

Statics Strings

STM32F1XX

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Chapter 1

Static Strings

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Features:

- Developed for the STM32F103.
- Global scope strings.
- Configurable quantity and size of the memory arrays.
- No dynamic memory allocation.
- Customizable quantity and length of string types.
- Create custom string function to create local scope strings.
- String length function.
- String can be \0 terminated and \r\n terminated.
- String split function.
- Fast string creation with save.
- Low level string creation with allocate.
- Reusable memory with deallocate.
- is_line function.
- Substring, concatenate, contains string, contains char and compare function.
- Transforms integers and floats to strings

GETTING STARTED

Suggested names

```
static_strings_string_descriptor string_name;
uint8_t string_name_memory[];
```

First of all initialize the library

```
static_strings_init();
```

Creating a string

```
uint8_t test_memory[] = "Hello Word\r\n";
static_strings_string_descriptor *test = static_strings_save(test_memory);
if(test == NULL){
    Error Handling.
}
else{
    Some work.
    static_strings_deallocate(test);
}
```

DON'T FORGET TO DEALLOCATE AFTER USING.

Also a string can be created this way

```
#include "string.h"
uint8_t test_memory[] = "Hello Word\r\n";
uint16_t test_length = static_strings_strlen(test_memory);
static_strings_string_descriptor *test = static_strings_allocate(test_length);
if(test == NULL){
    Error Handling.
}
else{
    memcpy(test->string, test_memory, test_length);
    test->length = test_length;
    Some work.
    static_strings_deallocate(test);
}
```

DON'T FORGET TO DEALLOCATE AFTER USING.

Split a local scope string

```
uint8_t split_memory[10] = "123,56,8\r\n";
static_strings_string_descriptor split;
static_strings_create_custom_string(&split, split_memory);
static_strings_string_descriptor *token;
static_strings_string_splitter_set_parameters(split, ',', ' ');
while(static_strings_string_splitter_get_next_token(&token)) {
    HAL_UART_Transmit(&huart1, token->string, token->length, HAL_MAX_DELAY);
}
```

Getting a substring

```
uint8_t custom[10] = "123,56,89\0";
static_strings_create_custom_string(string_descriptor, custom);
static_strings_string_descriptor *substring = static_strings_substring(string_descriptor, 2, 8);
if(substring != NULL){
    HAL_UART_Transmit(&huart1, substring->string, substring->length, HAL_MAX_DELAY);
    static_strings_deallocate(substring);
}
```

Concatenate two strings and search for a substring and a character in the result


```

uint8_t concatenate_at_memory[] = "Hello \0";
static_strings_string_descriptor concatenate_at;
static_strings_create_custom_string(&concatenate_at, concatenate_at_memory);
uint8_t concatenate_memory[] = "World\r\n";
static_strings_string_descriptor concatenate;
static_strings_create_custom_string(&concatenate, concatenate_memory);
static_strings_string_descriptor *concatenated;
concatenated = static_strings_concatenate(&concatenate_at, &concatenate);
if (concatenated != NULL) {
    HAL_UART_Transmit(&huart1, concatenated->string, concatenated->length, HAL_MAX_DELAY);
    if (static_strings_contains_string(concatenated, &concatenate_at)) {
        HAL_UART_Transmit(&huart1, (uint8_t *) "1\r\n", 3, HAL_MAX_DELAY);
    }
    else {
        HAL_UART_Transmit(&huart1, (uint8_t *) "0\r\n", 3, HAL_MAX_DELAY);
    }
    if (static_strings_contains_string(concatenated, 'W')) {
        HAL_UART_Transmit(&huart1, (uint8_t *) "1\r\n", 3, HAL_MAX_DELAY);
    }
    else {
        HAL_UART_Transmit(&huart1, (uint8_t *) "0\r\n", 3, HAL_MAX_DELAY);
    }
    static_strings_deallocate(concatenated);
}

```

Compare two equals and non equals strings

```

uint8_t equal_a_memory[] = "Hall\0";
static_strings_string_descriptor equal_a;
uint8_t equal_b_memory[] = "Hall\0";
static_strings_string_descriptor equal_b;
uint8_t non_equal_memory[] = "oil\0";
static_strings_string_descriptor non_equal;
static_strings_create_custom_string(&equal_a, equal_a_memory);
static_strings_create_custom_string(&equal_b, equal_b_memory);
static_strings_create_custom_string(&non_equal, non_equal_memory);
if (static_strings_compare(&equal_a, &equal_b)) {
    HAL_UART_Transmit(&huart1, (uint8_t *) "1\r\n", 3, HAL_MAX_DELAY);
}
else {
    HAL_UART_Transmit(&huart1, (uint8_t *) "0\r\n", 3, HAL_MAX_DELAY);
}
if (static_strings_compare(&equal_a, &non_equal)) {
    HAL_UART_Transmit(&huart1, (uint8_t *) "1\r\n", 3, HAL_MAX_DELAY);
}
else {
    HAL_UART_Transmit(&huart1, (uint8_t *) "0\r\n", 3, HAL_MAX_DELAY);
}

```

Transform a integer and a float to a string

```

static_strings_string_descriptor *var_string;
uint8_t uint8 = 200;
var_string = static_strings_uint8_to_string(uint8);
if (var_string != NULL) {
    HAL_UART_Transmit(&huart1, var_string->string, var_string->length, HAL_MAX_DELAY);
    static_strings_deallocate(var_string);
}
float float_number = 19.60232;
var_string = static_strings_float_to_string(float_number);
if (var_string != NULL) {
    HAL_UART_Transmit(&huart1, var_string->string, var_string->length, HAL_MAX_DELAY);
    static_strings_deallocate(var_string);
}

```

Configure quantity and size of the memory arrays

Just edit these constants in [static_strings.h](#)

```

#define STATIC_STRINGS_VERY_SHORT_STRING_SIZE 50
#define STATIC_STRINGS_VERY_SHORT_STRING_QUANTITY 10
#define STATIC_STRINGS_SHORT_STRING_SIZE 100
#define STATIC_STRINGS_SHORT_STRING_QUANTITY 6
#define STATIC_STRINGS_MEDIUM_STRING_SIZE 200
#define STATIC_STRINGS_MEDIUM_STRING_QUANTITY 2
#define STATIC_STRINGS_LONG_STRING_SIZE 500
#define STATIC_STRINGS_LONG_STRING_QUANTITY 1
#define STATIC_STRINGS_VERY_LONG_STRING_SIZE 1000
#define STATIC_STRINGS_VERY_LONG_STRING_QUANTITY 1

```


Chapter 2

Module Index

2.1 Modules

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Chapter 3

Data Structure Index

3.1 Data Structures

Here are the data structures with brief descriptions:

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Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

int_types.h	The fprintf() PRI[d,u,x,o,i,X][8,16,32] macros for 32 bits signed and unsigned integers	19
static_strings.c	Strings allocation with static memory	19
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Chapter 5

Module Documentation

5.1 String types size and quantity

Constants to reserve a memory for the different types of strings according to their length.

Macros

- `#define STATIC_STRINGS_VERY_SHORT_STRING_SIZE 50`
- `#define STATIC_STRINGS_VERY_SHORT_STRING_QUANTITY 10`
- `#define STATIC_STRINGS_SHORT_STRING_SIZE 100`
- `#define STATIC_STRINGS_SHORT_STRING_QUANTITY 6`
- `#define STATIC_STRINGS_MEDIUM_STRING_SIZE 200`
- `#define STATIC_STRINGS_MEDIUM_STRING_QUANTITY 2`
- `#define STATIC_STRINGS_LONG_STRING_SIZE 500`
- `#define STATIC_STRINGS_LONG_STRING_QUANTITY 1`
- `#define STATIC_STRINGS_VERY_LONG_STRING_SIZE 1000`
- `#define STATIC_STRINGS_VERY_LONG_STRING_QUANTITY 1`

5.1.1 Detailed Description

Constants to reserve a memory for the different types of strings according to their length.

5.2 String types

Constants to identify the different types of strings according to their length.

Macros

- `#define STATIC_STRINGS_STRING_TYPE_VERY_SHORT 0`
- `#define STATIC_STRINGS_STRING_TYPE_SHORT 1`
- `#define STATIC_STRINGS_STRING_TYPE_MEDIUM 2`
- `#define STATIC_STRINGS_STRING_TYPE_LONG 3`
- `#define STATIC_STRINGS_STRING_TYPE_VERY_LONG 4`
- `#define STATIC_STRINGS_STRING_TYPE_CUSTOM 5`

5.2.1 Detailed Description

Constants to identify the different types of strings according to their length.

5.3 String status

Constants to define the status of a string.

Macros

- `#define STATIC_STRINGS_STRING_STATUS_DEALLOCATED 0`
- `#define STATIC_STRINGS_STRING_STATUS_ALLOCATED 1`
- `#define STATIC_STRINGS_STRING_STATUS_CONSTANT 2`

5.3.1 Detailed Description

Constants to define the status of a string.

5.4 Error handling

Error codes.

Macros

- `#define STATIC_STRINGS_ERROR_CODE_NO_MEMORY_AVAILABLE 0`
- `#define STATIC_STRINGS_ERROR_CODE_INVALID_STRING 1`
- `#define STATIC_STRINGS_ERROR_CODE_STRING_TOO_LONG 2`
- `#define STATIC_STRINGS_ERROR_CODE_SUBSTRING_START_INDEX_OUT_OF_RANGE 3`
- `#define STATIC_STRINGS_ERROR_CODE_SUBSTRING_FINISH_INDEX_OUT_OF_RANGE 4`

Variables

- `uint8_t static_strings_error_code`
Global variable to store error code.

5.4.1 Detailed Description

Error codes.

5.4.2 Variable Documentation

5.4.2.1 static_strings_error_code

```
uint8_t static_strings_error_code
```

Global variable to store error code.

```
static_strings_error_code
```

5.5 Static memory arrays

Static memory arrays to allocate strings.

Variables

- `uint8_t static_strings_very_short_string_memory` [STATIC_STRINGS_VERY_SHORT_STRING_QUANTITY][STATIC_STRINGS_VERY_SHORT_STRING_SIZE]
- `uint8_t static_strings_short_string_memory` [STATIC_STRINGS_SHORT_STRING_QUANTITY][STATIC_STRINGS_SHORT_STRING_SIZE]
- `uint8_t static_strings_medium_string_memory` [STATIC_STRINGS_MEDIUM_STRING_QUANTITY][STATIC_STRINGS_MEDIUM_STRING_SIZE]
- `uint8_t static_strings_long_string_memory` [STATIC_STRINGS_LONG_STRING_QUANTITY][STATIC_STRINGS_LONG_STRING_SIZE]
- `uint8_t static_strings_very_long_string_memory` [STATIC_STRINGS_VERY_LONG_STRING_QUANTITY][STATIC_STRINGS_VERY_LONG_STRING_SIZE]

5.5.1 Detailed Description

Static memory arrays to allocate strings.

5.6 String descriptors

Descriptors for all the string types.

Variables

- [static_strings_string_descriptor](#) **static_strings_very_short_strings_descriptors** [STATIC_STRINGS_VERY_SHORT_STRING_QUANTITY]
- [static_strings_string_descriptor](#) **static_strings_short_strings_descriptors** [STATIC_STRINGS_SHORT_STRING_QUANTITY]
- [static_strings_string_descriptor](#) **static_strings_medium_strings_descriptors** [STATIC_STRINGS_MEDIUM_STRING_QUANTITY]
- [static_strings_string_descriptor](#) **static_strings_long_strings_descriptors** [STATIC_STRINGS_LONG_STRING_QUANTITY]
- [static_strings_string_descriptor](#) **static_strings_very_long_strings_descriptors** [STATIC_STRINGS_VERY_LONG_STRING_QUANTITY]

5.6.1 Detailed Description

Descriptors for all the string types.

Chapter 6

Data Structure Documentation

6.1 static_strings_string_descriptor Struct Reference

Meta data of a string.

```
#include <static_strings.h>
```

Data Fields

- `uint8_t * string`
- `uint16_t length`
- `uint8_t type`
- `uint8_t status`

6.1.1 Detailed Description

Meta data of a string.

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

- [static_strings.h](#)

6.2 static_strings_string_splitter_parameters Struct Reference

Definition of the structure to hold the parameters to `static_strings_string_splitter_get_next_token` function.

```
#include <static_strings.h>
```

Data Fields

- [static_strings_string_descriptor](#) * `string_descriptor`
- `uint8_t * next_token_start`
- `uint8_t delimiter`

6.2.1 Detailed Description

Definition of the structure to hold the parameters to `static_strings_string_splitter_get_next_token` function.

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

- [static_strings.h](#)

Chapter 7

File Documentation

7.1 `int_types.h` File Reference

The `fprintf()` `PR[d,u,x,o,i,X][8,16,32]` macros for 32 bits signed and unsigned integers.

Macros

- `#define PRId8 "hd"`
- `#define PRId16 "d"`
- `#define PRId32 "ld"`
- `#define PRIu8 "hu"`
- `#define PRIu16 "u"`
- `#define PRIu32 "lu"`
- `#define PRIx8 "hX"`
- `#define PRIx16 "X"`
- `#define PRIx32 "lX"`
- `#define PRIo8 "ho"`
- `#define PRIo16 "o"`
- `#define PRIo32 "lo"`
- `#define PRIi8 "hi"`
- `#define PRIi16 "i"`
- `#define PRIi32 "li"`
- `#define PRIx8 "hX"`
- `#define PRIx16 "X"`
- `#define PRIx32 "lX"`

7.1.1 Detailed Description

The `fprintf()` `PR[d,u,x,o,i,X][8,16,32]` macros for 32 bits signed and unsigned integers.

7.2 `static_strings.c` File Reference

Strings allocation with static memory.

```
#include "static_strings.h"
```

Functions

- void `static_strings_init` ()
Link the descriptors with the arrays and initialize the status as deallocated.
- `static_strings_string_descriptor * static_strings_allocate` (uint16_t string_size)
Request memory for a string with its size, the user must copy the string with the descriptor and specify the size. Also see `static_strings_save`.
- `static_strings_string_descriptor * static_strings_save` (uint8_t *string)
Calculate the string size, allocate memory, copy the string and set the size. String must end with `\r\n` or `\0`, if `\r` is found but `\n` is not found, it is added, size of string include line ending but not `\0`. Also see `static_strings_allocate`.
- int `static_strings_create_custom_string` (static_strings_string_descriptor *string_descriptor, uint8_t *string)
Bind the provided string descriptor with the data of a string. String must end with `\r\n` or `\0`.
- void `static_strings_deallocate` (static_strings_string_descriptor *string_descriptor)
Set the descriptor status as deallocated. Custom strings can't be deallocated.
- int `static_strings_is_line` (static_strings_string_descriptor *string_descriptor)
Look at the last two characters of a string to see if the string has a line ending `\r\n`.
- uint16_t `static_strings_strlen` (uint8_t *string)
Calculate the length of a string that ends with `\r\n` or `\0`, line ending is included in length. Maximum length is `STATIC_STRINGS_VERY_LONG_STRING_SIZE`.
- void `static_strings_string_splitter_set_parameters` (static_strings_string_descriptor *string_descriptor, uint8_t delimiter)
Set the parameters to the `static_strings_string_splitter_get_next_token` function.
- int `static_strings_string_splitter_get_next_token` (static_strings_string_descriptor **string_descriptor)
Bind the provided string descriptor with the next token data. Can be placed in a while condition as it returns 1 if success or 0 if no token available and retrieves the token in the `string_descriptor` parameter. If no delimiter the whole string is taken as token. The token is placed in a new string.
- `static_strings_string_descriptor * static_strings_substring` (static_strings_string_descriptor *string, uint16_t start_index, uint16_t finish_index)
Return a new string with the characters between the `start_index` and the `finish_index`. Not including the character at `finish_index`. Returned string has to be deallocated. To get all the string from a start index use the length in the `finish_index`.
- `static_strings_string_descriptor * static_strings_concatenate` (static_strings_string_descriptor *concatenate_at, static_strings_string_descriptor *concatenate)
Concatenate the second string at the end of the first in a new string. To get all the string from a start index use the length in the `finish_index`.
- int `static_strings_contains_string` (static_strings_string_descriptor *search_in, static_strings_string_descriptor *search_for)
Search a string in other string.
- int `static_strings_contains_char` (static_strings_string_descriptor *search_in, uint8_t search_for)
Search a character in a string.
- int `static_strings_compare` (static_strings_string_descriptor *compare_string_one, static_strings_string_descriptor *compare_string_two)
Compare two strings to see if they are equals.
- `static_strings_string_descriptor * static_strings_uint8_to_string` (uint8_t uint8)
Create a string with the value of the parameter.
- `static_strings_string_descriptor * static_strings_uint16_to_string` (uint16_t uint16)
Create a string with the value of the parameter.
- `static_strings_string_descriptor * static_strings_uint32_to_string` (uint32_t uint32)
Create a string with the value of the parameter.
- `static_strings_string_descriptor * static_strings_int8_to_string` (int8_t int8)
Create a string with the value of the parameter.
- `static_strings_string_descriptor * static_strings_int16_to_string` (int16_t int16)
Create a string with the value of the parameter.

- `static_strings_string_descriptor * static_strings_int32_to_string` (`int32_t int32`)
Create a string with the value of the parameter.
- `static_strings_string_descriptor * static_strings_float_to_string` (`float float_arg`)
Create a string with the value of the parameter.
- `static_strings_string_descriptor * static_strings_double_to_string` (`double double_arg`)
Create a string with the value of the parameter.

Variables

- `static_strings_string_splitter_parameters static_strings_string_splitter` = {NULL, '\0'}

7.2.1 Detailed Description

Strings allocation with static memory.

7.2.2 Function Documentation

7.2.2.1 static_strings_allocate()

```
static_strings_string_descriptor* static_strings_allocate (
    uint16_t string_size )
```

Request memory for a string with its size, the user must copy the string with the descriptor and specify the size. Also see `static_strings_save`.

`static_strings_string_descriptor *static_strings_allocate(uint16_t string_size)`

Parameters

<i>string_size</i>	Size of the string in <code>uint16_t</code> .
--------------------	---

Returns

A pointer to the string descriptor, if NULL check `static_strings_error_code`.

7.2.2.2 static_strings_compare()

```
int static_strings_compare (
    static_strings_string_descriptor * compare_string_one,
    static_strings_string_descriptor * compare_string_two )
```

Compare two strings to see if they are equals.

`int static_strings_compare(static_strings_string_descriptor* compare_string_one,static_strings_string_descriptor* compare_string_two)`

Parameters

<i>compare_string_one</i>	A pointer to the first string to compare.
<i>compare_string_two</i>	A pointer to the second string to compare.

Returns

A pointer to the string descriptor with the concatenated string, if NULL check `static_strings_error_code`.

7.2.2.3 static_strings_concatenate()

```
static_strings_string_descriptor* static_strings_concatenate (
    static_strings_string_descriptor * concatenate_at,
    static_strings_string_descriptor * concatenate )
```

Concatenate the second string at the end of the first in a new string. To get all the string from a start index use the length in the `finish_index`.

```
static_strings_string_descriptor static_strings_concatenate(static_strings_string_descriptor concatenate_at,static_strings_string_descriptor* concatenate)
```

Parameters

<i>concatenate_at</i>	A pointer to the string to concatenate at.
<i>concatenate</i>	A pointer to the string to concatenate at the end of the <code>concatenate_at</code> string.

Returns

A pointer to the string descriptor with the concatenated string, if NULL check `static_strings_error_code`.

7.2.2.4 static_strings_contains_char()

```
int static_strings_contains_char (
    static_strings_string_descriptor * search_in,
    uint8_t search_for )
```

Search a character in a string.

```
int static_strings_contains_char(static_strings_string_descriptor* search_in,uint8_t search_for)
```

Parameters

<i>search_in</i>	A pointer to the string in which the character will be search.
<i>search_for</i>	The searched character.

Returns

1 if the character is found, 0 if not.

7.2.2.5 static_strings_contains_string()

```
int static_strings_contains_string (
    static_strings_string_descriptor * search_in,
    static_strings_string_descriptor * search_for )
```

Search a string in other string.

int [static_strings_contains_string](#)(static_strings_string_descriptor* search_in,static_strings_string_descriptor* search_for)

Parameters

<i>search_in</i>	A pointer to the string in which the character will be search.
<i>search_for</i>	A pointer to the searched string.

Returns

1 if the string is found, 0 if not.

7.2.2.6 static_strings_create_custom_string()

```
int static_strings_create_custom_string (
    static_strings_string_descriptor * string_descriptor,
    uint8_t * string )
```

Bind the provided string descriptor with the data of a string. String must end with `\r\n` or `\0`.

void [static_strings_create_custom_string](#)(static_strings_string_descriptor *string_descriptor,uint8_t *string)

Parameters

<i>string_descriptor</i>	A pointer to a string descriptor.
<i>string</i>	A pointer to the string to bind the descriptor.

Returns

Return the length of the string, if 0 check `static_strings_error_code`.

7.2.2.7 static_strings_deallocate()

```
void static_strings_deallocate (
    static_strings_string_descriptor * string_descriptor )
```

Set the descriptor status as deallocated. Custom strings can't be deallocated.

```
void static_strings_deallocate(static_strings_string_descriptor *string_descriptor)
```

Parameters

<i>string_descriptor</i>	A pointer to the string descriptor to deallocate.
--------------------------	---

7.2.2.8 static_strings_double_to_string()

```
static_strings_string_descriptor* static_strings_double_to_string (
    double double_arg )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_double_to_string(double double_arg)
```

Parameters

<i>double_arg</i>	32 bits signed float (double).
-------------------	--------------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.2.2.9 static_strings_float_to_string()

```
static_strings_string_descriptor* static_strings_float_to_string (
    float float_arg )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_float_to_string(float float_arg)
```

Parameters

<i>float_arg</i>	16 bits signed float.
------------------	-----------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.2.2.10 static_strings_init()

```
void static_strings_init ( )
```

Link the descriptors with the arrays and initialize the status as deallocated.

```
void static_strings_init()
```

7.2.2.11 static_strings_int16_to_string()

```
static_strings_string_descriptor* static_strings_int16_to_string (
    int16_t int16 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_int16_to_string(int16_t int16)
```

Parameters

<i>int16</i>	16 bits signed integer.
--------------	-------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.2.2.12 static_strings_int32_to_string()

```
static_strings_string_descriptor* static_strings_int32_to_string (
    int32_t int32 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_int32_to_string(int32_t int32)
```

Parameters

<i>int32</i>	32 bits signed integer.
--------------	-------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.2.2.13 static_strings_int8_to_string()

```
static_strings_string_descriptor* static_strings_int8_to_string (
    int8_t int8 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_int8_to_string(int8_t int8)
```

Parameters

<i>int8</i>	8 bits signed integer.
-------------	------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.2.2.14 static_strings_is_line()

```
int static_strings_is_line (
    static_strings_string_descriptor * string_descriptor )
```

Look at the last two characters of a string to see if the string has a line ending `\r\n`.

```
int static_strings_is_line(static_strings_string_descriptor *string_descriptor)
```

Parameters

<i>string</i>	A pointer to the string descriptor.
---------------	-------------------------------------

Returns

Return 0 if the string doesn't have a line ending `\r\n` and 1 if the string has a line ending `\r\n`.

7.2.2.15 static_strings_save()

```
static_strings_string_descriptor* static_strings_save (
    uint8_t * string )
```


Calculate the string size, allocate memory, copy the string and set the size. String must end with `\r\n` or `\0`, if `\r` is found but `\n` is not found, it is added, size of string include line ending but not `\0`. Also see `static_strings_allocate`.

[static_strings_string_descriptor](#) *static_strings_save(uint8_t *string)

Parameters

<i>string</i>	A pointer to the string start.
---------------	--------------------------------

Returns

A pointer to the string descriptor, if NULL check `static_strings_error_code`.

7.2.2.16 static_strings_string_splitter_get_next_token()

```
int static_strings_string_splitter_get_next_token (
    static_strings_string_descriptor ** string_descriptor )
```

Bind the provided string descriptor with the next token data. Can be placed in a while condition as it returns 1 if success or 0 if no token available and retrieves the token in the `string_descriptor` parameter. If no delimiter the whole string is taken as token. The token is placed in a new string.

```
int static_strings_string_splitter_get_next_token(static_strings_string_descriptor **string_descriptor)
```

Parameters

<i>string_descriptor</i>	A pointer to a pointer to a string descriptor that will contain the token.
--------------------------	--

Returns

1 if success or 0 if no token is available.

7.2.2.17 static_strings_string_splitter_set_parameters()

```
void static_strings_string_splitter_set_parameters (
    static_strings_string_descriptor * string_descriptor,
    uint8_t delimiter )
```

Set the parameters to the `static_strings_string_splitter_get_next_token` function.

```
void static_strings_string_splitter_set_parameters(static_strings_string_descriptor *string_descriptor,uint8_t delimiter)
```

Parameters

<i>string_descriptor</i>	A pointer to the string descriptor of the string to split.
<i>delimiter</i>	The delimiter for the tokens.

7.2.2.18 static_strings_strlen()

```
uint16_t static_strings_strlen (
    uint8_t * string )
```

Calculate the length of a string that ends with `\r\n` or `\0`, line ending is included in length. Maximum length is `STATIC_STRINGS_VERY_LONG_STRING_SIZE`.

```
uint16_t static_strings_strlen(uint8_t *string)
```

Parameters

<i>string</i>	A pointer to the string.
---------------	--------------------------

Returns

Length of the string in `uint16_t`. If 0 check `static_strings_error_code`.

7.2.2.19 static_strings_substring()

```
static_strings_string_descriptor* static_strings_substring (
    static_strings_string_descriptor * string,
    uint16_t start_index,
    uint16_t finish_index )
```

Return a new string with the characters between the `start_index` and the `finish_index`. Not including the character at `finish_index`. Returned string has to be deallocated. To get all the string from a start index use the length in the `finish_index`.

```
static_strings_string_descriptor static_strings_substring(static_strings_string_descriptor string_descriptor, uint16_t start_index, uint16_t finish_index)
```

Parameters

<i>string_descriptor</i>	A pointer to the string which contains the substring.
<i>start_index</i>	The index of the first character.
<i>finish_index</i>	The index of the last character, not included.

Returns

A pointer to the string descriptor of the substring, if NULL check `static_strings_error_code`.

7.2.2.20 static_strings_uint16_to_string()

```
static_strings_string_descriptor* static_strings_uint16_to_string (
    uint16_t uint16 )
```

Create a string with the value of the parameter.

[static_strings_string_descriptor](#) *static_strings_uint16_to_string(uint16_t uint16)

Parameters

<i>uint16</i>	16 bits unsigned integer.
---------------	---------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.2.2.21 static_strings_uint32_to_string()

```
static_strings_string_descriptor* static_strings_uint32_to_string (  
    uint32_t uint32 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_uint32_to_string(uint32_t uint32)
```

Parameters

<i>uint32</i>	32 bits unsigned integer.
---------------	---------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.2.2.22 static_strings_uint8_to_string()

```
static_strings_string_descriptor* static_strings_uint8_to_string (  
    uint8_t uint8 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_uint8_to_string(uint8_t uint8)
```

Parameters

<i>uint8</i>	8 bits unsigned integer.
--------------	--------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.2.3 Variable Documentation

7.2.3.1 static_strings_string_splitter

```
static_strings_string_splitter_parameters static_strings_string_splitter = {NULL, '\0'}
```

Parameters to static_strings_string_splitter_get_next_token function. Initialized in null and \0.

7.3 static_strings.h File Reference

Strings allocation with static memory.

```
#include "stm32f1xx_hal.h"
#include "string.h"
#include "int_types.h"
#include "stdio.h"
```

Data Structures

- struct [static_strings_string_descriptor](#)
Meta data of a string.
- struct [static_strings_string_splitter_parameters](#)
Definition of the structure to hold the parameters to static_strings_string_splitter_get_next_token function.

Macros

- `#define STATIC_STRINGS_VERY_SHORT_STRING_SIZE 50`
- `#define STATIC_STRINGS_VERY_SHORT_STRING_QUANTITY 10`
- `#define STATIC_STRINGS_SHORT_STRING_SIZE 100`
- `#define STATIC_STRINGS_SHORT_STRING_QUANTITY 6`
- `#define STATIC_STRINGS_MEDIUM_STRING_SIZE 200`
- `#define STATIC_STRINGS_MEDIUM_STRING_QUANTITY 2`
- `#define STATIC_STRINGS_LONG_STRING_SIZE 500`
- `#define STATIC_STRINGS_LONG_STRING_QUANTITY 1`
- `#define STATIC_STRINGS_VERY_LONG_STRING_SIZE 1000`
- `#define STATIC_STRINGS_VERY_LONG_STRING_QUANTITY 1`
- `#define STATIC_STRINGS_STRING_TYPE_VERY_SHORT 0`
- `#define STATIC_STRINGS_STRING_TYPE_SHORT 1`
- `#define STATIC_STRINGS_STRING_TYPE_MEDIUM 2`
- `#define STATIC_STRINGS_STRING_TYPE_LONG 3`
- `#define STATIC_STRINGS_STRING_TYPE_VERY_LONG 4`
- `#define STATIC_STRINGS_STRING_TYPE_CUSTOM 5`
- `#define STATIC_STRINGS_STRING_STATUS_DEALLOCATED 0`
- `#define STATIC_STRINGS_STRING_STATUS_ALLOCATED 1`
- `#define STATIC_STRINGS_STRING_STATUS_CONSTANT 2`
- `#define STATIC_STRINGS_ERROR_CODE_NO_MEMORY_AVAILABLE 0`
- `#define STATIC_STRINGS_ERROR_CODE_INVALID_STRING 1`
- `#define STATIC_STRINGS_ERROR_CODE_STRING_TOO_LONG 2`
- `#define STATIC_STRINGS_ERROR_CODE_SUBSTRING_START_INDEX_OUT_OF_RANGE 3`
- `#define STATIC_STRINGS_ERROR_CODE_SUBSTRING_FINISH_INDEX_OUT_OF_RANGE 4`

Typedefs

- typedef struct [static_strings_string_descriptor](#) **static_strings_string_descriptor**
- typedef struct [static_strings_string_splitter_parameters](#) **static_strings_string_splitter_parameters**

Functions

- void [static_strings_init](#) ()
Link the descriptors with the arrays and initialize the status as deallocated.
- [static_strings_string_descriptor](#) * [static_strings_allocate](#) (uint16_t string_size)
Request memory for a string with its size, the user must copy the string with the descriptor and specify the size. Also see [static_strings_save](#).
- [static_strings_string_descriptor](#) * [static_strings_save](#) (uint8_t *string)
Calculate the string size, allocate memory, copy the string and set the size. String must end with `\r\n` or `\0`, if `\r` is found but `\n` is not found, it is added, size of string include line ending but not `\0`. Also see [static_strings_allocate](#).
- int [static_strings_create_custom_string](#) ([static_strings_string_descriptor](#) *string_descriptor, uint8_t *string)
Bind the provided string descriptor with the data of a string. String must end with `\r\n` or `\0`.
- void [static_strings_deallocate](#) ([static_strings_string_descriptor](#) *string_descriptor)
Set the descriptor status as deallocated. Custom strings can't be deallocated.
- int [static_strings_is_line](#) ([static_strings_string_descriptor](#) *string_descriptor)
Look at the last two characters of a string to see if the string has a line ending `\r\n`.
- uint16_t [static_strings_strlen](#) (uint8_t *string)
Calculate the length of a string that ends with `\r\n` or `\0`, line ending is included in length. Maximum length is `STATIC_STRINGS_VERY_LONG_STRING_SIZE`.
- void [static_strings_string_splitter_set_parameters](#) ([static_strings_string_descriptor](#) *string_descriptor, uint8_t delimiter)
Set the parameters to the [static_strings_string_splitter_get_next_token](#) function.
- int [static_strings_string_splitter_get_next_token](#) ([static_strings_string_descriptor](#) **string_descriptor)
Bind the provided string descriptor with the next token data. Can be placed in a while condition as it returns 1 if success or 0 if no token available and retrieves the token in the `string_descriptor` parameter. If no delimiter the whole string is taken as token. The token is placed in a new string.
- [static_strings_string_descriptor](#) * [static_strings_substring](#) ([static_strings_string_descriptor](#) *string, uint16_t start_index, uint16_t finish_index)
Return a new string with the characters between the `start_index` and the `finish_index`. Not including the character at `finish_index`. Returned string has to be deallocated. To get all the string from a start index use the length in the `finish_index`.
- [static_strings_string_descriptor](#) * [static_strings_concatenate](#) ([static_strings_string_descriptor](#) *concatenate_at, [static_strings_string_descriptor](#) *concatenate)
Concatenate the second string at the end of the first in a new string. To get all the string from a start index use the length in the `finish_index`.
- int [static_strings_contains_string](#) ([static_strings_string_descriptor](#) *search_in, [static_strings_string_descriptor](#) *search_for)
Search a string in other string.
- int [static_strings_contains_char](#) ([static_strings_string_descriptor](#) *search_in, uint8_t search_for)
Search a character in a string.
- int [static_strings_compare](#) ([static_strings_string_descriptor](#) *compare_string_one, [static_strings_string_descriptor](#) *compare_string_two)
Compare two strings to see if they are equals.
- [static_strings_string_descriptor](#) * [static_strings_uint8_to_string](#) (uint8_t uint8)
Create a string with the value of the parameter.
- [static_strings_string_descriptor](#) * [static_strings_uint16_to_string](#) (uint16_t uint16)
Create a string with the value of the parameter.
- [static_strings_string_descriptor](#) * [static_strings_uint32_to_string](#) (uint32_t uint32)

Create a string with the value of the parameter.

- [static_strings_string_descriptor](#) * [static_strings_int8_to_string](#) (int8_t int8)

Create a string with the value of the parameter.

- [static_strings_string_descriptor](#) * [static_strings_int16_to_string](#) (int16_t int16)

Create a string with the value of the parameter.

- [static_strings_string_descriptor](#) * [static_strings_int32_to_string](#) (int32_t int32)

Create a string with the value of the parameter.

- [static_strings_string_descriptor](#) * [static_strings_float_to_string](#) (float float_arg)

Create a string with the value of the parameter.

- [static_strings_string_descriptor](#) * [static_strings_double_to_string](#) (double double_arg)

Create a string with the value of the parameter.

Variables

- uint8_t [static_strings_error_code](#)

Global variable to store error code.

- [static_strings_string_splitter_parameters](#) [static_strings_string_splitter](#)
- uint8_t [static_strings_very_short_string_memory](#) [STATIC_STRINGS_VERY_SHORT_STRING_QUANTITY][STATIC_STRINGS_VERY_SHORT_STRING_SIZE]
- uint8_t [static_strings_short_string_memory](#) [STATIC_STRINGS_SHORT_STRING_QUANTITY][STATIC_STRINGS_SHORT_STRING_SIZE]
- uint8_t [static_strings_medium_string_memory](#) [STATIC_STRINGS_MEDIUM_STRING_QUANTITY][STATIC_STRINGS_MEDIUM_STRING_SIZE]
- uint8_t [static_strings_long_string_memory](#) [STATIC_STRINGS_LONG_STRING_QUANTITY][STATIC_STRINGS_LONG_STRING_SIZE]
- uint8_t [static_strings_very_long_string_memory](#) [STATIC_STRINGS_VERY_LONG_STRING_QUANTITY][STATIC_STRINGS_VERY_LONG_STRING_SIZE]
- [static_strings_string_descriptor](#) [static_strings_very_short_strings_descriptors](#) [STATIC_STRINGS_VERY_SHORT_STRING_QUANTITY]
- [static_strings_string_descriptor](#) [static_strings_short_strings_descriptors](#) [STATIC_STRINGS_SHORT_STRING_QUANTITY]
- [static_strings_string_descriptor](#) [static_strings_medium_strings_descriptors](#) [STATIC_STRINGS_MEDIUM_STRING_QUANTITY]
- [static_strings_string_descriptor](#) [static_strings_long_strings_descriptors](#) [STATIC_STRINGS_LONG_STRING_QUANTITY]
- [static_strings_string_descriptor](#) [static_strings_very_long_strings_descriptors](#) [STATIC_STRINGS_VERY_LONG_STRING_QUANTITY]

7.3.1 Detailed Description

Strings allocation with static memory.

7.3.2 Function Documentation

7.3.2.1 static_strings_allocate()

```
static_strings_string_descriptor* static_strings_allocate (
    uint16_t string_size )
```

Request memory for a string with its size, the user must copy the string with the descriptor and specify the size. Also see [static_strings_save](#).

```
static_strings_string_descriptor *static_strings_allocate(uint16_t string_size)
```


Parameters

<i>string_size</i>	Size of the string in uint16_t.
--------------------	---------------------------------

Returns

A pointer to the string descriptor, if NULL check static_strings_error_code.

7.3.2.2 static_strings_compare()

```
int static_strings_compare (
    static_strings_string_descriptor * compare_string_one,
    static_strings_string_descriptor * compare_string_two )
```

Compare two strings to see if they are equals.

```
int static_strings_compare(static_strings_string_descriptor* compare_string_one,static_strings_string_descriptor* compare_string_two)
```

Parameters

<i>compare_string_one</i>	A pointer to the first string to compare.
<i>compare_string_two</i>	A pointer to the second string to compare.

Returns

A pointer to the string descriptor with the concatenated string, if NULL check static_strings_error_code.

7.3.2.3 static_strings_concatenate()

```
static_strings_string_descriptor* static_strings_concatenate (
    static_strings_string_descriptor * concatenate_at,
    static_strings_string_descriptor * concatenate )
```

Concatenate the second string at the end of the first in a new string. To get all the string from a start index use the length in the finish_index.

```
static_strings_string_descriptor static_strings_concatenate(static_strings_string_descriptor concatenate_at,static_strings_string_descriptor* concatenate)
```

Parameters

<i>concatenate_at</i>	A pointer to the string to concatenate at.
<i>concatenate</i>	A pointer to the string to concatenate at the end of the concatenate_at string.

Returns

A pointer to the string descriptor with the concatenated string, if NULL check `static_strings_error_code`.

7.3.2.4 static_strings_contains_char()

```
int static_strings_contains_char (
    static_strings_string_descriptor * search_in,
    uint8_t search_for )
```

Search a character in a string.

int [static_strings_contains_char](#)(static_strings_string_descriptor* search_in,uint8_t search_for)

Parameters

<i>search_in</i>	A pointer to the string in which the character will be search.
<i>search_for</i>	The searched character.

Returns

1 if the character is found, 0 if not.

7.3.2.5 static_strings_contains_string()

```
int static_strings_contains_string (
    static_strings_string_descriptor * search_in,
    static_strings_string_descriptor * search_for )
```

Search a string in other string.

int [static_strings_contains_string](#)(static_strings_string_descriptor* search_in,static_strings_string_descriptor* search_for)

Parameters

<i>search_in</i>	A pointer to the string in which the character will be search.
<i>search_for</i>	A pointer to the searched string.

Returns

1 if the string is found, 0 if not.

7.3.2.6 static_strings_create_custom_string()

```
int static_strings_create_custom_string (
    static_strings_string_descriptor * string_descriptor,
    uint8_t * string )
```

Bind the provided string descriptor with the data of a string. String must end with `\r\n` or `\0`.

```
void static_strings_create_custom_string(static_strings_string_descriptor *string_descriptor,uint8_t *string)
```

Parameters

<i>string_descriptor</i>	A pointer to a string descriptor.
<i>string</i>	A pointer to the string to bind the descriptor.

Returns

Return the length of the string, if 0 check `static_strings_error_code`.

7.3.2.7 static_strings_deallocate()

```
void static_strings_deallocate (
    static_strings_string_descriptor * string_descriptor )
```

Set the descriptor status as deallocated. Custom strings can't be deallocated.

```
void static_strings_deallocate(static_strings_string_descriptor *string_descriptor)
```

Parameters

<i>string_descriptor</i>	A pointer to the string descriptor to deallocate.
--------------------------	---

7.3.2.8 static_strings_double_to_string()

```
static_strings_string_descriptor* static_strings_double_to_string (
    double double_arg )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_double_to_string(double double_arg)
```

Parameters

<i>double_arg</i>	32 bits signed float (double).
-------------------	--------------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.3.2.9 static_strings_float_to_string()

```
static_strings_string_descriptor* static_strings_float_to_string (
    float float_arg )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_float_to_string(float float_arg)
```

Parameters

<i>float_arg</i>	16 bits signed float.
------------------	-----------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.3.2.10 static_strings_init()

```
void static_strings_init ( )
```

Link the descriptors with the arrays and initialize the status as deallocated.

```
void static_strings_init()
```

7.3.2.11 static_strings_int16_to_string()

```
static_strings_string_descriptor* static_strings_int16_to_string (
    int16_t int16 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_int16_to_string(int16_t int16)
```

Parameters

<i>int16</i>	16 bits signed integer.
--------------	-------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.3.2.12 static_strings_int32_to_string()

```
static_strings_string_descriptor* static_strings_int32_to_string (
    int32_t int32 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_int32_to_string(int32_t int32)
```

Parameters

<i>int32</i>	32 bits signed integer.
--------------	-------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.3.2.13 static_strings_int8_to_string()

```
static_strings_string_descriptor* static_strings_int8_to_string (
    int8_t int8 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_int8_to_string(int8_t int8)
```

Parameters

<i>int8</i>	8 bits signed integer.
-------------	------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.3.2.14 static_strings_is_line()

```
int static_strings_is_line (
    static_strings_string_descriptor * string_descriptor )
```

Look at the last two characters of a string to see if the string has a line ending `\r\n`.

```
int static_strings_is_line(static_strings_string_descriptor *string_descriptor)
```

Parameters

<i>string</i>	A pointer to the string descriptor.
---------------	-------------------------------------

Returns

Return 0 if the string doesn't have a line ending `\r\n` and 1 if the string has a line ending `\r\n`.

7.3.2.15 static_strings_save()

```
static_strings_string_descriptor* static_strings_save (
    uint8_t * string )
```

Calculate the string size, allocate memory, copy the string and set the size. String must end with `\r\n` or `\0`, if `\r` is found but `\n` is not found, it is added, size of string include line ending but not `\0`. Also see `static_strings_allocate`.

```
static_strings_string_descriptor *static_strings_save(uint8_t *string)
```

Parameters

<i>string</i>	A pointer to the string start.
---------------	--------------------------------

Returns

A pointer to the string descriptor, if NULL check `static_strings_error_code`.

7.3.2.16 static_strings_string_splitter_get_next_token()

```
int static_strings_string_splitter_get_next_token (
    static_strings_string_descriptor ** string_descriptor )
```

Bind the provided string descriptor with the next token data. Can be placed in a while condition as it returns 1 if success or 0 if no token available and retrieves the token in the `string_descriptor` parameter. If no delimiter the whole string is taken as token. The token is placed in a new string.

```
int static_strings_string_splitter_get_next_token(static_strings_string_descriptor **string_descriptor)
```

Parameters

<i>string_descriptor</i>	A pointer to a pointer to a string descriptor that will contain the token.
--------------------------	--

Returns

1 if success or 0 if no token is available.

7.3.2.17 static_strings_string_splitter_set_parameters()

```
void static_strings_string_splitter_set_parameters (
    static_strings_string_descriptor * string_descriptor,
    uint8_t delimiter )
```

Set the parameters to the static_strings_string_splitter_get_next_token function.

```
void static_strings_string_splitter_set_parameters(static_strings_string_descriptor *string_descriptor,uint8_t delimiter)
```

Parameters

<i>string_descriptor</i>	A pointer to the string descriptor of the string to split.
<i>delimiter</i>	The delimiter for the tokens.

7.3.2.18 static_strings_strlen()

```
uint16_t static_strings_strlen (
    uint8_t * string )
```

Calculate the length of a string that ends with `\r\n` or `\0`, line ending is included in length. Maximum length is `STATIC_STRINGS_VERY_LONG_STRING_SIZE`.

```
uint16_t static_strings_strlen(uint8_t *string)
```

Parameters

<i>string</i>	A pointer to the string.
---------------	--------------------------

Returns

Length of the string in `uint16_t`. If 0 check `static_strings_error_code`.

7.3.2.19 static_strings_substring()

```
static_strings_string_descriptor* static_strings_substring (
    static_strings_string_descriptor * string,
    uint16_t start_index,
    uint16_t finish_index )
```

Return a new string with the characters between the `start_index` and the `finish_index`. Not including the character at `finish_index`. Returned string has to be deallocated. To get all the string from a start index use the length in the `finish_index`.

```
static_strings_string_descriptor static_strings_substring(static_strings_string_descriptor string_descriptor,uint16_t start_index,uint16_t finish_index)
```

Parameters

<i>string_descriptor</i>	A pointer to the string which contains the substring.
<i>start_index</i>	The index of the first character.
<i>finish_index</i>	The index of the last character, not included.

Returns

A pointer to the string descriptor of the substring, if NULL check `static_strings_error_code`.

7.3.2.20 static_strings_uint16_to_string()

```
static_strings_string_descriptor* static_strings_uint16_to_string (
    uint16_t uint16 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_uint16_to_string(uint16_t uint16)
```

Parameters

<i>uint16</i>	16 bits unsigned integer.
---------------	---------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.3.2.21 static_strings_uint32_to_string()

```
static_strings_string_descriptor* static_strings_uint32_to_string (
    uint32_t uint32 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_uint32_to_string(uint32_t uint32)
```

Parameters

<i>uint32</i>	32 bits unsigned integer.
---------------	---------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.3.2.22 static_strings_uint8_to_string()

```
static_strings_string_descriptor* static_strings_uint8_to_string (
    uint8_t uint8 )
```

Create a string with the value of the parameter.

```
static_strings_string_descriptor *static_strings_uint8_to_string(uint8_t uint8)
```

Parameters

<i>uint8</i>	8 bits unsigned integer.
--------------	--------------------------

Returns

A pointer to the string descriptor with the parameter as string.

7.3.3 Variable Documentation

7.3.3.1 static_strings_string_splitter

```
static_strings_string_splitter_parameters static_strings_string_splitter
```

Parameters to static_strings_string_splitter_get_next_token function. Initialized in null and \0.

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