



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
3.2 QueueMessage_s Struct Reference . . . . .	2
3.3 SystemInfo_s Struct Reference . . . . .	3
3.4 TaskInfo_s Struct Reference . . . . .	3
3.5 TaskNotification_s Struct Reference . . . . .	3
3.5.1 Detailed Description . . . . .	3
3.6 TaskRunTimeStats_s Struct Reference . . . . .	4
<b>4 File Documentation</b>	<b>4</b>
4.1 config.h File Reference . . . . .	4
4.1.1 Detailed Description . . . . .	5
4.1.2 Macro Definition Documentation . . . . .	5
4.2 HeliOS.h File Reference . . . . .	8
4.2.1 Detailed Description . . . . .	12
4.2.2 Typedef Documentation . . . . .	12
4.2.3 Enumeration Type Documentation . . . . .	14
4.2.4 Function Documentation . . . . .	15
<b>Index</b>	<b>61</b>

# 1 Data Structure Index

## 1.1 Data Structures

Here are the data structures with brief descriptions:

<b>MemoryRegionStats_s</b>	<b>2</b>
<b>QueueMessage_s</b>	<b>2</b>
<b>SystemInfo_s</b>	<b>3</b>
<b>TaskInfo_s</b>	<b>3</b>
<b>TaskNotification_s</b>	
Enumerated type for syscall return type	<b>3</b>
<b>TaskRunTimeStats_s</b>	<b>4</b>

## 2 File Index

### 2.1 File List

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

<a href="#">config.h</a>	
Kernel header file for user definable settings	4
<a href="#">HeliOS.h</a>	
Header file for end-user application code	8

## 3 Data Structure Documentation

### 3.1 MemoryRegionStats\_s Struct Reference

#### Data Fields

- Word\_t **largestFreeEntryInBytes**
- Word\_t **smallestFreeEntryInBytes**
- Word\_t **numberOfFreeBlocks**
- Word\_t **availableSpaceInBytes**
- Word\_t **successfulAllocations**
- Word\_t **successfulFrees**
- Word\_t **minimumEverFreeBytesRemaining**

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

- [HeliOS.h](#)

### 3.2 QueueMessage\_s Struct Reference

#### Data Fields

- Base\_t **messageBytes**
- Byte\_t **messageValue** [[CONFIG\\_MESSAGE\\_VALUE\\_BYTES](#)]

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

- [HeliOS.h](#)

### 3.3 SystemInfo\_s Struct Reference

#### Data Fields

- Byte\_t **productName** [OS\_PRODUCT\_NAME\_SIZE]
- Base\_t **majorVersion**
- Base\_t **minorVersion**
- Base\_t **patchVersion**
- Base\_t **numberOfTasks**

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

- [HeliOS.h](#)

### 3.4 TaskInfo\_s Struct Reference

#### Data Fields

- Base\_t **id**
- Byte\_t **name** [CONFIG\_TASK\_NAME\_BYTES]
- TaskState\_t **state**
- Ticks\_t **lastRunTime**
- Ticks\_t **totalRunTime**

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

- [HeliOS.h](#)

### 3.5 TaskNotification\_s Struct Reference

Enumerated type for syscall return type.

#### Data Fields

- Base\_t **notificationBytes**
- Byte\_t **notificationValue** [CONFIG\_NOTIFICATION\_VALUE\_BYTES]

#### 3.5.1 Detailed Description

See also

[Return\\_t](#)

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

- [HeliOS.h](#)

## 3.6 TaskRunTimeStats\_s Struct Reference

### Data Fields

- Base\_t **id**
- Ticks\_t **lastRunTime**
- Ticks\_t **totalRunTime**

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

- [HeliOS.h](#)

## 4 File Documentation

### 4.1 config.h File Reference

Kernel header file for user definable settings.

### Macros

- #define [CONFIG\\_MESSAGE\\_VALUE\\_BYTES](#) 0x8u /\* 8 \*/  
*Define to enable the Arduino API C++ interface.*
- #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 ASCII 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 ( [mannymsp@gmail.com](mailto:mannymsp@gmail.com) )

#### Version

0.4.0

#### Date

2022-01-31

#### Copyright

HeliOS Embedded Operating System Copyright (C) 2020-2023 Manny Peterson [mannymsp@gmail.com](mailto:mannymsp@gmail.com)

This program is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program. If not, see <https://www.gnu.org/licenses/>.

### 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\_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. The literal must be appended with a "u" to maintain MISRA C:2012 compliance.

#### See also

[xMemAlloc\(\)](#)

[xMemFree\(\)](#)

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

**4.1.2.3 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. By default the `CONFIG_MEMORY_REGION_SIZE_IN_BLOCKS` is defined on a per platform and/or tool-chain basis therefor it is not defined here by default. The literal must be appended with a "u" to maintain MISRA C:2012 compliance.

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

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.

#### Note

On some MCU's like the 8-bit AVR's, it is necessary to undefine the `DISABLE_INTERRUPTS()` macro because interrupts must be enabled to write to the serial bus.

Define to enable system assertions.

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`

Define the system assertion behavior.

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 )
```

Define the size in bytes of the message queue message value.

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. The literal must be appended with "u" to maintain MISRA C:2012 compliance.

#### See also

`xQueueMessage`

**4.1.2.5 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. The literal must be appended with "u" to maintain MISRA C:2012 compliance.

See also

`xTaskNotification`

**4.1.2.6 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. The literal must be appended with "u" to maintain MISRA C:2012 compliance.

See also

`xQueuesQueueFull()`  
`xQueueSend()`  
`xQueueCreate()`

**4.1.2.7 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. The literal must be appended with "u" to maintain MISRA C:2012 compliance.

**4.1.2.8 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 ASCII 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. The literal must be appended with "u" to maintain MISRA C:2012 compliance.

See also

`xTaskInfo`

**4.1.2.9 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

Header file for end-user application code.

### Data Structures

- struct [TaskNotification\\_s](#)  
*Enumerated type for syscall return type.*
- struct [TaskRunTimeStats\\_s](#)
- struct [MemoryRegionStats\\_s](#)
- struct [TaskInfo\\_s](#)
- struct [QueueMessage\\_s](#)
- struct [SystemInfo\\_s](#)

### 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 struct [TaskNotification\\_s](#) [TaskNotification\\_t](#)  
*Enumerated type for syscall return type.*
- typedef [TaskNotification\\_t](#) \* [xTaskNotification](#)
- typedef struct [TaskRunTimeStats\\_s](#) [TaskRunTimeStats\\_t](#)
- typedef [TaskRunTimeStats\\_t](#) \* [xTaskRunTimeStats](#)
- typedef struct [MemoryRegionStats\\_s](#) [MemoryRegionStats\\_t](#)
- typedef [MemoryRegionStats\\_t](#) \* [xMemoryRegionStats](#)
- typedef struct [TaskInfo\\_s](#) [TaskInfo\\_t](#)
- typedef [TaskInfo\\_t](#) [xTaskInfo](#)
- typedef struct [QueueMessage\\_s](#) [QueueMessage\\_t](#)
- typedef [QueueMessage\\_t](#) \* [xQueueMessage](#)
- typedef struct [SystemInfo\\_s](#) [SystemInfo\\_t](#)
- typedef [SystemInfo\\_t](#) \* [xSystemInfo](#)

### 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\_, xWord \*data\_)  
*Syscall to write a word 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\_, xWord \*data\_)  
*Syscall to read a word 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.*

### 4.2.1 Detailed Description

#### Author

Manny Peterson ( [mannymsp@gmail.com](mailto:mannymsp@gmail.com))

#### Version

0.4.0

#### Date

2022-09-06

#### Copyright

HeliOS Embedded Operating System Copyright (C) 2020-2023 Manny Peterson [mannymsp@gmail.com](mailto:mannymsp@gmail.com)

This program is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program. If not, see <https://www.gnu.org/licenses/>.

### 4.2.2 Typedef Documentation

#### 4.2.2.1 `Return_t` `typedef enum Return_e Return_t`

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))) {}`).

#### See also

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

#### 4.2.2.2 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\(\)](#)

#### 4.2.2.3 TaskNotification\_t `typedef struct TaskNotification_s TaskNotification_t`

See also

- [Return\\_t](#)

#### 4.2.2.4 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\(\)](#)

#### 4.2.2.5 xSchedulerState `typedef SchedulerState_t xSchedulerState`

See also

- [SchedulerState\\_t](#)

#### 4.2.2.6 **xTaskState** `typedef TaskState_t xTaskState`

See also

[TaskState\\_t](#)

### 4.2.3 Enumeration Type Documentation

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

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))) {}`).

See also

`OK()`

`ERROR()`

`xReturn`

Enumerator

<code>ReturnOK</code>	Return value if the syscall was successful.
<code>ReturnError</code>	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

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

<i>uid_↔</i> —	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 [xDevicesAvailable\(\)](#) 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

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

<i>uid</i> ↔ —	The unique identifier ("UID") of the device driver to be operated on.
<i>size</i> ↔ —	The number of bytes read from the device and contained in the data buffer.
<i>data</i> ↔ —	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_,`  
     `xWord * data_ )`

The `xDeviceSimpleRead()` syscall will read a word of data from a device. The word of data 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>data</code> ↔ —	The word of 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))) {}`).

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

The `xDeviceSimpleWrite()` syscall will write a word (i.e., `xWord`) of data to a device. The word of data 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

<code>uid</code> ↔ —	The unique identifier ("UID") of the device driver to be operated on.
<code>data</code> ↔ —	A word of data to be written to the device. The word of 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))) {}).

**4.2.4.8 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 <code>mystruct</code> ( <code>MyStruct *</code> ) needs to be allocated, the call to <code>xMemAlloc()</code> would be written as follows <code>if(OK(xMemAlloc((volatile xAddr *) &amp;mystruct, sizeof(MyStruct)))) {}</code> .
<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

<i>addr_↔</i> —	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

<i>stats</i> ↔ —	The memory region statistics. The memory region 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))) {}).

**4.2.4.13 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

<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))) {}`).

**4.2.4.18 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

<code>queue_↔</code> —	The message queue to be operated on.
<code>res_</code>	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 xQueueIsQueueEmpty()** `xReturn xQueueIsQueueEmpty (`  
`const xQueue queue_,`  
`xBase * res_ )`

The `xQueueIsQueueEmpty()` 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 xQueuesQueueFull()** xReturn xQueueIsQueueFull (  
     const xQueue queue\_,  
     xBase \* res\_ )

The [xQueuesQueueFull\(\)](#) 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 CONFIG_MESSAGE_VALUE_BYTES (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 CONFIG_STREAM_BUFFER_BYTES 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

<code>info_</code>	The system information. The system information must be freed by <code>xMemFree()</code> .
<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))) {}`).

**4.2.4.37 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_↔ 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**

<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))) {}).

**4.2.4.43 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

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

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

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

<code>task</code> —	The task to be operated on.
<code>name</code> —	The task name which must be precisely <code>CONFIG_TASK_NAME_BYTES</code> (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

<code>tasks</code> —	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

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

<code>task_↔</code> —	The task to be operated on.
<code>period_↔</code> —	The task watchdog timer period, measured in ticks. Ticks are platform and/or architecture dependent. However, on most 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 CONFIG_NOTIFICATION_VALUE_BYTES (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

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

<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))) {}`).

**4.2.4.61 `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

<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))) {}).

**4.2.4.65 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

<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))) {}).

**4.2.4.67 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

<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))) {}).

**4.2.4.75 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

<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))) {}).

## Index

### config.h, 4

- CONFIG\_DEVICE\_NAME\_BYTES, 5
- CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE, 5
- CONFIG\_MEMORY\_REGION\_SIZE\_IN\_BLOCKS, 5
- CONFIG\_MESSAGE\_VALUE\_BYTES, 6
- CONFIG\_NOTIFICATION\_VALUE\_BYTES, 6
- CONFIG\_QUEUE\_MINIMUM\_LIMIT, 7
- CONFIG\_STREAM\_BUFFER\_BYTES, 7
- CONFIG\_TASK\_NAME\_BYTES, 7
- CONFIG\_TASK\_WD\_TIMER\_ENABLE, 7

### CONFIG\_DEVICE\_NAME\_BYTES

- config.h, 5

### CONFIG\_MEMORY\_REGION\_BLOCK\_SIZE

- config.h, 5

### CONFIG\_MEMORY\_REGION\_SIZE\_IN\_BLOCKS

- config.h, 5

### CONFIG\_MESSAGE\_VALUE\_BYTES

- config.h, 6

### CONFIG\_NOTIFICATION\_VALUE\_BYTES

- config.h, 6

### CONFIG\_QUEUE\_MINIMUM\_LIMIT

- config.h, 7

### CONFIG\_STREAM\_BUFFER\_BYTES

- config.h, 7

### CONFIG\_TASK\_NAME\_BYTES

- config.h, 7

### CONFIG\_TASK\_WD\_TIMER\_ENABLE

- config.h, 7

### HeliOS.h, 8

- Return\_e, 14
- Return\_t, 12
- ReturnError, 14
- ReturnOK, 14
- SchedulerState\_e, 14
- SchedulerState\_t, 12
- SchedulerStateRunning, 14
- SchedulerStateSuspended, 14
- TaskNotification\_t, 13
- TaskState\_e, 15
- TaskState\_t, 13
- TaskStateRunning, 15
- TaskStateSuspended, 15
- TaskStateWaiting, 15
- xDeviceConfigDevice, 15
- xDeviceInitDevice, 16
- xDevicesAvailable, 16
- xDeviceRead, 17
- xDeviceRegisterDevice, 18
- xDeviceSimpleRead, 18
- xDeviceSimpleWrite, 19
- xDeviceWrite, 20
- xMemAlloc, 20
- xMemFree, 21

### xMemGetHeapStats, 22

### xMemGetKernelStats, 22

### xMemGetSize, 23

### xMemGetUsed, 23

### xQueueCreate, 24

### xQueueDelete, 25

### xQueueDropMessage, 25

### xQueueGetLength, 26

### xQueueIsQueueEmpty, 26

### xQueueIsQueueFull, 27

### xQueueLockQueue, 27

### xQueueMessagesWaiting, 28

### xQueuePeek, 29

### xQueueReceive, 29

### xQueueSend, 30

### xQueueUnLockQueue, 31

### xSchedulerState, 13

### xStreamBytesAvailable, 31

### xStreamCreate, 32

### xStreamDelete, 32

### xStreamIsEmpty, 33

### xStreamIsFull, 33

### xStreamReceive, 34

### xStreamReset, 35

### xStreamSend, 35

### xSystemAssert, 36

### xSystemGetSystemInfo, 36

### xSystemHalt, 37

### xSystemInit, 37

### xTaskChangePeriod, 38

### xTaskChangeWDPeriod, 39

### xTaskCreate, 39

### xTaskDelete, 40

### xTaskGetAllRunTimeStats, 40

### xTaskGetAllTaskInfo, 41

### xTaskGetHandleById, 42

### xTaskGetHandleByName, 42

### xTaskGetId, 43

### xTaskGetName, 43

### xTaskGetNumberOfTasks, 44

### xTaskGetPeriod, 45

### xTaskGetSchedulerState, 45

### xTaskGetTaskInfo, 46

### xTaskGetTaskRunTimeStats, 46

### xTaskGetTaskState, 47

### xTaskGetWDPeriod, 48

### xTaskNotificationIsWaiting, 48

### xTaskNotifyGive, 49

### xTaskNotifyStateClear, 49

### xTaskNotifyTake, 50

### xTaskResetTimer, 51

### xTaskResume, 51

### xTaskResumeAll, 52

### xTaskStartScheduler, 52

### xTaskState, 13

- xTaskSuspend, [53](#)
- xTaskSuspendAll, [53](#)
- xTaskWait, [54](#)
- xTimerChangePeriod, [55](#)
- xTimerCreate, [55](#)
- xTimerDelete, [56](#)
- xTimerGetPeriod, [57](#)
- xTimerHasTimerExpired, [57](#)
- xTimerIsTimerActive, [58](#)
- xTimerReset, [58](#)
- xTimerStart, [59](#)
- xTimerStop, [60](#)
- MemoryRegionStats\_s, [2](#)
- QueueMessage\_s, [2](#)
- Return\_e
  - [HeliOS.h, 14](#)
- Return\_t
  - [HeliOS.h, 12](#)
- ReturnError
  - [HeliOS.h, 14](#)
- ReturnOK
  - [HeliOS.h, 14](#)
- SchedulerState\_e
  - [HeliOS.h, 14](#)
- SchedulerState\_t
  - [HeliOS.h, 12](#)
- SchedulerStateRunning
  - [HeliOS.h, 14](#)
- SchedulerStateSuspended
  - [HeliOS.h, 14](#)
- SystemInfo\_s, [3](#)
- TaskInfo\_s, [3](#)
- TaskNotification\_s, [3](#)
- TaskNotification\_t
  - [HeliOS.h, 13](#)
- TaskRunTimeStats\_s, [4](#)
- TaskState\_e
  - [HeliOS.h, 15](#)
- TaskState\_t
  - [HeliOS.h, 13](#)
- TaskStateRunning
  - [HeliOS.h, 15](#)
- TaskStateSuspended
  - [HeliOS.h, 15](#)
- TaskStateWaiting
  - [HeliOS.h, 15](#)
- xDeviceConfigDevice
  - [HeliOS.h, 15](#)
- xDeviceInitDevice
  - [HeliOS.h, 16](#)
- xDevicesIsAvailable
  - [HeliOS.h, 16](#)
- xDeviceRead
  - [HeliOS.h, 17](#)
- xDeviceRegisterDevice
  - [HeliOS.h, 18](#)
- xDeviceSimpleRead
  - [HeliOS.h, 18](#)
- xDeviceSimpleWrite
  - [HeliOS.h, 19](#)
- xDeviceWrite
  - [HeliOS.h, 20](#)
- xMemAlloc
  - [HeliOS.h, 20](#)
- xMemFree
  - [HeliOS.h, 21](#)
- xMemGetHeapStats
  - [HeliOS.h, 22](#)
- xMemGetKernelStats
  - [HeliOS.h, 22](#)
- xMemGetSize
  - [HeliOS.h, 23](#)
- xMemGetUsed
  - [HeliOS.h, 23](#)
- xQueueCreate
  - [HeliOS.h, 24](#)
- xQueueDelete
  - [HeliOS.h, 25](#)
- xQueueDropMessage
  - [HeliOS.h, 25](#)
- xQueueGetLength
  - [HeliOS.h, 26](#)
- xQueueIsQueueEmpty
  - [HeliOS.h, 26](#)
- xQueueIsQueueFull
  - [HeliOS.h, 27](#)
- xQueueLockQueue
  - [HeliOS.h, 27](#)
- xQueueMessagesWaiting
  - [HeliOS.h, 28](#)
- xQueuePeek
  - [HeliOS.h, 29](#)
- xQueueReceive
  - [HeliOS.h, 29](#)
- xQueueSend
  - [HeliOS.h, 30](#)
- xQueueUnLockQueue
  - [HeliOS.h, 31](#)
- xschedulerState
  - [HeliOS.h, 13](#)
- xStreamBytesAvailable
  - [HeliOS.h, 31](#)
- xStreamCreate
  - [HeliOS.h, 32](#)
- xStreamDelete
  - [HeliOS.h, 32](#)
- xStreamIsEmpty
  - [HeliOS.h, 33](#)
- xStreamIsFull
  - [HeliOS.h, 33](#)
- xStreamReceive
  - [HeliOS.h, 34](#)

xStreamReset  
HeliOS.h, [35](#)

xStreamSend  
HeliOS.h, [35](#)

xSystemAssert  
HeliOS.h, [36](#)

xSystemGetSystemInfo  
HeliOS.h, [36](#)

xSystemHalt  
HeliOS.h, [37](#)

xSystemInit  
HeliOS.h, [37](#)

xTaskChangePeriod  
HeliOS.h, [38](#)

xTaskChangeWDPPeriod  
HeliOS.h, [39](#)

xTaskCreate  
HeliOS.h, [39](#)

xTaskDelete  
HeliOS.h, [40](#)

xTaskGetAllRunTimeStats  
HeliOS.h, [40](#)

xTaskGetAllTaskInfo  
HeliOS.h, [41](#)

xTaskGetHandleById  
HeliOS.h, [42](#)

xTaskGetHandleByName  
HeliOS.h, [42](#)

xTaskGetId  
HeliOS.h, [43](#)

xTaskGetName  
HeliOS.h, [43](#)

xTaskGetNumberOfTasks  
HeliOS.h, [44](#)

xTaskGetPeriod  
HeliOS.h, [45](#)

xTaskGetSchedulerState  
HeliOS.h, [45](#)

xTaskGetTaskInfo  
HeliOS.h, [46](#)

xTaskGetTaskRunTimeStats  
HeliOS.h, [46](#)

xTaskGetTaskState  
HeliOS.h, [47](#)

xTaskGetWDPPeriod  
HeliOS.h, [48](#)

xTaskNotificationIsWaiting  
HeliOS.h, [48](#)

xTaskNotifyGive  
HeliOS.h, [49](#)

xTaskNotifyStateClear  
HeliOS.h, [49](#)

xTaskNotifyTake  
HeliOS.h, [50](#)

xTaskResetTimer  
HeliOS.h, [51](#)

xTaskResume  
HeliOS.h, [51](#)

xTaskResumeAll  
HeliOS.h, [52](#)

xTaskStartScheduler  
HeliOS.h, [52](#)

xTaskState  
HeliOS.h, [13](#)

xTaskSuspend  
HeliOS.h, [53](#)

xTaskSuspendAll  
HeliOS.h, [53](#)

xTaskWait  
HeliOS.h, [54](#)

xTimerChangePeriod  
HeliOS.h, [55](#)

xTimerCreate  
HeliOS.h, [55](#)

xTimerDelete  
HeliOS.h, [56](#)

xTimerGetPeriod  
HeliOS.h, [57](#)

xTimerHasTimerExpired  
HeliOS.h, [57](#)

xTimerIsTimerActive  
HeliOS.h, [58](#)

xTimerReset  
HeliOS.h, [58](#)

xTimerStart  
HeliOS.h, [59](#)

xTimerStop  
HeliOS.h, [60](#)