Kneron Inc

Document Name: **Kneron Bootloader user guide**

Kneron bootloader user guide
Kneron Inc
Operating Guidelines

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1 Introduction

1.1 Purpose

The purpose of this document is to provide an user guide for those who hope to compile and use Bootloader (IPL/SPL) on Mozart EVB. After following the step-by-step instructions, you should be able to see the expected message log after the boot-up is complete.

1.2 Scope

The instructions in this document are only for users who want to learn about Bootloader and develop SPL code on Mozart EVB.

2 Reference

fevb_cust_kneron_fsh0as065a_evb.pdf

3 Acronyms, Abbreviations, Definitions

EVB – Evaluation Board
IPL – Initial Program Loader
SPL – Second Program Loader

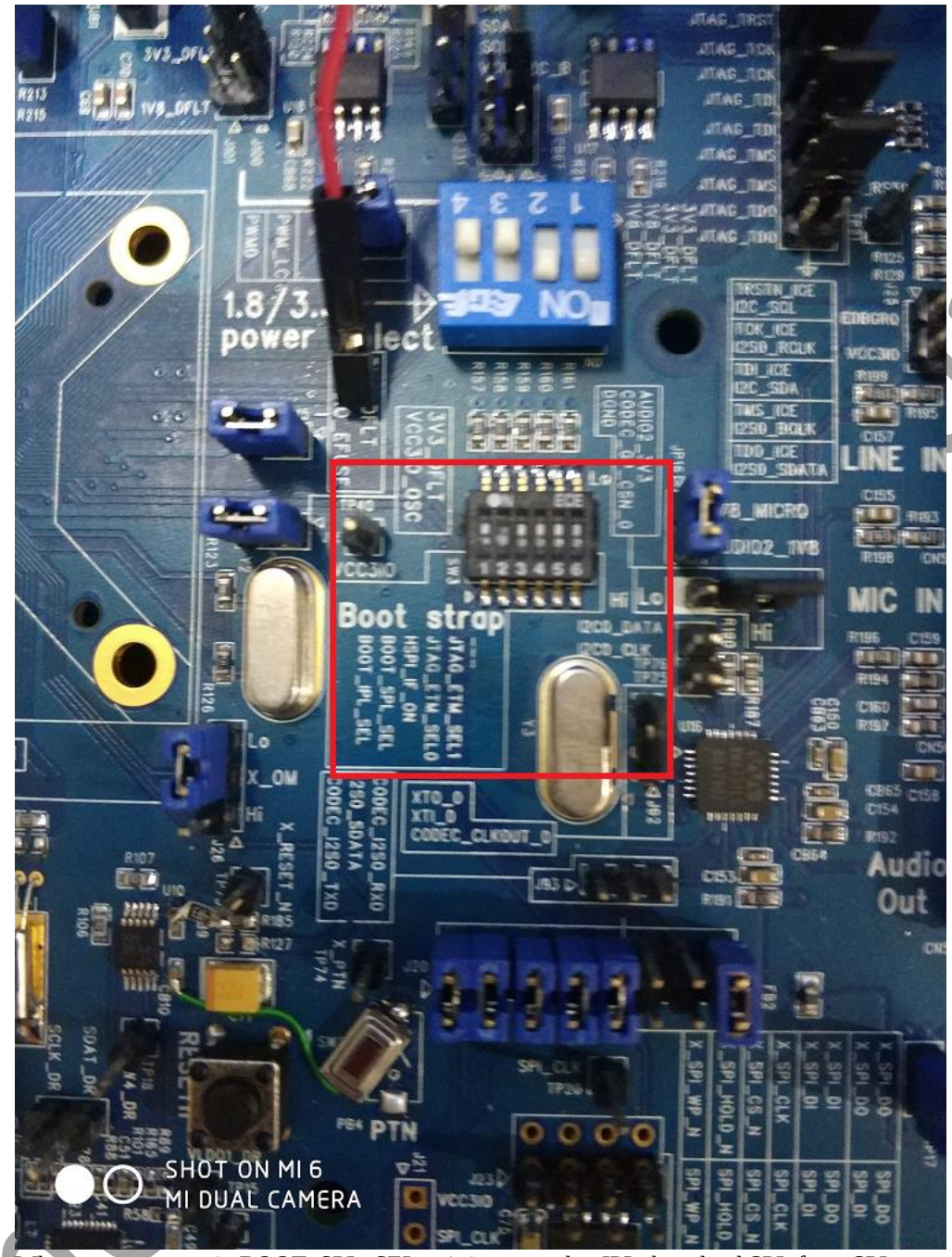
4 Embedded ROM Code Flow

1. SCPU fetch IPL in ROM
2. IPL checks SCU (Boot mode) and decide booting peripheral.
3. UART/SPI booting: IPL loader SPL to S-iRAM, and then jump to SPL

5 How to run IPL on Mozart EVB

1. Program SPL image on SPI flash
2. IPL boot mode selection depend on power strap pin's value (BOOT_SPL_SEL "0" is SPL is specified by UART, "1" is SPL is located in SPI flash).

Bootstrap Function	Description
BOOT_IPL_SEL	0: Boot from ROM 1: Boot from SPI (XIP mode)
BOOT_SPL_SEL	0: SPL is specified by UART 1: SPL is located in SPI flash.
JTAG_ETM_SEL	00: JTAG - Daisy chain, SCPU -> NCPU. ETM/ITM - SCPU. 01: JTAG - SCPU ETM/ITM - SCPU 10: JTAG - NCPU ETM/ITM - NCPU. 11: Disable.



3. When power strap pin BOOT_SPL_SEL = 1, it means that IPL download SPL from SPI.

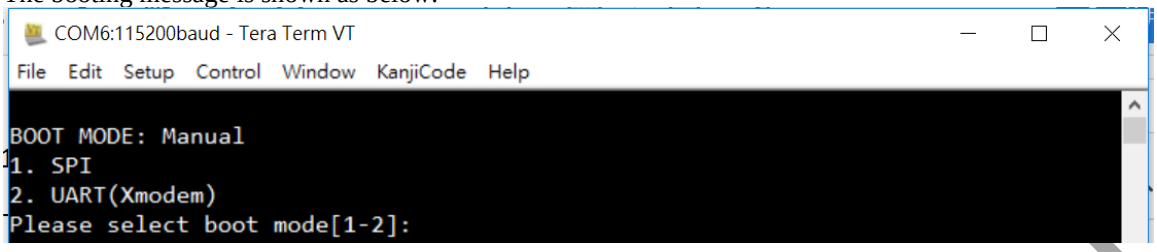
   It will directly runs SPI booting and download 8KB SPL from SPI Flash address 0x0. The first booting message is shown as below:

```
BOOT MODE: SPI
```

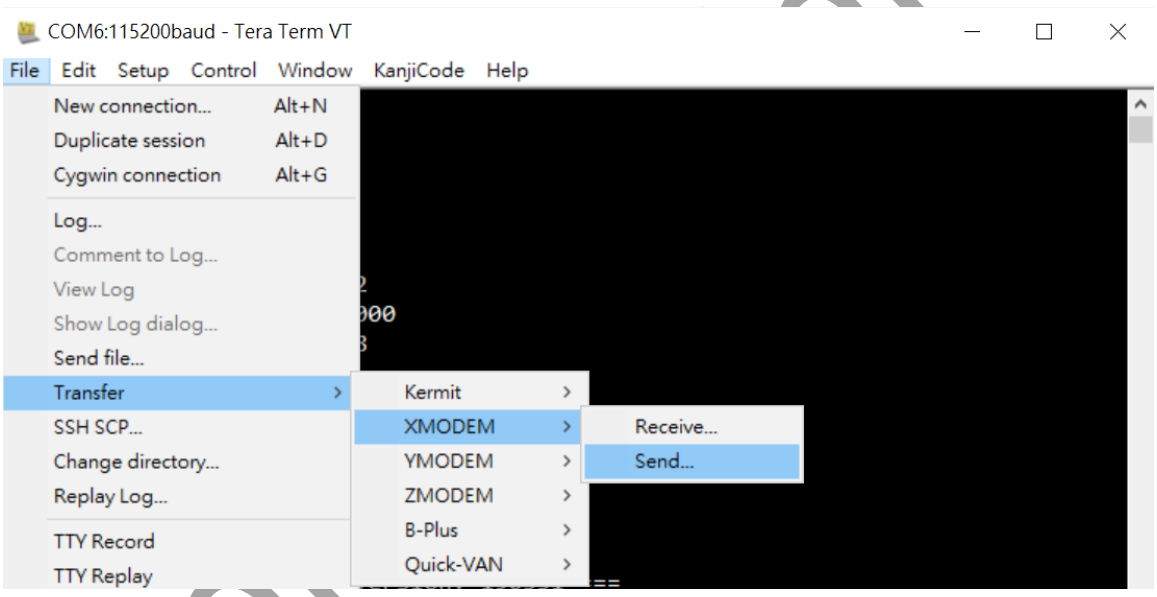
4. When power strap pin BOOT_SPL_SEL = 0, it means that IPL download SPL from UART.

   On UART menu:
   Select “1” runs SPI booting.
   Select “2” can download SPL image (boot_spl.bin) from terminal through X-modem protocol.

The booting message is shown as below:



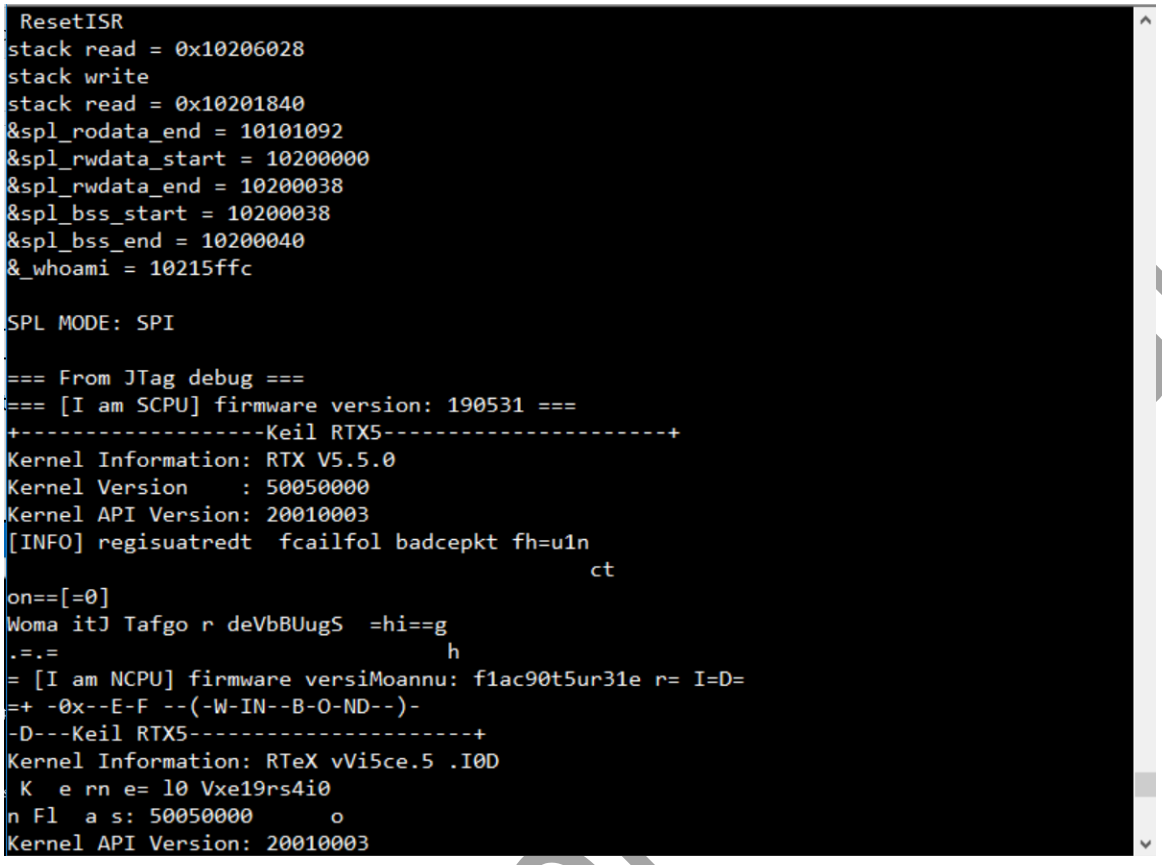
The SPL image (boot_spl.bin) can be transferred through protocol by selecting the file transfer function on terminal as follows.



6 How to run SPL on Mozart EVB

The following figure shows SPL message. If NCPU image and SCPU image are stored on the SPI-NOR flash.

1. SPL download NCPU from SPI Flash address 0x18000 to NiRAM.
2. SPL release NCPU reset (NCPU starts to execute NCPU code).
3. SPL download SCPU from SPI Flash address 0x02000 to SiRAM
4. Jump to SCPU code.



7 How to build SPL

It is necessary to prepare arm gcc cross tool and bootloader package first. We use arm-none-eabi- as our cross compiling toolchain. And next is to setup cross tool environment.

```
sudo apt-get install gcc-arm-none-eabi
```

Use the chmod command to make sure you have the appropriate permissions.

```
sudo chmod 755 -R bootloader/
```

Delete all the already compiled object files.

```
sudo make clean
```

User use “make menuconfig” command to enter SPL configuration menu to configure SPL settings.

```
sudo make menuconfig
```

Compile SPL

```
sudo make
```

And then you can get boot_spl.bin image in /output directory.