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Shark Calibration Document
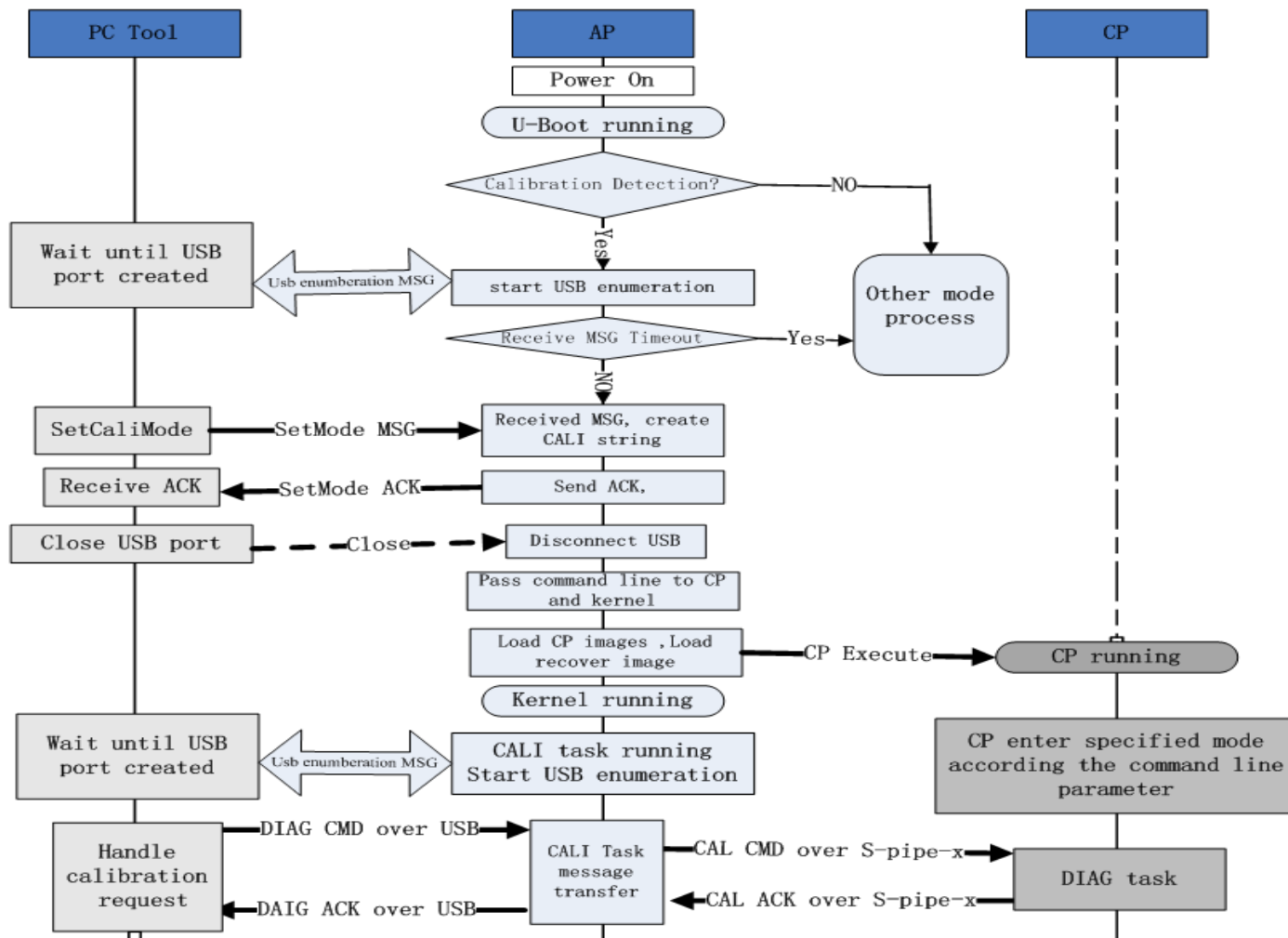
Presenter: *Title：*

SPREADTRUM

- **Physical Connection**

    2 physical connection: UART and USB.

    The dedicated connection is decided when u-boot is compiled,

   **it means only one connection is supported for specified project.**

USB Calibration

Shark Calibration

- **USB calibration power-on sequence.**

  After connected to PC through USB, power on the MS,

  and then MS try to enter calibration .

  1) **PC tool waiting for new USB port**

  2) **If enter calibration detect process, u-boot will try USB enumeration.**

  3) **When new USB port appears, PC tool will send calibration mode message.**

  4) **U-boot receives the message and feed back what received as ACK to PC tool. and then create calibration string ,insert it into command line, and this command line will be passed to kernel and CP. The command line includes information about calibration mode (such as GSM,TD or WCDMA) and calibration devices (UART or USB).**

  5) **u-boot load specified CP images and recover image**

6) u-boot start the specified CP to run

7) u-boot jump to kernel start address and kernel start to run.

8) Kernel will parse the command line and setup a SYSFS node.

9) Application calibration task will use the SYSFS node to obtain the calibration information.

10) AP provide 2 s-pipes: s-pipe-TD and s-pipe-WCDMA.

   s-pipe-TD is used transfer DIAG message between AP and TD MODEM.

   s-pipe-WCDMA is used transfer DIAG message between AP and WCDMA MODEM.

   Calibration task will use the calibration information start USB enumeration, then open the correct devices, and works as message forwarder between PC and CP.

11) Calibration task enters calibration successfully and start calibration command process.

Calibration string: calibraion=mode,device.

For example, "calibration=0x87,0" indicates: TD calibration by USB.

   "calibration=0x87" also indicates: TD calibration by USB.

Shark Calibration

UART Calibration
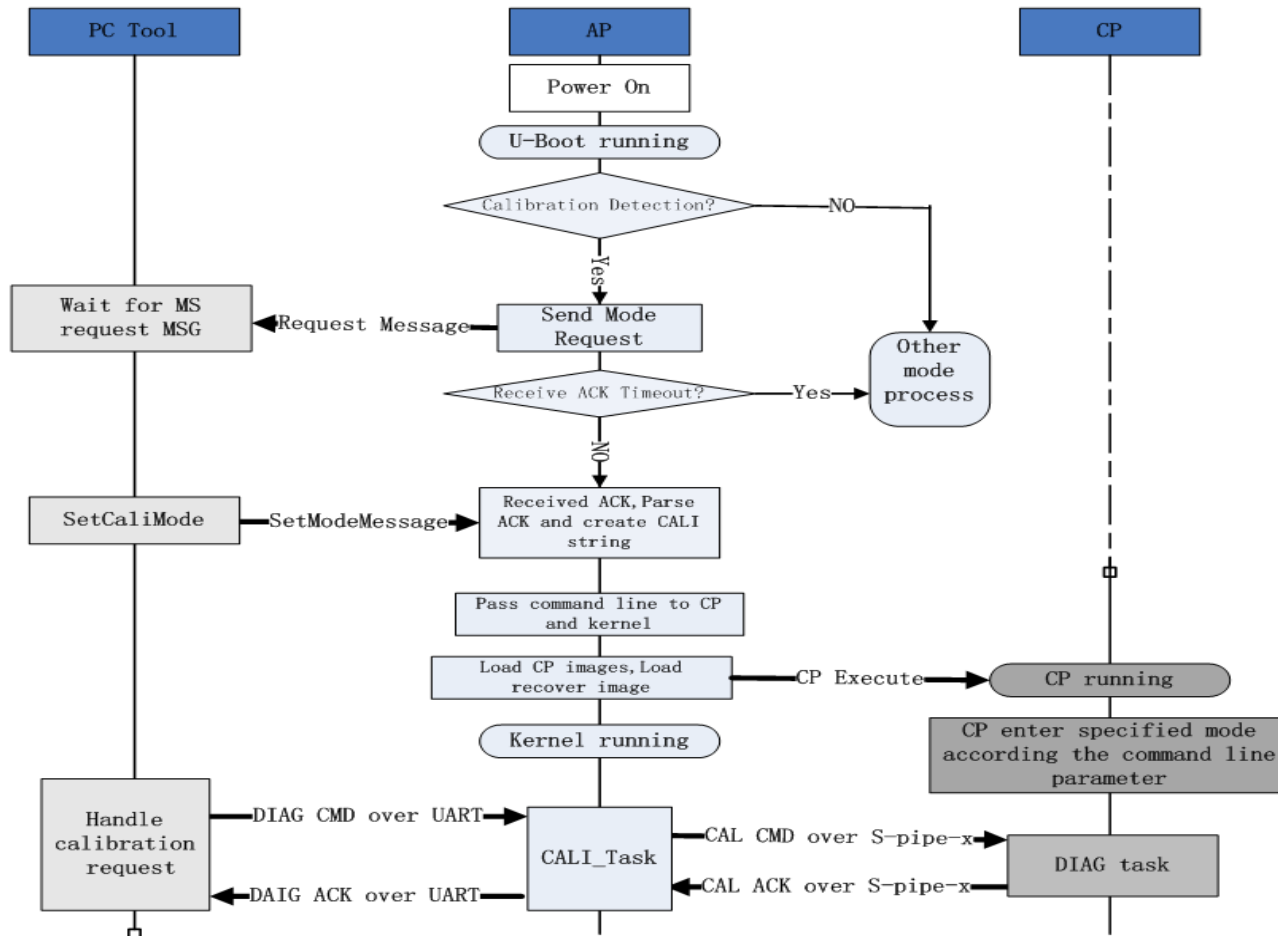
Shark Calibration

- **UART calibration power on sequence**

  UART port can configure by project configure file, and the UART works at baud-rate 115200.

  After connected to PC through UART, power on the MS, and then MS try to enter calibration .

  1) PC tool choose the specified UART and waiting for UART message

  2) If enter calibration detect process, u-boot will send request mode message through UART.

  3) The tool will feed back with calibration mode message.

  4) U-boot receives the message and make calibration string and insert the it into command line, and this command line will be passed to kernel and CP. The command line includes information about calibration mode (such as GSM,TD or WCDMA) and calibration devices (UART or USB).

  5) u-boot load specified CP images and recover image

6) u-boot start the specified CP to run

7) u-boot jump to kernel start address and kernel start to run.

8) Kernel will parse the command line and setup a SYSFS node to application.

9) Application calibration task will use the SYSFS node to obtain the calibration information.

10) AP provide 2 s-pipes: s-pipe-TD and s-pipe-

   s-pipe-TD is used transfer DIAG message between AP and TD MODE

   s-pipe-WCDMA is used transfer DIAG message between AP and WCDMA MODEM

11) MS enters calibration successfully and start calibration command process.

Calibration string: calibraion=mode,device.

For example, "calibration=0x87,1" indicates: TD calibration by UART.

- **NV synchronization**

  NV synchronization works in calibration in the same way as the normal mode

  1. NVITEM image is loaded to specified address by u-boot when u-boot load the CP images.

  2. CP will modify the NV in the memory during calibration process, PC tool use DIAG message to send NV from PC to CP and CP decide when to transfer the NV item to AP according the DIAG command.

  3. AP provides 2 different partitions to TD and WCDMA respectly, and another 2 s-pipes is used for NV transfer between AP and CP.

  4. NV synchronization uses another transfer protocol base on the s-pipes.

```
typedef struct  {
    file_type type;
    uint16    req_type;
    uint32    offset;
    uint32    size;
}request_header_t;
```

- **DIAG protocol**

  Struct DiagHeader{

  ```
  uint32 sequence_num;
  uint16 length;
  uint8   type;
  uint8   sub_type;
  ```

  }

  All the DIAG message begins with 0x7E and ends 0x7E, and the 0x7E in message body will be replaced by 0x7D 0x5E ,and 0x7D and 0x7D in message body will be replaced by 0x7D and 0x5D.

DIAG message in USB calibration

PC→MS: 7E 00 00 00 00 00 08 FE 8X 7E
MS→PC: 7E 00 00 00 00 00 08 FE 8X 7E

DIAG message in UART calibration

MS→PC: 7E 00 00 00 00 00 08 FE 01 7E

PC→MS: 7E 00 00 00 00 00 08 FE 8X 7E

- **Q & A**

  1: How to communicate between PC and U-Boot, between U-Boot and Modem (TD or W) by USB or UART?

  2: How synchronize NV items from PC Tools to u-Boot, to Modem, to Kernel by SIPC, to EMMC partition?

    Dedicated DIAG command is designed to transfer NV item from PC to MODEM.

    U-boot does not handle NV items.

    SIPC driver of kernel will transfer NV synchronization message between CP and NVITEMD task.

    NVITEMD is responsible for receiving NV items and save to EMMC partition.

  3:How to switch calibration from TD to W modem?

    When tool want to change calibration, it will send reset command by DIAG.

    And tool will send correct SetMode command to enter another calibration mode.

Thanks !

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