



HeliOS

Kernel 0.4.0

HeliOS Developer's Guide

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1 Data Structure Index

1.1 Data Structures

Here are the data structures with brief descriptions:

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2 File Index

2.1 File List

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

[config.h](#)

Kernel header file for user definable settings

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[HeliOS.h](#)

Header file for end-user application code

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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

Data Fields

- `Base_t notificationBytes`
- `Byte_t notificationValue` [[CONFIG_NOTIFICATION_VALUE_BYTES](#)]

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)

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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](#)
- struct [TaskRunTimeStats_s](#)
- struct [MemoryRegionStats_s](#)
- struct [TaskInfo_s](#)
- struct [QueueMessage_s](#)
- struct [SystemInfo_s](#)

Typedefs

- typedef enum TaskState_e **TaskState_t**
- typedef TaskState_t **xTaskState**
- typedef enum SchedulerState_e **SchedulerState_t**
- typedef SchedulerState_t **xSchedulerState**
- typedef enum Return_e **Return_t**
- typedef Return_t **xReturn**
- typedef enum TimerState_e **TimerState_t**
- typedef TimerState_t **xTimerState**
- typedef enum DeviceState_e **DeviceState_t**
- typedef DeviceState_t **xDeviceState**
- typedef enum DeviceMode_e **DeviceMode_t**
- typedef DeviceMode_t **xDeviceMode**
- typedef VOID_TYPE **TaskParm_t**
- typedef TaskParm_t * **xTaskParm**
- typedef UINT8_TYPE **Base_t**
- typedef Base_t **xBase**
- typedef UINT8_TYPE **Byte_t**
- typedef Byte_t **xByte**
- typedef VOID_TYPE **Addr_t**
- typedef Addr_t * **xAddr**
- typedef SIZE_TYPE **Size_t**
- typedef Size_t **xSize**
- typedef UINT16_TYPE **HalfWord_t**
- typedef HalfWord_t **xHalfWord**
- typedef UINT32_TYPE **Word_t**
- typedef Word_t **xWord**
- typedef UINT32_TYPE **Ticks_t**
- typedef Ticks_t **xTicks**
- typedef VOID_TYPE **Task_t**
- typedef Task_t * **xTask**
- typedef VOID_TYPE **Timer_t**
- typedef Timer_t * **xTimer**
- typedef VOID_TYPE **Queue_t**
- typedef Queue_t * **xQueue**
- typedef VOID_TYPE **StreamBuffer_t**
- typedef StreamBuffer_t * **xStreamBuffer**
- typedef struct [TaskNotification_s](#) **TaskNotification_t**
- 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 }
- enum **SchedulerState_e** { SchedulerStateSuspended , SchedulerStateRunning }
- enum **Return_e** { ReturnOK , ReturnError }
- enum **TimerState_e** { TimerStateSuspended , TimerStateRunning }
- enum **DeviceState_e** { DeviceStateSuspended , DeviceStateRunning }
- enum **DeviceMode_e** { DeviceModeReadOnly , DeviceModeWriteOnly , DeviceModeReadWrite }

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)

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4.2.2 Function Documentation

4.2.2.1 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 xMemAlloc() .

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))) {}`).

4.2.2.2 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.
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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))) {}`).

4.2.2.3 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))) {}).

4.2.2.4 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 xMemFree() .

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))) {}).

4.2.2.5 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))) {}).

4.2.2.6 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 xMemFree() .

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))) {}`).

4.2.2.7 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 xMemAlloc() .

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))) {}).

4.2.2.8 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 xMemAlloc() .

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))) {}).

4.2.2.9 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 *) &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))) {}`).

4.2.2.10 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))) {}).

4.2.2.11 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

stats_ ←	The memory region statistics. The memory region statistics must be freed by xMemFree() .
—	

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))) {}).

4.2.2.12 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 xMemFree() .
---------------------	--

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))) {}).

4.2.2.13 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))) {}).

4.2.2.14 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))) {}).

4.2.2.15 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 CONFIG_QUEUE_MINIMUM_LIMIT (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))) {}).

4.2.2.16 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))) {}).

4.2.2.17 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))) {}).

4.2.2.18 xQueueGetLength() xReturn xQueueGetLength (

```

    const xQueue queue_,
    xBase * res_ )

```

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

See also

xReturn
xQueue

Parameters

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

Returns

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

4.2.2.19 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))) {}).

4.2.2.20 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))) {}).

4.2.2.21 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))) {}).

4.2.2.22 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))) {}).

4.2.2.23 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 xMemFree() .

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))) {}).

4.2.2.24 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 xMemFree() .

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))) {}).

4.2.2.25 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))) {}).

4.2.2.26 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))) {}).

4.2.2.27 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))) {}).

4.2.2.28 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))) {}).

4.2.2.29 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))) {}).

4.2.2.30 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))) {}).

4.2.2.31 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))) {}).

4.2.2.32 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 xMemFree() .

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))) {}).

4.2.2.33 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))) {}).

4.2.2.34 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))) {}).

4.2.2.35 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))) {}).

4.2.2.36 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))) {}`).

4.2.2.37 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))) {}`).

4.2.2.38 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))) {}`).

4.2.2.39 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\(\)](#).

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))) {}`).

4.2.2.40 xTaskChangeWDPeriod() `xReturn xTaskChangeWDPeriod (`
`xTask task_,`
`const xTicks period_)`

The `xTaskChangeWDPPeriod()` 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.

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))) {}`).

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

Returns

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

4.2.2.42 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))) {}).

4.2.2.43 xTaskGetAllRunTimeStats() xReturn xTaskGetAllRunTimeStats (
 xTaskRunTimeStats * stats_,
 xBase * tasks_)

The [xTaskGetAllRunTimeStats\(\)](#) syscall is used to obtain the runtime statistics of all tasks.

See also

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

Parameters

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

Returns

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

4.2.2.44 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.

Parameters

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

Returns

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

4.2.2.45 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))) {}).

4.2.2.46 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))) {}).

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

The [xTaskGetId\(\)](#) syscall is used to obtain the id of a task.

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))) {}).

4.2.2.48 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.

Parameters

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

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))) {}).

4.2.2.49 xTaskGetNumberOfTasks() `xReturn xTaskGetNumberOfTasks (`
`xBase * tasks_)`

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

See also

[xReturn](#)

Parameters

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

Returns

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

4.2.2.50 xTaskGetPeriod() xReturn xTaskGetPeriod (
const xTask *task_*,
xTicks * *period_*)

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

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))) {}).

4.2.2.51 xTaskGetSchedulerState() xReturn xTaskGetSchedulerState (
xSchedulerState * *state_*)

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

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))) {}).

4.2.2.52 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 xMemFree() .
—	

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))) {}).

4.2.2.53 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 xMemFree() .

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))) {}`).

4.2.2.54 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).

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))) {}`).

4.2.2.55 `xTaskGetWdPeriod()` `xReturn xTaskGetWdPeriod (`
`const xTask task_,`
`xTicks * period_)`

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

Parameters

<i>task</i> ↔ —	The task to be operated on.
<i>period</i> ↔ —	The task watchdog timer period, measured in ticks. Ticks are platform and/or architecture dependent. However, on 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))) {}`).

4.2.2.56 `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.

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))) {}`).

4.2.2.57 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.

Parameters

<code>task_↔</code> —	The task to be operated on.
<code>bytes_↔</code> —	The number of bytes contained in the notification value. The number of bytes in the notification value cannot exceed <code>CONFIG_NOTIFICATION_VALUE_BYTES</code> (default is 8) bytes.
<code>value_↔</code> —	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))) {}`).

4.2.2.58 xTaskNotifyStateClear() `xReturn xTaskNotifyStateClear (`
`xTask task_)`

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

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)))` `{}`).

4.2.2.59 xTaskNotifyTake() `xReturn xTaskNotifyTake (`
`xTask task_,`
`xTaskNotification * notification_)`

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

Parameters

<code>task_</code>	The task to be operated on.
<code>notification_↔</code>	The direct-to-task notification.
<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)))` `{}`).

4.2.2.60 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.

Parameters

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

Returns

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

4.2.2.61 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.

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))) {}).

4.2.2.62 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.

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))) {}).

4.2.2.63 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.

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))) {}).

4.2.2.64 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.

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))) {}).

4.2.2.65 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\(\)](#).

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))) {}).

4.2.2.66 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.

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))) {}`).

4.2.2.67 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.

Parameters

<code>timer_↔</code>	The application timer to be operated on.
—	
<code>period_↔</code>	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))) {}`).

4.2.2.68 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.

Parameters

<code>timer↔</code> —	The application timer to be operated on.
<code>period↔</code> —	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))) {}`).

4.2.2.69 xTimerDelete() `xReturn xTimerDelete (`
`const xTimer timer_)`

The `xTimerDelete()` syscall is used to delete an application timer created with `xTimerCreate()`.

Parameters

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

Returns

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

4.2.2.70 xTimerGetPeriod() `xReturn xTimerGetPeriod (`
`const xTimer timer_,`
`xTicks * period_)`

The `xTimerGetPeriod()` syscall is used to obtain the current period for an application timer.

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))) {}).

4.2.2.71 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.

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))) {}).

4.2.2.72 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\(\)](#).

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))) {}).

4.2.2.73 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.

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))) {}).

4.2.2.74 xTimerStart() xReturn xTimerStart (
xTimer timer_)

The [xTimerStart\(\)](#) syscall is used to place an application timer in the running state.

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))) {}).

4.2.2.75 xTimerStop() xReturn xTimerStop (
xTimer timer_)

The [xTimerStop\(\)](#) syscall is used to place an application timer in the suspended state.

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))) {}).

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