



QN902x OTA Programming Guide

Version 0.1

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1. Introduction

The OTA is used to upgrade the firmware of QN90xx over the air.

2. OTA Example

2.1 Project

The project can be opened with the following IAR and KEIL workspace file:

C:\Quintic Corporation\QBlue-X.X.X\Projects\BLE\prj_ota\iar\ota.eww

C:\Quintic Corporation\QBlue-X.X.X\Projects\BLE\prj_ota\keil\ota.uvproj

2.2 Software Description

The OTA application is implemented in the following files:

- otas_task.h: Application function
- qn_ota.lib: OTA Profile
- serialflash.c: Serial Flash driver

2.2.1 User Configuration

The following macro shall be defined in the 'usr_config.h'.

- #define CFG_PRF_OTAS
- #define CFG_TASK_OTAS TASK_PR7 (Mandatory)

2.2.2 Initialization

The initialization of the application occurs in two phases:

First, the **otas_init(uint32_t fw2_start_addr, enum ota_crypt_t crypt, const uint8_t key[16])** function is called by the profiles register function(**prf_init_reg(prf_init)**). This function register OTA task into kernel.

- **fw2_start_addr**: firmware 2 start address – Default: 0x12000
- **crypt**: Enable or disable encryption - Default: OTA_ENABLE_ENCRYPT
- **key[16]**: AES 128 key (16bytes) - Default: 0x11223344556677889900AABBCCDDEEFF

Second: The following function is called by the `app_create_server_service_DB()` function.

- `app_otas_create_db()`: This function used to create server service database.

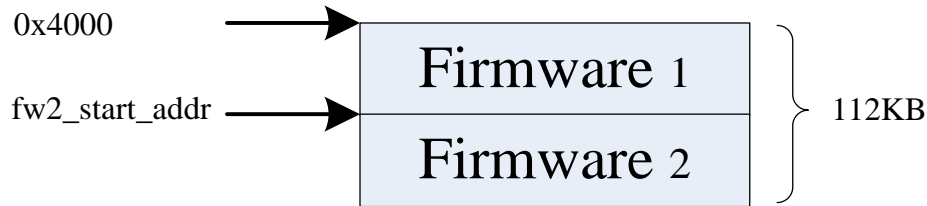


Figure 1 Flash Layout

2.3 Download

If you want to use OTA, first you must be download file use ISP tool. The second you should be open the file with the OTA function.

2.3.1 ISP Download

Step 1: Use ISP tool to download OTA bin file.

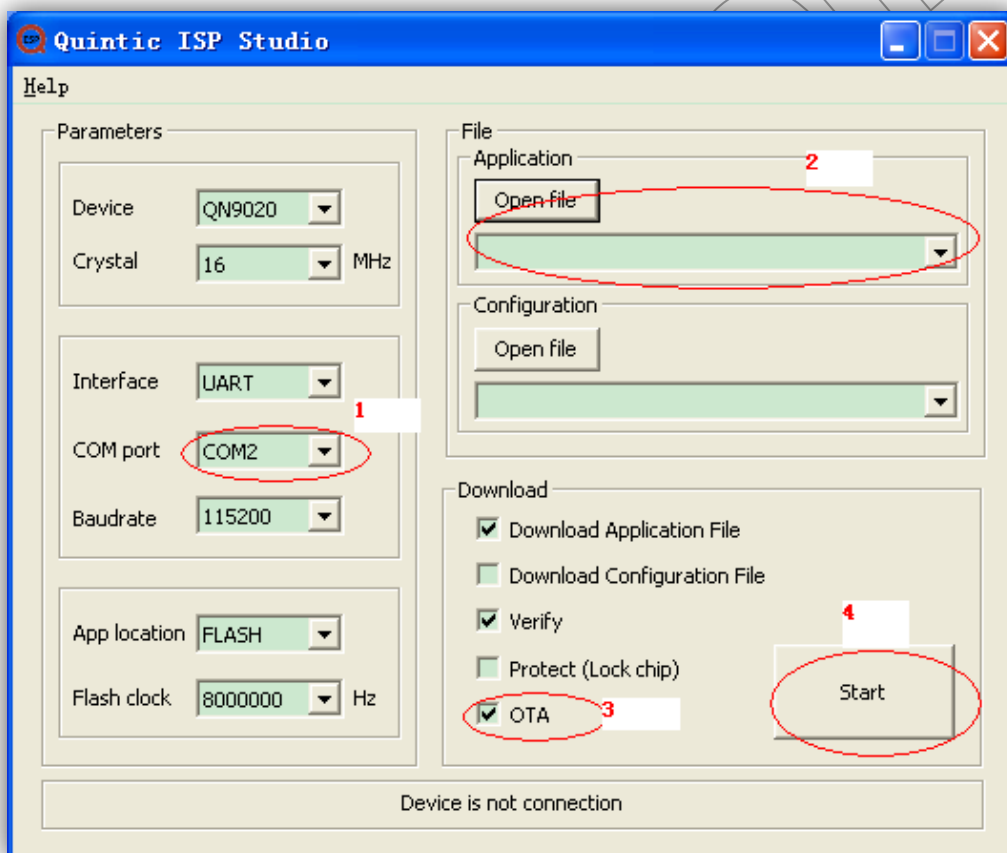


Figure 2 ISP Download bin file.

2.3.2 iOS Download

Step 2: If your New-App don't have OTA function, you can only upgrade once.

If you need to encrypt, first you must run qotapack.exe (Dashed box section below).

Encrypt Project Firmware file:

- Usage: qotapack [OPTION]...
- Options:
 - v, --version Mandatory. Firmware version (Hex Format, 2bytes).
 - e, --encrypt Optional. Enable to encrypt the original firmware.
 - k, --key If enable encryption, it is mandatory, otherwise it is ignored.
AES 128 key (Hex Format, 16bytes).
 - f, --from Mandatory. Original firmware file.
 - t, --to Mandatory. Encrypted firmware file.
 - h, --help Show me.
- Example:
qotapack --version=1234 --encrypt --key=11223344556677889900AABBCCDDEEFF
--from=origianl.bin --to=encrypted.bin

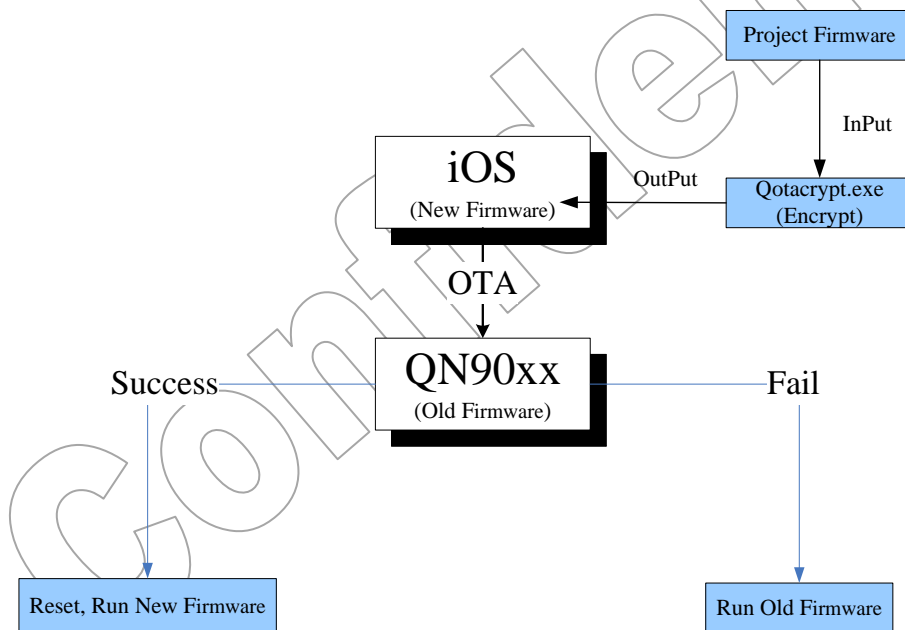


Figure 3 iOS Download and Encrypt firmware file

3. API

3.1 otas_init()

Prototype:

```
enum ota_status_t otas_init(uint32_t fw2_start_addr, enum ota_crypt_t crypt, const uint8_t key[16]);
```

Parameters:

in	fw2_start_addr	Set second zone start address.
in	crypt	OTA_ENABLE_ENCRYPT: Enable encryption OTA_DISABLE_ENCRYPT: Disable encryption.
in	key[16]	AES 128 key (16bytes).

Returns:

OTA_STATUS_OK: The OTAS initialize successfully.

OTA_STATUS_FW2_ADDR_INVALID: The OTAS initialize fail; firmware address is invalid.

OTA_STATUS_DEVICE_NOT_SUPPORT_OTA: The OTAS initialize fail; the device is not supported OTA. And the device firmware is not downloaded by "QnlSPStudio"

Description:

This function performs all the initializations of the OTA module.

3.2 app_otas_create_db()

Prototype:

```
void app_otas_create_db(void).
```

Description:

This function is used to create OTA server service database.

3.3 app_otas_enable_req()

Prototype:

```
void app_otas_enable_req (uint16_t conhdl, uint8_t sec_lvl)
```

Parameters:

in	conhdl	Connection handle for which the OTA Server role is enabled
in	sec_lvl	Security level required for protection of attributes. Service Hide and Disable are not permitted. Possible values are: PERM_RIGHT_ENABLE : Enable access PERM_RIGHT_UNAUTH : Access Requires Unauthenticated link PERM_RIGHT_AUTH : Access Requires Authenticated link

Response:

None

Description:

This function is used for enabling the Reporter role of the OTA profile. After calling this function, the services are unhidden from the peer discover.

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References

Included with QUINTIC QBlue-X.X.X Release. The QBlue-X.X.X software has been installed to the default path 'C:\ Quintic Corporation\QBlue-X.X.X':

- [1] C:\Quintic Corporation\QBlue-X.X.X\ Documents\Software\
ISP Studio Manual v0.6.pdf
- [2] C:\Quintic Corporation\QBlue-X.X.X\ Documents\Software\
QN9020 API Programming Guide v0.8.pdf

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Release History

REVISION	CHANGE DESCRIPTION	DATE
0.1	Initial release	2014-05-19

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