	135	Program verification is not allowed when the encryption is enabled.
kStatus_FLASH_HashCheckError	136	Hash check of page data is failed.
kStatus_FLASH_SealedFfrRegion	137	The FFR region is sealed.
kStatus_FLASH_FfrRegionWriteBroken	138	The FFR Spec region is not allowed to be written discontinuously.
kStatus_FLASH_NmpaAccessNotAllowed	139	The NMPA region is not allowed to be read/written/erased.
kStatus_FLASH_CmpaCfgDirectEraseNotAllowed	140	The CMPA Cfg region is not allowed to be erased directly.
kStatus_FLASH_FfrBankIsLocked	141	The FFR bank region is locked.

Happy Programming 😊