OTA TCP ESP32

Generated by Doxygen 1.9.1

Chapter 1

Class Index

1.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 2

File Index

2.1 File List

Here is a list of all files with brief descriptions:

Chapter 3

Class Documentation

3.1 crypt_buffer_t Struct Reference

Public Attributes

- uint8_t val [TCP_TLS_MAX_BUFFER_LEN]
- size_t len

3.1.1 Member Data Documentation

3.1.1.1 len

```
size_t crypt_buffer_t::len
```

3.1.1.2 val

```
uint8_t crypt_buffer_t::val[TCP_TLS_MAX_BUFFER_LEN]
```

The documentation for this struct was generated from the following file:

- components/tcp_tls/tcp_tls.c

3.2 state_machine_params_t Struct Reference

Public Attributes

- msg_parser_states_e state
- uint32_t firmware_size
- uint32_t firmware_bytes_read
- uint8_t hash [HASH_SIZE_IN_BYTES]
- SemaphoreHandle_t semaphore

3.2.1 Member Data Documentation

3.2.1.1 firmware_bytes_read

```
uint32_t state_machine_params_t::firmware_bytes_read
```

3.2.1.2 firmware_size

```
uint32_t state_machine_params_t::firmware_size
```

3.2.1.3 hash

```
uint8_t state_machine_params_t::hash[HASH_SIZE_IN_BYTES]
```

3.2.1.4 semaphore

```
SemaphoreHandle_t state_machine_params_t::semaphore
```

3.2.1.5 state

```
msg_parser_states_e state_machine_params_t::state
```

The documentation for this struct was generated from the following file:

- components/msg_parser/msg_parser.c

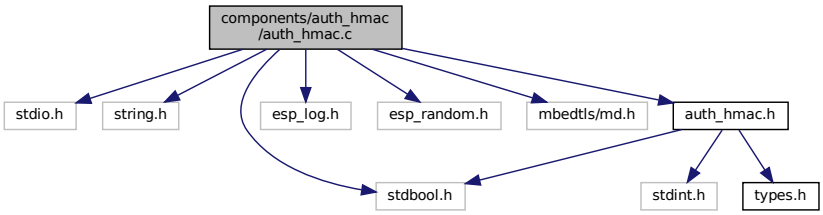
Chapter 4

File Documentation

4.1 components/auth_hmac/auth_hmac.c File Reference

```
#include <stdio.h>
#include <string.h>
#include <stdbool.h>
#include "esp_log.h"
#include "esp_random.h"
#include "mbedtls/md.h"
#include "auth_hmac.h"
```

Include dependency graph for auth_hmac.c:



Macros

- #define HMAC_SHA256_LEN (32U)

Functions

- types_error_code_e auth_hmac_set_hmac_psk (const uint8_t *key, const size_t len)

  pre-shared key setter
- void auth_hmac_generate_nonce (uint8_t *nonce, size_t len)

  Generate a random nonce for HMAC authentication.
- bool auth_hmac_verify_response (const uint8_t *nonce, size_t nonce_len, const uint8_t *received_hmac, size_t received_len)

  Verify the HMAC response using the nonce and shared key.

4.1.1 Macro Definition Documentation

4.1.1.1 HMAC_SHA256_LEN

```
#define HMAC_SHA256_LEN (32U)
```

4.1.2 Function Documentation

4.1.2.1 auth_hmac_generate_nonce()

```
void auth_hmac_generate_nonce (
            uint8_t * nonce,
            size_t len )
```

Generate a random nonce for HMAC authentication.

Parameters

nonce	[out]: Pointer to the buffer where the nonce will be stored
len	[in]: Length of the nonce in bytes

4.1.2.2 auth_hmac_set_hmac_psk()

```
types_error_code_e auth_hmac_set_hmac_psk (
            const uint8_t * key,
            const size_t len )
```

pre-shared key setter

Parameters

key	[in]: pre-shared key
len	[in]: pre-shared key length in bytes

4.1.2.3 auth_hmac_verify_response()

```
bool auth_hmac_verify_response (
            const uint8_t * nonce,
```

```
size_t nonce_len,
const uint8_t * received_hmac,
size_t received_len )
```

Verify the HMAC response using the nonce and shared key.

Parameters

nonce	[in]: Pointer to the nonce used for HMAC generation
nonce_len	[in]: Length of the nonce in bytes
received_hmac	[in]: Pointer to the received HMAC response
received_len	[in]: Length of the received HMAC response in bytes

Returns

true if the HMAC is valid, false otherwise

4.1.3 Variable Documentation

4.1.3.1 is_set

```
bool is_set
```

4.1.3.2 len

```
size_t len
```

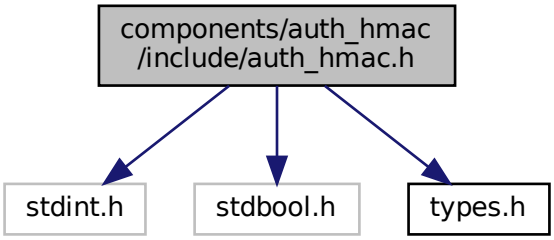
4.1.3.3 val

```
uint8_t val[AUTH_HMAC_MAX_BUFFER_LEN]
```

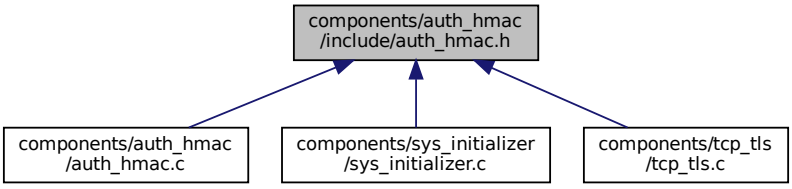
4.2 components/auth_hmac/include/auth_hmac.h File Reference

```
#include <stdint.h>
#include <stdbool.h>
#include "types.h"
```

Include dependency graph for auth_hmac.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define AUTH_HMAC_MAX_BUFFER_LEN (48U)
- #define AUTH_HMAC_NONCE_LEN (16U)

Functions

- types_error_code_e auth_hmac_set_hmac_psk (const uint8_t *key, const size_t len)

  pre-shared key setter
- void auth_hmac_generate_nonce (uint8_t *nonce, size_t len)

  Generate a random nonce for HMAC authentication.
- bool auth_hmac_verify_response (const uint8_t *nonce, size_t nonce_len, const uint8_t *received_hmac, size_t received_len)

  Verify the HMAC response using the nonce and shared key.

4.2.1 Macro Definition Documentation

4.2.1.1 AUTH_HMAC_MAX_BUFFER_LEN

```
#define AUTH_HMAC_MAX_BUFFER_LEN (48U)
```

4.2.1.2 AUTH_HMAC_NONCE_LEN

```
#define AUTH_HMAC_NONCE_LEN (16U)
```

4.2.2 Function Documentation

4.2.2.1 auth_hmac_generate_nonce()

```
void auth_hmac_generate_nonce (
            uint8_t * nonce,
            size_t len )
```

Generate a random nonce for HMAC authentication.

Parameters

nonce	[out]: Pointer to the buffer where the nonce will be stored
len	[in]: Length of the nonce in bytes

4.2.2.2 auth_hmac_set_hmac_psk()

```
types_error_code_e auth_hmac_set_hmac_psk (
            const uint8_t * key,
            const size_t len )
```

pre-shared key setter

Parameters

key	[in]: pre-shared key
len	[in]: pre-shared key length in bytes

4.2.2.3 auth_hmac_verify_response()

```
bool auth_hmac_verify_response (
            const uint8_t * nonce,
            size_t nonce_len,
            const uint8_t * received_hmac,
            size_t received_len )
```

Verify the HMAC response using the nonce and shared key.

Parameters

nonce	[in]: Pointer to the nonce used for HMAC generation
nonce_len	[in]: Length of the nonce in bytes
received_hmac	[in]: Pointer to the received HMAC response
received_len	[in]: Length of the received HMAC response in bytes

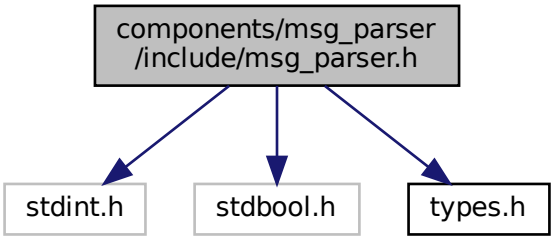
Returns

true if the HMAC is valid, false otherwise

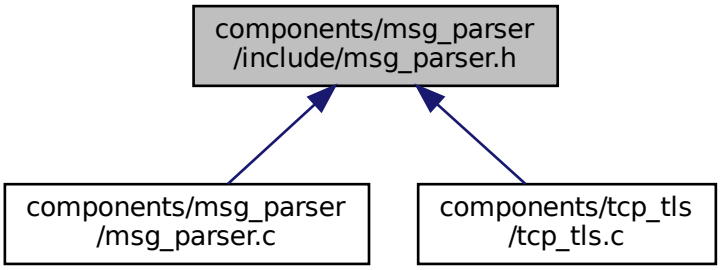
4.3 components/msg_parser/include/msg_parser.h File Reference

```
#include <stdint.h>
#include <stdbool.h>
#include "types.h"
```

Include dependency graph for msg_parser.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define MSG_PARSER_BUF_LEN_BYTES (10U)

Functions

- types_error_code_e msg_parser_init (void)

  Initialize the msg_parser component.
- types_error_code_e msg_parser_run (const uint8_t *p_data, const uint16_t len, uint32_t *p_out_bytes_read)

  Msg_parser state machine, responsible for parse the incoming messagens.
- void msg_parser_clean (void)

  Reset msg_parser state machine parameters.
- types_error_code_e msg_parser_build_firmware_ack (uint8_t *p_buffer, const uint8_t len, uint8_t *p_out_len)

  Build the firmware ack message.
- types_error_code_e msg_parser_build_ota_ack (uint8_t *p_buffer, const uint8_t len, const bool status, const uint32_t bytes_read, uint8_t *p_out_len)

4.3.1 Macro Definition Documentation

4.3.1.1 MSG_PARSER_BUF_LEN_BYTES

```
#define MSG_PARSER_BUF_LEN_BYTES (10U)
```

4.3.2 Function Documentation

4.3.2.1 msg_parser_build_firmware_ack()

```
types_error_code_e msg_parser_build_firmware_ack (
            uint8_t * p_buffer,
            const uint8_t len,
            uint8_t * p_out_len )
```

Build the firmware ack message.

Parameters

p_buffer	[in]: Message data buffer
len	[in]: Message data buffer length
p_out_len	[out]: Built frame length

Returns

types_error_code_e

4.3.2.2 msg_parser_build_ota_ack()

```
types_error_code_e msg_parser_build_ota_ack (
            uint8_t * p_buffer,
            const uint8_t len,
            const bool status,
            const uint32_t bytes_read,
            uint8_t * p_out_len )
```

Parameters

p_buffer	[in]: Message data buffer
len	[in]: Message data buffer length
status	[in]: True for success e false for fail
bytes_read	[in]: Number of bytes read
p_out_len	[out]: Built frame length

Returns

types_error_code_e

4.3.2.3 msg_parser_clean()

```
void msg_parser_clean (
            void  )
```

Reset msg_parser state machine parameters.

4.3.2.4 msg_parser_init()

```
types_error_code_e msg_parser_init (
            void  )
```

Initialize the msg_parser component.

Returns

types_error_code_e

4.3.2.5 msg_parser_run()

```
types_error_code_e msg_parser_run (
            const uint8_t * p_data,
            const uint16_t len,
            uint32_t * p_out_bytes_read )
```

Msg_parser state machine, responsible for parse the incoming messagens.

Parameters

p_data	[in]: Message data buffer
len	[in]: Message data buffer length
p_out_bytes_read	[out]: Number os bytes read

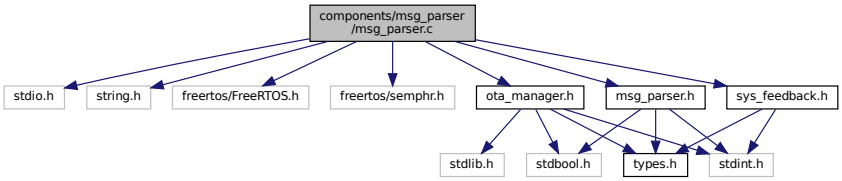
Returns

types_error_code_e

4.4 components/msg_parser/msg_parser.c File Reference

```
#include <stdio.h>
#include <string.h>
#include "freertos/FreeRTOS.h"
#include "freertos/semphr.h"
#include "ota_manager.h"
#include "sys_feedback.h"
#include "msg_parser.h"
```

Include dependency graph for msg_parser.c:



Classes

- struct state_machine_params_t

Macros

- #define FIRMWARE_LEN_SIZE_IN_BYTES (4U)
- #define HASH_SIZE_IN_BYTES (32U)
- #define HEADER_SIZE_IN_BYTES (FIRMWARE_LEN_SIZE_IN_BYTES + HASH_SIZE_IN_BYTES)
- #define OTA_ACK_SIZE_IN_BYTES (6U)
- #define OTA_ACK_LEN_SIZE_IN_BYTES (4U)
- #define OTA_ACK_ERR_SIZE_IN_BYTE (2U)
- #define OTA_ACK_OK_CODE (100U)
- #define OTA_ACK_FAIL_CODE (100U)
- #define FIRMWARE_ACK_SIZE_IN_BYTES (4U)

Enumerations

- enum msg_parser_states_e { READ_HEADER , START_OTA , WRITE_FIRMWARE }

Functions

- types_error_code_e msg_parser_init (void)

  Initialize the msg_parser component.
- types_error_code_e msg_parser_run (const uint8_t *p_data, const uint16_t len, uint32_t *p_out_bytes_read)

  Msg_parser state machine, responsible for parse the incoming messagens.
- void msg_parser_clean (void)

  Reset msg_parser state machine parameters.
- types_error_code_e msg_parser_build_firmware_ack (uint8_t *p_buffer, const uint8_t len, uint8_t *p_out_↩ len)

  Build the firmware ack message.
- types_error_code_e msg_parser_build_ota_ack (uint8_t *p_buffer, const uint8_t len, const bool status, const uint32_t bytes_read, uint8_t *p_out_len)

4.4.1 Macro Definition Documentation

4.4.1.1 FIRMWARE_ACK_SIZE_IN_BYTES

```
#define FIRMWARE_ACK_SIZE_IN_BYTES (4U)
```

4.4.1.2 FIRMWARE_LEN_SIZE_IN_BYTES

```
#define FIRMWARE_LEN_SIZE_IN_BYTES (4U)
```

4.4.1.3 HASH_SIZE_IN_BYTES

```
#define HASH_SIZE_IN_BYTES (32U)
```

4.4.1.4 HEADER_SIZE_IN_BYTES

```
#define HEADER_SIZE_IN_BYTES (FIRMWARE_LEN_SIZE_IN_BYTES + HASH_SIZE_IN_BYTES)
```

4.4.1.5 OTA_ACK_ERR_SIZE_IN_BYTE

```
#define OTA_ACK_ERR_SIZE_IN_BYTE (2U)
```

4.4.1.6 OTA_ACK_FAIL_CODE

```
#define OTA_ACK_FAIL_CODE (100U)
```

4.4.1.7 OTA_ACK_LEN_SIZE_IN_BYTES

```
#define OTA_ACK_LEN_SIZE_IN_BYTES (4U)
```

4.4.1.8 OTA_ACK_OK_CODE

```
#define OTA_ACK_OK_CODE (100U)
```

4.4.1.9 OTA_ACK_SIZE_IN_BYTES

```
#define OTA_ACK_SIZE_IN_BYTES (6U)
```

4.4.2 Enumeration Type Documentation

4.4.2.1 msg_parser_states_e

```
enum msg_parser_states_e
```

Enumerator

READ_HEADER	
START_OTA	
WRITE_FIRMWARE	

4.4.3 Function Documentation

4.4.3.1 msg_parser_build_firmware_ack()

```
types_error_code_e msg_parser_build_firmware_ack (
            uint8_t * p_buffer,
            const uint8_t len,
            uint8_t * p_out_len )
```

Build the firmware ack message.

Parameters

p_buffer	[in]: Message data buffer
len	[in]: Message data buffer length
p_out_len	[out]: Built frame length

Returns

types_error_code_e

4.4.3.2 msg_parser_build_ota_ack()

```
types_error_code_e msg_parser_build_ota_ack (
            uint8_t * p_buffer,
            const uint8_t len,
            const bool status,
            const uint32_t bytes_read,
            uint8_t * p_out_len )
```

Parameters

p_buffer	[in]: Message data buffer
len	[in]: Message data buffer length
status	[in]: True for success e false for fail
bytes_read	[in]: Number of bytes read
p_out_len	[out]: Built frame length

Returns

types_error_code_e

4.4.3.3 msg_parser_clean()

```
void msg_parser_clean (
            void  )
```

Reset msg_parser state machine parameters.

4.4.3.4 msg_parser_init()

```
types_error_code_e msg_parser_init (
            void  )
```

Initialize the msg_parser component.

Returns

types_error_code_e

4.4.3.5 msg_parser_run()

```
types_error_code_e msg_parser_run (
            const uint8_t * p_data,
            const uint16_t len,
            uint32_t * p_out_bytes_read )
```

Msg_parser state machine, responsible for parse the incoming messagens.

Parameters

p_data	[in]: Message data buffer
len	[in]: Message data buffer length
p_out_bytes_read	[out]: Number os bytes read

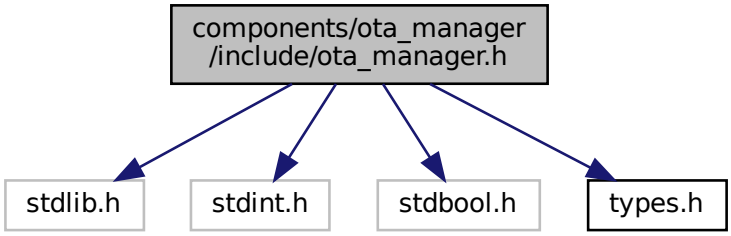
Returns

types_error_code_e

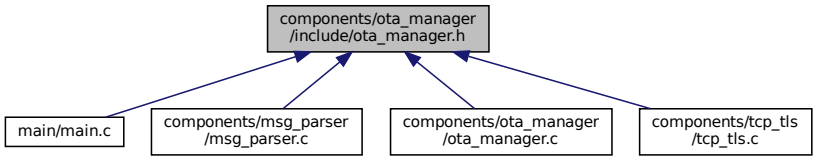
4.5 components/ota_manager/include/ota_manager.h File Reference

```
#include <stdlib.h>
#include <stdint.h>
#include <stdbool.h>
#include "types.h"
```

Include dependency graph for ota_manager.h:



This graph shows which files directly or indirectly include this file:



Functions

- types_error_code_e ota_process_init (const size_t, const uint8_t *)

  Initializes an Over-The-Air (OTA) update process by setting the firmware size, copying the hash, selecting the next OTA partition, and preparing the partition for writing. It also initializes a SHA-256 context for hash computation and returns an appropriate error code based on the success or failure of the initialization steps.
- types_error_code_e ota_process_write_block (const uint8_t *, const size_t)

  Writes a block of data to an ongoing Over-The-Air (OTA) update process, verifies the integrity of the data using SHA-256 hashing, and checks the firmware size against the expected size. It returns an error code indicating the status of the operation, such as success, failure, or in-progress, and handles errors like mismatched firmware size or hash computation failures.
- types_error_code_e ota_process_end (bool)

Concludes an ongoing OTA (Over-The-Air) update process, ensuring proper cleanup and validation. It checks if the system is healthy, frees allocated resources, finalizes the OTA update, sets the new boot partition, and returns an appropriate error code based on the operation's success or failure.

- void ota_check_rollback (bool)

  Evaluates the health of the system and manages OTA rollback behavior based on the firmware state. If the system is unhealthy or the firmware verification fails, it triggers a rollback and reboot; otherwise, it marks the firmware as valid and cancels the rollback.

4.5.1 Function Documentation

4.5.1.1 ota_check_rollback()

```
void ota_check_rollback (
            bool is_healthy )
```

Evaluates the health of the system and manages OTA rollback behavior based on the firmware state. If the system is unhealthy or the firmware verification fails, it triggers a rollback and reboot; otherwise, it marks the firmware as valid and cancels the rollback.

Parameters

is_healthy	true when system is healthy, false otherwise

4.5.1.2 ota_process_end()

```
types_error_code_e ota_process_end (
            bool is_healthy )
```

Concludes an ongoing OTA (Over-The-Air) update process, ensuring proper cleanup and validation. It checks if the system is healthy, frees allocated resources, finalizes the OTA update, sets the new boot partition, and returns an appropriate error code based on the operation's success or failure.

Parameters

is_healthy	true when writing process was sucessful

Returns

types_error_code_e

4.5.1.3 ota_process_init()

```
types_error_code_e ota_process_init (
            const size_t img_size,
            const uint8_t * hash )
```

Initializes an Over-The-Air (OTA) update process by setting the firmware size, copying the hash, selecting the next OTA partition, and preparing the partition for writing. It also initializes a SHA-256 context for hash computation and returns an appropriate error code based on the success or failure of the initialization steps.

Parameters

img_size	Firmware size to be updated
hash	Received hash

Returns

types_error_code_e

4.5.1.4 ota_process_write_block()

```
types_error_code_e ota_process_write_block (
            const uint8_t * data,
            const size_t data_len )
```

Writes a block of data to an ongoing Over-The-Air (OTA) update process, verifies the integrity of the data using SHA-256 hashing, and checks the firmware size against the expected size. It returns an error code indicating the status of the operation, such as success, failure, or in-progress, and handles errors like mismatched firmware size or hash computation failures.

Parameters

data	Firmware block
data_len	Firmware block size

Returns

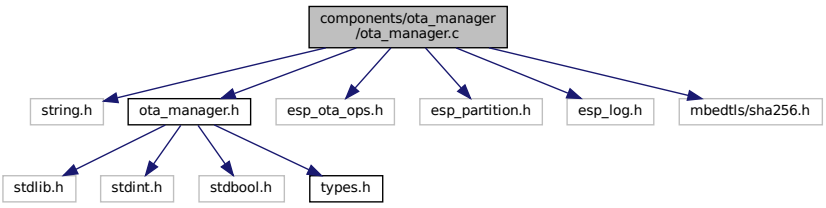
types_error_code_e

4.6 components/ota_manager/ota_manager.c File Reference

```
#include <string.h>
#include "ota_manager.h"
#include "esp_ota_ops.h"
#include "esp_partition.h"
#include "esp_log.h"
```

```
#include "mbedtls/sha256.h"
```

Include dependency graph for ota_manager.c:



Macros

- #define HASH_SIZE_IN_BYTES (32U)

Functions

- types_error_code_e ota_process_init (const size_t img_size, const uint8_t *hash)

  Initializes an Over-The-Air (OTA) update process by setting the firmware size, copying the hash, selecting the next OTA partition, and preparing the partition for writing. It also initializes a SHA-256 context for hash computation and returns an appropriate error code based on the success or failure of the initialization steps.
- types_error_code_e ota_process_write_block (const uint8_t *data, const size_t data_len)

  Writes a block of data to an ongoing Over-The-Air (OTA) update process, verifies the integrity of the data using SHA-256 hashing, and checks the firmware size against the expected size. It returns an error code indicating the status of the operation, such as success, failure, or in-progress, and handles errors like mismatched firmware size or hash computation failures.
- types_error_code_e ota_process_end (bool is_healthy)

  Concludes an ongoing OTA (Over-The-Air) update process, ensuring proper cleanup and validation. It checks if the system is healthy, frees allocated resources, finalizes the OTA update, sets the new boot partition, and returns an appropriate error code based on the operation's success or failure.
- void ota_check_rollback (bool is_healthy)

  Evaluates the health of the system and manages OTA rollback behavior based on the firmware state. If the system is unhealthy or the firmware verification fails, it triggers a rollback and reboot; otherwise, it marks the firmware as valid and cancels the rollback.

4.6.1 Macro Definition Documentation

4.6.1.1 HASH_SIZE_IN_BYTES

```
#define HASH_SIZE_IN_BYTES (32U)
```

4.6.2 Function Documentation

4.6.2.1 ota_check_rollback()

```
void ota_check_rollback (
            bool is_healthy )
```

Evaluates the health of the system and manages OTA rollback behavior based on the firmware state. If the system is unhealthy or the firmware verification fails, it triggers a rollback and reboot; otherwise, it marks the firmware as valid and cancels the rollback.

Parameters

is_healthy	true when system is healthy, false otherwise

4.6.2.2 ota_process_end()

```
types_error_code_e ota_process_end (
            bool is_healthy )
```

Concludes an ongoing OTA (Over-The-Air) update process, ensuring proper cleanup and validation. It checks if the system is healthy, frees allocated resources, finalizes the OTA update, sets the new boot partition, and returns an appropriate error code based on the operation's success or failure.

Parameters

is_healthy	true when writing process was sucessful

Returns

types_error_code_e

4.6.2.3 ota_process_init()

```
types_error_code_e ota_process_init (
            const size_t img_size,
            const uint8_t * hash )
```

Initializes an Over-The-Air (OTA) update process by setting the firmware size, copying the hash, selecting the next OTA partition, and preparing the partition for writing. It also initializes a SHA-256 context for hash computation and returns an appropriate error code based on the success or failure of the initialization steps.

Parameters

img_size	Firmware size to be updated
hash	Received hash

Returns

types_error_code_e

4.6.2.4 ota_process_write_block()

```
types_error_code_e ota_process_write_block (
            const uint8_t * data,
            const size_t data_len )
```

Writes a block of data to an ongoing Over-The-Air (OTA) update process, verifies the integrity of the data using SHA-256 hashing, and checks the firmware size against the expected size. It returns an error code indicating the status of the operation, such as success, failure, or in-progress, and handles errors like mismatched firmware size or hash computation failures.

Parameters

data	Firmware block
data_len	Firmware block size

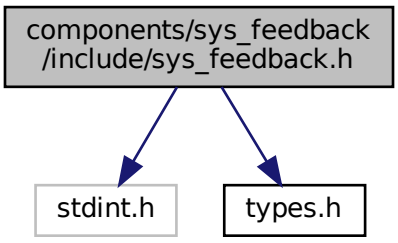
Returns

types_error_code_e

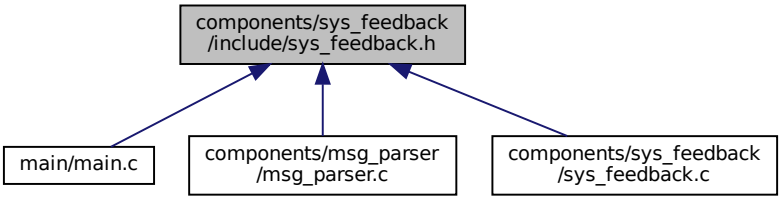
4.7 components/sys_feedback/include/sys_feedback.h File Reference

```
#include <stdint.h>
#include "types.h"
```

Include dependency graph for sys_feedback.h:



This graph shows which files directly or indirectly include this file:



Enumerations

- enum sys_feedback_mode_t { SYS_FEEDBACK_MODE_UPDATE , SYS_FEEDBACK_MODE_NORMAL }

  Sys_feedback modes.

Functions

- types_error_code_e sys_feedback_init (void)

  Initialize sys_feedback component.
- void sys_feedback_set_update_mode (void)

  Update sys_feedback to update mode.
- void sys_feedback_set_normal_mode (void)

  Update sys_feedback to normal mode.
- void sys_feedback_whoiam (const uint8_t major, const uint8_t minor, const uint8_t patch)

  Print information about the firmware.

4.7.1 Enumeration Type Documentation

4.7.1.1 sys_feedback_mode_t

```
enum sys_feedback_mode_t
```

Sys_feedback modes.

Values used to indicate the system mode

Enumerator

SYS_FEEDBACK_MODE_UPDATE	
SYS_FEEDBACK_MODE_NORMAL	

4.7.2 Function Documentation

4.7.2.1 sys_feedback_init()

```
types_error_code_e sys_feedback_init (
            void  )
```

Initialize sys_feedback component.

Returns

types_error_code_e

4.7.2.2 sys_feedback_set_normal_mode()

```
void sys_feedback_set_normal_mode (
            void  )
```

Update sys_feedback to normal mode.

4.7.2.3 sys_feedback_set_update_mode()

```
void sys_feedback_set_update_mode (
            void  )
```

Update sys_feedback to update mode.

4.7.2.4 sys_feedback_whoiam()

```
void sys_feedback_whoiam (
            const uint8_t major,
            const uint8_t minor,
            const uint8_t patch )
```

Print information about the firmware.

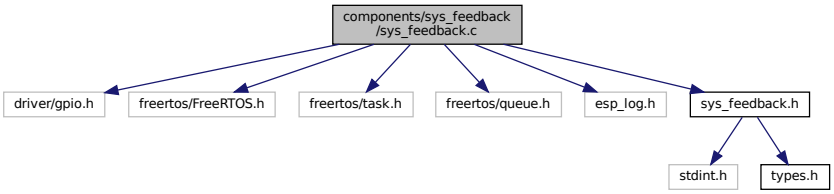
Parameters

major	[in]: Major version
minor	[in]: Minor version
patch	[in]: Patch version

4.8 components/sys_feedback/sys_feedback.c File Reference

```
#include "driver/gpio.h"
#include "freertos/FreeRTOS.h"
#include "freertos/task.h"
#include "freertos/queue.h"
#include "esp_log.h"
#include "sys_feedback.h"
```

Include dependency graph for sys_feedback.c:



Macros

- #define FEEDBACK_GPIO (GPIO_NUM_2)
- #define PINNED_CORE (1)
- #define FEEDBACK_QUEUE_LEN (5)
- #define DELAY_FEEDBACK_TASK_MS (100U)

Functions

- types_error_code_e sys_feedback_init (void)

  Initialize sys_feedback component.
- void sys_feedback_set_update_mode (void)

  Update sys_feedback to update mode.
- void sys_feedback_set_normal_mode (void)

  Update sys_feedback to normal mode.
- void sys_feedback_whoiam (const uint8_t major, const uint8_t minor, const uint8_t patch)

  Print information about the firmware.

4.8.1 Macro Definition Documentation

4.8.1.1 DELAY_FEEDBACK_TASK_MS

```
#define DELAY_FEEDBACK_TASK_MS (100U)
```

4.8.1.2 FEEDBACK_GPIO

```
#define FEEDBACK_GPIO (GPIO_NUM_2)
```

4.8.1.3 FEEDBACK_QUEUE_LEN

```
#define FEEDBACK_QUEUE_LEN (5)
```

4.8.1.4 PINNED_CORE

```
#define PINNED_CORE (1)
```

4.8.2 Function Documentation

4.8.2.1 sys_feedback_init()

```
types_error_code_e sys_feedback_init (
            void  )
```

Initialize sys_feedback component.

Returns

types_error_code_e

4.8.2.2 sys_feedback_set_normal_mode()

```
void sys_feedback_set_normal_mode (
            void  )
```

Update sys_feedback to normal mode.

4.8.2.3 sys_feedback_set_update_mode()

```
void sys_feedback_set_update_mode (
            void  )
```

Update sys_feedback to update mode.

4.8.2.4 sys_feedback_whoiam()

```
void sys_feedback_whoiam (
            const uint8_t major,
            const uint8_t minor,
            const uint8_t patch )
```

Print information about the firmware.

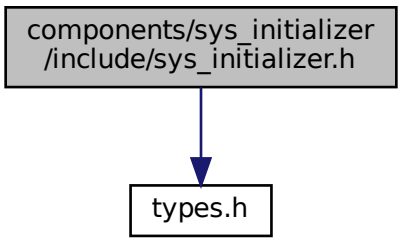
Parameters

major	[in]: Major version
minor	[in]: Minor version
patch	[in]: Patch version

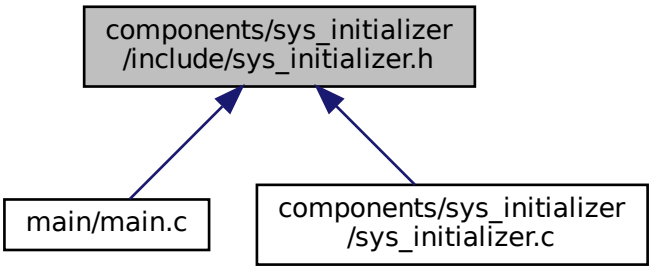
4.9 components/sys_initializer/include/sys_initializer.h File Reference

```
#include "types.h"
```

Include dependency graph for sys_initializer.h:



This graph shows which files directly or indirectly include this file:



Functions

- types_error_code_e sys_initializer_init (void)

  Initialize the sys_initializer component.

4.9.1 Function Documentation

4.9.1.1 sys_initializer_init()

```
types_error_code_e sys_initializer_init (
            void  )
```

Initialize the sys_initializer component.

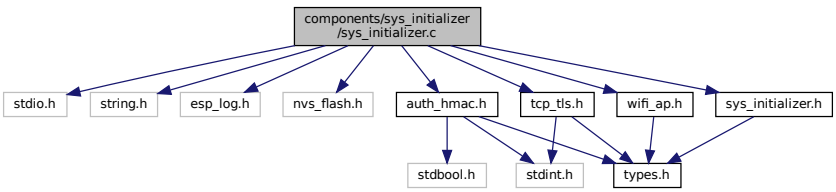
Returns

types_error_code_e

4.10 components/sys_initializer/sys_initializer.c File Reference

```
#include <stdio.h>
#include <string.h>
#include "esp_log.h"
#include "nvs_flash.h"
#include "tcp_tls.h"
#include "wifi_ap.h"
#include "auth_hmac.h"
#include "sys_initializer.h"
```

Include dependency graph for sys_initializer.c:



Functions

- types_error_code_e sys_initializer_init (void)

  Initialize the sys_initializer component.

4.10.1 Function Documentation

4.10.1.1 sys_initializer_init()

```
types_error_code_e sys_initializer_init (
            void  )
```

Initialize the sys_initializer component.

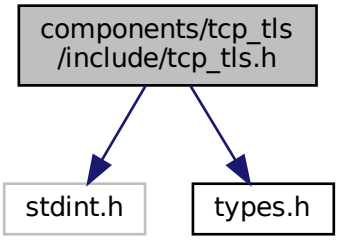
Returns

types_error_code_e

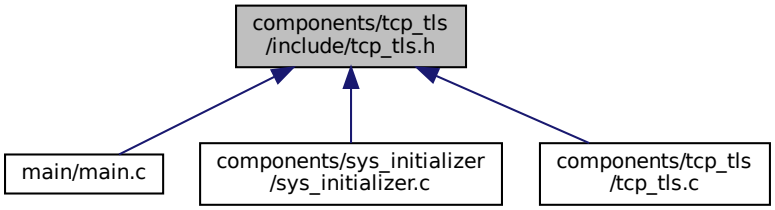
4.11 components/tcp_tls/include/tcp_tls.h File Reference

```
#include <stdint.h>
#include "types.h"
```

Include dependency graph for tcp_tls.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define TCP_TLS_MAX_BUFFER_LEN (4198U)

Functions

- types_error_code_e tcp_tls_init (void)

  Initialize the tcp_tls component.
- types_error_code_e tcp_tls_set_server_crt (const uint8_t *crt, const size_t len)

  Server_crt setter.
- types_error_code_e tcp_tls_set_server_key (const uint8_t *key, const size_t len)

  Server_key setter.

4.11.1 Macro Definition Documentation

4.11.1.1 TCP_TLS_MAX_BUFFER_LEN

```
#define TCP_TLS_MAX_BUFFER_LEN (4198U)
```

4.11.2 Function Documentation

4.11.2.1 tcp_tls_init()

```
types_error_code_e tcp_tls_init (
            void  )
```

Initialize the tcp_tls component.

Returns

types_error_code_e

4.11.2.2 tcp_tls_set_server_crt()

```
types_error_code_e tcp_tls_set_server_crt (
            const uint8_t * crt,
            const size_t len )
```

Server_crt setter.

Parameters

crt	[in]: Server certificate
len	[in]: Server certificate length in bytes

Returns

types_error_code_e

4.11.2.3 tcp_tls_set_server_key()

```
types_error_code_e tcp_tls_set_server_key (
            const uint8_t * key,
            const size_t len )
```

Server_key setter.

Parameters

key	[in]: Server key
len	[in]: Server key length in bytes

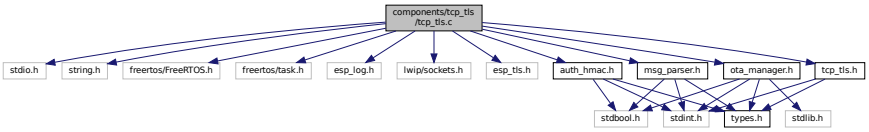
Returns

types_error_code_e

4.12 components/tcp_tls/tcp_tls.c File Reference

```
#include <stdio.h>
#include <string.h>
#include "freertos/FreeRTOS.h"
#include "freertos/task.h"
#include "esp_log.h"
#include "lwip/sockets.h"
#include "esp_tls.h"
#include "msg_parser.h"
#include "auth_hmac.h"
#include "ota_manager.h"
#include "tcp_tls.h"
```

Include dependency graph for tcp_tls.c:



Classes

- struct crypt_buffer_t

Macros

- #define PINNED_CORE (1)
- #define COUNT_NEEDED_TO_START_TCP_SOCKET (2U)
- #define TCP_BUFFER_LEN_BYTES (2048U)
- #define KEEPIDLE_TIME_SEC (30)
- #define KEEPINTERVAL_SEC (5)
- #define KEEPCOUNT (2)
- #define RX_TIMEOUT_SEC (0)
- #define RX_TIMEOUT_USEC (500000)
- #define DELAY_AFTER_UPDATE_MS (200)

Functions

- types_error_code_e tcp_tls_init (void)

  Initialize the tcp_tls component.
- types_error_code_e tcp_tls_set_server_crt (const uint8_t *crt, const size_t len)

  Server_crt setter.
- types_error_code_e tcp_tls_set_server_key (const uint8_t *key, const size_t len)

  Server_key setter.

4.12.1 Macro Definition Documentation

4.12.1.1 COUNT_NEEDED_TO_START_TCP_SOCKET

```
#define COUNT_NEEDED_TO_START_TCP_SOCKET (2U)
```

4.12.1.2 DELAY_AFTER_UPDATE_MS

```
#define DELAY_AFTER_UPDATE_MS (200)
```

4.12.1.3 KEEPCOUNT

```
#define KEEPCOUNT (2)
```

4.12.1.4 KEEPIDLE_TIME_SEC

```
#define KEEPIDLE_TIME_SEC (30)
```

4.12.1.5 KEEPINTERVAL_SEC

```
#define KEEPINTERVAL_SEC (5)
```

4.12.1.6 PINNED_CORE

```
#define PINNED_CORE (1)
```

4.12.1.7 RX_TIMEOUT_SEC

```
#define RX_TIMEOUT_SEC (0)
```

4.12.1.8 RX_TIMEOUT_USEC

```
#define RX_TIMEOUT_USEC (500000)
```

4.12.1.9 TCP_BUFFER_LEN_BYTES

```
#define TCP_BUFFER_LEN_BYTES (2048U)
```

4.12.2 Function Documentation

4.12.2.1 tcp_tls_init()

```
types_error_code_e tcp_tls_init (
            void  )
```

Initialize the tcp_tls component.

Returns

types_error_code_e

4.12.2.2 tcp_tls_set_server_crt()

```
types_error_code_e tcp_tls_set_server_crt (
            const uint8_t * crt,
            const size_t len )
```

Server_crt setter.

Parameters

crt	[in]: Server certificate
len	[in]: Server certificate length in bytes

Returns

types_error_code_e

4.12.2.3 tcp_tls_set_server_key()

```
types_error_code_e tcp_tls_set_server_key (
            const uint8_t * key,
            const size_t len )
```

Server_key setter.

Parameters

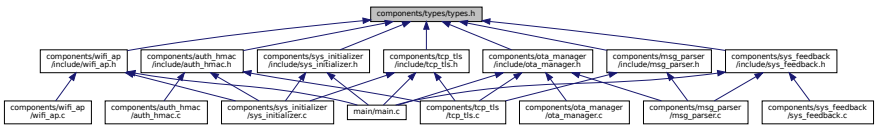
key	[in]: Server key
len	[in]: Server key length in bytes

Returns

types_error_code_e

4.13 components/types/types.h File Reference

This graph shows which files directly or indirectly include this file:



Enumerations

- enum types_error_code_e {
  ERR_CODE_OK , ERR_CODE_IN_PROGRESS , ERR_CODE_FAIL , ERR_CODE_INVALID_PARAM ,
  ERR_CODE_INVALID_OP , ERR_CODE_NOT_ALLOWED }

  Error code types.

4.13.1 Enumeration Type Documentation

4.13.1.1 types_error_code_e

```
enum types_error_code_e
```

Error code types.

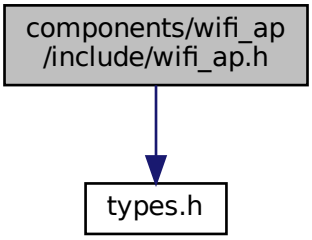
Enumerator

ERR_CODE_OK	
ERR_CODE_IN_PROGRESS	
ERR_CODE_FAIL	
ERR_CODE_INVALID_PARAM	
ERR_CODE_INVALID_OP	
ERR_CODE_NOT_ALLOWED	

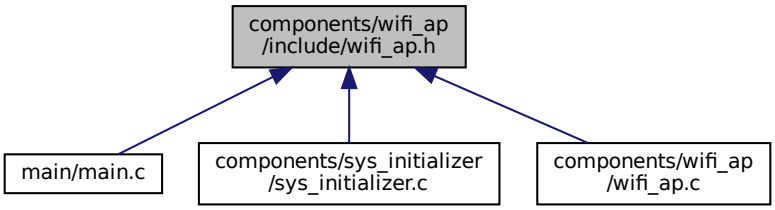
4.14 components/wifi_ap/include/wifi_ap.h File Reference

```
#include "types.h"
```

Include dependency graph for wifi_ap.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define WIFI_AP_SSID_MAX_LEN (32U)
- #define WIFI_AP_PASSWORD_MAX_LEN (64U)

Functions

- void wifi_ap_init (void)

  Initialize wifi_ap component.
- types_error_code_e wifi_ap_set_ssid (char ∗ssid, const uint8_t len)

  SSID setter.
- types_error_code_e wifi_ap_set_password (char ∗password, const uint8_t len)

  Password setter.

4.14.1 Macro Definition Documentation

4.14.1.1 WIFI_AP_PASSWORD_MAX_LEN

```
#define WIFI_AP_PASSWORD_MAX_LEN (64U)
```

4.14.1.2 WIFI_AP_SSID_MAX_LEN

```
#define WIFI_AP_SSID_MAX_LEN (32U)
```

4.14.2 Function Documentation

4.14.2.1 wifi_ap_init()

```
void wifi_ap_init (
            void  )
```

Initialize wifi_ap component.

4.14.2.2 wifi_ap_set_password()

```
types_error_code_e wifi_ap_set_password (
            char * password,
            const uint8_t len )
```

Password setter.

Parameters

password	[in]: Wi-Fi AP password
len	[in]: Password length

4.14.2.3 wifi_ap_set_ssid()

```
types_error_code_e wifi_ap_set_ssid (
            char * ssid,
            const uint8_t len )
```

SSID setter.

Parameters

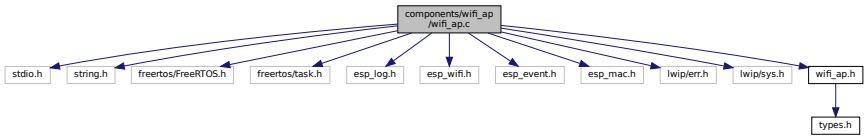
ssid	[in]: Wi-Fi AP SSID
len	[in]: SSID length

4.15 components/wifi_ap/wifi_ap.c File Reference

```
#include <stdio.h>
#include <string.h>
#include "freertos/FreeRTOS.h"
#include "freertos/task.h"
#include "esp_log.h"
#include "esp_wifi.h"
#include "esp_event.h"
#include "esp_mac.h"
#include "lwip/err.h"
```

```
#include "lwip/sys.h"
#include "wifi_ap.h"
```

Include dependency graph for wifi_ap.c:



Macros

- #define PASSWORD_MIN_LEN (8U) /∗ Min length of Wi-Fi API. Don't choose less than 8 bytes ∗/
- #define MAX_CLIENTS (1U)
- #define WIFI_CHANNEL (1U)

Functions

- void wifi_ap_init (void)

  Initialize wifi_ap component.
- types_error_code_e wifi_ap_set_ssid (char ∗ssid, const uint8_t len)

  SSID setter.
- types_error_code_e wifi_ap_set_password (char ∗password, const uint8_t len)

  Password setter.

4.15.1 Macro Definition Documentation

4.15.1.1 MAX_CLIENTS

```
#define MAX_CLIENTS (1U)
```

4.15.1.2 PASSWORD_MIN_LEN

```
#define PASSWORD_MIN_LEN (8U) /* Min length of Wi-Fi API. Don't choose less than 8 bytes */
```

4.15.1.3 WIFI_CHANNEL

```
#define WIFI_CHANNEL (1U)
```

4.15.2 Function Documentation

4.15.2.1 wifi_ap_init()

```
void wifi_ap_init (
            void  )
```

Initialize wifi_ap component.

4.15.2.2 wifi_ap_set_password()

```
types_error_code_e wifi_ap_set_password (
            char * password,
            const uint8_t len )
```

Password setter.

Parameters

password	[in]: Wi-Fi AP password
len	[in]: Password length

4.15.2.3 wifi_ap_set_ssid()

```
types_error_code_e wifi_ap_set_ssid (
            char * ssid,
            const uint8_t len )
```

SSID setter.

Parameters

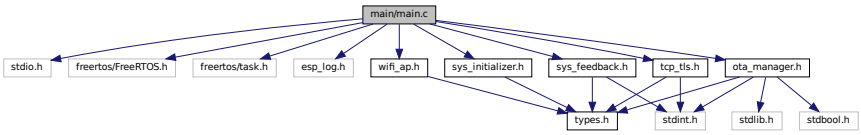
ssid	[in]: Wi-Fi AP SSID
len	[in]: SSID length

4.16 main/main.c File Reference

```
#include <stdio.h>
#include "freertos/FreeRTOS.h"
#include "freertos/task.h"
```

```
#include "esp_log.h"
#include "sys_initializer.h"
#include "wifi_ap.h"
#include "tcp_tls.h"
#include "ota_manager.h"
#include "sys_feedback.h"
```

Include dependency graph for main.c:



Macros

- #define VERSION_MAJOR (1U)
- #define VERSION_MINOR (0U)
- #define VERSION_PATCH (0U)
- #define RESET_DELAY_MS (1000)

Functions

- void app_main (void)

  Main task.

4.16.1 Macro Definition Documentation

4.16.1.1 RESET_DELAY_MS

```
#define RESET_DELAY_MS (1000)
```

4.16.1.2 VERSION_MAJOR

```
#define VERSION_MAJOR (1U)
```

4.16.1.3 VERSION_MINOR

```
#define VERSION_MINOR (0U)
```

4.16.1.4 VERSION_PATCH

```
#define VERSION_PATCH (0U)
```

4.16.2 Function Documentation

4.16.2.1 app_main()

```
void app_main (
            void  )
```

Main task.

Index