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SIPC Introduction

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UNISOC (SHANGHAI) TECHNOLOGIES CO., LTD.



Revision History

Version	Date	Notes
V1.0	2019/06/03	Initial version.
V1.1	2020/01/01	<ul style="list-style-type: none">• Update the template.• Add the applicable platform SL8563.
V1.2	2020/04/09	<ul style="list-style-type: none">• Change the document name to <i>SIPC Introduction</i>.• Update the template.
V1.3	2021/02/25	Optimize description and update the format.

Keyword

Keyword: SIPC, Inter-Processor Communications.

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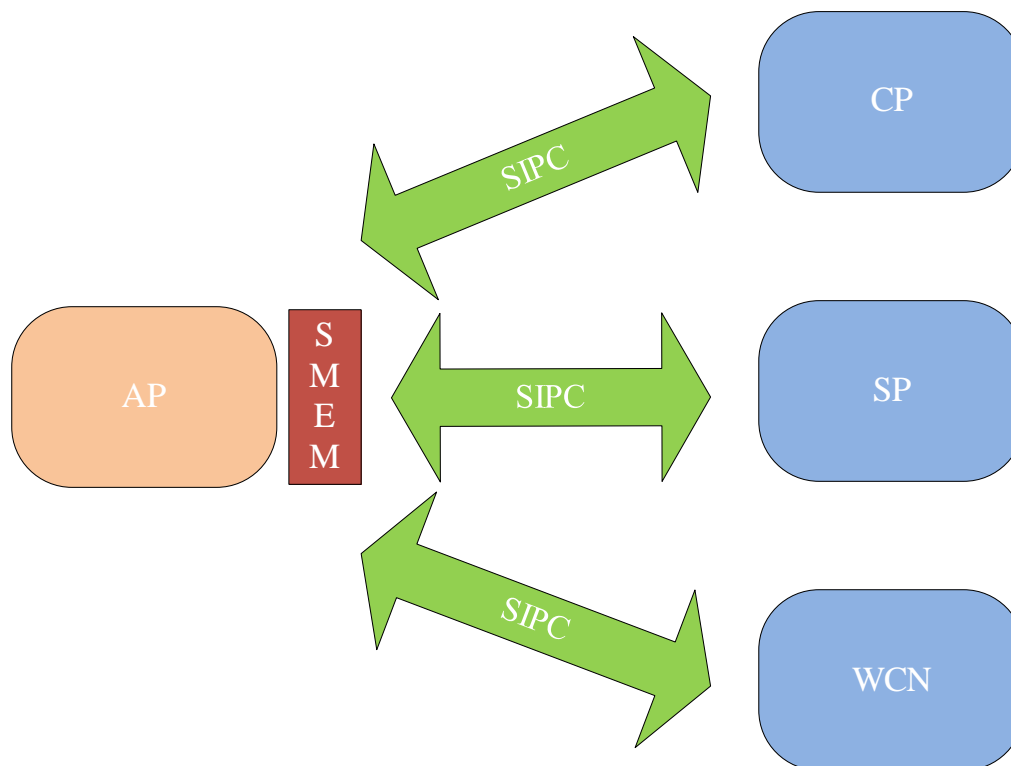
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Introduction



Introduction

SIPC (Spreadtrum Inter-Processor Communications) is designed for the communication between UNISOC AP and other systems (CP, SP, WCN). As an underlying general module, SIPC uses mailbox and the shared memory to transfer SMSG and data among different processors.



Note: SP refers to Sensor Processor.

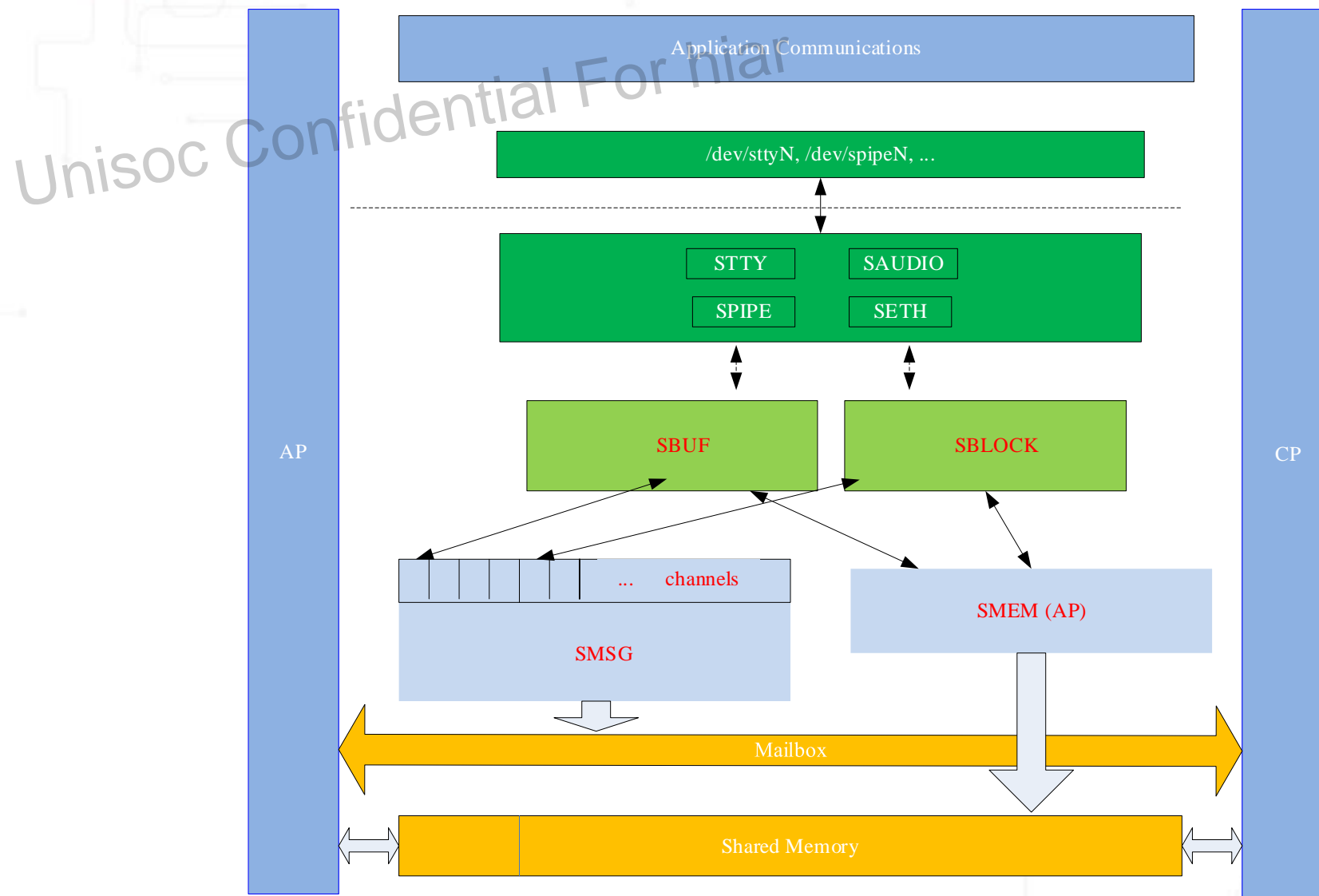
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Module Design



Module Design (1/2)



- AP: Application Processor system
- CP: Communication Processor system
- SIPC: SPRD Inter-Processor Communication
- MSG: a fundamental low-level message upon Mailbox
- MEM: SIPC memory management module
- SBUF: SIPC FIFO buffer interface module
- SBLOCK: SIPC block interface module
- SPIPE/ STTY/ SAUDIO /SETH: they can be implemented based on SBUF and SBLOCK, and provide interface to user space.
- Mailbox: Logic control unit for multi-core communication

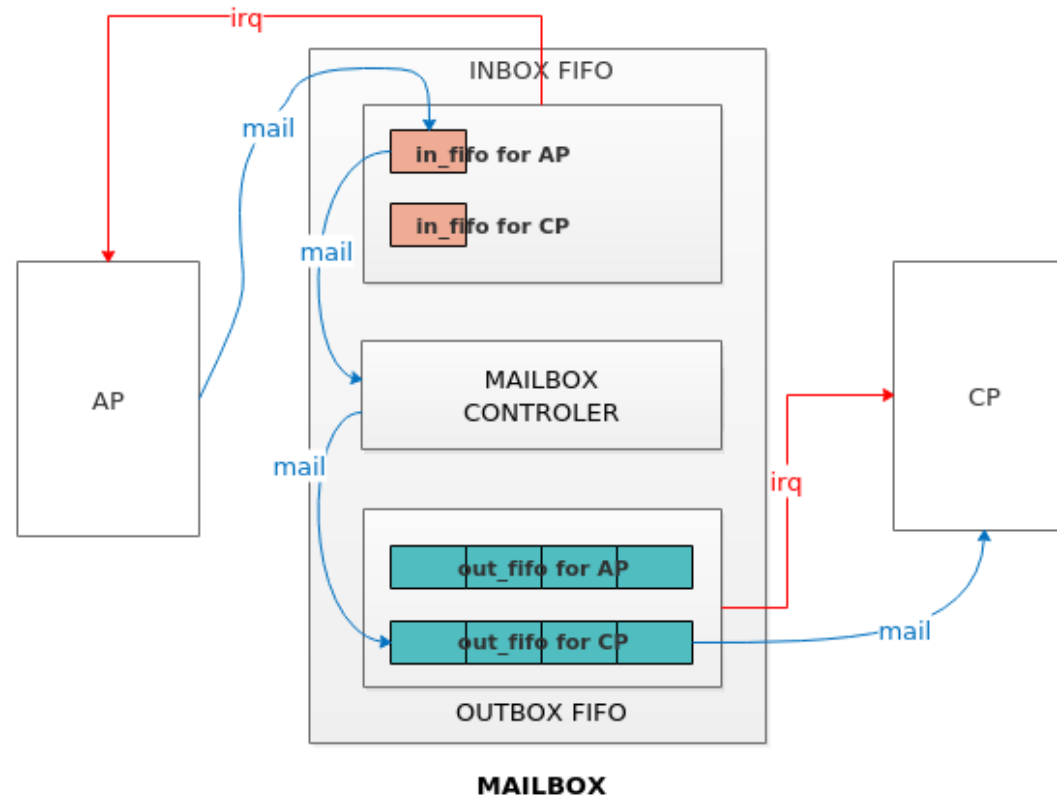
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Mailbox



Mailbox is a logic control unit used for multi-core communication. In Mailbox, each core has its own inbox and outbox. To send mail, the core puts mail into its inbox, and to receive mail, the core gets mail from its outbox. Mailbox controller is responsible for mails between the two cores (getting mail from the inbox in the source core and putting it into the outbox in the target core).



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SMEM



- **SMEM is a module to manage the shared memory.**
- **SMEM is a memory allocator in AP side.**
- **SMEM directly manages the physical address space.**
- **CP (Client SIPC) can get the corresponding memory address via communication with AP(host client) by passing SMSG through Mailbox.**

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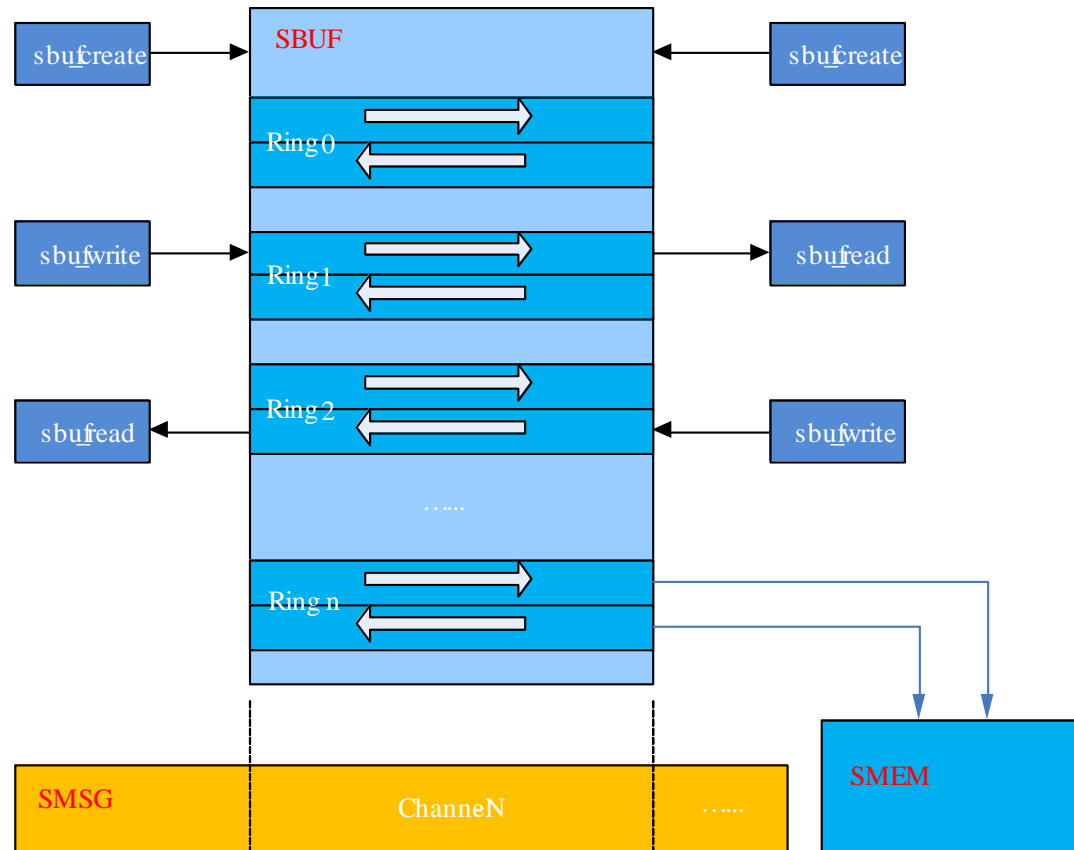
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SBUF



SBUF (1/2)

- SBUF is an interface that can implement multiple bi-directional FIFOs for AP and CP communication.
- A SBUF instance consumes a SMSG channel and builds multiple ring-buffers upon SMEM.



Data Structure

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```
struct sbuf_mgr {  
    uint8_t    dst;  
    uint8_t    channel;  
    uint32_t    state;  
  
    void    *smem_virt;  
    uint32_t    smem_addr;  
    uint32_t    smem_size;  
    uint32_t    ringnr;  
    struct sbuf_ring *rings;  
    struct task_struct *thread;  
};
```

```
struct sbuf_ring {  
    /* tx/rx buffer info */  
    volatile struct sbuf_ring_header *header;  
  
    void    *txbuf_virt;  
    void    *rxbuf_virt;  
  
    /* send/rcv wait queue */  
    wait_queue_head_t txwait;  
    wait_queue_head_t rxwait;  
  
    /* send/rcv mutex */  
    struct mutex txlock;  
    struct mutex rxlock;  
  
    void    (*handler)(int event, void *data);  
    void    *data;  
};
```

```
struct sbuf_ring_header {  
    /* send-buffer info */  
    uint32_t    txbuf_addr;  
    uint32_t    txbuf_size;  
    uint32_t    txbuf_rdprr;  
    uint32_t    txbuf_wrprr;  
  
    /* rcv-buffer info */  
    uint32_t    rxbuf_addr;  
    uint32_t    rxbuf_size;  
    uint32_t    rxbuf_rdprr;  
    uint32_t    rxbuf_wrprr;  
};
```

```
struct sbuf_smem_header {  
    Uint32_t    ringnr;  
  
    struct sbuf_ring_header headers[0];  
};
```

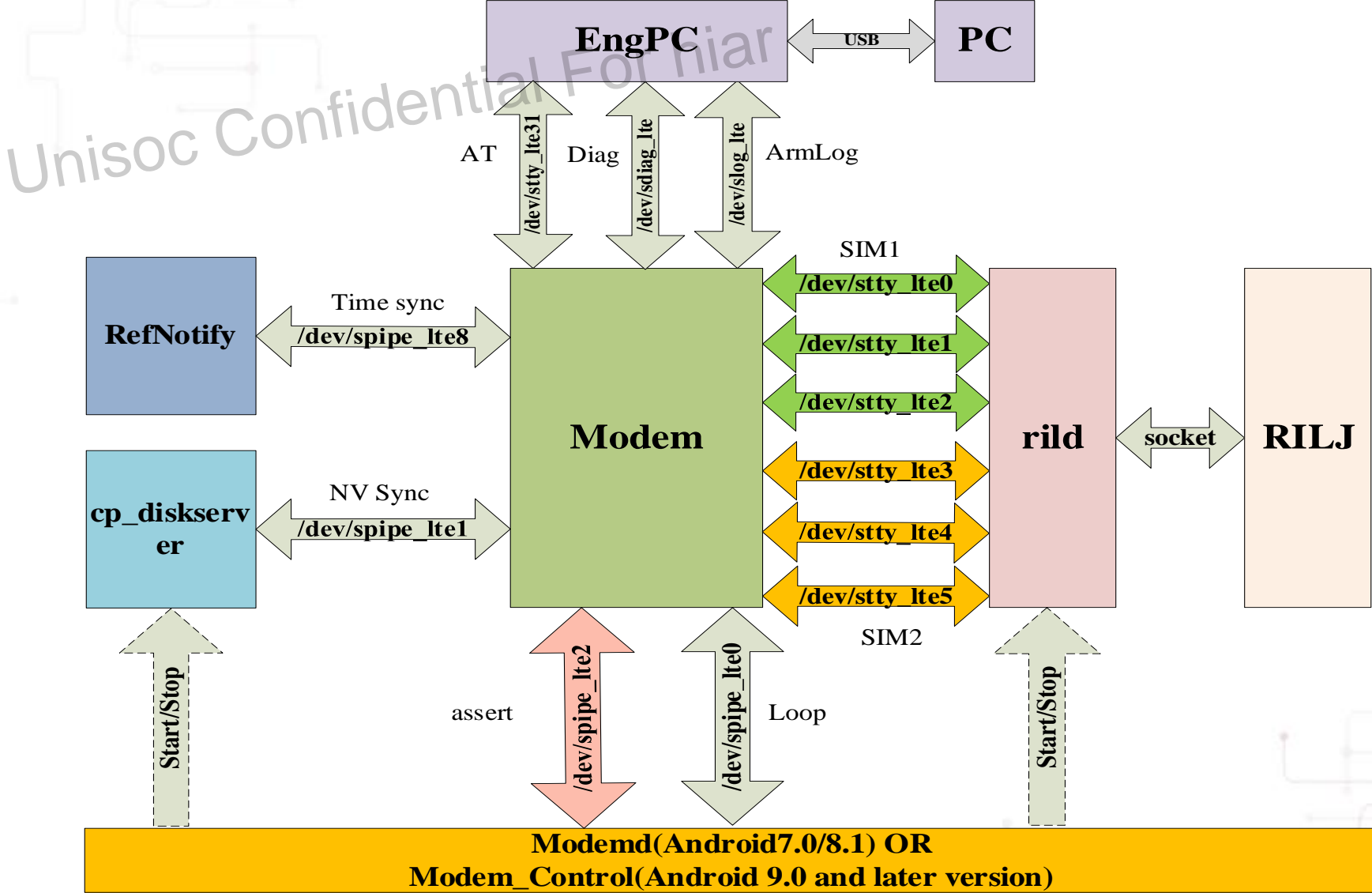
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Common Applications



Common Applications-Android

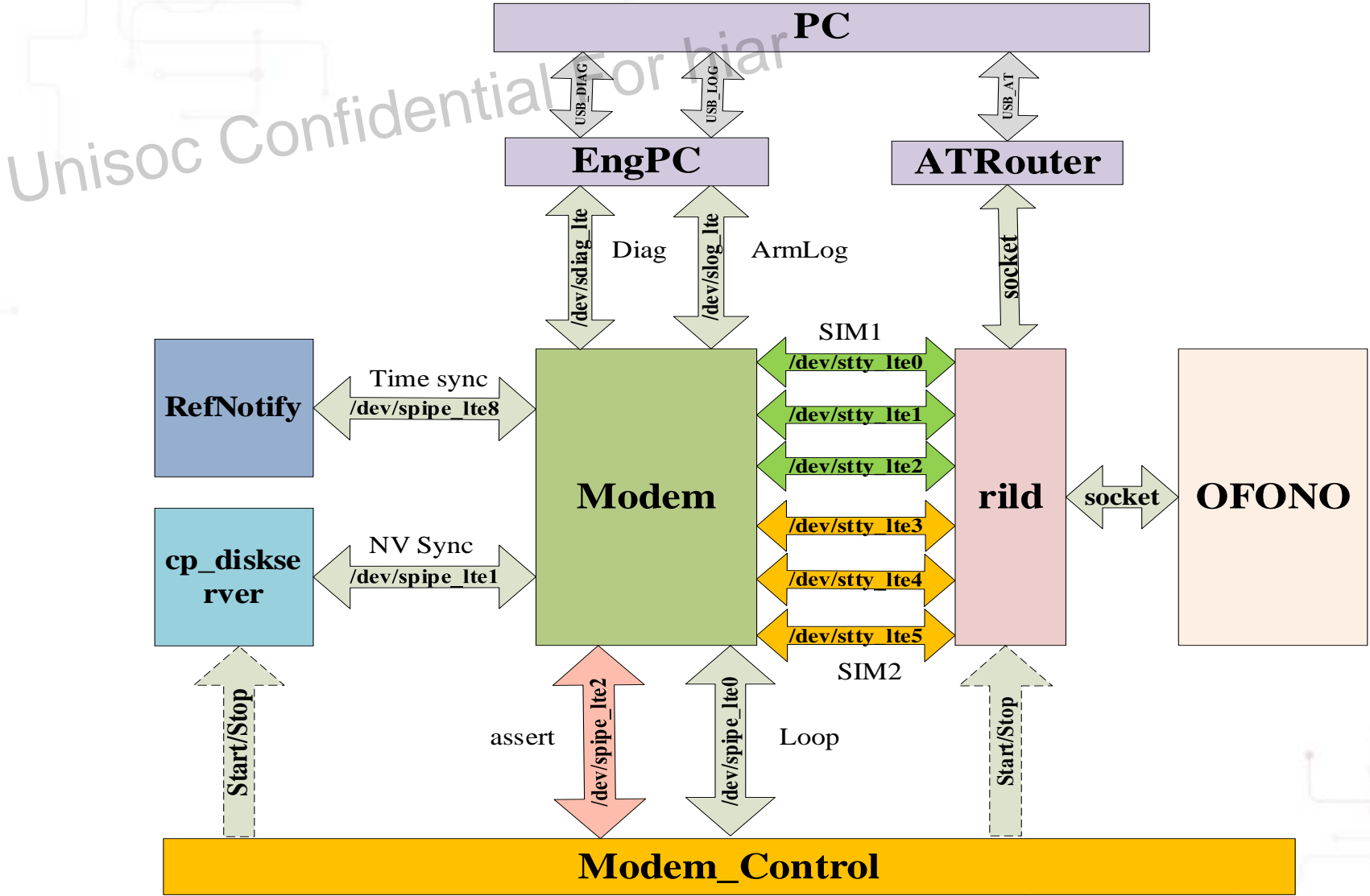


- **COM Port-Normal Mode**

- SPRD AT (ONLY SC7731E)
- SPRD DIAG(SENSOR HUB) (ONLY SC7731E)
- SPRD LOG(AGDSP)
- SPRD LTE AT -- AT Commands
- SPRD LTE DIAG -- Diag Commands
- SPRD LTE LOG -- Arm Log & Dsp Log
- SPRD WCN AT
- SPRD WCN DIAG
- Android Phone: Android Composite ADB Interface

- **COM Port-Calibration Mode**

- SPRD U2S Diag -- AutoTest/Pandora/Calibration



- **COM Port-Normal Mode**

- SPRD AT+MODEM+ECM
- SPRD Log+AT+MODEM+ECM
- SPRD DIAG+AT+MODEM+ECM
- AT+MODEM+RNDIS
- Log+AT+MODEM+RNDIS
- DIAG+AT+MODEM+RNDIS

- **COM Port-Calibration Mode**

- SPRD U2S Diag -- AutoTest/Pandora/Calibration

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FAQ






● Modem Crash

- Init Fail
- Modem Assert
- Modem Block

Provide /proc/cpt/mem + ylog +modem log to analyze.

● Modem Power

- Armlog On  Turn off all Log in YLog interface or use the User version to test.
- Network Issues  Select data scenario in YLog Settings and provide corresponding Log to analyze.
- Data Service On  Check APK's data behavior.

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Thank You



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