# MT793X IoT SDK for FreeRTOS ADSP IPI User Guide

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|---|---|
| Version: | 1.1 |
| Release date: | 2021-07-09 |

## Version History

| Version | Date | Description |
|---|---|---|
| 1.0 | 2020-11-20 | Official release |
| 1.1 | 2021-07-09 | Change file location |

# Table of Contents

# 1 Getting Started

This chapter introduces the MT7933 FreeRTOS project and gives you an idea of what you need to prepare to get started.

## 1.1 Overview

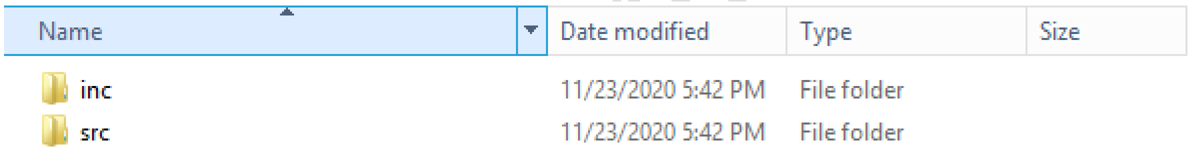
1. ADSP IPI is designed for the communication between AP and ADSP
2. ADSP IPI provides the same APIs for AP and ADSP to support two-way communication.
3. The data transferred by ADSP IPI is unformatted.

## 1.2 Code Layout

The current ADSP IPI driver is divided into two parts, AP and BSP. This section introduces the location of the AP and BSP code.

1. **AP: 7933 freertos**

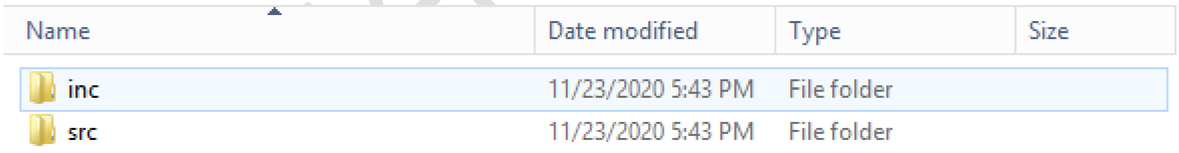
   \middleware\MTK\hifi4dsp\hifi4dsp_ipi\



| Name | Date modified | Type | Size |
|---|---|---|---|
| inc | 11/23/2020 5:42 PM | File folder | |
| src | 11/23/2020 5:42 PM | File folder | |

2. **BSP: freertos**

   \tinysys\adsp\HIFI4\project\mt7933\platform\drivers\HIFI4_A\ipi



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| src | 11/23/2020 5:43 PM | File folder | |

## 1.3 ADSP IPI APIs

ADSP IPI provides the same APIs for AP and ADSP to support two-way communication.

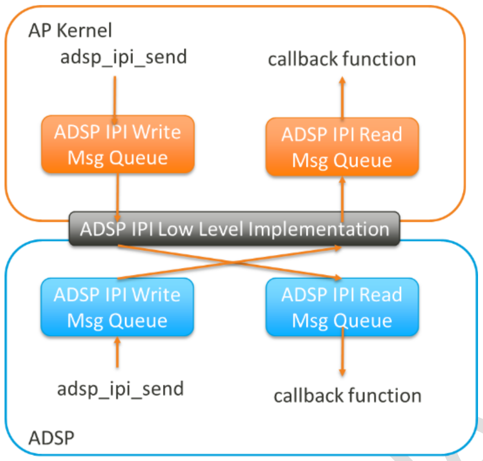
### adsp_ipi_send

- adsp_ipi_status adsp_ipi_send(uint32_t id, void *buf, uint32_t len, uint32_t wait, enum ipi_dir dir);
- Transfer specific command ID and buffer to the opposite end

### adsp_ipi_registration

- adsp_ipi_status adsp_ipi_registration(uint32_t id, ipi_handler_t handler, const char* name);

- Register callback function for specific command ID. The callback function is called after the corresponding command ID is received.



## Notice

- The definition of command ID must be consistent between AP and ADSP.
- Callback function is called in message queue one-by-one; please keep callback function as simple and short as possible.

# 2 ADSP IPI Usage Sample

**Add a new IPI command, IPI_NEW_CMD, which is sent by AP and handled by ADSP**

- Add IPI_NEW_CMD in "enum ipi_id" in adsp_ipi.h[AP side & DSP side] (IPI command must be defined both in AP side and ADSP side and remain consistent in both sides)
- Define a ipi_handler_t function "new_cmd_handler" in ADSP side, "typedef int (*ipi_handler_t)(int id, void* data, unsigned int len)"
- Register IPI command handler in the ADSP module init function, adsp_ipi_registration(IPI_NEW_CMD, new_cmd_handler, "new cmd handler");
- When AP wants to send IPI message to ADSP, call adsp_ipi_send(IPI_NEW_CMD, buffer, len, 1, 0) in AP side.
- The ADSP IPI module transfers the message from AP to ADSP, and calls back an IPI_NEW_CMD handler registered in ADSP side, new_cmd_handler

  -- buffer length is limited to 272 bytes

  -- when new_cmd_handler is called back, the content of parameter "data/len" is the same as the content in AP side

**Add a new IPI command, IPI_NEW_CMD, which is sent by ADSP and handled by AP**

- Add IPI_NEW_CMD in "enum ipi_id" in adsp_ipi.h[AP side & DSP side] (IPI command must be defined both in AP side and ADSP side and remain consistent in both sides)
- Define a ipi_handler_t function "new_cmd_handler" in AP side, "typedef int (*ipi_handler_t)(int id, void* data, unsigned int len)"
- Register IPI command handler in the AP module init function, adsp_ipi_registration(IPI_NEW_CMD, new_cmd_handler, "new cmd handler");
- When ADSP wants to send IPI message to AP, call adsp_ipi_send(IPI_NEW_CMD, buffer, len, 1, 0) in ADSP side.
- The ADSP IPI module transfers the message from ADSP to AP, and calls back an IPI_NEW_CMD handler registered in AP side, new_cmd_handler

  -- buffer length is limited to 272 bytes

-- when new_cmd_handler is called back, the content of parameter "data/len" is the same as the content in ADSP side

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