



Helios  
Kernel 0.4.0

Helios Developer's Guide

<b>1 Data Structure Index</b>	<b>1</b>
<b>1 Data Structure Index</b>	<b>1</b>
1.1 Data Structures . . . . .	1
<b>2 File Index</b>	<b>2</b>
2.1 File List . . . . .	2
<b>3 Data Structure Documentation</b>	<b>2</b>
3.1 MemoryRegionStats_s Struct Reference . . . . .	2
3.1.1 Detailed Description . . . . .	3
3.1.2 Field Documentation . . . . .	3
3.2 QueueMessage_s Struct Reference . . . . .	4
3.2.1 Detailed Description . . . . .	4
3.2.2 Field Documentation . . . . .	4
3.3 SystemInfo_s Struct Reference . . . . .	4
3.3.1 Detailed Description . . . . .	5
3.3.2 Field Documentation . . . . .	5
3.4 TaskInfo_s Struct Reference . . . . .	6
3.4.1 Detailed Description . . . . .	6
3.4.2 Field Documentation . . . . .	6
3.5 TaskNotification_s Struct Reference . . . . .	7
3.5.1 Detailed Description . . . . .	7
3.5.2 Field Documentation . . . . .	7
3.6 TaskRunTimeStats_s Struct Reference . . . . .	8
3.6.1 Detailed Description . . . . .	8
3.6.2 Field Documentation . . . . .	8
<b>4 File Documentation</b>	<b>8</b>
4.1 config.h File Reference . . . . .	8
4.1.1 Detailed Description . . . . .	9
4.1.2 Macro Definition Documentation . . . . .	10
4.2 HeliOS.h File Reference . . . . .	12
4.2.1 Detailed Description . . . . .	18
4.2.2 Typedef Documentation . . . . .	18
4.2.3 Enumeration Type Documentation . . . . .	26
4.2.4 Function Documentation . . . . .	28
<b>Index</b>	<b>75</b>

# 1 Data Structure Index

## 1.1 Data Structures

Here are the data structures with brief descriptions:

<a href="#">MemoryRegionStats_s</a>	
Data structure for memory region statistics	2
<a href="#">QueueMessage_s</a>	
Data structure for a queue message	4
<a href="#">SystemInfo_s</a>	
Data structure for information about the HeliOS system	4
<a href="#">TaskInfo_s</a>	
Data structure for information about a task	6
<a href="#">TaskNotification_s</a>	
Data structure for a direct to task notification	7
<a href="#">TaskRunTimeStats_s</a>	
Data structure for task runtime statistics	8

## 2 File Index

### 2.1 File List

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

<a href="#">config.h</a>	
Kernel source for build configuration	8
<a href="#">HeliOS.h</a>	
Kernel source for user application header	12

## 3 Data Structure Documentation

### 3.1 MemoryRegionStats\_s Struct Reference

Data structure for memory region statistics.

#### Data Fields

- [Word\\_t largestFreeEntryInBytes](#)
- [Word\\_t smallestFreeEntryInBytes](#)
- [Word\\_t numberOfFreeBlocks](#)
- [Word\\_t availableSpaceInBytes](#)
- [Word\\_t successfulAllocations](#)
- [Word\\_t successfulFrees](#)
- [Word\\_t minimumEverFreeBytesRemaining](#)

### 3.1.1 Detailed Description

The MemoryRegionStats\_t data structure is used by [xMemGetHeapStats\(\)](#) and [xMemGetKernelStats\(\)](#) to obtain statistics about either memory region.

See also

[xMemoryRegionStats](#)  
[xMemGetHeapStats\(\)](#)  
[xMemGetKernelStats\(\)](#)  
[xMemFree\(\)](#)

### 3.1.2 Field Documentation

#### 3.1.2.1 availableSpaceInBytes [Word\\_t](#) MemoryRegionStats\_s::availableSpaceInBytes

The amount of free memory in bytes (i.e., numberOfFreeBlocks \* CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE).

#### 3.1.2.2 largestFreeEntryInBytes [Word\\_t](#) MemoryRegionStats\_s::largestFreeEntryInBytes

The largest free entry in bytes.

#### 3.1.2.3 minimumEverFreeBytesRemaining [Word\\_t](#) MemoryRegionStats\_s::minimumEverFreeBytes↵ Remaining

Lowest water lever since system initialization of free bytes of memory.

#### 3.1.2.4 numberOfFreeBlocks [Word\\_t](#) MemoryRegionStats\_s::numberOfFreeBlocks

The number of free blocks. See CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE for block size in bytes.

#### 3.1.2.5 smallestFreeEntryInBytes [Word\\_t](#) MemoryRegionStats\_s::smallestFreeEntryInBytes

The smallest free entry in bytes.

#### 3.1.2.6 successfulAllocations [Word\\_t](#) MemoryRegionStats\_s::successfulAllocations

Number of successful memory allocations.

#### 3.1.2.7 successfulFrees [Word\\_t](#) MemoryRegionStats\_s::successfulFrees

Number of successful memory "frees".

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

- [HeliOS.h](#)

## 3.2 QueueMessage\_s Struct Reference

Data structure for a queue message.

### Data Fields

- [Base\\_t messageBytes](#)
- [Byte\\_t messageValue \[0x8u\]](#)

### 3.2.1 Detailed Description

The QueueMessage\_t stucture is used to store a queue message and is returned by [xQueueReceive\(\)](#) and [xQueuePeek\(\)](#).

See also

[xQueueMessage](#)  
[xQueueReceive\(\)](#)  
[xQueuePeek\(\)](#)  
[CONFIG\\_MESSAGE\\_VALUE\\_BYTES](#)  
[xMemFree\(\)](#)

### 3.2.2 Field Documentation

#### 3.2.2.1 messageBytes [Base\\_t](#) QueueMessage\_s::messageBytes

The number of bytes contained in the message value which cannot exceed CONFIG\_MESSAGE\_VALUE\_BYTES.

#### 3.2.2.2 messageValue [Byte\\_t](#) QueueMessage\_s::messageValue[0x8u]

The queue message value.

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

- [HeliOS.h](#)

## 3.3 SystemInfo\_s Struct Reference

Data structure for information about the HeliOS system.

## Data Fields

- [Byte\\_t productName](#) [0x6u]
- [Base\\_t majorVersion](#)
- [Base\\_t minorVersion](#)
- [Base\\_t patchVersion](#)
- [Base\\_t numberOfTasks](#)

### 3.3.1 Detailed Description

The `SystemInfo_t` data structure is used to store information about the HeliOS system and is returned by [xSystemGetSystemInfo\(\)](#).

See also

[xSystemInfo](#)  
[xSystemGetSystemInfo\(\)](#)  
`OS_PRODUCT_NAME_SIZE`  
[xMemFree\(\)](#)

### 3.3.2 Field Documentation

#### 3.3.2.1 majorVersion [Base\\_t](#) `SystemInfo_s::majorVersion`

The SemVer major version number of HeliOS.

#### 3.3.2.2 minorVersion [Base\\_t](#) `SystemInfo_s::minorVersion`

The SemVer minor version number of HeliOS.

#### 3.3.2.3 numberOfTasks [Base\\_t](#) `SystemInfo_s::numberOfTasks`

The number of tasks regardless of their state.

#### 3.3.2.4 patchVersion [Base\\_t](#) `SystemInfo_s::patchVersion`

The SemVer patch version number of HeliOS.

#### 3.3.2.5 productName [Byte\\_t](#) `SystemInfo_s::productName[0x6u]`

The product name of the operating system (always "HeliOS").

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

- [HeliOS.h](#)

## 3.4 TaskInfo\_s Struct Reference

Data structure for information about a task.

### Data Fields

- [Base\\_t id](#)
- [Byte\\_t name](#) [0x8u]
- [TaskState\\_t state](#)
- [Ticks\\_t lastRunTime](#)
- [Ticks\\_t totalRunTime](#)

### 3.4.1 Detailed Description

The TaskInfo\_t structure is similar to xTaskRuntimeStats\_t in that it contains runtime statistics for a task. However, TaskInfo\_t also contains additional details about a task such as its name and state. The TaskInfo\_t structure is returned by [xTaskGetTaskInfo\(\)](#) and [xTaskGetAllTaskInfo\(\)](#). If only runtime statistics are needed, then TaskRuntimeStats\_t should be used because of its smaller memory footprint.

See also

[xTaskInfo](#)  
[xTaskGetTaskInfo\(\)](#)  
[xTaskGetAllTaskInfo\(\)](#)  
[CONFIG\\_TASK\\_NAME\\_BYTES](#)  
[xMemFree\(\)](#)

### 3.4.2 Field Documentation

#### 3.4.2.1 id [Base\\_t](#) TaskInfo\_s::id

The ID of the task.

#### 3.4.2.2 lastRunTime [Ticks\\_t](#) TaskInfo\_s::lastRunTime

The duration in ticks of the task's last runtime.

#### 3.4.2.3 name [Byte\\_t](#) TaskInfo\_s::name[0x8u]

The name of the task which must be exactly CONFIG\_TASK\_NAME\_BYTES bytes in length. Shorter task names must be padded.

#### 3.4.2.4 state [TaskState\\_t](#) TaskInfo\_s::state

The state the task is in which is one of four states specified in the TaskState\_t enumerated data type.

#### 3.4.2.5 totalRunTime `Ticks_t TaskInfo_s::totalRunTime`

The duration in ticks of the task's total runtime.

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

- [HeliOS.h](#)

### 3.5 TaskNotification\_s Struct Reference

Data structure for a direct to task notification.

#### Data Fields

- [Base\\_t notificationBytes](#)
- [Byte\\_t notificationValue](#) [0x8u]

#### 3.5.1 Detailed Description

The TaskNotification\_t data structure is used by [xTaskNotifyGive\(\)](#) and [xTaskNotifyTake\(\)](#) to send and receive direct to task notifications. Direct to task notifications are part of the event-driven multitasking model. A direct to task notification may be received by event-driven and co-operative tasks alike. However, the benefit of direct to task notifications may only be realized by tasks scheduled as event-driven. In order to wait for a direct to task notification, the task must be in a "waiting" state which is set by [xTaskWait\(\)](#).

See also

[xTaskNotification](#)  
[xMemFree\(\)](#)  
[xTaskNotifyGive\(\)](#)  
[xTaskNotifyTake\(\)](#)  
[xTaskWait\(\)](#)

#### 3.5.2 Field Documentation

##### 3.5.2.1 notificationBytes `Base_t TaskNotification_s::notificationBytes`

The length in bytes of the notification value which cannot exceed CONFIG\_NOTIFICATION\_VALUE\_BYTES.

##### 3.5.2.2 notificationValue `Byte_t TaskNotification_s::notificationValue` [0x8u]

The notification value whose length is specified by the notification bytes member.

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

- [HeliOS.h](#)



## 3.6 TaskRunTimeStats\_s Struct Reference

Data structure for task runtime statistics.

### Data Fields

- [Base\\_t id](#)
- [Ticks\\_t lastRunTime](#)
- [Ticks\\_t totalRunTime](#)

### 3.6.1 Detailed Description

The TaskRunTimeStats\_t data structure is used by [xTaskGetTaskRunTimeStats\(\)](#) and [xTaskGetAllRuntimeStats\(\)](#) to obtain runtime statistics about a task.

See also

[xTaskRunTimeStats](#)  
[xTaskGetTaskRunTimeStats\(\)](#)  
[xTaskGetAllRunTimeStats\(\)](#)  
[xMemFree\(\)](#)

### 3.6.2 Field Documentation

#### 3.6.2.1 id [Base\\_t](#) TaskRunTimeStats\_s::id

The ID of the task.

#### 3.6.2.2 lastRunTime [Ticks\\_t](#) TaskRunTimeStats\_s::lastRunTime

The duration in ticks of the task's last runtime.

#### 3.6.2.3 totalRunTime [Ticks\\_t](#) TaskRunTimeStats\_s::totalRunTime

The duration in ticks of the task's total runtime.

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

- [HeliOS.h](#)

## 4 File Documentation

### 4.1 config.h File Reference

Kernel source for build configuration.

## Macros

- #define [CONFIG\\_ENABLE\\_ARDUINO\\_CPP\\_INTERFACE](#)  
*Define to enable the Arduino API C++ interface.*
- #define [CONFIG\\_ENABLE\\_SYSTEM\\_ASSERT](#)  
*Define to enable system assertions.*
- #define [CONFIG\\_SYSTEM\\_ASSERT\\_BEHAVIOR](#)(f, l) \_\_ArduinoAssert\_\_(f, l)  
*Define the system assertion behavior.*
- #define [CONFIG\\_MESSAGE\\_VALUE\\_BYTES](#) 0x8u /\* 8 \*/  
*Define the size in bytes of the message queue message value.*
- #define [CONFIG\\_NOTIFICATION\\_VALUE\\_BYTES](#) 0x8u /\* 8 \*/  
*Define the size in bytes of the direct to task notification value.*
- #define [CONFIG\\_TASK\\_NAME\\_BYTES](#) 0x8u /\* 8 \*/  
*Define the size in bytes of the task name.*
- #define [CONFIG\\_MEMORY\\_REGION\\_SIZE\\_IN\\_BLOCKS](#) 0x18u /\* 24 \*/  
*Define the number of memory blocks available in all memory regions.*
- #define [CONFIG\\_MEMORY\\_REGION\\_BLOCK\\_SIZE](#) 0x20u /\* 32 \*/  
*Define the memory block size in bytes for all memory regions.*
- #define [CONFIG\\_QUEUE\\_MINIMUM\\_LIMIT](#) 0x5u /\* 5 \*/  
*Define the minimum value for a message queue limit.*
- #define [CONFIG\\_STREAM\\_BUFFER\\_BYTES](#) 0x20u /\* 32 \*/  
*Define the length of the stream buffer.*
- #define [CONFIG\\_TASK\\_WD\\_TIMER\\_ENABLE](#)  
*Enable task watchdog timers.*
- #define [CONFIG\\_DEVICE\\_NAME\\_BYTES](#) 0x8u /\* 8 \*/  
*Define the length of a device driver name.*

### 4.1.1 Detailed Description

#### Author

Manny Peterson [manny@heliosproj.org](mailto:manny@heliosproj.org)

#### Version

0.4.0

#### Date

2023-03-19

#### Copyright

HeliOS Embedded Operating System Copyright (C) 2020-2023 HeliOS Project [license@heliosproj.org](mailto:license@heliosproj.org)

SPDX-License-Identifier: GPL-2.0-or-later

## 4.1.2 Macro Definition Documentation

### 4.1.2.1 CONFIG\_DEVICE\_NAME\_BYTES `#define CONFIG_DEVICE_NAME_BYTES 0x8u /* 8 */`

Setting CONFIG\_DEVICE\_NAME\_BYTES will define the length of a device driver name. The name of device drivers should be exactly this length. There really isn't a reason to change this and doing so may break existing device drivers. The default length is 8 bytes.

### 4.1.2.2 CONFIG\_ENABLE\_ARDUINO\_CPP\_INTERFACE `#define CONFIG_ENABLE_ARDUINO_CPP_INTERFACE`

Because HeliOS kernel is written in C, the Arduino API cannot be called directly from the kernel. For example, assertions are unable to be written to the serial bus in applications using the Arduino platform/tool-chain. The CONFIG\_ENABLE\_ARDUINO\_CPP\_INTERFACE builds the included arduino.cpp file to allow the kernel to call the Arduino API through wrapper functions such as **ArduinoAssert()**. The arduino.cpp file can be found in the /extras directory. It must be copied into the /src directory to be built.

### 4.1.2.3 CONFIG\_ENABLE\_SYSTEM\_ASSERT `#define CONFIG_ENABLE_SYSTEM_ASSERT`

The CONFIG\_ENABLE\_SYSTEM\_ASSERT setting allows the end-user to enable system assertions in HeliOS. Once enabled, the end-user must define CONFIG\_SYSTEM\_ASSERT\_BEHAVIOR for there to be an effect. By default the CONFIG\_ENABLE\_SYSTEM\_ASSERT setting is not defined.

See also

[CONFIG\\_SYSTEM\\_ASSERT\\_BEHAVIOR](#)

### 4.1.2.4 CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE `#define CONFIG_MEMORY_REGION_BLOCK_SIZE 0x20u /* 32 */`

Setting CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE allows the end-user to define the size of a memory region block in bytes. The memory region block size should be set to achieve the best possible utilization of the available memory. The CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE setting effects both the heap and kernel memory regions. The default value is 32 bytes.

See also

[xMemAlloc\(\)](#)

[xMemFree\(\)](#)

[CONFIG\\_MEMORY\\_REGION\\_SIZE\\_IN\\_BLOCKS](#)

**4.1.2.5 CONFIG\_MEMORY\_REGION\_SIZE\_IN\_BLOCKS** `#define CONFIG_MEMORY_REGION_SIZE_IN_BLOCKS 0x18u /* 24 */`

The heap memory region is used by tasks. Whereas the kernel memory region is used solely by the kernel for kernel objects. The `CONFIG_MEMORY_REGION_SIZE_IN_BLOCKS` setting allows the end-user to define the size, in blocks, of all memory regions thus effecting both the heap and kernel memory regions. The size of a memory block is defined by the `CONFIG_MEMORY_REGION_BLOCK_SIZE` setting. The size of all memory regions needs to be adjusted to fit the memory requirements of the end-user's application. The default value is 24 blocks.

**4.1.2.6 CONFIG\_MESSAGE\_VALUE\_BYTES** `#define CONFIG_MESSAGE_VALUE_BYTES 0x8u /* 8 */`

Setting the `CONFIG_MESSAGE_VALUE_BYTES` allows the end-user to define the size of the message queue message value. The larger the size of the message value, the greater impact there will be on system performance. The default size is 8 bytes.

See also

[xQueueMessage](#)

**4.1.2.7 CONFIG\_NOTIFICATION\_VALUE\_BYTES** `#define CONFIG_NOTIFICATION_VALUE_BYTES 0x8u /* 8 */`

Setting the `CONFIG_NOTIFICATION_VALUE_BYTES` allows the end-user to define the size of the direct to task notification value. The larger the size of the notification value, the greater impact there will be on system performance. The default size is 8 bytes.

See also

[xTaskNotification](#)

**4.1.2.8 CONFIG\_QUEUE\_MINIMUM\_LIMIT** `#define CONFIG_QUEUE_MINIMUM_LIMIT 0x5u /* 5 */`

Setting the `CONFIG_QUEUE_MINIMUM_LIMIT` allows the end-user to define the MINIMUM length limit a message queue can be created with [xQueueCreate\(\)](#). When a message queue length equals its limit, the message queue will be considered full and return true when [xQueuesQueueFull\(\)](#) is called. A full queue will also not accept messages from [xQueueSend\(\)](#). The default value is 5.

See also

[xQueuesQueueFull\(\)](#)

[xQueueSend\(\)](#)

[xQueueCreate\(\)](#)

#### 4.1.2.9 CONFIG\_STREAM\_BUFFER\_BYTES `#define CONFIG_STREAM_BUFFER_BYTES 0x20u /* 32 */`

Setting CONFIG\_STREAM\_BUFFER\_BYTES will define the length of stream buffers created by [xStreamCreate\(\)](#). When the length of the stream buffer reaches this value, it is considered full and can no longer be written to by calling [xStreamSend\(\)](#). The default value is 32.

#### 4.1.2.10 CONFIG\_SYSTEM\_ASSERT\_BEHAVIOR `#define CONFIG_SYSTEM_ASSERT_BEHAVIOR( f, l ) __ArduinoAssert__(f, l)`

The CONFIG\_SYSTEM\_ASSERT\_BEHAVIOR setting allows the end-user to specify the behavior (code) of the assertion which is called when CONFIG\_ENABLE\_SYSTEM\_ASSERT is defined. Typically some sort of output is generated over a serial or other interface. By default the CONFIG\_SYSTEM\_ASSERT\_BEHAVIOR is not defined.

##### Note

In order to use the **ArduinoAssert()** functionality, the CONFIG\_ENABLE\_ARDUINO\_CPP\_INTERFACE setting must be enabled.

##### See also

[CONFIG\\_ENABLE\\_SYSTEM\\_ASSERT](#)

[CONFIG\\_ENABLE\\_ARDUINO\\_CPP\\_INTERFACE](#)

```
#define CONFIG_SYSTEM_ASSERT_BEHAVIOR(f, l) __ArduinoAssert__( f , l )
```

#### 4.1.2.11 CONFIG\_TASK\_NAME\_BYTES `#define CONFIG_TASK_NAME_BYTES 0x8u /* 8 */`

Setting the CONFIG\_TASK\_NAME\_BYTES allows the end-user to define the size of the task name. The larger the size of the task name, the greater impact there will be on system performance. The default size is 8 bytes.

##### See also

[xTaskInfo](#)

#### 4.1.2.12 CONFIG\_TASK\_WD\_TIMER\_ENABLE `#define CONFIG_TASK_WD_TIMER_ENABLE`

Defining CONFIG\_TASK\_WD\_TIMER\_ENABLE will enable the task watchdog timer feature. The default is enabled.

## 4.2 HeliOS.h File Reference

Kernel source for user application header.

## Data Structures

- struct [TaskNotification\\_s](#)  
*Data structure for a direct to task notification.*
- struct [TaskRunTimeStats\\_s](#)  
*Data structure for task runtime statistics.*
- struct [MemoryRegionStats\\_s](#)  
*Data structure for memory region statistics.*
- struct [TaskInfo\\_s](#)  
*Data structure for information about a task.*
- struct [QueueMessage\\_s](#)  
*Data structure for a queue message.*
- struct [SystemInfo\\_s](#)  
*Data structure for information about the HeliOS system.*

## Typedefs

- typedef enum [TaskState\\_e](#) [TaskState\\_t](#)  
*Enumerated type for task states.*
- typedef [TaskState\\_t](#) [xTaskState](#)  
*Enumerated type for task states.*
- typedef enum [SchedulerState\\_e](#) [SchedulerState\\_t](#)  
*Enumerated type for scheduler state.*
- typedef [SchedulerState\\_t](#) [xSchedulerState](#)  
*Enumerated type for scheduler state.*
- typedef enum [Return\\_e](#) [Return\\_t](#)  
*Enumerated type for syscall return type.*
- typedef [Return\\_t](#) [xReturn](#)  
*Enumerated type for syscall return type.*
- typedef void [TaskParm\\_t](#)  
*Data type for the task paramater.*
- typedef [TaskParm\\_t](#) \* [xTaskParm](#)  
*Data type for the task paramater.*
- typedef uint8\_t [Base\\_t](#)  
*Data type for the base type.*
- typedef [Base\\_t](#) [xBase](#)  
*Data type for the base type.*
- typedef uint8\_t [Byte\\_t](#)  
*Data type for an 8-bit wide byte.*
- typedef [Byte\\_t](#) [xByte](#)  
*Data type for an 8-bit wide byte.*
- typedef void [Addr\\_t](#)  
*Data type for a pointer to a memory address.*
- typedef [Addr\\_t](#) \* [xAddr](#)  
*Data type for a pointer to a memory address.*
- typedef size\_t [Size\\_t](#)  
*Data type for the storage requirements of an object in memory.*
- typedef [Size\\_t](#) [xSize](#)  
*Data type for the storage requirements of an object in memory.*
- typedef uint16\_t [HalfWord\\_t](#)

- Data type for a 16-bit half word.*

  - typedef [HalfWord\\_t](#) xHalfWord
- Data type for a 16-bit half word.*

  - typedef uint32\_t [Word\\_t](#)
- Data type for a 32-bit word.*

  - typedef [Word\\_t](#) xWord
- Data type for a 32-bit word.*

  - typedef uint32\_t [Ticks\\_t](#)
- Data type for system ticks.*

  - typedef [Ticks\\_t](#) xTicks
- Data type for system ticks.*

  - typedef void [Task\\_t](#)
- Data type for a task.*

  - typedef [Task\\_t](#) \* xTask
- Data type for a task.*

  - typedef void [Timer\\_t](#)
- Data type for a timer.*

  - typedef [Timer\\_t](#) \* xTimer
- Data type for a timer.*

  - typedef void [Queue\\_t](#)
- Data type for a queue.*

  - typedef [Queue\\_t](#) \* xQueue
- Data type for a queue.*

  - typedef void [StreamBuffer\\_t](#)
- Data type for a stream buffer.*

  - typedef [StreamBuffer\\_t](#) \* xStreamBuffer
- Data type for a stream buffer.*

  - typedef struct [TaskNotification\\_s](#) TaskNotification\_t
- Data structure for a direct to task notification.*

  - typedef [TaskNotification\\_t](#) \* xTaskNotification
- Data structure for a direct to task notification.*

  - typedef struct [TaskRunTimeStats\\_s](#) TaskRunTimeStats\_t
- Data structure for task runtime statistics.*

  - typedef [TaskRunTimeStats\\_t](#) \* xTaskRunTimeStats
- Data structure for task runtime statistics.*

  - typedef struct [MemoryRegionStats\\_s](#) MemoryRegionStats\_t
- Data structure for memory region statistics.*

  - typedef [MemoryRegionStats\\_t](#) \* xMemoryRegionStats
- Data structure for memory region statistics.*

  - typedef struct [TaskInfo\\_s](#) TaskInfo\_t
- Data structure for information about a task.*

  - typedef [TaskInfo\\_t](#) \* xTaskInfo
- Data structure for information about a task.*

  - typedef struct [QueueMessage\\_s](#) QueueMessage\_t
- Data structure for a queue message.*

  - typedef [QueueMessage\\_t](#) \* xQueueMessage
- Data structure for a queue message.*

  - typedef struct [SystemInfo\\_s](#) SystemInfo\_t
- Data structure for information about the HeliOS system.*

  - typedef [SystemInfo\\_t](#) \* xSystemInfo
- Data structure for information about the HeliOS system.*

## Enumerations

- enum `TaskState_e` { `TaskStateSuspended` , `TaskStateRunning` , `TaskStateWaiting` }  
*Enumerated type for task states.*
- enum `SchedulerState_e` { `SchedulerStateSuspended` , `SchedulerStateRunning` }  
*Enumerated type for scheduler state.*
- enum `Return_e` { `ReturnOK` , `ReturnError` }  
*Enumerated type for syscall return type.*

## Functions

- `xReturn xDeviceRegisterDevice (xReturn(*device_self_register_>())`  
*Syscall to register a device driver with the kernel.*
- `xReturn xDevicesAvailable (const xHalfWord uid_, xBase *res_)`  
*Syscall to query the device driver about the availability of a device.*
- `xReturn xDeviceSimpleWrite (const xHalfWord uid_, xByte data_)`  
*Syscall to write a byte of data to the device.*
- `xReturn xDeviceWrite (const xHalfWord uid_, xSize *size_, xAddr data_)`  
*Syscall to write multiple bytes of data to a device.*
- `xReturn xDeviceSimpleRead (const xHalfWord uid_, xByte *data_)`  
*Syscall to read a byte of data from the device.*
- `xReturn xDeviceRead (const xHalfWord uid_, xSize *size_, xAddr *data_)`  
*Syscall to read multiple bytes from a device.*
- `xReturn xDeviceInitDevice (const xHalfWord uid_)`  
*Syscall to initialize a device.*
- `xReturn xDeviceConfigDevice (const xHalfWord uid_, xSize *size_, xAddr config_)`  
*Syscall to configure a device.*
- `xReturn xMemAlloc (volatile xAddr *addr_, const xSize size_)`  
*Syscall to request memory from the heap.*
- `xReturn xMemFree (const volatile xAddr addr_)`  
*Syscall to free heap memory allocated by `xMemAlloc()`*
- `xReturn xMemGetUsed (xSize *size_)`  
*Syscall to obtain the amount of in-use heap memory.*
- `xReturn xMemGetSize (const volatile xAddr addr_, xSize *size_)`  
*Syscall to obtain the amount of heap memory allocated at a specific address.*
- `xReturn xMemGetHeapStats (xMemoryRegionStats *stats_)`  
*Syscall to get memory statistics on the heap memory region.*
- `xReturn xMemGetKernelStats (xMemoryRegionStats *stats_)`  
*Syscall to get memory statistics on the kernel memory region.*
- `xReturn xQueueCreate (xQueue *queue_, const xBase limit_)`  
*Syscall to create a message queue.*
- `xReturn xQueueDelete (xQueue queue_)`  
*Syscall to delete a message queue.*
- `xReturn xQueueGetLength (const xQueue queue_, xBase *res_)`  
*Syscall to get the length of a message queue.*
- `xReturn xQueuesQueueEmpty (const xQueue queue_, xBase *res_)`  
*Syscall to inquire as to whether a message queue is empty.*
- `xReturn xQueuesQueueFull (const xQueue queue_, xBase *res_)`  
*Syscall to inquire as to whether a message queue is full.*
- `xReturn xQueueMessagesWaiting (const xQueue queue_, xBase *res_)`



- Syscall to inquire as to whether a message queue has one or more messages waiting.*

  - `xReturn xQueueSend (xQueue queue_, const xBase bytes_, const xByte *value_)`
- Syscall to send a message to a message queue.*

  - `xReturn xQueuePeek (const xQueue queue_, xQueueMessage *message_)`
- Syscall to retrieve a message from a message queue without dropping the message.*

  - `xReturn xQueueDropMessage (xQueue queue_)`
- Syscall to drop a message from a message queue without retrieving the message.*

  - `xReturn xQueueReceive (xQueue queue_, xQueueMessage *message_)`
- Syscall to retrieve and drop the next message from a message queue.*

  - `xReturn xQueueLockQueue (xQueue queue_)`
- Syscall to lock a message queue.*

  - `xReturn xQueueUnLockQueue (xQueue queue_)`
- Syscall to unlock a message queue.*

  - `xReturn xStreamCreate (xStreamBuffer *stream_)`
- Syscall to create a stream buffer.*

  - `xReturn xStreamDelete (const xStreamBuffer stream_)`
- Syscall to delete a stream buffer.*

  - `xReturn xStreamSend (xStreamBuffer stream_, const xByte byte_)`
- Syscall to send a byte to a stream buffer.*

  - `xReturn xStreamReceive (const xStreamBuffer stream_, xHalfWord *bytes_, xByte **data_)`
- Syscall to retrieve all waiting bytes from a stream buffer.*

  - `xReturn xStreamBytesAvailable (const xStreamBuffer stream_, xHalfWord *bytes_)`
- Syscall to inquire about the number of bytes waiting in a stream buffer.*

  - `xReturn xStreamReset (const xStreamBuffer stream_)`
- Syscall to reset a stream buffer.*

  - `xReturn xStreamIsEmpty (const xStreamBuffer stream_, xBase *res_)`
- Syscall to inquire as to whether a stream buffer is empty.*

  - `xReturn xStreamIsFull (const xStreamBuffer stream_, xBase *res_)`
- Syscall to inquire as to whether a stream buffer is full.*

  - `xReturn xSystemAssert (const char *file_, const int line_)`
- Syscall to raise a system assert.*

  - `xReturn xSystemInit (void)`
- Syscall to bootstrap HeliOS.*

  - `xReturn xSystemHalt (void)`
- Syscall to halt HeliOS.*

  - `xReturn xSystemGetSystemInfo (xSystemInfo *info_)`
- Syscall to inquire about the system.*

  - `xReturn xTaskCreate (xTask *task_, const xByte *name_, void(*callback_)(xTask task_, xTaskParm parm_), xTaskParm taskParameter_)`
- Syscall to create a new task.*

  - `xReturn xTaskDelete (const xTask task_)`
- Syscall to delete a task.*

  - `xReturn xTaskGetHandleByName (xTask *task_, const xByte *name_)`
- Syscall to get the task handle by name.*

  - `xReturn xTaskGetHandleById (xTask *task_, const xBase id_)`
- Syscall to get the task handle by task id.*

  - `xReturn xTaskGetAllRunTimeStats (xTaskRunTimeStats *stats_, xBase *tasks_)`
- Syscall to get obtain the runtime statistics of all tasks.*

  - `xReturn xTaskGetTaskRunTimeStats (const xTask task_, xTaskRunTimeStats *stats_)`
- Syscall to get the runtime statistics for a single task.*

  - `xReturn xTaskGetNumberOfTasks (xBase *tasks_)`

- Syscall to get the number of tasks.*

  - `xReturn xTaskGetTaskInfo` (const `xTask` task\_, `xTaskInfo` \*info\_)
- Syscall to get info about a task.*

  - `xReturn xTaskGetAllTaskInfo` (`xTaskInfo` \*info\_, `xBase` \*tasks\_)
- Syscall to get info about all tasks.*

  - `xReturn xTaskGetTaskState` (const `xTask` task\_, `xTaskState` \*state\_)
- Syscall to get the state of a task.*

  - `xReturn xTaskGetName` (const `xTask` task\_, `xByte` \*\*name\_)
- Syscall to get the name of a task.*

  - `xReturn xTaskGetId` (const `xTask` task\_, `xBase` \*id\_)
- Syscall to get the task id of a task.*

  - `xReturn xTaskNotifyStateClear` (`xTask` task\_)
- Syscall to clear a waiting direct-to-task notification.*

  - `xReturn xTaskNotificationIsWaiting` (const `xTask` task\_, `xBase` \*res\_)
- Syscall to inquire as to whether a direct-to-task notification is waiting.*

  - `xReturn xTaskNotifyGive` (`xTask` task\_, const `xBase` bytes\_, const `xByte` \*value\_)
- Syscall to give (i.e., send) a task a direct-to-task notification.*

  - `xReturn xTaskNotifyTake` (`xTask` task\_, `xTaskNotification` \*notification\_)
- Syscall to take (i.e. receive) a waiting direct-to-task notification.*

  - `xReturn xTaskResume` (`xTask` task\_)
- Syscall to place a task in the "running" state.*

  - `xReturn xTaskSuspend` (`xTask` task\_)
- Syscall to place a task in the "suspended" state.*

  - `xReturn xTaskWait` (`xTask` task\_)
- Syscall to place a task in the "waiting" state.*

  - `xReturn xTaskChangePeriod` (`xTask` task\_, const `xTicks` period\_)
- Syscall to change the interval period of a task timer.*

  - `xReturn xTaskChangeWDPeriod` (`xTask` task\_, const `xTicks` period\_)
- Syscall to change the task watchdog timer period.*

  - `xReturn xTaskGetPeriod` (const `xTask` task\_, `xTicks` \*period\_)
- Syscall to obtain the task timer period.*

  - `xReturn xTaskResetTimer` (`xTask` task\_)
- Syscall to set the task timer elapsed time to zero.*

  - `xReturn xTaskStartScheduler` (void)
- Syscall to start the HeliOS scheduler.*

  - `xReturn xTaskResumeAll` (void)
- Syscall to set the scheduler state to running.*

  - `xReturn xTaskSuspendAll` (void)
- Syscall to set the scheduler state to suspended.*

  - `xReturn xTaskGetSchedulerState` (`xSchedulerState` \*state\_)
- Syscall to get the scheduler state.*

  - `xReturn xTaskGetWDPeriod` (const `xTask` task\_, `xTicks` \*period\_)
- Syscall to get the task watchdog timer period.*

  - `xReturn xTimerCreate` (`xTimer` \*timer\_, const `xTicks` period\_)
- Syscall to create an application timer.*

  - `xReturn xTimerDelete` (const `xTimer` timer\_)
- Syscall to delete an application timer.*

  - `xReturn xTimerChangePeriod` (`xTimer` timer\_, const `xTicks` period\_)
- Syscall to change the period on an application timer.*

  - `xReturn xTimerGetPeriod` (const `xTimer` timer\_, `xTicks` \*period\_)
- Syscall to get the current period for an application timer.*

- `xReturn xTimerIsTimerActive` (const `xTimer` timer\_, `xBase` \*res\_)  
*Syscall to inquire as to whether an application timer is active.*
- `xReturn xTimerHasTimerExpired` (const `xTimer` timer\_, `xBase` \*res\_)  
*Syscall to inquire as to whether an application timer has expired.*
- `xReturn xTimerReset` (`xTimer` timer\_)  
*Syscall to reset an application timer.*
- `xReturn xTimerStart` (`xTimer` timer\_)  
*Syscall to place an application timer in the running state.*
- `xReturn xTimerStop` (`xTimer` timer\_)  
*Syscall to place an application timer in the suspended state.*
- `char * xByte2CString` (`xSize` size\_, `xByte` \*bytes\_, `char` \*cstr\_)

#### 4.2.1 Detailed Description

##### Author

Manny Peterson [manny@heliosproj.org](mailto:manny@heliosproj.org)

##### Version

0.4.0

##### Date

2023-03-19

##### Copyright

HeliOS Embedded Operating System Copyright (C) 2020-2023 HeliOS Project [license@heliosproj.org](mailto:license@heliosproj.org)

SPDX-License-Identifier: GPL-2.0-or-later

#### 4.2.2 Typedef Documentation

##### 4.2.2.1 `Addr_t` `typedef void Addr_t`

The `Addr_t` type is a pointer of type `void` and is used to pass addresses between the end-user application and syscalls. It is not necessary to use the `Addr_t` type within the end-user application as long as the type is not used to interact with the kernel through syscalls

##### See also

[xAddr](#)

#### 4.2.2.2 **Base\_t** `typedef uint8_t Base_t`

The `Base_t` type is a simple data type often used as an argument or result type for syscalls when the value is known not to exceed its 8-bit width and no data structure requirements exist. There are no guarantees the `Base_t` will always be 8-bits wide. If an 8-bit data type is needed that is guaranteed to remain 8-bits wide, the `Byte_t` data type should be used.

See also

[xBase](#)

[Byte\\_t](#)

#### 4.2.2.3 **Byte\_t** `typedef uint8_t Byte_t`

The `Byte_t` type is an 8-bit wide data type and is guaranteed to always be 8-bits wide.

See also

[xByte](#)

#### 4.2.2.4 **HalfWord\_t** `typedef uint16_t HalfWord_t`

The `HalfWord_t` type is a 16-bit wide data type and is guaranteed to always be 16-bits wide.

See also

[xHalfWord](#)

#### 4.2.2.5 **MemoryRegionStats\_t** `typedef struct MemoryRegionStats_s MemoryRegionStats_t`

The `MemoryRegionStats_t` data structure is used by [xMemGetHeapStats\(\)](#) and [xMemGetKernelStats\(\)](#) to obtain statistics about either memory region.

See also

[xMemoryRegionStats](#)

[xMemGetHeapStats\(\)](#)

[xMemGetKernelStats\(\)](#)

[xMemFree\(\)](#)

#### 4.2.2.6 Queue\_t `typedef void Queue_t`

The Queue\_t data type is used as a queue. The queue is created when `xQueueCreate()` is called. For more information about queues, see `xQueueCreate()`.

See also

`xQueue`  
`xQueueCreate()`  
`xQueueDelete()`

#### 4.2.2.7 QueueMessage\_t `typedef struct QueueMessage_s QueueMessage_t`

The QueueMessage\_t structure is used to store a queue message and is returned by `xQueueReceive()` and `xQueuePeek()`.

See also

`xQueueMessage`  
`xQueueReceive()`  
`xQueuePeek()`  
`CONFIG_MESSAGE_VALUE_BYTES`  
`xMemFree()`

#### 4.2.2.8 Return\_t `typedef enum Return_e Return_t`

All HeliOS syscalls return the Return\_t type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

See also

`OK()`  
`ERROR()`  
`xReturn`

#### 4.2.2.9 SchedulerState\_t `typedef enum SchedulerState_e SchedulerState_t`

The scheduler can be in one of three possible states as defined by the SchedulerState\_t enumerated data type. The state the scheduler is in is changed by calling `xTaskSuspendAll()` and `xTaskResumeAll()`. The state the scheduler is in can be obtained by calling `xTaskGetSchedulerState()`.

See also

`xSchedulerState`  
`xTaskSuspendAll()`  
`xTaskResumeAll()`  
`xTaskGetSchedulerState()`  
`xTaskStartScheduler()`

#### 4.2.2.10 **Size\_t** `typedef size_t Size_t`

The `Size_t` type is used for the storage requirements of an object in memory and is always represented in bytes.

See also

[xSize](#)

#### 4.2.2.11 **StreamBuffer\_t** `typedef void StreamBuffer_t`

The `StreamBuffer_t` data type is used as a stream buffer. The stream buffer is created when [xStreamCreate\(\)](#) is called. For more information about stream buffers, see [xStreamCreate\(\)](#). `Stream_t` should be declared as `xStream`.

See also

[xStream](#)

[xStreamCreate\(\)](#)

[xStreamDelete\(\)](#)

#### 4.2.2.12 **SystemInfo\_t** `typedef struct SystemInfo_s SystemInfo_t`

The `SystemInfo_t` data structure is used to store information about the HeliOS system and is returned by [xSystemGetSystemInfo\(\)](#).

See also

[xSystemInfo](#)

[xSystemGetSystemInfo\(\)](#)

[OS\\_PRODUCT\\_NAME\\_SIZE](#)

[xMemFree\(\)](#)

#### 4.2.2.13 **Task\_t** `typedef void Task_t`

The `Task_t` data type is used as a task. The task is created when [xTaskCreate\(\)](#) is called. For more information about tasks, see [xTaskCreate\(\)](#).

See also

[xTask](#)

[xTaskCreate\(\)](#)

[xTaskDelete\(\)](#)

**4.2.2.14 TaskInfo\_t** `typedef struct TaskInfo_s TaskInfo_t`

The TaskInfo\_t structure is similar to xTaskRuntimeStats\_t in that it contains runtime statistics for a task. However, TaskInfo\_t also contains additional details about a task such as its name and state. The TaskInfo\_t structure is returned by xTaskGetTaskInfo() and xTaskGetAllTaskInfo(). If only runtime statistics are needed, then TaskRunTimeStats\_t should be used because of its smaller memory footprint.

See also

[xTaskInfo](#)  
[xTaskGetTaskInfo\(\)](#)  
[xTaskGetAllTaskInfo\(\)](#)  
[CONFIG\\_TASK\\_NAME\\_BYTES](#)  
[xMemFree\(\)](#)

**4.2.2.15 TaskNotification\_t** `typedef struct TaskNotification_s TaskNotification_t`

The TaskNotification\_t data structure is used by xTaskNotifyGive() and xTaskNotifyTake() to send and receive direct to task notifications. Direct to task notifications are part of the event-driven multitasking model. A direct to task notification may be received by event-driven and co-operative tasks alike. However, the benefit of direct to task notifications may only be realized by tasks scheduled as event-driven. In order to wait for a direct to task notification, the task must be in a "waiting" state which is set by xTaskWait().

See also

[xTaskNotification](#)  
[xMemFree\(\)](#)  
[xTaskNotifyGive\(\)](#)  
[xTaskNotifyTake\(\)](#)  
[xTaskWait\(\)](#)

**4.2.2.16 TaskParm\_t** `typedef void TaskParm_t`

The TaskParm\_t type is used to pass a parameter to a task at the time of task creation using xTaskCreate(). A task parameter is a pointer of type void and can point to any number of types, arrays and/or data structures that will be passed to the task. It is up to the end-user to manage, allocate and free the memory related to these objects using xMemAlloc() and xMemFree().

See also

[xTaskParm](#)  
[xTaskCreate\(\)](#)  
[xMemAlloc\(\)](#)  
[xMemFree\(\)](#)

**4.2.2.17 TaskRunTimeStats\_t** typedef struct TaskRunTimeStats\_s TaskRunTimeStats\_t

The TaskRunTimeStats\_t data structure is used by [xTaskGetTaskRunTimeStats\(\)](#) and [xTaskGetAllRuntimeStats\(\)](#) to obtain runtime statistics about a task.

See also

[xTaskRunTimeStats](#)  
[xTaskGetTaskRunTimeStats\(\)](#)  
[xTaskGetAllRunTimeStats\(\)](#)  
[xMemFree\(\)](#)

**4.2.2.18 TaskState\_t** typedef enum TaskState\_e TaskState\_t

A task can be in one of four possible states as defined by the TaskState\_t enumerated data type. The state a task is in is changed by calling [xTaskResume\(\)](#), [xTaskSuspend\(\)](#) or [xTaskWait\(\)](#). The HeliOS scheduler will only schedule, for execution, tasks in either the TaskStateRunning or TaskStateWaiting state.

See also

[xTaskState](#)  
[xTaskResume\(\)](#)  
[xTaskSuspend\(\)](#)  
[xTaskWait\(\)](#)  
[xTaskGetTaskState\(\)](#)

**4.2.2.19 Ticks\_t** typedef uint32\_t Ticks\_t

The Ticks\_t type is used to store ticks from the system clock. Ticks is not bound to any one unit of measure for time though most systems are configured for millisecond resolution, milliseconds is not guaranteed and is dependent on the system clock frequency and prescaler.

See also

[xTicks](#)

**4.2.2.20 Timer\_t** typedef void Timer\_t

The Timer\_t data type is used as a timer. The timer is created when [xTimerCreate\(\)](#) is called. For more information about timers, see [xTimerCreate\(\)](#).

See also

[xTimer](#)  
[xTimerCreate\(\)](#)  
[xTimerDelete\(\)](#)



**4.2.2.21 Word\_t** `typedef uint32_t Word_t`

The `Word_t` type is a 32-bit wide data type and is guaranteed to always be 32-bits wide.

See also

[xWord](#)

**4.2.2.22 xAddr** `typedef Addr_t* xAddr`

See also

[Addr\\_t](#)

**4.2.2.23 xBase** `typedef Base_t xBase`

See also

[Base\\_t](#)

**4.2.2.24 xByte** `typedef Byte_t xByte`

See also

[Byte\\_t](#)

**4.2.2.25 xHalfWord** `typedef HalfWord_t xHalfWord`

See also

[HalfWord\\_t](#)

**4.2.2.26 xQueue** `typedef Queue_t* xQueue`

See also

[Queue\\_t](#)

**4.2.2.27 xReturn** typedef [Return\\_t](#) xReturn

See also

[Return\\_t](#)

**4.2.2.28 xSchedulerState** typedef [SchedulerState\\_t](#) xSchedulerState

See also

[SchedulerState\\_t](#)

**4.2.2.29 xSize** typedef [Size\\_t](#) xSize

See also

[Size\\_t](#)

**4.2.2.30 xStreamBuffer** typedef [StreamBuffer\\_t\\*](#) xStreamBuffer

See also

[StreamBuffer\\_t](#)

**4.2.2.31 xTask** typedef [Task\\_t\\*](#) xTask

See also

[Task\\_t](#)

**4.2.2.32 xTaskNotification** typedef [TaskNotification\\_t\\*](#) xTaskNotification

See also

[TaskNotification\\_t](#)

**4.2.2.33 xTaskParm** `typedef TaskParm_t* xTaskParm`

See also

[TaskParm\\_t](#)

**4.2.2.34 xTaskState** `typedef TaskState_t xTaskState`

See also

[TaskState\\_t](#)

**4.2.2.35 xTicks** `typedef Ticks_t xTicks`

See also

[Ticks\\_t](#)

**4.2.2.36 xTimer** `typedef Timer_t* xTimer`

See also

[Timer\\_t](#)

**4.2.2.37 xWord** `typedef Word_t xWord`

See also

[Word\\_t](#)

## 4.2.3 Enumeration Type Documentation

**4.2.3.1 Return\_e** `enum Return_e`

All HeliOS syscalls return the `Return_t` type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

See also

`OK()`

`ERROR()`

[xReturn](#)

## Enumerator

ReturnOK	Return value if the syscall was successful.
ReturnError	Return value if the syscall failed.

**4.2.3.2 SchedulerState\_e** `enum SchedulerState_e`

The scheduler can be in one of three possible states as defined by the SchedulerState\_t enumerated data type. The state the scheduler is in is changed by calling [xTaskSuspendAll\(\)](#) and [xTaskResumeAll\(\)](#). The state the scheduler is in can be obtained by calling [xTaskGetSchedulerState\(\)](#).

## See also

[xSchedulerState](#)  
[xTaskSuspendAll\(\)](#)  
[xTaskResumeAll\(\)](#)  
[xTaskGetSchedulerState\(\)](#)  
[xTaskStartScheduler\(\)](#)

## Enumerator

SchedulerStateSuspended	State the scheduler is in after calling <a href="#">xTaskSuspendAll()</a> . TaskStartScheduler() will stop scheduling tasks for execution and relinquish control when <a href="#">xTaskSuspendAll()</a> is called.
SchedulerStateRunning	State the scheduler is in after calling <a href="#">xTaskResumeAll()</a> . <a href="#">xTaskStartScheduler()</a> will continue to schedule tasks for execution until <a href="#">xTaskSuspendAll()</a> is called.

**4.2.3.3 TaskState\_e** `enum TaskState_e`

A task can be in one of four possible states as defined by the TaskState\_t enumerated data type. The state a task is in is changed by calling [xTaskResume\(\)](#), [xTaskSuspend\(\)](#) or [xTaskWait\(\)](#). The HeliOS scheduler will only schedule, for execution, tasks in either the TaskStateRunning or TaskStateWaiting state.

## See also

[xTaskState](#)  
[xTaskResume\(\)](#)  
[xTaskSuspend\(\)](#)  
[xTaskWait\(\)](#)  
[xTaskGetTaskState\(\)](#)

## Enumerator

TaskStateSuspended	State a task is in after it is created OR after calling <a href="#">xTaskSuspend()</a> . Tasks in the TaskStateSuspended state will not be scheduled for execution by the scheduler.
TaskStateRunning	State a task is in after calling <a href="#">xTaskResume()</a> . Tasks in the TaskStateRunning state will be scheduled for execution by the scheduler.
TaskStateWaiting	State a task is in after calling <a href="#">xTaskWait()</a> . Tasks in the TaskStateWaiting state will be scheduled for execution by the scheduler only when a task event has occurred.

## 4.2.4 Function Documentation

**4.2.4.1 xDeviceConfigDevice()** [xReturn](#) xDeviceConfigDevice (

```

    const xHalfWord uid_,
    xSize * size_,
    xAddr config_ )

```

The [xDeviceConfigDevice\(\)](#) will call the device driver's DEVICENAME\_config() function to configure the device. The syscall is bi-directional (i.e., it will write configuration data to the device and read the same from the device before returning). The purpose of the bi-directional functionality is to allow the device's configuration to be set and queried using one syscall. The structure of the configuration data is left to the device driver's author. What is required is that the configuration data memory is allocated using [xMemAlloc\(\)](#) and that the "size\_" parameter is set to the size (i.e., amount) of the configuration data (e.g., sizeof(MyDeviceDriverConfig)) in bytes.

### See also

[xReturn](#)  
[xMemAlloc\(\)](#)  
[xMemFree\(\)](#)

### Parameters

<i>uid_</i>	The unique identifier ("UID") of the device driver to be operated on.
<i>size_↔</i> —	The size (i.e., amount) of configuration data to be written and read to and from the device, in bytes.
<i>config_↔</i> —	The configuration data. The configuration data must have been allocated by <a href="#">xMemAlloc()</a> .

### Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.2 xDeviceInitDevice()** `xReturn` xDeviceInitDevice (   
     const `xHalfWord` uid\_ )

The `xDeviceInitDevice()` syscall will call the device driver's `DRIVERNAME_init()` function to bootstrap the device. For example, setting memory mapped registers to starting values or setting the device driver's state and mode. This syscall is optional and is dependent on the specifics of the device driver's implementation by its author.

See also

[xReturn](#)

#### Parameters

<code>uid_</code> ↔	The unique identifier ("UID") of the device driver to be operated on.
—	

#### Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.3 xDeviceIsAvailable()** `xReturn` xDeviceIsAvailable (   
     const `xHalfWord` uid\_,   
     `xBase` \* res\_ )

The `xDeviceIsAvailable()` syscall queries the device driver about the availability of a device. Generally "available" means the that the device is available for read and/or write operations though the meaning is implementation specific and left up to the device driver's author.

See also

[xReturn](#)

#### Parameters

<code>uid_</code> ↔	The unique identifier ("UID") of the device driver to be operated on.
—	
<code>res_</code> ↔	The result of the inquiry; here, taken to mean the availability of the device.
—	

#### Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or

invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.4 xDeviceRead()** `xReturn` `xDeviceRead` (

```

    const xHalfWord uid_,
    xSize * size_,
    xAddr * data_ )

```

The `xDeviceRead()` syscall will read multiple bytes of data from a device into a data buffer. The data buffer must be freed by `xMemFree()`. Whether the data is read from the device is dependent on the device driver mode, state and implementation of these features by the device driver's author.

See also

[xReturn](#)  
[xMemFree\(\)](#)

#### Parameters

<code>uid</code> ↔ —	The unique identifier ("UID") of the device driver to be operated on.
<code>size</code> ↔ —	The number of bytes read from the device and contained in the data buffer.
<code>data</code> ↔ —	The data buffer containing the data read from the device which must be freed by <a href="#">xMemFree()</a> .

#### Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.5 xDeviceRegisterDevice()** `xReturn` `xDeviceRegisterDevice` (

```

    xReturn(*)() device_self_register_ )

```

The `xDeviceRegisterDevice()` syscall is a component of the HeliOS device driver model which registers a device driver with the HeliOS kernel. This syscall must be made before a device driver can be called by `xDeviceRead()`, `xDeviceWrite()`, etc. Once a device is registered, it cannot be un-registered - it can only be placed in a suspended state which is done by calling `xDeviceConfigDevice()`. However, as with most aspects of the HeliOS device driver model, it is important to note that the implementation of and support for device state and mode is up to the device driver's author.

**Note**

A device driver's unique identifier ("UID") must be a globally unique identifier. No two device drivers in the same application can share the same UID. This is best achieved by ensuring the device driver author selects a UID for his device driver that is not in use by other device drivers. A device driver template and device drivers can be found in /drivers.

**See also**

[CONFIG\\_DEVICE\\_NAME\\_BYTES](#)

[xReturn](#)

**Parameters**

<i>device_self_↔ register_</i>	The device driver's self registration function, DRIVERNAME_self_register().
------------------------------------	---

**Returns**

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.6 xDeviceSimpleRead()** [xReturn](#) xDeviceSimpleRead (   
     const [xHalfWord](#) uid\_,   
     [xByte](#) \* data\_ )

The [xDeviceSimpleRead\(\)](#) syscall will read a byte of data from a device. Whether the data is read from the device is dependent on the device driver mode, state and implementation of these features by the device driver's author.

**See also**

[xReturn](#)

**Parameters**

<i>uid_↔ —</i>	The unique identifier ("UID") of the device driver to be operated on.
<i>data_↔ —</i>	The byte of data read from the device.

**Returns**

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or



invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.7 `xDeviceSimpleWrite()`** `xReturn` `xDeviceSimpleWrite` (  
    const `xHalfWord` `uid_`,  
    `xByte` `data_` )

The `xDeviceSimpleWrite()` syscall will write a byte of data to a device. Whether the data is written to the device is dependent on the device driver mode, state and implementation of these features by the device driver's author.

See also

[xReturn](#)

#### Parameters

<code>uid_↔</code> —	The unique identifier ("UID") of the device driver to be operated on.
<code>data_↔</code> —	A byte of data to be written to the device.

#### Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.8 `xDeviceWrite()`** `xReturn` `xDeviceWrite` (  
    const `xHalfWord` `uid_`,  
    `xSize` \* `size_`,  
    `xAddr` `data_` )

The `xDeviceWrite()` syscall will write multiple bytes of data contained in a data buffer to a device. The data buffer must have been allocated by `xMemAlloc()`. Whether the data is written to the device is dependent on the device driver mode, state and implementation of these features by the device driver's author.

See also

[xReturn](#)

[xMemAlloc\(\)](#)

[xMemFree\(\)](#)

## Parameters

<i>uid</i> ↔ —	The unique identifier ("UID") of the device driver to be operated on.
<i>size</i> ↔ —	The size of the data buffer, in bytes.
<i>data</i> ↔ —	The data buffer containing the data to be written to the device. The data buffer must have been allocated by <a href="#">xMemAlloc()</a> .

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.9 xMemAlloc()** `xReturn xMemAlloc (`  
`volatile xAddr * addr_,`  
`const xSize size_ )`

The [xMemAlloc\(\)](#) syscall allocates heap memory for user's application. The amount of available heap memory is dependent on the CONFIG\_MEMORY\_REGION\_SIZE\_IN\_BLOCKS and CONFIG\_MEMORY\_REGION\_BLOCK\_↔SIZE settings. Similar to libc calloc(), [xMemAlloc\(\)](#) clears (i.e., zeros out) the allocated memory it allocates. Because the address of the newly allocated heap memory is handed back through the "addr\_" argument, the argument must be cast to "volatile xAddr \*" to avoid compiler warnings.

## See also

[xReturn](#)  
[CONFIG\\_MEMORY\\_REGION\\_SIZE\\_IN\\_BLOCKS](#)  
[CONFIG\\_MEMORY\\_REGION\\_BLOCK\\_SIZE](#)  
[xMemFree\(\)](#)

## Parameters

<i>addr</i> ↔ —	The address of the allocated memory. For example, if heap memory for a structure called mystruct (MyStruct *) needs to be allocated, the call to <a href="#">xMemAlloc()</a> would be written as follows if(OK(xMemAlloc((volatile xAddr *) &mystruct, sizeof(MyStruct)))) {}.
<i>size</i> ↔ —	The amount of heap memory, in bytes, being requested.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or

invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.10 xMemFree()** `xReturn` `xMemFree` (  
     const volatile `xAddr` `addr_` )

The [xMemFree\(\)](#) syscall frees (i.e., de-allocates) heap memory allocated by [xMemAlloc\(\)](#). [xMemFree\(\)](#) is also used to free heap memory allocated by syscalls including [xTaskGetAllRunTimeStats\(\)](#).

See also

[xReturn](#)  
[xMemAlloc\(\)](#)

Parameters

<code>addr_↔</code>	The address of the allocated memory to be freed.
—	

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.11 xMemGetHeapStats()** `xReturn` `xMemGetHeapStats` (  
     `xMemoryRegionStats` \* `stats_` )

The [xMemGetHeapStats\(\)](#) syscall is used to obtain detailed statistics about the heap memory region which can be used by the application to monitor memory utilization.

See also

[xReturn](#)  
[xMemoryRegionStats](#)  
[xMemFree\(\)](#)

## Parameters

<code>stats↔</code>	The memory region statistics. The memory region statistics must be freed by <a href="#">xMemFree()</a> .
<code>_</code>	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.12 xMemGetKernelStats()** [xReturn](#) xMemGetKernelStats (   
 [xMemoryRegionStats](#) \* stats\_ )

The [xMemGetKernelStats\(\)](#) syscall is used to obtain detailed statistics about the kernel memory region which can be used by the application to monitor memory utilization.

## See also

[xReturn](#)  
[xMemoryRegionStats](#)  
[xMemFree\(\)](#)

## Parameters

<code>stats↔</code>	The memory region statistics. The memory region statistics must be freed by <a href="#">xMemFree()</a> .
<code>_</code>	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.13 xMemGetSize()** [xReturn](#) xMemGetSize (   
 const volatile [xAddr](#) addr\_,   
 [xSize](#) \* size\_ )

The [xMemGetSize\(\)](#) syscall can be used to obtain the amount, in bytes, of heap memory allocated at a specific address. The address must be the address obtained from [xMemAlloc\(\)](#).

See also

[xReturn](#)

#### Parameters

<i>addr</i> ↔ —	The address of the heap memory for which the size (i.e., amount) allocated, in bytes, is being sought.
<i>size</i> ↔ —	The size (i.e., amount), in bytes, of heap memory allocated to the address.

#### Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

#### 4.2.4.14 xMemGetUsed() [xReturn](#) xMemGetUsed ( [xSize](#) \* *size\_* )

The [xMemGetUsed\(\)](#) syscall will update the "size\_" argument with the amount, in bytes, of in-use heap memory. If more memory statistics are needed, [xMemGetHeapStats\(\)](#) provides a more complete picture of the heap memory region.

See also

[xReturn](#)

[xMemGetHeapStats\(\)](#)

#### Parameters

<i>size</i> ↔ —	The size (i.e., amount), in bytes, of in-use heap memory.
--------------------	---

#### Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.15 xQueueCreate()** `xReturn` xQueueCreate (   
     xQueue \* queue\_,   
     const xBase limit\_ )

The `xQueueCreate()` syscall will create a new message queue for inter-task communication.

See also

`xReturn`  
`xQueue`  
`CONFIG_QUEUE_MINIMUM_LIMIT`  
`xQueueDelete()`

#### Parameters

<i>queue</i> ↔ —	The message queue to be operated on.
<i>limit_</i>	The message limit for the queue. When this value is reached, the message queue is considered to be full. The minimum message limit is configured using the <code>CONFIG_QUEUE_MINIMUM_LIMIT</code> (default is 5) setting.

#### Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.16 xQueueDelete()** `xReturn` xQueueDelete (   
     xQueue queue\_ )

The `xQueueDelete()` syscall will delete a message queue used for inter-task communication.

See also

`xReturn`  
`xQueue`  
`xQueueCreate()`

#### Parameters

<i>queue</i> ↔ —	The message queue to be operated on.
---------------------	--------------------------------------

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

### 4.2.4.17 xQueueDropMessage() `xReturn` `xQueueDropMessage` ( `xQueue` `queue_` )

The `xQueueDropMessage()` syscall is used to drop the next message from a message queue without retrieving the message.

## See also

[xReturn](#)

[xQueue](#)

## Parameters

<code>queue_↔</code>	The message queue to be operated on.
<code>_</code>	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

### 4.2.4.18 xQueueGetLength() `xReturn` `xQueueGetLength` ( `const` `xQueue` `queue_`, `xBase` \* `res_` )

The `xQueueGetLength()` syscall is used to inquire about the length (i.e., the number of messages) of a message queue.

## See also

[xReturn](#)

[xQueue](#)

## Parameters

<i>queue</i> ↔ —	The message queue to be operated on.
<i>res_</i>	The result of the inquiry; taken here to mean the number of messages a message queue contains.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.19 xQueuelQueueEmpty()** [xReturn](#) xQueueIsQueueEmpty (   
     const [xQueue](#) queue\_,   
     [xBase](#) \* res\_ )

The [xQueuelQueueEmpty\(\)](#) syscall is used to inquire as to whether a message queue is empty. A message queue is considered empty if the length (i.e., number of messages) of a queue is zero.

## See also

[xReturn](#)

[xQueue](#)

## Parameters

<i>queue</i> ↔ —	The message queue to be operated on.
<i>res_</i>	The result of the inquiry; taken here to mean "true" if the queue is empty, "false" if it contains one or more messages.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).



**4.2.4.20 xQueuelQueueFull()** `xReturn` xQueueIsQueueFull (   
     const `xQueue` queue\_,   
     `xBase` \* res\_ )

The `xQueuelQueueFull()` syscall is used to inquire as to whether a message queue is full. A message queue is considered full if the length (i.e., number of messages) of a queue has reached its message limit which is configured using the `CONFIG_QUEUE_MINIMUM_LIMIT` (default is 5) setting.

See also

[xReturn](#)

[xQueue](#)

[CONFIG\\_QUEUE\\_MINIMUM\\_LIMIT](#)

Parameters

<i>queue</i> ↔ _	The message queue to be operated on.
<i>res_</i>	The result of the inquiry; taken here to mean "true" if the queue is full, "false" if it contains less than "limit" messages.

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.21 xQueueLockQueue()** `xReturn` xQueueLockQueue (   
     `xQueue` queue\_ )

The `xQueueLockQueue()` syscall is used to lock a message queue. Locking a message queue prevents tasks from sending messages to the queue but does not prevent tasks from peeking, receiving or dropping messages from a message queue.

See also

[xReturn](#)

[xQueue](#)

[xQueueUnLockQueue\(\)](#)

Parameters

<i>queue</i> ↔ _	The message queue to be operated on.
---------------------	--------------------------------------

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.22 xQueueMessagesWaiting()** [xReturn](#) xQueueMessagesWaiting (   
     const [xQueue](#) queue\_,   
     [xBase](#) \* res\_ )

The [xQueueMessagesWaiting\(\)](#) syscall is used to inquire as to whether a message queue has one or more messages waiting.

## See also

[xReturn](#)

[xQueue](#)

## Parameters

<i>queue_</i> ↔ —	The message queue to be operated on.
<i>res_</i>	The result of the inquiry; taken here to mean "true" if there is one or more messages waiting.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.23 xQueuePeek()** [xReturn](#) xQueuePeek (   
     const [xQueue](#) queue\_,   
     [xQueueMessage](#) \* message\_ )

The [xQueuePeek\(\)](#) syscall is used to retrieve the next message from a message queue without dropping the message (i.e., peek at the message).

## See also

[xReturn](#)

[xQueue](#)

[xQueueMessage](#)

[xMemFree\(\)](#)

## Parameters

<i>queue_</i>	The message queue to be operated on.
<i>message_</i> ←	The message retrieved from the message queue. The message must be freed by <a href="#">xMemFree()</a> .

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.24 xQueueReceive()** [xReturn](#) xQueueReceive (   
[xQueue](#) queue\_,   
[xQueueMessage](#) \* message\_ )

The [xQueueReceive\(\)](#) syscall has the effect of calling [xQueuePeek\(\)](#) followed by [xQueueDropMessage\(\)](#). The syscall will receive the next message from the message queue if there is a waiting message.

## See also

[xReturn](#)  
[xQueue](#)  
[xQueueMessage](#)  
[xMemFree\(\)](#)

## Parameters

<i>queue_</i>	The message queue to be operated on.
<i>message_</i> ←	The message retrieved from the message queue. The message must be freed by <a href="#">xMemFree()</a> .

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.25 xQueueSend()** `xReturn` xQueueSend (   
     xQueue queue\_,   
     const xBase bytes\_,   
     const xByte \* value\_ )

The `xQueueSend()` syscall is used to send a message to a message queue. The message value is an array of bytes (i.e., `xByte`) and cannot exceed `CONFIG_MESSAGE_VALUE_BYTES` (default is 8) bytes in size.

See also

[xReturn](#)  
[xQueue](#)  
[xByte](#)  
[CONFIG\\_MESSAGE\\_VALUE\\_BYTES](#)

#### Parameters

<i>queue_↔</i> —	The message queue to be operated on.
<i>bytes_↔</i> —	The size, in bytes, of the message to send to the message queue. The size of the message cannot exceed the <code>CONFIG_MESSAGE_VALUE_BYTES</code> (default is 8) setting.
<i>value_↔</i> —	The message to be sent to the queue.

#### Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.26 xQueueUnLockQueue()** `xReturn` xQueueUnLockQueue (   
     xQueue queue\_ )

The `xQueueUnLockQueue()` syscall is used to unlock a message queue that was previously locked by `xQueueLockQueue()`. Once a message queue is unlocked, tasks may resume sending messages to the message queue.

See also

[xReturn](#)  
[xQueue](#)  
[xQueueLockQueue\(\)](#)

## Parameters

<i>queue</i> ↔ —	The message queue to be operated on.
---------------------	--------------------------------------

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.27 xStreamBytesAvailable()** [xReturn](#) xStreamBytesAvailable (   
const [xStreamBuffer](#) stream\_,   
[xHalfWord](#) \* bytes\_ )

The [xStreamBytesAvailable\(\)](#) syscall is used to obtain the number of waiting (i.e., available) bytes in a stream buffer.

## See also

[xReturn](#)  
[xStreamBuffer](#)

## Parameters

<i>stream</i> ↔ —	The stream buffer to be operated on.
<i>bytes</i> ↔ —	The number of available bytes in the stream buffer.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.28 xStreamCreate()** [xReturn](#) xStreamCreate (   
[xStreamBuffer](#) \* stream\_ )

The [xStreamCreate\(\)](#) syscall is used to create a stream buffer which is used for inter-task communications. A stream buffer is similar to a message queue, however, it operates only on one byte at a time.

## See also

[xReturn](#)  
[xStreamBuffer](#)  
[xStreamDelete\(\)](#)

## Parameters

<i>stream</i> ↔	The stream buffer to be operated on.
—	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

#### 4.2.4.29 xStreamDelete() [xReturn](#) xStreamDelete (

const [xStreamBuffer](#) *stream\_* )

The [xStreamDelete\(\)](#) syscall is used to delete a stream buffer created by [xStreamCreate\(\)](#).

## See also

[xReturn](#)  
[xStreamBuffer](#)  
[xStreamCreate\(\)](#)

## Parameters

<i>stream</i> ↔	The stream buffer to be operated on.
—	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.30 xStreamIsEmpty()** `xReturn` xStreamIsEmpty (   
     const `xStreamBuffer` stream\_,   
     `xBase` \* res\_ )

The `xStreamIsEmpty()` syscall is used to inquire as to whether a stream buffer is empty. An empty stream buffer has zero waiting (i.e., available) bytes.

See also

`xReturn`  
`xStreamBuffer`

Parameters

<i>stream_</i> ↔	The stream buffer to be operated on.
<i>res_</i>	The result of the inquiry; taken here to mean "true" if the length (i.e., number of waiting bytes) is zero.

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.31 xStreamIsFull()** `xReturn` xStreamIsFull (   
     const `xStreamBuffer` stream\_,   
     `xBase` \* res\_ )

The `xStreamIsFull()` syscall is used to inquire as to whether a stream buffer is full. An full stream buffer has `CONFIG_STREAM_BUFFER_BYTES` (default is 32) bytes waiting.

See also

`xReturn`  
`xStreamBuffer`  
`CONFIG_STREAM_BUFFER_BYTES`

Parameters

<i>stream_</i> ↔	The stream buffer to be operated on.
<i>res_</i>	The result of the inquiry; taken here to mean "true" if the length (i.e., number of waiting bytes) is <code>CONFIG_STREAM_BUFFER_BYTES</code> bytes.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.32 xStreamReceive()** [xReturn](#) xStreamReceive (   
     const [xStreamBuffer](#) stream\_,   
     [xHalfWord](#) \* bytes\_,   
     [xByte](#) \*\* data\_ )

The [xStreamReceive\(\)](#) syscall is used to retrieve all waiting bytes from a stream buffer.

## See also

[xReturn](#)  
[xByte](#)  
[xStreamBuffer](#)  
[xMemFree\(\)](#)

## Parameters

<i>stream_</i> ↔ —	The stream buffer to be operated on.
<i>bytes_</i> ↔ —	The number of bytes retrieved from the stream buffer.
<i>data_</i>	The bytes retrieved from the stream buffer. The data must be freed by <a href="#">xMemFree()</a> .

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.33 xStreamReset()** [xReturn](#) xStreamReset (   
     const [xStreamBuffer](#) stream\_ )

The [xStreamReset\(\)](#) syscall is used to reset a stream buffer. Resetting a stream buffer has the effect of clearing the stream buffer such that [xStreamBytesAvailable\(\)](#) would return zero bytes available.



See also

[xReturn](#)  
[xStreamBuffer](#)

Parameters

<i>stream</i> ↔ —	The stream buffer to be operated on.
----------------------	--------------------------------------

Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.34 xStreamSend()** [xReturn](#) xStreamSend (  
[xStreamBuffer](#) stream\_,  
 const [xByte](#) byte\_ )

The [xStreamSend\(\)](#) syscall is used to send one byte to a stream buffer.

See also

[xReturn](#)  
[xByte](#)  
[xStreamBuffer](#)

Parameters

<i>stream</i> ↔ —	The stream buffer to be operated on.
<i>byte_</i>	The byte to send to the stream buffer.

Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.35 xSystemAssert()** [xReturn](#) xSystemAssert (   
     const char \* *file\_*,   
     const int *line\_* )

The [xSystemAssert\(\)](#) syscall is used to raise a system assert. In order for [xSystemAssert\(\)](#) to have an effect the configuration setting CONFIG\_SYSTEM\_ASSERT\_BEHAVIOR must be defined. That said, it is recommended that the ASSERT C macro be used in place of [xSystemAssert\(\)](#). In order for the ASSERT C macro to have any effect, the configuration setting CONFIG\_ENABLE\_SYSTEM\_ASSERT must be defined.

See also

[xReturn](#)  
[CONFIG\\_SYSTEM\\_ASSERT\\_BEHAVIOR](#)  
[CONFIG\\_ENABLE\\_SYSTEM\\_ASSERT](#)  
[ASSERT](#)

Parameters

<i>file_</i> ↔ —	The C file where the assert occurred. This will be set by the ASSERT C macro.
<i>line_</i> ↔ —	The C file line where the assert occurred. This will be set by the ASSERT C macro.

Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.36 xSystemGetSystemInfo()** [xReturn](#) xSystemGetSystemInfo (   
     xSystemInfo \* *info\_* )

The [xSystemGetSystemInfo\(\)](#) syscall is used to inquire about the system. The information about the system that may be obtained is the product (i.e., OS) name, version and number of tasks.

See also

[xReturn](#)  
[xSystemInfo](#)  
[xMemFree\(\)](#)

Parameters

<i>info_</i> ↔ —	The system information. The system information must be freed by <a href="#">xMemFree()</a> .
---------------------	--

### Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.37 xSystemHalt()** [xReturn](#) xSystemHalt (   
 void )

The [xSystemHalt\(\)](#) syscall is used to halt HeliOS. Once called, [xSystemHalt\(\)](#) will disable all interrupts and stops the execution of further statements. The system will have to be reset to recover.

### See also

[xReturn](#)

### Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.38 xSystemInit()** [xReturn](#) xSystemInit (   
 void )

The [xSystemInit\(\)](#) syscall is used to bootstrap HeliOS and must be the first syscall made in the user's application. The [xSystemInit\(\)](#) syscall initializes memory and calls initialization functions through the port layer.

### See also

[xReturn](#)

### Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.39 xTaskChangePeriod()** `xReturn` xTaskChangePeriod (   
     `xTask` *task\_*,   
     const `xTicks` *period\_* )

The `xTaskChangePeriod()` is used to change the interval period of a task timer. The period is measured in ticks. While architecture and/or platform dependent, a tick is often one millisecond. In order for the task timer to have an effect, the task must be in the "waiting" state which can be set using `xTaskWait()`.

See also

[xReturn](#)  
[xTask](#)  
[xTicks](#)  
[xTaskWait\(\)](#)

Parameters

<i>task_</i> ↔ —	The task to be operated on.
<i>period_</i> ↔ —	The interval period in ticks.

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.40 xTaskChangeWDPeriod()** `xReturn` xTaskChangeWDPeriod (   
     `xTask` *task\_*,   
     const `xTicks` *period\_* )

The `xTaskChangeWDPeriod()` syscall is used to change the task watchdog timer period. This has no effect unless `CONFIG_TASK_WD_TIMER_ENABLE` is defined and the watchdog timer period is greater than zero. The task watchdog timer will place a task in a suspended state if a task's runtime exceeds the watchdog timer period. The task watchdog timer period is set on a per task basis.

See also

[xReturn](#)  
[xTask](#)  
[xTicks](#)  
[CONFIG\\_TASK\\_WD\\_TIMER\\_ENABLE](#)

## Parameters

<i>task</i> ↔ —	The task to be operated on.
<i>period</i> ↔ —	The task watchdog timer period measured in ticks. Ticks is platform and/or architecture dependent. However, most platforms and/or architectures have a one millisecond tick duration.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.41 xTaskCreate()** `xReturn xTaskCreate (`  
`xTask * task_,`  
`const xByte * name_,`  
`void(*) (xTask task_, xTaskParm parm_) callback_,`  
`xTaskParm taskParameter_ )`

The [xTaskCreate\(\)](#) syscall is used to create a new task. Neither the [xTaskCreate\(\)](#) or [xTaskDelete\(\)](#) syscalls can be called from within a task (i.e., while the scheduler is running).

## See also

[xReturn](#)  
[xTaskDelete\(\)](#)  
[xTask](#)  
[xTaskParm](#)  
[CONFIG\\_TASK\\_NAME\\_BYTES](#)

## Parameters

<i>task_</i>	The task to be operated on.
<i>name_</i>	The name of the task which must be exactly CONFIG_TASK_NAME_BYTES (default is 8) bytes in length. Shorter task names must be padded.
<i>callback_</i>	The task's main (i.e., entry point) function.
<i>task_</i> ↔ <i>Parameter_</i>	A parameter which is accessible from the task's main function. If a task parameter is not needed, this parameter may be set to null.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn

(a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.42 `xTaskDelete()`** `xReturn` `xTaskDelete` (   
 `const xTask task_` )

The `xTaskDelete()` syscall is used to delete an existing task. Neither the `xTaskCreate()` or `xTaskDelete()` syscalls can be called from within a task (i.e., while the scheduler is running).

See also

[xReturn](#)

[xTask](#)

Parameters

<code>task_</code>	The task to be operated on.
—	

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.43 `xTaskGetAllRunTimeStats()`** `xReturn` `xTaskGetAllRunTimeStats` (   
 `xTaskRunTimeStats * stats_`,   
 `xBase * tasks_` )

The `xTaskGetAllRunTimeStats()` syscall is used to obtain the runtime statistics of all tasks.

See also

[xReturn](#)

[xTask](#)

[xTaskRunTimeStats](#)

[xMemFree\(\)](#)

## Parameters

<i>stats</i> ↔ —	The runtime statistics. The runtime statics must be freed by <a href="#">xMemFree()</a> .
<i>tasks</i> ↔ —	The number of tasks in the runtime statistics.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.44 xTaskGetAllTaskInfo()** [xReturn](#) xTaskGetAllTaskInfo (   
[xTaskInfo](#) \* *info\_*,  
[xBase](#) \* *tasks\_* )

The [xTaskGetAllTaskInfo\(\)](#) syscall is used to get info about all tasks. [xTaskGetAllTaskInfo\(\)](#) is similar to [xTaskGetAllRunTimeStats\(\)](#) with one difference, [xTaskGetAllTaskInfo\(\)](#) provides the state and name of the task along with the task's runtime statistics.

## See also

[xReturn](#)  
[xTaskInfo](#)  
[xMemFree\(\)](#)

## Parameters

<i>info</i> ↔ —	Information about the tasks. The task information must be freed by <a href="#">xMemFree()</a> .
<i>tasks</i> ↔ —	The number of tasks.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.45 xTaskGetHandleById()** `xReturn` xTaskGetHandleById (   
     xTask \* task\_,   
     const xBase id\_ )

The `xTaskGetHandleById()` syscall will get the task handle using the task id.

See also

`xReturn`

`xTask`

Parameters

<i>task_</i> ↔ —	The task to be operated on.
<i>id_</i> —	The task id.

Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.46 xTaskGetHandleByName()** `xReturn` xTaskGetHandleByName (   
     xTask \* task\_,   
     const xByte \* name\_ )

The `xTaskGetHandleByName()` syscall will get the task handle using the task name.

See also

`xReturn`

`xTask`

`CONFIG_TASK_NAME_BYTES`

Parameters

<i>task_</i> ↔ —	The task to be operated on.
<i>name_</i> ↔ —	The name of the task which must be exactly CONFIG_TASK_NAME_BYTES (default is 8) bytes in length. Shorter task names must be padded.



## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.47 xTaskGetId()** `xReturn` `xTaskGetId` (   
     const `xTask` `task_`,   
     `xBase` \* `id_` )

The `xTaskGetId()` syscall is used to obtain the id of a task.

## See also

`xReturn`

`xTask`

## Parameters

<code>task_↔</code>	The task to be operated on.
<code>id_</code>	The id of the task.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.48 xTaskGetName()** `xReturn` `xTaskGetName` (   
     const `xTask` `task_`,   
     `xByte` \*\* `name_` )

The `xTaskGetName()` syscall is used to get the ASCII name of a task. The size of the task name is `CONFIG_↔ TASK_NAME_BYTES` (default is 8) bytes in length.

## See also

`xReturn`

`xTask`

`xMemFree()`

## Parameters

<i>task</i> ↔ —	The task to be operated on.
<i>name</i> ↔ —	The task name which must be precisely CONFIG_TASK_NAME_BYTES (default is 8) bytes in length. The task name must be freed by <a href="#">xMemFree()</a> .

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.49 xTaskGetNumberOfTasks()** [xReturn](#) xTaskGetNumberOfTasks (   
 [xBase](#) \* *tasks\_* )

The [xTaskGetNumberOfTasks\(\)](#) syscall is used to obtain the number of tasks regardless of their state (i.e., suspended, running or waiting).

## See also

[xReturn](#)

## Parameters

<i>tasks</i> ↔ —	The number of tasks.
---------------------	----------------------

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.50 xTaskGetPeriod()** [xReturn](#) xTaskGetPeriod (   
 const [xTask](#) *task\_*,   
 [xTicks](#) \* *period\_* )

The [xTaskGetPeriod\(\)](#) syscall is used to obtain the current task timer period.

## See also

[xReturn](#)  
[xTask](#)  
[xTicks](#)

## Parameters

<i>task</i> ↔ —	The task to be operated on.
<i>period</i> ↔ —	The task timer period in ticks. Ticks is platform and/or architecture dependent. However, most platforms and/or architect

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.51 xTaskGetSchedulerState()** [xReturn](#) xTaskGetSchedulerState (   
[xSchedulerState](#) \* state\_ )

The [xTaskGetSchedulerState\(\)](#) is used to get the state of the scheduler.

## See also

[xReturn](#)  
[xSchedulerState](#)

## Parameters

<i>state</i> ↔ —	The state of the scheduler.
---------------------	-----------------------------

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.52 xTaskGetTaskInfo()** `xReturn` xTaskGetTaskInfo (   
     const `xTask` *task\_*,   
     `xTaskInfo` \* *info\_* )

The `xTaskGetTaskInfo()` syscall is used to get info about a single task. `xTaskGetTaskInfo()` is similar to `xTaskGetTaskRunTimeStats()` with one difference, `xTaskGetTaskInfo()` provides the state and name of the task along with the task's runtime statistics.

See also

[xReturn](#)  
[xMemFree\(\)](#)  
[xTask](#)  
[xTaskInfo](#)

Parameters

<i>task_</i> ↔ —	The task to be operated on.
<i>info_</i> ↔ —	Information about the task. The task information must be freed by <a href="#">xMemFree()</a> .

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.53 xTaskGetTaskRunTimeStats()** `xReturn` xTaskGetTaskRunTimeStats (   
     const `xTask` *task\_*,   
     `xTaskRunTimeStats` \* *stats\_* )

The `xTaskGetTaskRunTimeStats()` syscall is used to get the runtime statistics for a single task.

See also

[xReturn](#)  
[xTask](#)  
[xTaskRunTimeStats](#)  
[xMemFree\(\)](#)

Parameters

<i>task_</i> ↔ —	The task to be operated on.
<i>stats_</i> ↔ —	The runtime statistics. The runtime statistics must be freed by <a href="#">xMemFree()</a> .

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.54 xTaskGetTaskState()** `xReturn` `xTaskGetTaskState` (   
     const `xTask` `task_`,   
     `xTaskState` \* `state_` )

The `xTaskGetTaskState()` syscall is used to obtain the state of a task (i.e., suspended, running or waiting).

## See also

`xReturn`  
`xTask`  
`xTaskState`

## Parameters

<code>task_↔</code> —	The task to be operated on.
<code>state_↔</code> —	The state of the task.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.55 xTaskGetWDPeriod()** `xReturn` `xTaskGetWDPeriod` (   
     const `xTask` `task_`,   
     `xTicks` \* `period_` )

The `xTaskGetWDPeriod()` syscall is used to obtain the task watchdog timer period.

**See also**[xReturn](#)[xTask](#)[xTicks](#)[CONFIG\\_TASK\\_WD\\_TIMER\\_ENABLE](#)

## Parameters

<i>task</i> ↔ —	The task to be operated on.
<i>period</i> ↔ —	The task watchdog timer period, measured in ticks. Ticks are platform and/or architecture dependent. However, on must platforms and/or architectures the tick represents one millisecond.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.56 xTaskNotificationIsWaiting()** `xReturn xTaskNotificationIsWaiting (`  
`const xTask task_,`  
`xBase * res_ )`

The [xTaskNotificationIsWaiting\(\)](#) syscall is used to inquire as to whether a direct-to-task notification is waiting for the given task.

## See also

[xReturn](#)

[xTask](#)

## Parameters

<i>task</i> ↔ —	Task to be operated on.
<i>res</i> ↔ —	The result of the inquiry; taken here to mean "true" if there is a waiting direct-to-task notification. Otherwise "false", if there is not a waiting direct-to-notification.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.57 xTaskNotifyGive()** `xReturn` xTaskNotifyGive (   
     `xTask` *task\_*,  
     const `xBase` *bytes\_*,  
     const `xByte` \* *value\_* )

The `xTaskNotifyGive()` syscall is used to give (i.e., send) a direct-to-task notification to the given task.

See also

`xReturn`

`xTask`

`CONFIG_NOTIFICATION_VALUE_BYTES`

Parameters

<i>task_</i> ↔ —	The task to be operated on.
<i>bytes_</i> ↔ —	The number of bytes contained in the notification value. The number of bytes in the notification value cannot exceed <code>CONFIG_NOTIFICATION_VALUE_BYTES</code> (default is 8) bytes.
<i>value_</i> ↔ —	The notification value which is a byte array whose length is defined by "bytes_".

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.58 xTaskNotifyStateClear()** `xReturn` xTaskNotifyStateClear (   
     `xTask` *task\_* )

The `xTaskNotifyStateClear()` syscall is used to clear a waiting direct-to-task notification for the given task.

See also

`xReturn`

`xTask`

Parameters

<i>task_</i> ↔ —	The task to be operated on.
---------------------	-----------------------------



## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.59 xTaskNotifyTake()** `xReturn` `xTaskNotifyTake` (  
`xTask` `task_`,  
`xTaskNotification` \* `notification_` )

The `xTaskNotifyTake()` syscall is used to take (i.e., receive) a waiting direct-to-task notification.

## See also

`xReturn`  
`xTask`  
`CONFIG_NOTIFICATION_VALUE_BYTES`  
`xTaskNotification`

## Parameters

<code>task_</code>	The task to be operated on.
<code>notification_</code>	The direct-to-task notification.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.60 xTaskResetTimer()** `xReturn` `xTaskResetTimer` (  
`xTask` `task_` )

The `xTaskResetTimer()` syscall is used to reset the task timer. In effect, this sets the elapsed time, measured in ticks, back to zero.

## See also

`xReturn`  
`xTask`  
`xTicks`

## Parameters

<i>task</i> ↔	The task to be operated on.
—	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.61 xTaskResume()** [xReturn](#) xTaskResume (   
 [xTask](#) task\_ )

The [xTaskResume\(\)](#) syscall will place a task in the "running" state. A task in this state will run continuously until suspended and is scheduled to run cooperatively by the HeliOS scheduler.

## See also

[xReturn](#)  
[xTask](#)  
[xTaskResume\(\)](#)  
[xTaskSuspend\(\)](#)  
[xTaskWait\(\)](#)

## Parameters

<i>task</i> ↔	The task to be operated on.
—	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.62 xTaskResumeAll()** [xReturn](#) xTaskResumeAll (   
 void )

The `xTaskResumeAll()` syscall is used to set the scheduler state to running. `xTaskStartScheduler()` must still be called to pass control to the scheduler. If the scheduler state is not running, then `xTaskStartScheduler()` will simply return to the caller when called.

#### See also

[xReturn](#)  
[xTaskStartScheduler\(\)](#)  
[xTaskResumeAll\(\)](#)  
[xTaskSuspendAll\(\)](#)

#### Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

#### 4.2.4.63 xTaskStartScheduler() `xReturn` xTaskStartScheduler ( void )

The `xTaskStartScheduler()` syscall is used to start the HeliOS task scheduler. On this syscall is made, control is handed over to HeliOS. In order to suspend the scheduler and return to the caller, the `xTaskSuspendAll()` syscall will need to be made. Once a call to `xTaskSuspendAll()` is made, `xTaskResumeAll()` must be called before calling `xTaskStartScheduler()` again. If `xTaskStartScheduler()` is called while the scheduler is in a suspended state, `xTaskStartScheduler()` will immediately return.

#### See also

[xReturn](#)  
[xTaskResumeAll\(\)](#)  
[xTaskSuspendAll\(\)](#)

#### Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

#### 4.2.4.64 xTaskSuspend() [xReturn](#) xTaskSuspend ( [xTask](#) task\_ )

The [xTaskSuspend\(\)](#) syscall will place a task in the "suspended" state. A task in this state is not scheduled to run by the HeliOS scheduler and will not run.

See also

[xReturn](#)  
[xTask](#)  
[xTaskResume\(\)](#)  
[xTaskSuspend\(\)](#)  
[xTaskWait\(\)](#)

Parameters

<a href="#">task</a> ↔	The task to be operated on.
—	

Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

#### 4.2.4.65 xTaskSuspendAll() [xReturn](#) xTaskSuspendAll ( void )

The [xTaskSuspendAll\(\)](#) syscall is used to set the scheduler state to suspended. If called from a running task, the HeliOS scheduler will quit and return control back to the caller. To set the scheduler state to running, [xTaskResumeAll\(\)](#) must be called followed by a call to [xTaskStartScheduler\(\)](#).

See also

[xReturn](#)  
[xTaskStartScheduler\(\)](#)  
[xTaskResumeAll\(\)](#)  
[xTaskSuspendAll\(\)](#)

Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.66 xTaskWait()** `xReturn` xTaskWait (   
`xTask` *task\_* )

The `xTaskWait()` syscall will place a task in the "waiting" state. A task in this state is not scheduled to run by the HeliOS scheduler *UNTIL* an event occurs. When an event occurs, the HeliOS will schedule the task to run until the even has passed (e.g., the task either "takes" or "clears a direct-to-task notification"). Tasks in the "waiting" state are tasks that are using event-driven multitasking. HeliOS supports two types of events: task timers and direct-to-task notifications.

See also

[xReturn](#)  
[xTask](#)  
[xTaskResume\(\)](#)  
[xTaskSuspend\(\)](#)  
[xTaskWait\(\)](#)

Parameters

<i>task_</i> ↔	The task to be operated on.
—	

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.67 xTimerChangePeriod()** `xReturn` xTimerChangePeriod (   
`xTimer` *timer\_*,  
`const xTicks` *period\_* )

The `xTimerChangePeriod()` syscall is used to change the time period on an application timer. Once the period has elapsed, the application timer is considered expired.

See also

[xReturn](#)  
[xTimer](#)  
[xTicks](#)

Parameters

<i>timer_</i> ↔	The application timer to be operated on.
—	
<i>period_</i> ↔	The application timer period, measured in ticks.
—	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.68 xTimerCreate()** [xReturn](#) xTimerCreate (   
[xTimer](#) \* timer\_,   
const [xTicks](#) period\_ )

The [xTimerCreate\(\)](#) syscall is used to create a new application timer. Application timers are not the same as task timers. Application timers are not part of HeliOS's event-driven multitasking. Application timers are just that, timers for use by the user's application for general purpose timekeeping. Application timers can be started, stopped, reset and have time period, measured in ticks, that elapses.

## See also

[xReturn](#)  
[xTimer](#)  
[xTicks](#)  
[xTimerDelete\(\)](#)

## Parameters

<i>timer</i> ↔ —	The application timer to be operated on.
<i>period</i> ↔ —	The application timer period, measured in ticks.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.69 xTimerDelete()** [xReturn](#) xTimerDelete (   
const [xTimer](#) timer\_ )

The [xTimerDelete\(\)](#) syscall is used to delete an application timer created with [xTimerCreate\(\)](#).

## See also

[xReturn](#)  
[xTimer](#)  
[xTicks](#)  
[xTimerCreate\(\)](#)

## Parameters

<i>timer</i> ↔	The application timer to be operated on.
—	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.70 xTimerGetPeriod()** [xReturn](#) xTimerGetPeriod (

```

    const xTimer timer_,
    xTicks * period_ )

```

The [xTimerGetPeriod\(\)](#) syscall is used to obtain the current period for an application timer.

## See also

[xReturn](#)  
[xTimer](#)  
[xTicks](#)

## Parameters

<i>timer</i> ↔	The application timer to be operate don.
—	
<i>period</i> ↔	The application timer period, measured in ticks.
—	

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.71 xTimerHasTimerExpired()** `xReturn xTimerHasTimerExpired (`  
`const xTimer timer_,`  
`xBase * res_ )`

The `xTimerHasTimerExpired()` syscall is used to inquire as to whether an application timer has expired. If the application timer has expired, it must be reset with `xTimerReset()`. If a timer is not active (i.e., started), it cannot expire even if the timer period has elapsed.

See also

[xReturn](#)  
[xTimer](#)  
[xTimerReset\(\)](#)

Parameters

<i>timer</i> ↔ —	The application timer to be operated on.
<i>res</i> ↔ —	The result of the inquiry; taken here to mean "true" if the application timer has elapsed (i.e., expired). "False" if the application timer has not expired

Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return ReturnError. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

**4.2.4.72 xTimerIsTimerActive()** `xReturn xTimerIsTimerActive (`  
`const xTimer timer_,`  
`xBase * res_ )`

The `xTimerIsTimerActive()` syscall is used to inquire as to whether an application timer is active. An application timer is considered to be active if the application timer has been started by `xTimerStart()`.

See also

[xReturn](#)  
[xTimer](#)  
[xTimerStart\(\)](#)  
[xTimerStop\(\)](#)



## Parameters

<i>timer</i> ↔ —	The application timer to be operated on.
<i>res</i> ↔ —	The result of the inquiry; taken here to mean "true" if the application timer is running. "False" if the application timer is not running.

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.73 xTimerReset()** `xReturn xTimerReset (`  
`xTimer timer_ )`

The [xTimerReset\(\)](#) syscall is used to reset an application timer. Resetting has the effect of setting the application timer's elapsed time to zero.

## See also

[xReturn](#)  
[xTimer](#)  
[xTimerReset\(\)](#)  
[xTimerStart\(\)](#)  
[xTimerStop\(\)](#)

## Parameters

<i>timer</i> ↔ —	The application timer to be operated on.
---------------------	--

## Returns

On success, the syscall returns ReturnOK. On failure, the syscall returns ReturnError. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if [xTaskGetId\(\)](#) was unable to locate the task by the task object (i.e., xTask) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), [xTaskGetId\(\)](#) would return ReturnError. All HeliOS syscalls return the xReturn (a.k.a., Return\_t) type which can either be ReturnOK or ReturnError. The C macros OK() and ERROR() can be used as a more concise way of checking the return value of a syscall (e.g., if(OK(xMemGetUsed(&size))) {} or if(ERROR(xMemGetUsed(&size))) {}).

**4.2.4.74 xTimerStart()** `xReturn` xTimerStart (  
    `xTimer` timer\_ )

The `xTimerStart()` syscall is used to place an application timer in the running state.

See also

`xReturn`  
`xTimer`  
`xTimerReset()`  
`xTimerStart()`  
`xTimerStop()`

Parameters

<code>timer↔</code>	The application timer to be operated on.
—	

Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size)))` or `if(ERROR(xMemGetUsed(&size)))` {}).

**4.2.4.75 xTimerStop()** `xReturn` xTimerStop (  
    `xTimer` timer\_ )

The `xTimerStop()` syscall is used to place an application timer in the suspended state.

See also

`xReturn`  
`xTimer`  
`xTimerReset()`  
`xTimerStart()`  
`xTimerStop()`

Parameters

<code>timer↔</code>	The application timer to be operated on.
—	

## Returns

On success, the syscall returns `ReturnOK`. On failure, the syscall returns `ReturnError`. A failure is any condition in which the syscall was unable to achieve its intended objective. For example, if `xTaskGetId()` was unable to locate the task by the task object (i.e., `xTask`) passed to the syscall, because either the object was null or invalid (e.g., a deleted task), `xTaskGetId()` would return `ReturnError`. All HeliOS syscalls return the `xReturn` (a.k.a., `Return_t`) type which can either be `ReturnOK` or `ReturnError`. The C macros `OK()` and `ERROR()` can be used as a more concise way of checking the return value of a syscall (e.g., `if(OK(xMemGetUsed(&size))) {}` or `if(ERROR(xMemGetUsed(&size))) {}`).

## Index

Addr\_t

HeliOS.h, [18](#)

availableSpaceInBytes

MemoryRegionStats\_s, [3](#)

Base\_t

HeliOS.h, [18](#)

Byte\_t

HeliOS.h, [19](#)

config.h, [8](#)

CONFIG\_DEVICE\_NAME\_BYTES, [10](#)

CONFIG\_ENABLE\_ARDUINO\_CPP\_INTERFACE,  
[10](#)

CONFIG\_ENABLE\_SYSTEM\_ASSERT, [10](#)

CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE, [10](#)

CONFIG\_MEMORY\_REGION\_SIZE\_IN\_BLOCKS,  
[10](#)

CONFIG\_MESSAGE\_VALUE\_BYTES, [11](#)

CONFIG\_NOTIFICATION\_VALUE\_BYTES, [11](#)

CONFIG\_QUEUE\_MINIMUM\_LIMIT, [11](#)

CONFIG\_STREAM\_BUFFER\_BYTES, [11](#)

CONFIG\_SYSTEM\_ASSERT\_BEHAVIOR, [12](#)

CONFIG\_TASK\_NAME\_BYTES, [12](#)

CONFIG\_TASK\_WD\_TIMER\_ENABLE, [12](#)

CONFIG\_DEVICE\_NAME\_BYTES

config.h, [10](#)

CONFIG\_ENABLE\_ARDUINO\_CPP\_INTERFACE

config.h, [10](#)

CONFIG\_ENABLE\_SYSTEM\_ASSERT

config.h, [10](#)

CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE

config.h, [10](#)

CONFIG\_MEMORY\_REGION\_SIZE\_IN\_BLOCKS

config.h, [10](#)

CONFIG\_MESSAGE\_VALUE\_BYTES

config.h, [11](#)

CONFIG\_NOTIFICATION\_VALUE\_BYTES

config.h, [11](#)

CONFIG\_QUEUE\_MINIMUM\_LIMIT

config.h, [11](#)

CONFIG\_STREAM\_BUFFER\_BYTES

config.h, [11](#)

CONFIG\_SYSTEM\_ASSERT\_BEHAVIOR

config.h, [12](#)

CONFIG\_TASK\_NAME\_BYTES

config.h, [12](#)

CONFIG\_TASK\_WD\_TIMER\_ENABLE

config.h, [12](#)

HalfWord\_t

HeliOS.h, [19](#)

HeliOS.h, [12](#)

Addr\_t, [18](#)

Base\_t, [18](#)

Byte\_t, [19](#)

HalfWord\_t, [19](#)

MemoryRegionStats\_t, [19](#)

Queue\_t, [19](#)

QueueMessage\_t, [20](#)

Return\_e, [26](#)

Return\_t, [20](#)

ReturnError, [27](#)

ReturnOK, [27](#)

SchedulerState\_e, [27](#)

SchedulerState\_t, [20](#)

SchedulerStateRunning, [27](#)

SchedulerStateSuspended, [27](#)

Size\_t, [20](#)

StreamBuffer\_t, [21](#)

SystemInfo\_t, [21](#)

Task\_t, [21](#)

TaskInfo\_t, [21](#)

TaskNotification\_t, [22](#)

TaskParm\_t, [22](#)

TaskRunTimeStats\_t, [22](#)

TaskState\_e, [27](#)

TaskState\_t, [23](#)

TaskStateRunning, [28](#)

TaskStateSuspended, [28](#)

TaskStateWaiting, [28](#)

Ticks\_t, [23](#)

Timer\_t, [23](#)

Word\_t, [23](#)

xAddr, [24](#)

xBase, [24](#)

xByte, [24](#)

xDeviceConfigDevice, [28](#)

xDeviceInitDevice, [28](#)

xDevicesAvailable, [29](#)

xDeviceRead, [30](#)

xDeviceRegisterDevice, [30](#)

xDeviceSimpleRead, [31](#)

xDeviceSimpleWrite, [32](#)

xDeviceWrite, [32](#)

xHalfWord, [24](#)

xMemAlloc, [33](#)

xMemFree, [34](#)

xMemGetHeapStats, [34](#)

xMemGetKernelStats, [35](#)

xMemGetSize, [35](#)

xMemGetUsed, [36](#)

xQueue, [24](#)

xQueueCreate, [36](#)

xQueueDelete, [37](#)

xQueueDropMessage, [38](#)

xQueueGetLength, [38](#)

xQueueIsQueueEmpty, [39](#)

xQueueIsQueueFull, [39](#)

xQueueLockQueue, [40](#)

xQueueMessagesWaiting, [41](#)

- xQueuePeek, [41](#)
- xQueueReceive, [42](#)
- xQueueSend, [42](#)
- xQueueUnLockQueue, [43](#)
- xReturn, [24](#)
- xSchedulerState, [25](#)
- xSize, [25](#)
- xStreamBuffer, [25](#)
- xStreamBytesAvailable, [44](#)
- xStreamCreate, [44](#)
- xStreamDelete, [45](#)
- xStreamIsEmpty, [45](#)
- xStreamIsFull, [46](#)
- xStreamReceive, [47](#)
- xStreamReset, [47](#)
- xStreamSend, [48](#)
- xSystemAssert, [48](#)
- xSystemGetSystemInfo, [49](#)
- xSystemHalt, [50](#)
- xSystemInit, [50](#)
- xTask, [25](#)
- xTaskChangePeriod, [50](#)
- xTaskChangeWDP, [51](#)
- xTaskCreate, [52](#)
- xTaskDelete, [53](#)
- xTaskGetAllRunTimeStats, [53](#)
- xTaskGetAllTaskInfo, [54](#)
- xTaskGetHandleById, [54](#)
- xTaskGetHandleByName, [55](#)
- xTaskGetId, [56](#)
- xTaskGetName, [56](#)
- xTaskGetNumberOfTasks, [57](#)
- xTaskGetPeriod, [57](#)
- xTaskGetSchedulerState, [58](#)
- xTaskGetTaskInfo, [58](#)
- xTaskGetTaskRunTimeStats, [59](#)
- xTaskGetTaskState, [60](#)
- xTaskGetWDP, [60](#)
- xTaskNotification, [25](#)
- xTaskNotificationIsWaiting, [62](#)
- xTaskNotifyGive, [62](#)
- xTaskNotifyStateClear, [63](#)
- xTaskNotifyTake, [64](#)
- xTaskParm, [25](#)
- xTaskResetTimer, [64](#)
- xTaskResume, [65](#)
- xTaskResumeAll, [65](#)
- xTaskStartScheduler, [66](#)
- xTaskState, [26](#)
- xTaskSuspend, [66](#)
- xTaskSuspendAll, [67](#)
- xTaskWait, [67](#)
- xTicks, [26](#)
- xTimer, [26](#)
- xTimerChangePeriod, [68](#)
- xTimerCreate, [69](#)
- xTimerDelete, [69](#)
- xTimerGetPeriod, [70](#)
- xTimerHasTimerExpired, [71](#)
- xTimerIsTimerActive, [71](#)
- xTimerReset, [72](#)
- xTimerStart, [72](#)
- xTimerStop, [73](#)
- xWord, [26](#)
- id
  - TaskInfo\_s, [6](#)
  - TaskRunTimeStats\_s, [8](#)
- largestFreeEntryInBytes
  - MemoryRegionStats\_s, [3](#)
- lastRunTime
  - TaskInfo\_s, [6](#)
  - TaskRunTimeStats\_s, [8](#)
- majorVersion
  - SystemInfo\_s, [5](#)
- MemoryRegionStats\_s, [2](#)
  - availableSpaceInBytes, [3](#)
  - largestFreeEntryInBytes, [3](#)
  - minimumEverFreeBytesRemaining, [3](#)
  - numberOfFreeBlocks, [3](#)
  - smallestFreeEntryInBytes, [3](#)
  - successfulAllocations, [3](#)
  - successfulFrees, [3](#)
- MemoryRegionStats\_t
  - HeliOS.h, [19](#)
- messageBytes
  - QueueMessage\_s, [4](#)
- messageValue
  - QueueMessage\_s, [4](#)
- minimumEverFreeBytesRemaining
  - MemoryRegionStats\_s, [3](#)
- minorVersion
  - SystemInfo\_s, [5](#)
- name
  - TaskInfo\_s, [6](#)
- notificationBytes
  - TaskNotification\_s, [7](#)
- notificationValue
  - TaskNotification\_s, [7](#)
- numberOfFreeBlocks
  - MemoryRegionStats\_s, [3](#)
- numberOfTasks
  - SystemInfo\_s, [5](#)
- patchVersion
  - SystemInfo\_s, [5](#)
- productName
  - SystemInfo\_s, [5](#)
- Queue\_t
  - HeliOS.h, [19](#)
- QueueMessage\_s, [4](#)
  - messageBytes, [4](#)
  - messageValue, [4](#)
- QueueMessage\_t

- HeliOS.h, 20
- Return\_e
  - HeliOS.h, 26
- Return\_t
  - HeliOS.h, 20
- ReturnError
  - HeliOS.h, 27
- ReturnOK
  - HeliOS.h, 27
- SchedulerState\_e
  - HeliOS.h, 27
- SchedulerState\_t
  - HeliOS.h, 20
- SchedulerStateRunning
  - HeliOS.h, 27
- SchedulerStateSuspended
  - HeliOS.h, 27
- Size\_t
  - HeliOS.h, 20
- smallestFreeEntryInBytes
  - MemoryRegionStats\_s, 3
- state
  - TaskInfo\_s, 6
- StreamBuffer\_t
  - HeliOS.h, 21
- successfulAllocations
  - MemoryRegionStats\_s, 3
- successfulFrees
  - MemoryRegionStats\_s, 3
- SystemInfo\_s, 4
  - majorVersion, 5
  - minorVersion, 5
  - numberOfTasks, 5
  - patchVersion, 5
  - productName, 5
- SystemInfo\_t
  - HeliOS.h, 21
- Task\_t
  - HeliOS.h, 21
- TaskInfo\_s, 6
  - id, 6
  - lastRunTime, 6
  - name, 6
  - state, 6
  - totalRunTime, 6
- TaskInfo\_t
  - HeliOS.h, 21
- TaskNotification\_s, 7
  - notificationBytes, 7
  - notificationValue, 7
- TaskNotification\_t
  - HeliOS.h, 22
- TaskParm\_t
  - HeliOS.h, 22
- TaskRunTimeStats\_s, 8
  - id, 8
  - lastRunTime, 8
  - totalRunTime, 8
- TaskRunTimeStats\_t
  - HeliOS.h, 22
- TaskState\_e
  - HeliOS.h, 27
- TaskState\_t
  - HeliOS.h, 23
- TaskStateRunning
  - HeliOS.h, 28
- TaskStateSuspended
  - HeliOS.h, 28
- TaskStateWaiting
  - HeliOS.h, 28
- Ticks\_t
  - HeliOS.h, 23
- Timer\_t
  - HeliOS.h, 23
- totalRunTime
  - TaskInfo\_s, 6
  - TaskRunTimeStats\_s, 8
- Word\_t
  - HeliOS.h, 23
- xAddr
  - HeliOS.h, 24
- xBase
  - HeliOS.h, 24
- xByte
  - HeliOS.h, 24
- xDeviceConfigDevice
  - HeliOS.h, 28
- xDeviceInitDevice
  - HeliOS.h, 28
- xDeviceIsAvailable
  - HeliOS.h, 29
- xDeviceRead
  - HeliOS.h, 30
- xDeviceRegisterDevice
  - HeliOS.h, 30
- xDeviceSimpleRead
  - HeliOS.h, 31
- xDeviceSimpleWrite
  - HeliOS.h, 32
- xDeviceWrite
  - HeliOS.h, 32
- xHalfWord
  - HeliOS.h, 24
- xMemAlloc
  - HeliOS.h, 33
- xMemFree
  - HeliOS.h, 34
- xMemGetHeapStats
  - HeliOS.h, 34
- xMemGetKernelStats
  - HeliOS.h, 35
- xMemGetSize
  - HeliOS.h, 35

xMemGetUsed  
     HeliOS.h, [36](#)  
 xQueue  
     HeliOS.h, [24](#)  
 xQueueCreate  
     HeliOS.h, [36](#)  
 xQueueDelete  
     HeliOS.h, [37](#)  
 xQueueDropMessage  
     HeliOS.h, [38](#)  
 xQueueGetLength  
     HeliOS.h, [38](#)  
 xQueueIsQueueEmpty  
     HeliOS.h, [39](#)  
 xQueueIsQueueFull  
     HeliOS.h, [39](#)  
 xQueueLockQueue  
     HeliOS.h, [40](#)  
 xQueueMessagesWaiting  
     HeliOS.h, [41](#)  
 xQueuePeek  
     HeliOS.h, [41](#)  
 xQueueReceive  
     HeliOS.h, [42](#)  
 xQueueSend  
     HeliOS.h, [42](#)  
 xQueueUnLockQueue  
     HeliOS.h, [43](#)  
 xReturn  
     HeliOS.h, [24](#)  
 xSchedulerState  
     HeliOS.h, [25](#)  
 xSize  
     HeliOS.h, [25](#)  
 xStreamBuffer  
     HeliOS.h, [25](#)  
 xStreamBytesAvailable  
     HeliOS.h, [44](#)  
 xStreamCreate  
     HeliOS.h, [44](#)  
 xStreamDelete  
     HeliOS.h, [45](#)  
 xStreamIsEmpty  
     HeliOS.h, [45](#)  
 xStreamIsFull  
     HeliOS.h, [46](#)  
 xStreamReceive  
     HeliOS.h, [47](#)  
 xStreamReset  
     HeliOS.h, [47](#)  
 xStreamSend  
     HeliOS.h, [48](#)  
 xSystemAssert  
     HeliOS.h, [48](#)  
 xSystemGetSystemInfo  
     HeliOS.h, [49](#)  
 xSystemHalt  
     HeliOS.h, [50](#)  
 xSystemInit  
     HeliOS.h, [50](#)  
 xTask  
     HeliOS.h, [25](#)  
 xTaskChangePeriod  
     HeliOS.h, [50](#)  
 xTaskChangeWdPeriod  
     HeliOS.h, [51](#)  
 xTaskCreate  
     HeliOS.h, [52](#)  
 xTaskDelete  
     HeliOS.h, [53](#)  
 xTaskGetAllRunTimeStats  
     HeliOS.h, [53](#)  
 xTaskGetAllTaskInfo  
     HeliOS.h, [54](#)  
 xTaskGetHandleById  
     HeliOS.h, [54](#)  
 xTaskGetHandleByName  
     HeliOS.h, [55](#)  
 xTaskGetId  
     HeliOS.h, [56](#)  
 xTaskGetName  
     HeliOS.h, [56](#)  
 xTaskGetNumberOfTasks  
     HeliOS.h, [57](#)  
 xTaskGetPeriod  
     HeliOS.h, [57](#)  
 xTaskGetSchedulerState  
     HeliOS.h, [58](#)  
 xTaskGetTaskInfo  
     HeliOS.h, [58](#)  
 xTaskGetTaskRunTimeStats  
     HeliOS.h, [59](#)  
 xTaskGetTaskState  
     HeliOS.h, [60](#)  
 xTaskGetWdPeriod  
     HeliOS.h, [60](#)  
 xTaskNotification  
     HeliOS.h, [25](#)  
 xTaskNotificationIsWaiting  
     HeliOS.h, [62](#)  
 xTaskNotifyGive  
     HeliOS.h, [62](#)  
 xTaskNotifyStateClear  
     HeliOS.h, [63](#)  
 xTaskNotifyTake  
     HeliOS.h, [64](#)  
 xTaskParm  
     HeliOS.h, [25](#)  
 xTaskResetTimer  
     HeliOS.h, [64](#)  
 xTaskResume  
     HeliOS.h, [65](#)  
 xTaskResumeAll  
     HeliOS.h, [65](#)  
 xTaskStartScheduler  
     HeliOS.h, [66](#)

xTaskState  
    HeliOS.h, [26](#)  
xTaskSuspend  
    HeliOS.h, [66](#)  
xTaskSuspendAll  
    HeliOS.h, [67](#)  
xTaskWait  
    HeliOS.h, [67](#)  
xTicks  
    HeliOS.h, [26](#)  
xTimer  
    HeliOS.h, [26](#)  
xTimerChangePeriod  
    HeliOS.h, [68](#)  
xTimerCreate  
    HeliOS.h, [69](#)  
xTimerDelete  
    HeliOS.h, [69](#)  
xTimerGetPeriod  
    HeliOS.h, [70](#)  
xTimerHasTimerExpired  
    HeliOS.h, [71](#)  
xTimerIsTimerActive  
    HeliOS.h, [71](#)  
xTimerReset  
    HeliOS.h, [72](#)  
xTimerStart  
    HeliOS.h, [72](#)  
xTimerStop  
    HeliOS.h, [73](#)  
xWord  
    HeliOS.h, [26](#)