

ROCmSMI

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## Chapter 1

# ROCm System Management Interface (ROCm SMI) Library

The ROCm System Management Interface Library, or ROCm SMI library, is part of the Radeon Open Compute [ROCm](#) software stack . It is a C library for Linux that provides a user space interface for applications to monitor and control GPU applications.

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## Building ROCm SMI

### Additional Required software for building

In order to build the ROCm SMI library, the following components are required. Note that the software versions listed are what was used in development. Earlier versions are not guaranteed to work:

- CMake (v3.5.0)
- g++ (5.4.0)

In order to build the latest documentation, the following are required:

- DOxygen (1.8.11)
- latex (pdfTeX 3.14159265-2.6-1.40.16)

The source code for ROCm SMI is available on [Github](#).

After the ROCm SMI library git repository has been cloned to a local Linux machine, building the library is achieved by following the typical CMake build sequence. Specifically,

```
$ mkdir -p build

$ cd build

$ cmake <location of root of ROCm SMI library CMakeLists.txt>

$ make

# Install library file and header; default location is /opt/rocm

$ make install
```

The built library will appear in the `build` folder.

To build the rpm and deb packages follow the above steps with:

```
$ make package
```

### Documentation

The reference manual, `refman.pdf` will be in the `latex` directory upon a successful build.

### Building the Tests

In order to verify the build and capability of ROCm SMI on your system and to see an example of how ROCm SMI can be used, you may build and run the tests that are available in the repo. To build the tests, follow these steps:

```
# Set environment variables used in CMakeLists.txt file

$ ROCM_DIR=<parent dir. to lib/ and inc/, containing RSMI library and header>

$ mkdir <location for test build>

$ cd <location for test build>

$ cmake -DROCM_DIR=$ROCM_DIR <ROCm SMI source root>/tests/rocm_smi_test

$ make
```

To run the test, execute the program `rsmitst` that is built from the steps above.

## Usage Basics

### Device Indices

Many of the functions in the library take a "device index". The device index is a number greater than or equal to 0, and less than the number of devices detected, as determined by `rsmi_num_monitor_devices()`. The index is used to distinguish the detected devices from one another. It is important to note that a device may end up with a different index after a reboot, so an index should not be relied upon to be constant over reboots.

## Hello ROCm SMI

The only required ROCm-SMI call for any program that wants to use ROCm-SMI is the `rsmi_init()` call. This call initializes some internal data structures that will be used by subsequent ROCm-SMI calls.

When ROCm-SMI is no longer being used, `rsmi_shut_down()` should be called. This provides a way to do any releasing of resources that ROCm-SMI may have held. In many cases, this may have no effect, but may be necessary in future versions of the library.

A simple "Hello World" type program that displays the device ID of detected devices would look like this:

```
“ #include <stdint.h> #include "rocm_smi/rocm_smi.h" int main() { rsmi_status_t ret; uint32_t num_devices; uint16-  
_t dev_id;  
  
// We will skip return code checks for this example, but it // is recommended to always check this as some calls may  
not // apply for some devices or ROCm releases  
  
ret = rsmi_init(0); ret = rsmi_num_monitor_devices(&num_devices);  
  
for (int i=0; i < num_devices; ++i) { ret = rsmi_dev_id_get(i, &dev_id); // dev_id holds the device ID of device i, upon  
a // successful call } ret = rsmi\_shut\_down\(\); return 0; } “
```



## Chapter 2

# Deprecated List

Global [rsmi\\_dev\\_overdrive\\_level\\_set](#) (int32\_t dv\_ind, uint32\_t od)

This function is deprecated. [rsmi\\_dev\\_overdrive\\_level\\_set\\_v1](#) has the same functionality, with an interface that more closely matches the rest of the rocm\_smi API.

Global [rsmi\\_dev\\_perf\\_level\\_set](#) (int32\_t dv\_ind, rsmi\_dev\_perf\_level\_t perf\_lvl)

[rsmi\\_dev\\_perf\\_level\\_set\\_v1\(\)](#) is preferred, with an interface that more closely matches the rest of the rocm\_smi API.





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## Chapter 4

# Data Structure Index

### 4.1 Data Structures

Here are the data structures with brief descriptions:

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## Chapter 5

# File Index

### 5.1 File List

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

[rocm\\_smi.h](#)

The rocm\_smi library api is new, and therefore subject to change either at the ABI or API level. Instead of marking every function prototype as "unstable", we are instead saying the API is unstable (i.e., changes are possible) while the major version remains 0. This means that if the API/ABI changes, we will not increment the major version to 1. Once the ABI stabilizes, we will increment the major version to 1, and thereafter increment it on all ABI breaks . . . . .

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# Chapter 6

## Module Documentation

### 6.1 Initialization and Shutdown

#### Functions

- [rsmi\\_status\\_t rsmi\\_init](#) (uint64\_t init\_flags)  
*Initialize ROCm SMI.*
- [rsmi\\_status\\_t rsmi\\_shut\\_down](#) (void)  
*Shutdown ROCm SMI.*

#### 6.1.1 Detailed Description

These functions are used for initialization of ROCm SMI and clean up when done.

#### 6.1.2 Function Documentation

##### 6.1.2.1 [rsmi\\_status\\_t rsmi\\_init](#) ( uint64\_t *init\_flags* )

Initialize ROCm SMI.

When called, this initializes internal data structures, including those corresponding to sources of information that SMI provides.

#### Parameters

in	<i>init_flags</i>	Bit flags that tell SMI how to initialize. Values of <a href="#">rsmi_init_flags_t</a> may be OR'd together and passed through <i>init_flags</i> to modify how RSMI initializes.
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#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call.
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##### 6.1.2.2 [rsmi\\_status\\_t rsmi\\_shut\\_down](#) ( void )

Shutdown ROCm SMI.

Do any necessary clean up.

## 6.2 Identifier Queries

### Functions

- [rsmi\\_status\\_t rsmi\\_num\\_monitor\\_devices](#) (uint32\_t \*num\_devices)  
*Get the number of devices that have monitor information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_id\\_get](#) (uint32\_t dv\_ind, uint16\_t \*id)  
*Get the device id associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_sku\\_get](#) (uint32\_t dv\_ind, char \*sku)  
*Get the SKU for a desired device associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_vendor\\_id\\_get](#) (uint32\_t dv\_ind, uint16\_t \*id)  
*Get the device vendor id associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_name\\_get](#) (uint32\_t dv\_ind, char \*name, size\_t len)  
*Get the name string of a gpu device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_brand\\_get](#) (uint32\_t dv\_ind, char \*brand, uint32\_t len)  
*Get the brand string of a gpu device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_vendor\\_name\\_get](#) (uint32\_t dv\_ind, char \*name, size\_t len)  
*Get the name string for a give vendor ID.*
- [rsmi\\_status\\_t rsmi\\_dev\\_vram\\_vendor\\_get](#) (uint32\_t dv\_ind, char \*brand, uint32\_t len)  
*Get the vram vendor string of a gpu device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_serial\\_number\\_get](#) (uint32\_t dv\_ind, char \*serial\_num, uint32\_t len)  
*Get the serial number string for a device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_subsystem\\_id\\_get](#) (uint32\_t dv\_ind, uint16\_t \*id)  
*Get the subsystem device id associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_subsystem\\_name\\_get](#) (uint32\_t dv\_ind, char \*name, size\_t len)  
*Get the name string for the device subsystem.*
- [rsmi\\_status\\_t rsmi\\_dev\\_drm\\_render\\_minor\\_get](#) (uint32\_t dv\_ind, uint32\_t \*minor)  
*Get the drm minor number associated with this device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_subsystem\\_vendor\\_id\\_get](#) (uint32\_t dv\_ind, uint16\_t \*id)  
*Get the device subsystem vendor id associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_unique\\_id\\_get](#) (uint32\_t dv\_ind, uint64\_t \*id)  
*Get Unique ID.*

### 6.2.1 Detailed Description

These functions provide identification information.

### 6.2.2 Function Documentation

#### 6.2.2.1 [rsmi\\_status\\_t rsmi\\_num\\_monitor\\_devices](#) ( uint32\_t \* num\_devices )

Get the number of devices that have monitor information.

The number of devices which have monitors is returned. Monitors are referenced by the index which can be between 0 and num\_devices - 1.

#### Parameters

in, out	num_devices	Caller provided pointer to uint32_t. Upon successful call, the value num_devices will contain the number of monitor devices.
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## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call.
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6.2.2.2 `rsmi_status_t rsmi_dev_id_get ( uint32_t dv_ind, uint16_t * id )`

Get the device id associated with the device with provided device index.

Given a device index `dv_ind` and a pointer to a `uint32_t id`, this function will write the device id value to the `uint64_t` pointed to by `id`. This ID is an identification of the type of device, so calling this function for different devices will give the same value if they are kind of device. Consequently, this function should not be used to distinguish one device from another. `rsmi_dev_pci_id_get()` should be used to get a unique identifier.

## Parameters

in	<code>dv_ind</code>	a device index
in, out	<code>id</code>	a pointer to <code>uint64_t</code> to which the device id will be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

6.2.2.3 `rsmi_status_t rsmi_dev_sku_get ( uint32_t dv_ind, char * sku )`

Get the SKU for a desired device associated with the device with provided device index.

Given a device index `dv_ind` and a pointer to a `char sku`, this function will attempt to obtain the SKU from the Product Information FRU chip, present on server ASICs. It will write the sku value to the char array pointed to by `sku`.

## Parameters

in	<code>dv_ind</code>	a device index
in, out	<code>sku</code>	a pointer to char to which the sku will be written

If this parameter is nullptr, this function will return [RSMI\\_STATUS\\_INVALID\\_ARGS](#) if the function is supported with the provided arguments and [RSMI\\_STATUS\\_NOT\\_SUPPORTED](#) if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

6.2.2.4 `rsmi_status_t rsmi_dev_vendor_id_get ( uint32_t dv_ind, uint16_t * id )`

Get the device vendor id associated with the device with provided device index.

Given a device index `dv_ind` and a pointer to a `uint32_t id`, this function will write the device vendor id value to the `uint64_t` pointed to by `id`.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>id</i>	a pointer to <code>uint64_t</code> to which the device vendor id will be written. If this parameter is <code>nullptr</code> , this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

### 6.2.2.5 `rsmi_status_t rsmi_dev_name_get ( uint32_t dv_ind, char * name, size_t len )`

Get the name string of a gpu device.

Given a device index `dv_ind`, a pointer to a caller provided char buffer `name`, and a length of this buffer `len`, this function will write the name of the device (up to `len` characters) to the buffer `name`.

If the integer ID associated with the device is not found in one of the system files containing device name information (e.g. `/usr/share/misc/pci.ids`), then this function will return the hex device ID as a string. Updating the system name files can be accomplished with "sudo update-pciids".

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>name</i>	a pointer to a caller provided char buffer to which the name will be written. If this parameter is <code>nullptr</code> , this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.
in	<i>len</i>	the length of the caller provided buffer <code>name</code> .

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid
<code>RSMI_STATUS_INSUFFICIENT_SIZE</code>	is returned if <code>len</code> bytes is not large enough to hold the entire name. In this case, only <code>len</code> bytes will be written.

### 6.2.2.6 `rsmi_status_t rsmi_dev_brand_get ( uint32_t dv_ind, char * brand, uint32_t len )`

Get the brand string of a gpu device.

Given a device index `dv_ind`, a pointer to a caller provided char buffer `brand`, and a length of this buffer `len`, this function will write the brand of the device (up to `len` characters) to the buffer `brand`.

If the sku associated with the device is not found as one of the values contained within `rsmi_dev_brand_get`, then this function will return the device marketing name as a string instead of the brand name.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>brand</i>	a pointer to a caller provided char buffer to which the brand will be written. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.
in	<i>len</i>	the length of the caller provided buffer <i>brand</i> .

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid
<code>RSMI_STATUS_INSUFFICIENT_SIZE</code>	is returned if <i>len</i> bytes is not large enough to hold the entire name. In this case, only <i>len</i> bytes will be written.

6.2.2.7 `rsmi_status_t rsmi_dev_vendor_name_get ( uint32_t dv_ind, char * name, size_t len )`

Get the name string for a give vendor ID.

Given a device index *dv\_ind*, a pointer to a caller provided char buffer *name*, and a length of this buffer *len*, this function will write the name of the vendor (up to *len* characters) buffer *name*. The *id* may be a device vendor or subsystem vendor ID.

If the integer ID associated with the vendor is not found in one of the system files containing device name information (e.g. `/usr/share/misc/pci.ids`), then this function will return the hex vendor ID as a string. Updating the system name files can be accomplished with "sudo update-pciids".

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>name</i>	a pointer to a caller provided char buffer to which the name will be written. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.
in	<i>len</i>	the length of the caller provided buffer <i>name</i> .

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid
<code>RSMI_STATUS_INSUFFICIENT_SIZE</code>	is returned if <i>len</i> bytes is not large enough to hold the entire name. In this case, only <i>len</i> bytes will be written.

6.2.2.8 `rsmi_status_t rsmi_dev_vram_vendor_get ( uint32_t dv_ind, char * brand, uint32_t len )`

Get the vram vendor string of a gpu device.

Given a device index *dv\_ind*, a pointer to a caller provided char buffer *brand*, and a length of this buffer *len*, this function will write the vram vendor of the device (up to *len* characters) to the buffer *brand*.

If the vram vendor for the device is not found as one of the values contained within `rsmi_dev_vram_vendor_get`, then this function will return the string 'unknown' instead of the vram vendor.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>brand</i>	a pointer to a caller provided char buffer to which the vram vendor will be written
in	<i>len</i>	the length of the caller provided buffer <i>brand</i> .

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
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### 6.2.2.9 `rsmi_status_t rsmi_dev_serial_number_get ( uint32_t dv_ind, char * serial_num, uint32_t len )`

Get the serial number string for a device.

Given a device index *dv\_ind*, a pointer to a buffer of chars *serial\_num*, and the length of the provided buffer *len*, this function will write the serial number string (up to *len* characters) to the buffer pointed to by *serial\_num*.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>serial_num</i>	a pointer to caller-provided memory to which the serial number will be written If this parameter is nullptr, this function will return <a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a> if the function is supported with the provided, arguments and <a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a> if it is not supported with the provided arguments.
in	<i>len</i>	the length of the caller provided buffer <i>serial_num</i> .

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid
<a href="#"><i>RSMI_STATUS_INSUFFICIENT_SIZE</i></a>	is returned if <i>len</i> bytes is not large enough to hold the entire name. In this case, only <i>len</i> bytes will be written.

### 6.2.2.10 `rsmi_status_t rsmi_dev_subsystem_id_get ( uint32_t dv_ind, uint16_t * id )`

Get the subsystem device id associated with the device with provided device index.

Given a device index *dv\_ind* and a pointer to a `uint32_t id`, this function will write the subsystem device id value to the `uint64_t` pointed to by *id*.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>id</i>	a pointer to <code>uint64_t</code> to which the subsystem device id will be written If this parameter is nullptr, this function will return <a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a> if the function is supported with the provided, arguments and <a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a> if it is not supported with the provided arguments.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
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<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

#### 6.2.2.11 `rsmi_status_t rsmi_dev_subsystem_name_get ( uint32_t dv_ind, char * name, size_t len )`

Get the name string for the device subsystem.

Given a device index `dv_ind`, a pointer to a caller provided char buffer `name`, and a length of this buffer `len`, this function will write the name of the device subsystem (up to `len` characters) to the buffer `name`.

If the integer ID associated with the sub-system is not found in one of the system files containing device name information (e.g. `/usr/share/misc/pci.ids`), then this function will return the hex sub-system ID as a string. Updating the system name files can be accomplished with "sudo update-pciids".

##### Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>name</i>	a pointer to a caller provided char buffer to which the name will be written. If this parameter is nullptr, this function will return <a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a> if the function is supported with the provided arguments and <a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a> if it is not supported with the provided arguments.
in	<i>len</i>	the length of the caller provided buffer <code>name</code> .

##### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid
<a href="#"><i>RSMI_STATUS_INSUFFICIENT_SIZE</i></a>	is returned if <code>len</code> bytes is not large enough to hold the entire name. In this case, only <code>len</code> bytes will be written.

#### 6.2.2.12 `rsmi_status_t rsmi_dev_drm_render_minor_get ( uint32_t dv_ind, uint32_t * minor )`

Get the drm minor number associated with this device.

Given a device index `dv_ind`, find its render device file `/dev/dri/renderDN` where N corresponds to its minor number.

##### Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>minor</i>	a pointer to a <code>uint32_t</code> into which minor number will be copied

##### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
<a href="#"><i>RSMI_STATUS_INIT_ERROR</i></a>	if failed to get minor number during initialization.
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

#### 6.2.2.13 `rsmi_status_t rsmi_dev_subsystem_vendor_id_get ( uint32_t dv_ind, uint16_t * id )`

Get the device subsystem vendor id associated with the device with provided device index.

Given a device index `dv_ind` and a pointer to a `uint32_t id`, this function will write the device subsystem vendor id value to the `uint64_t` pointed to by `id`.

#### Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>id</i>	a pointer to <code>uint64_t</code> to which the device subsystem vendor id will be written. If this parameter is <code>nullptr</code> , this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

#### Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

#### 6.2.2.14 `rsmi_status_t rsmi_dev_unique_id_get ( uint32_t dv_ind, uint64_t * id )`

Get Unique ID.

Given a device index `dv_ind` and a pointer to a `uint64_t id`, this function will write the unique ID of the GPU pointed to `id`.

#### Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>id</i>	a pointer to <code>uint64_t</code> to which the unique ID of the GPU is written. If this parameter is <code>nullptr</code> , this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

#### Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

## 6.3 PCIe Queries

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_bandwidth\\_get](#) (uint32\_t dv\_ind, [rsmi\\_pcie\\_bandwidth\\_t](#) \*bandwidth)  
*Get the list of possible PCIe bandwidths that are available.*
- [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_id\\_get](#) (uint32\_t dv\_ind, uint64\_t \*bdfid)  
*Get the unique PCI device identifier associated for a device.*
- [rsmi\\_status\\_t rsmi\\_topo\\_numa\\_affinity\\_get](#) (uint32\_t dv\_ind, uint32\_t \*numa\_node)  
*Get the NUMA node associated with a device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_throughput\\_get](#) (uint32\_t dv\_ind, uint64\_t \*sent, uint64\_t \*received, uint64\_t \*max\_pkt\_sz)  
*Get PCIe traffic information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_replay\\_counter\\_get](#) (uint32\_t dv\_ind, uint64\_t \*counter)  
*Get PCIe replay counter.*

### 6.3.1 Detailed Description

These functions provide information about PCIe.

### 6.3.2 Function Documentation

#### 6.3.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_bandwidth\\_get](#) ( uint32\_t dv\_ind, [rsmi\\_pcie\\_bandwidth\\_t](#) \* bandwidth )

Get the list of possible PCIe bandwidths that are available.

Given a device index `dv_ind` and a pointer to a to an [rsmi\\_pcie\\_bandwidth\\_t](#) structure `bandwidth`, this function will fill in `bandwidth` with the possible T/s values and associated number of lanes, and indication of the current selection.

#### Parameters

in	<code>dv_ind</code>	a device index
in, out	<code>bandwidth</code>	a pointer to a caller provided <a href="#">rsmi_pcie_bandwidth_t</a> structure to which the frequency information will be written

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call.
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#### 6.3.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_id\\_get](#) ( uint32\_t dv\_ind, uint64\_t \* bdfid )

Get the unique PCI device identifier associated for a device.

Give a device index `dv_ind` and a pointer to a `uint64_t bdfid`, this function will write the Bus/Device/Function PCI identifier (BDFID) associated with device `dv_ind` to the value pointed to by `bdfid`.

The format of `bdfid` will be as follows:

```
BDFID = ((DOMAIN & 0xffffffff) << 32) | ((BUS & 0xff) << 8) |
        ((DEVICE & 0x1f) << 3) | (FUNCTION & 0x7)
```

Name	Field
------	-------

Domain	[64:32]
Reserved	[31:16]
Bus	[15: 8]
Device	[ 7: 3]
Function	[ 2: 0]

**Parameters**

in	<i>dv_ind</i>	a device index
in, out	<i>bdfid</i>	a pointer to uint64_t to which the device bdfid value will be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

**Return values**

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

**6.3.2.3 rsmi\_status\_t rsmi\_topo\_numa\_affinity\_get ( uint32\_t dv\_ind, uint32\_t \* numa\_node )**

Get the NUMA node associated with a device.

Given a device index *dv\_ind* and a pointer to a uint32\_t *numa\_node*, this function will retrieve the NUMA node value associated with device *dv\_ind* and store the value at location pointed to by *numa\_node*.

**Parameters**

in	<i>dv_ind</i>	a device index
in, out	<i>numa_node</i>	pointer to location where NUMA node value will be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

**Return values**

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

**6.3.2.4 rsmi\_status\_t rsmi\_dev\_pci\_throughput\_get ( uint32\_t dv\_ind, uint64\_t \* sent, uint64\_t \* received, uint64\_t \* max\_pkt\_sz )**

Get PCIe traffic information.

Give a device index *dv\_ind* and pointers to a uint64\_t's, *sent*, *received* and *max\_pkt\_sz*, this function will write the number of bytes sent and received in 1 second to *sent* and *received*, respectively. The maximum possible packet size will be written to *max\_pkt\_sz*.

**Parameters**



in	<i>dv_ind</i>	a device index
in, out	<i>sent</i>	a pointer to uint64_t to which the number of bytes sent will be written in 1 second. If pointer is NULL, it will be ignored.
in, out	<i>received</i>	a pointer to uint64_t to which the number of bytes received will be written. If pointer is NULL, it will be ignored.
in, out	<i>max_pkt_sz</i>	a pointer to uint64_t to which the maximum packet size will be written. If pointer is NULL, it will be ignored.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments

6.3.2.5 `rsmi_status_t rsmi_dev_pci_replay_counter_get ( uint32_t dv_ind, uint64_t * counter )`

Get PCIe replay counter.

Given a device index *dv\_ind* and a pointer to a uint64\_t *counter*, this function will write the sum of the number of NAK's received by the GPU and the NAK's generated by the GPU to memory pointed to by *counter*.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>counter</i>	a pointer to uint64_t to which the sum of the NAK's received and generated by the GPU is written. If this parameter is nullptr, this function will return <a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a> if the function is supported with the provided arguments and <a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a> if it is not supported with the provided arguments.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

## 6.4 PCIe Control

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_bandwidth\\_set](#) (uint32\_t dv\_ind, uint64\_t bw\_bitmask)

*Control the set of allowed PCIe bandwidths that can be used.*

#### 6.4.1 Detailed Description

These functions provide some control over PCIe.

#### 6.4.2 Function Documentation

##### 6.4.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_bandwidth\\_set](#) ( uint32\_t *dv\_ind*, uint64\_t *bw\_bitmask* )

Control the set of allowed PCIe bandwidths that can be used.

Given a device index *dv\_ind* and a 64 bit bitmask *bw\_bitmask*, this function will limit the set of allowable bandwidths. If a bit in *bw\_bitmask* has a value of 1, then the frequency (as ordered in an [rsmi\\_frequencies\\_t](#) returned by [rsmi\\_dev\\_gpu\\_clk\\_freq\\_get\(\)](#)) corresponding to that bit index will be allowed.

This function will change the performance level to [RSMI\\_DEV\\_PERF\\_LEVEL\\_MANUAL](#) in order to modify the set of allowable band\_widths. Caller will need to set to [RSMI\\_DEV\\_PERF\\_LEVEL\\_AUTO](#) in order to get back to default state.

All bits with indices greater than or equal to the value of the [rsmi\\_frequencies\\_t::num\\_supported](#) field of [rsmi\\_pcie\\_bandwidth\\_t](#) will be ignored.

##### Parameters

in	<i>dv_ind</i>	a device index
in	<i>bw_bitmask</i>	A bitmask indicating the indices of the bandwidths that are to be enabled (1) and disabled (0). Only the lowest <a href="#">rsmi_frequencies_t::num_supported</a> (of <a href="#">rsmi_pcie_bandwidth_t</a> ) bits of this mask are relevant.

##### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_PERMISSION</a>	function requires root access

## 6.5 Power Queries

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_power\\_ave\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \*power)  
Get the average power consumption of the device with provided device index.
- [rsmi\\_status\\_t rsmi\\_dev\\_energy\\_count\\_get](#) (uint32\_t dv\_ind, uint64\_t \*power, float \*counter\_resolution, uint64\_t \*timestamp)  
Get the energy accumulator counter of the device with provided device index.
- [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \*cap)  
Get the cap on power which, when reached, causes the system to take action to reduce power.
- [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_default\\_get](#) (uint32\_t dv\_ind, uint64\_t \*default\_cap)  
Get the default power cap for the device specified by dv\_ind.
- [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_range\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \*max, uint64\_t \*min)  
Get the range of valid values for the power cap.

### 6.5.1 Detailed Description

These functions provide information about power usage.

### 6.5.2 Function Documentation

#### 6.5.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_power\\_ave\\_get](#) ( uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \* power )

Get the average power consumption of the device with provided device index.

Given a device index `dv_ind` and a pointer to a `uint64_t power`, this function will write the current average power consumption (in microwatts) to the `uint64_t` pointed to by `power`.

#### Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
in, out	<i>power</i>	a pointer to <code>uint64_t</code> to which the average power consumption will be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

#### 6.5.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_energy\\_count\\_get](#) ( uint32\_t dv\_ind, uint64\_t \* power, float \* counter\_resolution, uint64\_t \* timestamp )

Get the energy accumulator counter of the device with provided device index.

Given a device index `dv_ind`, a pointer to a `uint64_t power`, and a pointer to a `uint64_t timestamp`, this function will write amount of energy consumed to the `uint64_t` pointed to by `power`, and the timestamp to the

uint64\_t pointed to by `timestamp`. The `rsmi_dev_power_ave_get()` is an average of a short time. This function accumulates all energy consumed.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>counter_ - resolution</i>	resolution of the counter <i>power</i> in micro Joules
in, out	<i>power</i>	a pointer to uint64_t to which the energy counter will be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided, and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.
in, out	<i>timestamp</i>	a pointer to uint64_t to which the timestamp will be written. Resolution: 1 ns.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

6.5.2.3 `rsmi_status_t rsmi_dev_power_cap_get ( uint32_t dv_ind, uint32_t sensor_ind, uint64_t * cap )`

Get the cap on power which, when reached, causes the system to take action to reduce power.

When power use rises above the value *power*, the system will take action to reduce power use. The power level returned through *power* will be in microWatts.

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
in, out	<i>cap</i>	a pointer to a uint64_t that indicates the power cap, in microwatts. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided, arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

6.5.2.4 `rsmi_status_t rsmi_dev_power_cap_default_get ( uint32_t dv_ind, uint64_t * default_cap )`

Get the default power cap for the device specified by *dv\_ind*.

The maximum power cap be temporarily changed by the user. However, this function always returns the default reset power cap. The power level returned through *power* will be in microWatts.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>default_cap</i>	a pointer to a uint64_t that indicates the default power cap, in microwatts. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided, arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

**6.5.2.5** `rsmi_status_t rsmi_dev_power_cap_range_get ( uint32_t dv_ind, uint32_t sensor_ind, uint64_t * max, uint64_t * min )`

Get the range of valid values for the power cap.

This function will return the maximum possible valid power cap `max` and the minimum possible valid power cap `min`

## Parameters

<i>in</i>	<i>dv_ind</i>	a device index
<i>in</i>	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
<i>in, out</i>	<i>max</i>	a pointer to a <code>uint64_t</code> that indicates the maximum possible power cap, in microwatts. If this parameter is <code>nullptr</code> , this function will return <a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a> if the function is supported with the provided arguments and <a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a> if it is not supported with the provided arguments.
<i>in, out</i>	<i>min</i>	a pointer to a <code>uint64_t</code> that indicates the minimum possible power cap, in microwatts. If this parameter is <code>nullptr</code> , this function will return <a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a> if the function is supported with the provided arguments and <a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a> if it is not supported with the provided arguments.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

## 6.6 Power Control

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_set](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t cap)  
*Set the power cap value.*
- [rsmi\\_status\\_t rsmi\\_dev\\_power\\_profile\\_set](#) (uint32\_t dv\_ind, uint32\_t reserved, [rsmi\\_power\\_profile\\_preset\\_masks\\_t](#) profile)  
*Set the power profile.*

#### 6.6.1 Detailed Description

These functions provide ways to control power usage.

#### 6.6.2 Function Documentation

##### 6.6.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_set](#) ( uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t cap )

Set the power cap value.

This function will set the power cap to the provided value `cap`. `cap` must be between the minimum and maximum power cap values set by the system, which can be obtained from [rsmi\\_dev\\_power\\_cap\\_range\\_get](#).

##### Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
in	<i>cap</i>	a uint64_t that indicates the desired power cap, in microwatts

##### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call.
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid
<a href="#">RSMI_STATUS_PERMISSION</a>	function requires root access

##### 6.6.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_power\\_profile\\_set](#) ( uint32\_t dv\_ind, uint32\_t reserved, [rsmi\\_power\\_profile\\_preset\\_masks\\_t](#) profile )

Set the power profile.

Given a device index `dv_ind` and a `profile`, this function will attempt to set the current profile to the provided profile. The provided profile must be one of the currently supported profiles, as indicated by a call to [rsmi\\_dev\\_power\\_profile\\_presets\\_get](#)()

##### Parameters

in	<i>dv_ind</i>	a device index
in	<i>reserved</i>	Not currently used. Set to 0.
in	<i>profile</i>	a <a href="#">rsmi_power_profile_preset_masks_t</a> that hold the mask of the desired new power profile

## Return values

<i>RSMI_STATUS_SUCCESS</i>	is returned upon successful call.
<i>RSMI_STATUS_PERMISSION</i>	function requires root access



## 6.7 Memory Queries

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_total\\_get](#) (uint32\_t dv\_ind, [rsmi\\_memory\\_type\\_t](#) mem\_type, uint64\_t \*total)  
*Get the total amount of memory that exists.*
- [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_usage\\_get](#) (uint32\_t dv\_ind, [rsmi\\_memory\\_type\\_t](#) mem\_type, uint64\_t \*used)  
*Get the current memory usage.*
- [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_busy\\_percent\\_get](#) (uint32\_t dv\_ind, uint32\_t \*busy\_percent)  
*Get percentage of time any device memory is being used.*
- [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_reserved\\_pages\\_get](#) (uint32\_t dv\_ind, uint32\_t \*num\_pages, [rsmi\\_retired\\_page\\_record\\_t](#) \*records)  
*Get information about reserved ("retired") memory pages.*

### 6.7.1 Detailed Description

These functions provide information about memory systems.

### 6.7.2 Function Documentation

#### 6.7.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_total\\_get](#) ( uint32\_t *dv\_ind*, [rsmi\\_memory\\_type\\_t](#) *mem\_type*, uint64\_t \* *total* )

Get the total amount of memory that exists.

Given a device index *dv\_ind*, a type of memory *mem\_type*, and a pointer to a uint64\_t *total*, this function will write the total amount of *mem\_type* memory that exists to the location pointed to by *total*.

#### Parameters

in	<i>dv_ind</i>	a device index
in	<i>mem_type</i>	The type of memory for which the total amount will be found
in, out	<i>total</i>	a pointer to uint64_t to which the total amount of memory will be written If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided, arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

#### 6.7.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_usage\\_get](#) ( uint32\_t *dv\_ind*, [rsmi\\_memory\\_type\\_t](#) *mem\_type*, uint64\_t \* *used* )

Get the current memory usage.

Given a device index *dv\_ind*, a type of memory *mem\_type*, and a pointer to a uint64\_t *usage*, this function will write the amount of *mem\_type* memory that that is currently being used to the location pointed to by *used*.

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>mem_type</i>	The type of memory for which the amount being used will be found
in, out	<i>used</i>	a pointer to uint64_t to which the amount of memory currently being used will be written If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided, arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

### 6.7.2.3 `rsmi_status_t rsmi_dev_memory_busy_percent_get ( uint32_t dv_ind, uint32_t * busy_percent )`

Get percentage of time any device memory is being used.

Given a device index *dv\_ind*, this function returns the percentage of time that any device memory is being used for the specified device.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>busy_percent</i>	a pointer to the uint32_t to which the busy percent will be written If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided, arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

### 6.7.2.4 `rsmi_status_t rsmi_dev_memory_reserved_pages_get ( uint32_t dv_ind, uint32_t * num_pages, rsmi_retired_page_record_t * records )`

Get information about reserved ("retired") memory pages.

Given a device index *dv\_ind*, this function returns retired page information *records* corresponding to the device with the provided device index *dv\_ind*. The number of retired page records is returned through *num\_pages*. *records* may be NULL on input. In this case, the number of records available for retrieval will be returned through *num\_pages*.

## Parameters

<code>in</code>	<code>dv_ind</code>	a device index
<code>in, out</code>	<code>num_pages</code>	a pointer to a uint32. As input, the value passed through this parameter is the number of <code>rsmi_retired_page_record_t</code> 's that may be safely written to the memory pointed to by <code>records</code> . This is the limit on how many records will be written to <code>records</code> . On return, <code>num_pages</code> will contain the number of records written to <code>records</code> , or the number of records that could have been written if enough memory had been provided. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.
<code>in, out</code>	<code>records</code>	A pointer to a block of memory to which the <code>rsmi_retired_page_record_t</code> values will be written. This value may be NULL. In this case, this function can be used to query how many records are available to read.

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid
<code>RSMI_STATUS_INSUFFICIENT_SIZE</code>	is returned if more records were available than allowed by the provided, allocated memory.

## 6.8 Physical State Queries

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_rpms\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, int64\_t \*speed)  
*Get the fan speed in RPMs of the device with the specified device index and 0-based sensor index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_speed\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, int64\_t \*speed)  
*Get the fan speed for the specified device as a value relative to [RSMI\\_MAX\\_FAN\\_SPEED](#).*
- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_speed\\_max\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \*max\_speed)  
*Get the max. fan speed of the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_temp\\_metric\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_type, [rsmi\\_temperature\\_metric\\_t](#) metric, int64\_t \*temperature)  
*Get the temperature metric value for the specified metric, from the specified temperature sensor on the specified device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_volt\\_metric\\_get](#) (uint32\_t dv\_ind, [rsmi\\_voltage\\_type\\_t](#) sensor\_type, [rsmi\\_voltage\\_metric\\_t](#) metric, int64\_t \*voltage)  
*Get the voltage metric value for the specified metric, from the specified voltage sensor on the specified device.*

### 6.8.1 Detailed Description

These functions provide information about the physical characteristics of the device.

### 6.8.2 Function Documentation

#### 6.8.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_rpms\\_get](#) ( uint32\_t dv\_ind, uint32\_t sensor\_ind, int64\_t \* speed )

Get the fan speed in RPMs of the device with the specified device index and 0-based sensor index.

Given a device index `dv_ind` and a pointer to a `uint32_t` `speed`, this function will write the current fan speed in RPMs to the `uint32_t` pointed to by `speed`

#### Parameters

in	<code>dv_ind</code>	a device index
in	<code>sensor_ind</code>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
in, out	<code>speed</code>	a pointer to <code>uint32_t</code> to which the speed will be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

#### 6.8.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_speed\\_get](#) ( uint32\_t dv\_ind, uint32\_t sensor\_ind, int64\_t \* speed )

Get the fan speed for the specified device as a value relative to [RSMI\\_MAX\\_FAN\\_SPEED](#).

Given a device index `dv_ind` and a pointer to a `uint32_t` `speed`, this function will write the current fan speed (a value between 0 and the maximum fan speed, [RSMI\\_MAX\\_FAN\\_SPEED](#)) to the `uint32_t` pointed to by `speed`

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
in, out	<i>speed</i>	a pointer to <code>uint32_t</code> to which the speed will be written. If this parameter is <code>nullptr</code> , this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

6.8.2.3 `rsmi_status_t rsmi_dev_fan_speed_max_get ( uint32_t dv_ind, uint32_t sensor_ind, uint64_t * max_speed )`

Get the max. fan speed of the device with provided device index.

Given a device index `dv_ind` and a pointer to a `uint32_t max_speed`, this function will write the maximum fan speed possible to the `uint32_t` pointed to by `max_speed`.

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
in, out	<i>max_speed</i>	a pointer to <code>uint32_t</code> to which the maximum speed will be written. If this parameter is <code>nullptr</code> , this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

6.8.2.4 `rsmi_status_t rsmi_dev_temp_metric_get ( uint32_t dv_ind, uint32_t sensor_type, rsmi_temperature_metric_t metric, int64_t * temperature )`

Get the temperature metric value for the specified metric, from the specified temperature sensor on the specified device.

Given a device index `dv_ind`, a sensor type `sensor_type`, a `rsmi_temperature_metric_t metric` and a pointer to an `int64_t temperature`, this function will write the value of the metric indicated by `metric` and `sensor_type` to the memory location `temperature`.

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_type</i>	part of device from which temperature should be obtained. This should come from the enum <a href="#">rsmi_temperature_type_t</a>
in	<i>metric</i>	enum indicated which temperature value should be retrieved
in, out	<i>temperature</i>	a pointer to <code>int64_t</code> to which the temperature will be written, in millidegrees Celcius. If this parameter is <code>nullptr</code> , this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided, arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

**Return values**

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

**6.8.2.5** `rsmi_status_t rsmi_dev_volt_metric_get ( uint32_t dv_ind, rsmi_voltage_type_t sensor_type, rsmi_voltage_metric_t metric, int64_t* voltage )`

Get the voltage metric value for the specified metric, from the specified voltage sensor on the specified device.

Given a device index `dv_ind`, a sensor type `sensor_type`, a [rsmi\\_voltage\\_metric\\_t](#) `metric` and a pointer to an `int64_t` `voltage`, this function will write the value of the metric indicated by `metric` and `sensor_type` to the memory location `voltage`.

**Parameters**

in	<i>dv_ind</i>	a device index
in	<i>sensor_type</i>	part of device from which voltage should be obtained. This should come from the enum <a href="#">rsmi_voltage_type_t</a>
in	<i>metric</i>	enum indicated which voltage value should be retrieved
in, out	<i>voltage</i>	a pointer to <code>int64_t</code> to which the voltage will be written, in millivolts. If this parameter is <code>nullptr</code> , this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided, arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

**Return values**

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

## 6.9 Physical State Control

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_reset](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind)  
*Reset the fan to automatic driver control.*
- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_speed\\_set](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t speed)  
*Set the fan speed for the specified device with the provided speed, in RPMs.*

#### 6.9.1 Detailed Description

These functions provide control over the physical state of a device.

#### 6.9.2 Function Documentation

##### 6.9.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_reset](#) ( uint32\_t *dv\_ind*, uint32\_t *sensor\_ind* )

Reset the fan to automatic driver control.

This function returns control of the fan to the system

##### Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.

##### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call.
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments

##### 6.9.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_speed\\_set](#) ( uint32\_t *dv\_ind*, uint32\_t *sensor\_ind*, uint64\_t *speed* )

Set the fan speed for the specified device with the provided speed, in RPMs.

Given a device index *dv\_ind* and a integer value indicating speed *speed*, this function will attempt to set the fan speed to *speed*. An error will be returned if the specified speed is outside the allowable range for the device. The maximum value is 255 and the minimum is 0.

##### Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
in	<i>speed</i>	the speed to which the function will attempt to set the fan

##### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call.
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments

<i>RSMI_STATUS_PERMISSION</i>	function requires root access
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## 6.10 Clock, Power and Performance Queries

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_busy\\_percent\\_get](#) (uint32\_t dv\_ind, uint32\_t \*busy\_percent)  
*Get percentage of time device is busy doing any processing.*
- [rsmi\\_status\\_t rsmi\\_utilization\\_count\\_get](#) (uint32\_t dv\_ind, [rsmi\\_utilization\\_counter\\_t](#) utilization\_counters[], uint32\_t count, uint64\_t \*timestamp)  
*Get coarse grain utilization counter of the specified device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_perf\\_level\\_get](#) (uint32\_t dv\_ind, [rsmi\\_dev\\_perf\\_level\\_t](#) \*perf)  
*Get the performance level of the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_perf\\_determinism\\_mode\\_set](#) (uint32\_t dv\_ind, uint64\_t clkvalue)  
*Enter performance determinism mode with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_overdrive\\_level\\_get](#) (uint32\_t dv\_ind, uint32\_t \*od)  
*Get the overdrive percent associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_gpu\\_clk\\_freq\\_get](#) (uint32\_t dv\_ind, [rsmi\\_clk\\_type\\_t](#) clk\_type, [rsmi\\_frequencies\\_t](#) \*f)  
*Get the list of possible system clock speeds of device for a specified clock type.*
- [rsmi\\_status\\_t rsmi\\_dev\\_gpu\\_reset](#) (uint32\_t dv\_ind)  
*Reset the gpu associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_od\\_volt\\_info\\_get](#) (uint32\_t dv\_ind, [rsmi\\_od\\_volt\\_freq\\_data\\_t](#) \*odv)  
*This function retrieves the voltage/frequency curve information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_gpu\\_metrics\\_info\\_get](#) (uint32\_t dv\_ind, [rsmi\\_gpu\\_metrics\\_t](#) \*pgpu\_metrics)  
*This function retrieves the gpu metrics information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_clk\\_range\\_set](#) (uint32\_t dv\_ind, uint64\_t minclkvalue, uint64\_t maxclkvalue, [rsmi\\_clk\\_type\\_t](#) clkType)  
*This function sets the clock range information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_od\\_clk\\_info\\_set](#) (uint32\_t dv\_ind, [rsmi\\_freq\\_ind\\_t](#) level, uint64\_t clkvalue, [rsmi\\_clk\\_type\\_t](#) clkType)  
*This function sets the clock frequency information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_od\\_volt\\_info\\_set](#) (uint32\_t dv\_ind, uint32\_t vpoint, uint64\_t clkvalue, uint64\_t volt-value)  
*This function sets 1 of the 3 voltage curve points.*
- [rsmi\\_status\\_t rsmi\\_dev\\_od\\_volt\\_curve\\_regions\\_get](#) (uint32\_t dv\_ind, uint32\_t \*num\_regions, [rsmi\\_freq\\_volt\\_region\\_t](#) \*buffer)  
*This function will retrieve the current valid regions in the frequency/voltage space.*
- [rsmi\\_status\\_t rsmi\\_dev\\_power\\_profile\\_presets\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, [rsmi\\_power\\_profile\\_status\\_t](#) \*status)  
*Get the list of available preset power profiles and an indication of which profile is currently active.*

### 6.10.1 Detailed Description

These functions provide information about clock frequencies and performance.

### 6.10.2 Function Documentation

#### 6.10.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_busy\\_percent\\_get](#) ( uint32\_t dv\_ind, uint32\_t \* busy\_percent )

Get percentage of time device is busy doing any processing.

Given a device index `dv_ind`, this function returns the percentage of time that the specified device is busy. The device is considered busy if any one or more of its sub-blocks are working, and idle if none of the sub-blocks are working.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>busy_percent</i>	a pointer to the <code>uint32_t</code> to which the busy percent will be written. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

6.10.2.2 `rsmi_status_t rsmi_utilization_count_get ( uint32_t dv_ind, rsmi_utilization_counter_t utilization_counters[], uint32_t count, uint64_t * timestamp )`

Get coarse grain utilization counter of the specified device.

Given a device index `dv_ind`, the array of the utilization counters, the size of the array, this function returns the coarse grain utilization counters and timestamp. The counter is the accumulated percentages. Every milliseconds the firmware calculates % busy count and then accumulates that value in the counter. This provides minimally invasive coarse grain GPU usage information.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>utilization_counters</i>	Multiple utilization counters can be retrieved with a single call. The caller must allocate enough space to the <code>utilization_counters</code> array. The caller also needs to set valid <code>RSMI_UTILIZATION_COUNTER_TYPE</code> type for each element of the array. <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

If the function returns `RSMI_STATUS_SUCCESS`, the counter will be set in the value field of the `rsmi_utilization_counter_t`.

## Parameters

in	<i>count</i>	The size of array.
in, out	<i>timestamp</i>	The timestamp when the counter is retrieved. Resolution: 1 ns.

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

6.10.2.3 `rsmi_status_t rsmi_dev_perf_level_get ( uint32_t dv_ind, rsmi_dev_perf_level_t * perf )`

Get the performance level of the device with provided device index.

Given a device index `dv_ind` and a pointer to a `uint32_t perf`, this function will write the `rsmi_dev_perf_level_t` to the `uint32_t` pointed to by `perf`.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>perf</i>	a pointer to <code>rsmi_dev_perf_level_t</code> to which the performance level will be written. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

6.10.2.4 `rsmi_status_t rsmi_perf_determinism_mode_set ( uint32_t dv_ind, uint64_t clkvalue )`

Enter performance determinism mode with provided device index.

Given a device index `dv_ind` and `clkvalue` this function will enable performance determinism mode, which enforces a GFXCLK frequency SoftMax limit per GPU set by the user. This prevents the GFXCLK PLL from stretching when running the same workload on different GPUS, making performance variation minimal. This call will result in the performance level `rsmi_dev_perf_level_t` of the device being `RSMI_DEV_PERF_LEVEL_DETERMINISM`.

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>clkvalue</i>	Softmax value for GFXCLK in MHz.

## Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

6.10.2.5 `rsmi_status_t rsmi_dev_overdrive_level_get ( uint32_t dv_ind, uint32_t * od )`

Get the overdrive percent associated with the device with provided device index.

Given a device index `dv_ind` and a pointer to a `uint32_t od`, this function will write the overdrive percentage to the `uint32_t` pointed to by `od`.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>od</i>	a pointer to <code>uint32_t</code> to which the overdrive percentage will be written. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

#### 6.10.2.6 `rsmi_status_t rsmi_dev_gpu_clk_freq_get ( uint32_t dv_ind, rsmi_clk_type_t clk_type, rsmi_frequencies_t * f )`

Get the list of possible system clock speeds of device for a specified clock type.

Given a device index `dv_ind`, a clock type `clk_type`, and a pointer to a to an [`rsmi\_frequencies\_t`](#) structure `f`, this function will fill in `f` with the possible clock speeds, and indication of the current clock speed selection.

##### Parameters

in	<i>dv_ind</i>	a device index
in	<i>clk_type</i>	the type of clock for which the frequency is desired
in, out	<i>f</i>	a pointer to a caller provided <a href="#"><code>rsmi_frequencies_t</code></a> structure to which the frequency information will be written. Frequency values are in Hz. If this parameter is nullptr, this function will return <a href="#"><code>RSMI_STATUS_INVALID_ARGS</code></a> if the function is supported with the provided, arguments and <a href="#"><code>RSMI_STATUS_NOT_SUPPORTED</code></a> if it is not supported with the provided arguments.

##### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

#### 6.10.2.7 `rsmi_status_t rsmi_dev_gpu_reset ( int32_t dv_ind )`

Reset the gpu associated with the device with provided device index.

Given a device index `dv_ind`, this function will reset the GPU

##### Parameters

in	<i>dv_ind</i>	a device index
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##### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

#### 6.10.2.8 `rsmi_status_t rsmi_dev_od_volt_info_get ( uint32_t dv_ind, rsmi_od_volt_freq_data_t * odv )`

This function retrieves the voltage/frequency curve information.

Given a device index `dv_ind` and a pointer to a [`rsmi\_od\_volt\_freq\_data\_t`](#) structure `odv`, this function will populate `odv`. See [`rsmi\_od\_volt\_freq\_data\_t`](#) for more details.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>odv</i>	a pointer to an <a href="#">rsmi_od_volt_freq_data_t</a> structure. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

6.10.2.9 `rsmi_status_t rsmi_dev_gpu_metrics_info_get ( uint32_t dv_ind, rsmi_gpu_metrics_t * pgpu_metrics )`

This function retrieves the gpu metrics information.

Given a device index *dv\_ind* and a pointer to a [rsmi\\_gpu\\_metrics\\_t](#) structure *pgpu\_metrics*, this function will populate *pgpu\_metrics*. See [rsmi\\_gpu\\_metrics\\_t](#) for more details.

## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>pgpu_metrics</i>	a pointer to an <a href="#">rsmi_gpu_metrics_t</a> structure. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

6.10.2.10 `rsmi_status_t rsmi_dev_clk_range_set ( uint32_t dv_ind, uint64_t minclkvalue, uint64_t maxclkvalue, rsmi_clk_type_t clkType )`

This function sets the clock range information.

Given a device index *dv\_ind*, a minimum clock value *minclkvalue*, a maximum clock value *maxclkvalue* and a clock type *clkType* this function will set the *sclk|mclk* range

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>minclkvalue</i>	value to apply to the clock range. Frequency values are in MHz.
in	<i>maxclkvalue</i>	value to apply to the clock range. Frequency values are in MHz.
in	<i>clkType</i>	<a href="#">RSMI_CLK_TYPE_SYS</a>   <a href="#">RSMI_CLK_TYPE_MEM</a> range type

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

6.10.2.11 `rsmi_status_t rsmi_dev_od_clk_info_set ( uint32_t dv_ind, rsmi_freq_ind_t level, uint64_t clkvalue, rsmi_clk_type_t clkType )`

This function sets the clock frequency information.

Given a device index `dv_ind`, a frequency level `level`, a clock value `clkvalue` and a clock type `clkType` this function will set the `sclk|mclk` range

#### Parameters

in	<i>dv_ind</i>	a device index
in	<i>level</i>	RSMI_FREQ_IND_MIN RSMI_FREQ_IND_MAX to set the minimum (0) or maximum (1) speed.
in	<i>clkvalue</i>	value to apply to the clock range. Frequency values are in MHz.
in	<i>clkType</i>	RSMI_CLK_TYPE_SYS   RSMI_CLK_TYPE_MEM range type

#### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

6.10.2.12 `rsmi_status_t rsmi_dev_od_volt_info_set ( uint32_t dv_ind, uint32_t vpoint, uint64_t clkvalue, uint64_t voltvalue )`

This function sets 1 of the 3 voltage curve points.

Given a device index `dv_ind`, a voltage point `vpoint` and a voltage value `voltvalue` this function will set voltage curve point

#### Parameters

in	<i>dv_ind</i>	a device index
in	<i>vpoint</i>	voltage point [0 1 2] on the voltage curve
in	<i>clkvalue</i>	clock value component of voltage curve point. Frequency values are in MHz.
in	<i>voltvalue</i>	voltage value component of voltage curve point. Voltage is in mV.

#### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

6.10.2.13 `rsmi_status_t rsmi_dev_od_volt_curve_regions_get ( uint32_t dv_ind, uint32_t * num_regions, rsmi_freq_volt_region_t * buffer )`

This function will retrieve the current valid regions in the frequency/voltage space.

Given a device index `dv_ind`, a pointer to an unsigned integer `num_regions` and a buffer of `rsmi_freq_volt_region_t` structures, `buffer`, this function will populate `buffer` with the current frequency-volt space regions. The caller should assign `buffer` to memory that can be written to by this function. The caller should also indicate the number of `rsmi_freq_volt_region_t` structures that can safely be written to `buffer` in `num_regions`.

The number of regions to expect this function provide (`num_regions`) can be obtained by calling `rsmi_dev_od_volt_info_get()`.

#### Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>num_regions</i>	As input, this is the number of <code>rsmi_freq_volt_region_t</code> structures that can be written to <code>buffer</code> . As output, this is the number of <code>rsmi_freq_volt_region_t</code> structures that were actually written. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.
in, out	<i>buffer</i>	a caller provided buffer to which <code>rsmi_freq_volt_region_t</code> structures will be written. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

#### Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid

#### 6.10.2.14 `rsmi_status_t rsmi_dev_power_profile_presets_get ( uint32_t dv_ind, uint32_t sensor_ind, rsmi_power_profile_status_t * status )`

Get the list of available preset power profiles and an indication of which profile is currently active.

Given a device index `dv_ind` and a pointer to a `rsmi_power_profile_status_t` `status`, this function will set the bits of the `rsmi_power_profile_status_t.available_profiles` bit field of `status` to 1 if the profile corresponding to the respective `rsmi_power_profile_preset_masks_t` profiles are enabled. For example, if both the VIDEO and VR power profiles are available selections, then `RSMI_PWR_PROF_PRST_VIDEO_MASK` AND'ed with `rsmi_power_profile_status_t.available_profiles` will be non-zero as will `RSMI_PWR_PROF_PRST_VR_MASK` AND'ed with `rsmi_power_profile_status_t.available_profiles`. Additionally, `rsmi_power_profile_status_t.current` will be set to the `rsmi_power_profile_preset_masks_t` of the profile that is currently active.

#### Parameters

in	<i>dv_ind</i>	a device index
in	<i>sensor_ind</i>	a 0-based sensor index. Normally, this will be 0. If a device has more than one sensor, it could be greater than 0.
in, out	<i>status</i>	a pointer to <code>rsmi_power_profile_status_t</code> that will be populated by a call to this function. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

#### Return values

<i>RSMI_STATUS_SUCCESS</i>	call was successful
<i>RSMI_STATUS_NOT_SUPPORTED</i>	installed software or hardware does not support this function with the given arguments
<i>RSMI_STATUS_INVALID_ARGS</i>	the provided arguments are not valid



## 6.11 Clock, Power and Performance Control

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_perf\\_level\\_set](#) (int32\_t dv\_ind, [rsmi\\_dev\\_perf\\_level\\_t](#) perf\_lvl)  
*Set the PowerPlay performance level associated with the device with provided device index with the provided value.*
- [rsmi\\_status\\_t rsmi\\_dev\\_perf\\_level\\_set\\_v1](#) (uint32\_t dv\_ind, [rsmi\\_dev\\_perf\\_level\\_t](#) perf\_lvl)  
*Set the PowerPlay performance level associated with the device with provided device index with the provided value.*
- [rsmi\\_status\\_t rsmi\\_dev\\_overdrive\\_level\\_set](#) (int32\_t dv\_ind, uint32\_t od)  
*Set the overdrive percent associated with the device with provided device index with the provided value. See details for WARNING.*
- [rsmi\\_status\\_t rsmi\\_dev\\_overdrive\\_level\\_set\\_v1](#) (uint32\_t dv\_ind, uint32\_t od)  
*Set the overdrive percent associated with the device with provided device index with the provided value. See details for WARNING.*
- [rsmi\\_status\\_t rsmi\\_dev\\_gpu\\_clk\\_freq\\_set](#) (uint32\_t dv\_ind, [rsmi\\_clk\\_type\\_t](#) clk\_type, uint64\_t freq\_bitmask)  
*Control the set of allowed frequencies that can be used for the specified clock.*

### 6.11.1 Detailed Description

These functions provide control over clock frequencies, power and performance.

### 6.11.2 Function Documentation

#### 6.11.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_perf\\_level\\_set](#) ( int32\_t dv\_ind, [rsmi\\_dev\\_perf\\_level\\_t](#) perf\_lvl )

Set the PowerPlay performance level associated with the device with provided device index with the provided value.

**Deprecated** [rsmi\\_dev\\_perf\\_level\\_set\\_v1\(\)](#) is preferred, with an interface that more closely matches the rest of the rocm\_smi API.

Given a device index [dv\\_ind](#) and an [rsmi\\_dev\\_perf\\_level\\_t](#) [perf\\_level](#), this function will set the PowerPlay performance level for the device to the value [perf\\_lvl](#).

#### Parameters

in	<a href="#">dv_ind</a>	a device index
in	<a href="#">perf_lvl</a>	the value to which the performance level should be set

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call.
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_PERMISSION</a>	function requires root access

#### 6.11.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_perf\\_level\\_set\\_v1](#) ( uint32\_t dv\_ind, [rsmi\\_dev\\_perf\\_level\\_t](#) perf\_lvl )

Set the PowerPlay performance level associated with the device with provided device index with the provided value.

Given a device index [dv\\_ind](#) and an [rsmi\\_dev\\_perf\\_level\\_t](#) [perf\\_level](#), this function will set the PowerPlay performance level for the device to the value [perf\\_lvl](#).

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>perf_lvl</i>	the value to which the performance level should be set

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_PERMISSION</i></a>	function requires root access

6.11.2.3 `rsmi_status_t rsmi_dev_overdrive_level_set ( int32_t dv_ind, uint32_t od )`

Set the overdrive percent associated with the device with provided device index with the provided value. See details for WARNING.

**Deprecated** This function is deprecated. [`rsmi\_dev\_overdrive\_level\_set\_v1`](#) has the same functionality, with an interface that more closely matches the rest of the roc\_msmi API.

Given a device index *dv\_ind* and an overdrive level *od*, this function will set the overdrive level for the device to the value *od*. The overdrive level is an integer value between 0 and 20, inclusive, which represents the overdrive percentage; e.g., a value of 5 specifies an overclocking of 5%.

The overdrive level is specific to the gpu system clock.

The overdrive level is the percentage above the maximum Performance Level to which overclocking will be limited. The overclocking percentage does not apply to clock speeds other than the maximum. This percentage is limited to 20%.

\*\*\*\*\*WARNING\*\*\*\*\* Operating your AMD GPU outside of official AMD specifications or outside of factory settings, including but not limited to the conducting of overclocking (including use of this overclocking software, even if such software has been directly or indirectly provided by AMD or otherwise affiliated in any way with AMD), may cause damage to your AMD GPU, system components and/or result in system failure, as well as cause other problems. DAMAGES CAUSED BY USE OF YOUR AMD GPU OUTSIDE OF OFFICIAL AMD SPECIFICATIONS OR OUTSIDE OF FACTORY SETTINGS ARE NOT COVERED UNDER ANY AMD PRODUCT WARRANTY AND MAY NOT BE COVERED BY YOUR BOARD OR SYSTEM MANUFACTURER'S WARRANTY. Please use this utility with caution.

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>od</i>	the value to which the overdrive level should be set

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_PERMISSION</i></a>	function requires root access

6.11.2.4 `rsmi_status_t rsmi_dev_overdrive_level_set_v1 ( uint32_t dv_ind, uint32_t od )`

Set the overdrive percent associated with the device with provided device index with the provided value. See details for WARNING.

Given a device index *dv\_ind* and an overdrive level *od*, this function will set the overdrive level for the device to

the value `od`. The overdrive level is an integer value between 0 and 20, inclusive, which represents the overdrive percentage; e.g., a value of 5 specifies an overclocking of 5%.

The overdrive level is specific to the gpu system clock.

The overdrive level is the percentage above the maximum Performance Level to which overclocking will be limited. The overclocking percentage does not apply to clock speeds other than the maximum. This percentage is limited to 20%.

\*\*\*\*\*WARNING\*\*\*\*\* Operating your AMD GPU outside of official AMD specifications or outside of factory settings, including but not limited to the conducting of overclocking (including use of this overclocking software, even if such software has been directly or indirectly provided by AMD or otherwise affiliated in any way with AMD), may cause damage to your AMD GPU, system components and/or result in system failure, as well as cause other problems. DAMAGES CAUSED BY USE OF YOUR AMD GPU OUTSIDE OF OFFICIAL AMD SPECIFICATIONS OR OUTSIDE OF FACTORY SETTINGS ARE NOT COVERED UNDER ANY AMD PRODUCT WARRANTY AND MAY NOT BE COVERED BY YOUR BOARD OR SYSTEM MANUFACTURER'S WARRANTY. Please use this utility with caution.

#### Parameters

in	<i>dv_ind</i>	a device index
in	<i>od</i>	the value to which the overdrive level should be set

#### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_PERMISSION</i></a>	function requires root access

#### 6.11.2.5 `rsmi_status_t rsmi_dev_gpu_clk_freq_set ( uint32_t dv_ind, rsmi_clk_type_t clk_type, uint64_t freq_bitmask )`

Control the set of allowed frequencies that can be used for the specified clock.

Given a device index `dv_ind`, a clock type `clk_type`, and a 64 bit bitmask `freq_bitmask`, this function will limit the set of allowable frequencies. If a bit in `freq_bitmask` has a value of 1, then the frequency (as ordered in an [`rsmi\_frequencies\_t`](#) returned by [`rsmi\_dev\_gpu\_clk\_freq\_get\(\)`](#)) corresponding to that bit index will be allowed.

This function will change the performance level to [`RSMI\_DEV\_PERF\_LEVEL\_MANUAL`](#) in order to modify the set of allowable frequencies. Caller will need to set to [`RSMI\_DEV\_PERF\_LEVEL\_AUTO`](#) in order to get back to default state.

All bits with indices greater than or equal to [`rsmi\_frequencies\_t::num\_supported`](#) will be ignored.

#### Parameters

in	<i>dv_ind</i>	a device index
in	<i>clk_type</i>	the type of clock for which the set of frequencies will be modified
in	<i>freq_bitmask</i>	A bitmask indicating the indices of the frequencies that are to be enabled (1) and disabled (0). Only the lowest <a href="#"><code>rsmi_frequencies_t::num_supported</code></a> bits of this mask are relevant.

#### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments

<i>RSMI_STATUS_PERMISSION</i>	function requires root access
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## 6.12 Version Queries

### Functions

- [rsmi\\_status\\_t rsmi\\_version\\_get](#) ([rsmi\\_version\\_t](#) \*version)  
*Get the build version information for the currently running build of RSMI.*
- [rsmi\\_status\\_t rsmi\\_version\\_str\\_get](#) ([rsmi\\_sw\\_component\\_t](#) component, char \*ver\_str, uint32\_t len)  
*Get the driver version string for the current system.*
- [rsmi\\_status\\_t rsmi\\_dev\\_vbios\\_version\\_get](#) (uint32\_t dv\_ind, char \*vbios, uint32\_t len)  
*Get the VBIOS identifier string.*
- [rsmi\\_status\\_t rsmi\\_dev\\_firmware\\_version\\_get](#) (uint32\_t dv\_ind, [rsmi\\_fw\\_block\\_t](#) block, uint64\_t \*fw\_version)  
*Get the firmware versions for a device.*

### 6.12.1 Detailed Description

These functions provide version information about various subsystems.

### 6.12.2 Function Documentation

#### 6.12.2.1 [rsmi\\_status\\_t rsmi\\_version\\_get](#) ( [rsmi\\_version\\_t](#) \* *version* )

Get the build version information for the currently running build of RSMI.

Get the major, minor, patch and build string for RSMI build currently in use through `version`

##### Parameters

<code>in, out</code>	<code>version</code>	A pointer to an <a href="#">rsmi_version_t</a> structure that will be updated with the version information upon return.
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##### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call
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#### 6.12.2.2 [rsmi\\_status\\_t rsmi\\_version\\_str\\_get](#) ( [rsmi\\_sw\\_component\\_t](#) *component*, char \* *ver\_str*, uint32\_t *len* )

Get the driver version string for the current system.

Given a software component `component`, a pointer to a char buffer, `ver_str`, this function will write the driver version string (up to `len` characters) for the current system to `ver_str`. The caller must ensure that it is safe to write at least `len` characters to `ver_str`.

##### Parameters

<code>in</code>	<code>component</code>	The component for which the version string is being requested
<code>in, out</code>	<code>ver_str</code>	A pointer to a buffer of char's to which the version of <code>component</code> will be written
<code>in</code>	<code>len</code>	the length of the caller provided buffer <code>name</code> .

##### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
-------------------------------------	---------------------

<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid
<a href="#"><i>RSMI_STATUS_INSUFFICIENT_SIZE</i></a>	is returned if <code>len</code> bytes is not large enough to hold the entire name. In this case, only <code>len</code> bytes will be written.

#### 6.12.2.3 `rsmi_status_t rsmi_dev_vbios_version_get ( uint32_t dv_ind, char * vbios, uint32_t len )`

Get the VBIOS identifier string.

Given a device ID `dv_ind`, and a pointer to a char buffer, `vbios`, this function will write the VBIOS string (up to `len` characters) for device `dv_ind` to `vbios`. The caller must ensure that it is safe to write at least `len` characters to `vbios`.

##### Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>vbios</i>	A pointer to a buffer of char's to which the VBIOS name will be written. If this parameter is nullptr, this function will return <a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a> if the function is supported with the provided arguments and <a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a> if it is not supported with the provided arguments.
in	<i>len</i>	The number of char's pointed to by <code>vbios</code> which can safely be written to by this function.

##### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

#### 6.12.2.4 `rsmi_status_t rsmi_dev_firmware_version_get ( uint32_t dv_ind, rsmi_fw_block_t block, uint64_t * fw_version )`

Get the firmware versions for a device.

Given a device ID `dv_ind`, and a pointer to a `uint64_t`, `fw_version`, this function will write the FW Versions as a string (up to `len` characters) for device `dv_ind` to `vbios`. The caller must ensure that it is safe to write at least `len` characters to `vbios`.

##### Parameters

in	<i>dv_ind</i>	a device index
in	<i>block</i>	The firmware block for which the version is being requested
in, out	<i>fw_version</i>	The version for the firmware block. If this parameter is nullptr, this function will return <a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a> if the function is supported with the provided arguments and <a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a> if it is not supported with the provided arguments.

##### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments

<i>RSMI_STATUS_INVALID_- ARGS</i>	the provided arguments are not valid
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## 6.13 Error Queries

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_ecc\\_count\\_get](#) (uint32\_t dv\_ind, [rsmi\\_gpu\\_block\\_t](#) block, [rsmi\\_error\\_count\\_t](#) \*ec)  
*Retrieve the error counts for a GPU block.*
- [rsmi\\_status\\_t rsmi\\_dev\\_ecc\\_enabled\\_get](#) (uint32\_t dv\_ind, uint64\_t \*enabled\_blocks)  
*Retrieve the enabled ECC bit-mask.*
- [rsmi\\_status\\_t rsmi\\_dev\\_ecc\\_status\\_get](#) (uint32\_t dv\_ind, [rsmi\\_gpu\\_block\\_t](#) block, [rsmi\\_ras\\_err\\_state\\_t](#) \*state)  
*Retrieve the ECC status for a GPU block.*
- [rsmi\\_status\\_t rsmi\\_status\\_string](#) ([rsmi\\_status\\_t](#) status, const char \*\*status\_string)  
*Get a description of a provided RSMI error status.*

### 6.13.1 Detailed Description

These functions provide error information about RSMI calls as well as device errors.

### 6.13.2 Function Documentation

#### 6.13.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_ecc\\_count\\_get](#) ( uint32\_t dv\_ind, [rsmi\\_gpu\\_block\\_t](#) block, [rsmi\\_error\\_count\\_t](#) \* ec )

Retrieve the error counts for a GPU block.

Given a device index `dv_ind`, an [rsmi\\_gpu\\_block\\_t](#) `block` and a pointer to an [rsmi\\_error\\_count\\_t](#) `ec`, this function will write the error count values for the GPU block indicated by `block` to memory pointed to by `ec`.

#### Parameters

in	<code>dv_ind</code>	a device index
in	<code>block</code>	The block for which error counts should be retrieved
in, out	<code>ec</code>	A pointer to an <a href="#">rsmi_error_count_t</a> to which the error counts should be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

#### 6.13.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_ecc\\_enabled\\_get](#) ( uint32\_t dv\_ind, uint64\_t \* enabled\_blocks )

Retrieve the enabled ECC bit-mask.

Given a device index `dv_ind`, and a pointer to a `uint64_t` `enabled_mask`, this function will write bits to memory pointed to by `enabled_blocks`. Upon a successful call, `enabled_blocks` can then be AND'd with elements of the [rsmi\\_gpu\\_block\\_t](#) enumeration to determine if the corresponding block has ECC enabled. Note that whether a block has ECC enabled or not in the device is independent of whether there is kernel support for error counting for that block. Although a block may be enabled, but there may not be kernel support for reading error counters for that block.



## Parameters

in	<i>dv_ind</i>	a device index
in, out	<i>enabled_blocks</i>	A pointer to a uint64_t to which the enabled blocks bits will be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

### 6.13.2.3 `rsmi_status_t rsmi_dev_ecc_status_get ( uint32_t dv_ind, rsmi_gpu_block_t block, rsmi_ras_err_state_t * state )`

Retrieve the ECC status for a GPU block.

Given a device index *dv\_ind*, an [rsmi\\_gpu\\_block\\_t](#) *block* and a pointer to an [rsmi\\_ras\\_err\\_state\\_t](#) *state*, this function will write the current state for the GPU block indicated by *block* to memory pointed to by *state*.

## Parameters

in	<i>dv_ind</i>	a device index
in	<i>block</i>	The block for which error counts should be retrieved
in, out	<i>state</i>	A pointer to an <a href="#">rsmi_ras_err_state_t</a> to which the ECC state should be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

### 6.13.2.4 `rsmi_status_t rsmi_status_string ( rsmi_status_t status, const char ** status_string )`

Get a description of a provided RSMI error status.

Set the provided pointer to a const char \*, *status\_string*, to a string containing a description of the provided error code *status*.

## Parameters

in	<i>status</i>	The error status for which a description is desired
in, out	<i>status_string</i>	A pointer to a const char * which will be made to point to a description of the provided error code

## Return values

<i>RSML_STATUS_SUCCESS</i>	is returned upon successful call
----------------------------	----------------------------------

## 6.14 Performance Counter Functions

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_counter\\_group\\_supported](#) (uint32\_t dv\_ind, [rsmi\\_event\\_group\\_t](#) group)  
*Tell if an event group is supported by a given device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_counter\\_create](#) (uint32\_t dv\_ind, [rsmi\\_event\\_type\\_t](#) type, [rsmi\\_event\\_handle\\_t](#) \*evnt\_handle)  
*Create a performance counter object.*
- [rsmi\\_status\\_t rsmi\\_dev\\_counter\\_destroy](#) ([rsmi\\_event\\_handle\\_t](#) evnt\_handle)  
*Deallocate a performance counter object.*
- [rsmi\\_status\\_t rsmi\\_counter\\_control](#) ([rsmi\\_event\\_handle\\_t](#) evt\_handle, [rsmi\\_counter\\_command\\_t](#) cmd, void \*cmd\_args)  
*Issue performance counter control commands.*
- [rsmi\\_status\\_t rsmi\\_counter\\_read](#) ([rsmi\\_event\\_handle\\_t](#) evt\_handle, [rsmi\\_counter\\_value\\_t](#) \*value)  
*Read the current value of a performance counter.*
- [rsmi\\_status\\_t rsmi\\_counter\\_available\\_counters\\_get](#) (uint32\_t dv\_ind, [rsmi\\_event\\_group\\_t](#) grp, uint32\_t \*available)  
*Get the number of currently available counters.*

### 6.14.1 Detailed Description

These functions are used to configure, query and control performance counting.

These functions use the same mechanisms as the "perf" command line utility. They share the same underlying resources and have some similarities in how they are used. The events supported by this API should have corresponding perf events that can be seen with "perf stat ...". The events supported by perf can be seen with "perf list"

The types of events available and the ability to count those events are dependent on which device is being targeted and if counters are still available for that device, respectively. [rsmi\\_dev\\_counter\\_group\\_supported\(\)](#) can be used to see which event types ([rsmi\\_event\\_group\\_t](#)) are supported for a given device. Assuming a device supports a given event type, we can then check to see if there are counters available to count a specific event with [rsmi\\_counter\\_available\\_counters\\_get\(\)](#). Counters may be occupied by other perf based programs.

Once it is determined that events are supported and counters are available, an event counter can be created/destroyed and controlled.

[rsmi\\_dev\\_counter\\_create\(\)](#) allocates internal data structures that will be used to control the event counter, and return a handle to this data structure.

Once an event counter handle is obtained, the event counter can be controlled (i.e., started, stopped,...) with [rsmi\\_counter\\_control\(\)](#) by passing [rsmi\\_counter\\_command\\_t](#) commands. [RSMI\\_CNTR\\_CMD\\_START](#) starts an event counter and [RSMI\\_CNTR\\_CMD\\_STOP](#) stops a counter. [rsmi\\_counter\\_read\(\)](#) reads an event counter.

Once the counter is no longer needed, the resources it uses should be freed by calling [rsmi\\_dev\\_counter\\_destroy\(\)](#).

### Important Notes about Counter Values

- A running "absolute" counter is kept internally. For the discussion that follows, we will call the internal counter value at time  $t$   $val_t$
- Issuing [RSMI\\_CNTR\\_CMD\\_START](#) or calling [rsmi\\_counter\\_read\(\)](#), causes RSMI (in kernel) to internally record the current absolute counter value
- [rsmi\\_counter\\_read\(\)](#) returns the number of events that have occurred since the previously recorded value (ie, a relative value,  $val_t - val_{t-1}$ ) from the issuing of [RSMI\\_CNTR\\_CMD\\_START](#) or calling [rsmi\\_counter\\_read\(\)](#)

Example of event counting sequence:

```

rsmi_counter_value_t value;

// Determine if RSMI_EVT_GRP_XGMI is supported for device dv_ind
ret = rsmi_dev_counter_group_supported(dv_ind,
    RSMI_EVT_GRP_XGMI);

// See if there are counters available for device dv_ind for event
// RSMI_EVT_GRP_XGMI

ret = rsmi_counter_available_counters_get(dv_ind,
    RSMI_EVT_GRP_XGMI, &counters_available);

// Assuming RSMI_EVT_GRP_XGMI is supported and there is at least 1
// counter available for RSMI_EVT_GRP_XGMI on device dv_ind, create
// an event object for an event of group RSMI_EVT_GRP_XGMI (e.g.,
// RSMI_EVT_XGMI_0_BEATS_TX) and get the handle
// (rsmi_event_handle_t).

ret = rsmi_dev_counter_create(dv_ind,
    RSMI_EVT_XGMI_0_BEATS_TX,
                                &evnt_handle);

// A program that generates the events of interest can be started
// immediately before or after starting the counters.
// Start counting:
ret = rsmi_counter_control(evnt_handle, RSMI_CNTR_CMD_START, NULL);

// Wait...

// Get the number of events since RSMI_CNTR_CMD_START was issued:
ret = rsmi_counter_read(rsmi_event_handle_t evt_handle, &value)

// Wait...

// Get the number of events since rsmi_counter_read() was last called:
ret = rsmi_counter_read(rsmi_event_handle_t evt_handle, &value)

// Stop counting.
ret = rsmi_counter_control(evnt_handle, RSMI_CNTR_CMD_STOP, NULL);

// Release all resources (e.g., counter and memory resources) associated
// with evnt_handle.
ret = rsmi_dev_counter_destroy(evnt_handle);

```

## 6.14.2 Function Documentation

### 6.14.2.1 `rsmi_status_t rsmi_dev_counter_group_supported ( uint32_t dv_ind, rsmi_event_group_t group )`

Tell if an event group is supported by a given device.

Given a device index `dv_ind` and an event group specifier `group`, tell if `group` type events are supported by the device associated with `dv_ind`

#### Parameters

in	<i>dv_ind</i>	device index of device being queried
in	<i>group</i>	<a href="#">rsmi_event_group_t</a> identifier of group for which support is being queried

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	if the device associatee with <code>dv_ind</code> support counting events of the type indicated by <code>group</code> .
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments <code>group</code>

### 6.14.2.2 `rsmi_status_t rsmi_dev_counter_create ( uint32_t dv_ind, rsmi_event_type_t type, rsmi_event_handle_t * evnt_handle )`

Create a performance counter object.

Create a performance counter object of type `type` for the device with a device index of `dv_ind`, and write a handle to the object to the memory location pointed to by `evnt_handle`. `evnt_handle` can be used with other

performance event operations. The handle should be deallocated with `rsmi_dev_counter_destroy()` when no longer needed.

#### Parameters

in	<i>dv_ind</i>	a device index
in	<i>type</i>	the <code>rsmi_event_type_t</code> of performance event to create
in, out	<i>evnt_handle</i>	A pointer to a <code>rsmi_event_handle_t</code> which will be associated with a newly allocated counter. If this parameter is nullptr, this function will return <code>RSMI_STATUS_INVALID_ARGS</code> if the function is supported with the provided arguments and <code>RSMI_STATUS_NOT_SUPPORTED</code> if it is not supported with the provided arguments.

#### Return values

<code>RSMI_STATUS_SUCCESS</code>	call was successful
<code>RSMI_STATUS_NOT_SUPPORTED</code>	installed software or hardware does not support this function with the given arguments
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid
<code>RSMI_STATUS_OUT_OF_RESOURCES</code>	unable to allocate memory for counter
<code>RSMI_STATUS_PERMISSION</code>	function requires root access

#### 6.14.2.3 `rsmi_status_t rsmi_dev_counter_destroy ( rsmi_event_handle_t evnt_handle )`

Deallocate a performance counter object.

Deallocate the performance counter object with the provided `rsmi_event_handle_t evnt_handle`

#### Parameters

in	<i>evnt_handle</i>	handle to event object to be deallocated
----	--------------------	--

#### Return values

<code>RSMI_STATUS_SUCCESS</code>	is returned upon successful call
<code>RSMI_STATUS_INVALID_ARGS</code>	the provided arguments are not valid
<code>RSMI_STATUS_PERMISSION</code>	function requires root access

#### 6.14.2.4 `rsmi_status_t rsmi_counter_control ( rsmi_event_handle_t evt_handle, rsmi_counter_command_t cmd, void * cmd_args )`

Issue performance counter control commands.

Issue a command `cmd` on the event counter associated with the provided handle `evt_handle`.

#### Parameters

in	<i>evt_handle</i>	an event handle
in	<i>cmd</i>	The event counter command to be issued
in, out	<i>cmd_args</i>	Currently not used. Should be set to NULL.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid
<a href="#"><i>RSMI_STATUS_PERMISSION</i></a>	function requires root access

6.14.2.5 `rsmi_status_t rsmi_counter_read ( rsmi_event_handle_t evt_handle, rsmi_counter_value_t * value )`

Read the current value of a performance counter.

Read the current counter value of the counter associated with the provided handle `evt_handle` and write the value to the location pointed to by `value`.

## Parameters

<code>in</code>	<code>evt_handle</code>	an event handle
<code>in, out</code>	<code>value</code>	pointer to memory of size of <a href="#"><code>rsmi_counter_value_t</code></a> to which the counter value will be written

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid
<a href="#"><i>RSMI_STATUS_PERMISSION</i></a>	function requires root access

6.14.2.6 `rsmi_status_t rsmi_counter_available_counters_get ( uint32_t dv_ind, rsmi_event_group_t grp, uint32_t * available )`

Get the number of currently available counters.

Given a device index `dv_ind`, a performance event group `grp`, and a pointer to a `uint32_t` `available`, this function will write the number of `grp` type counters that are available on the device with index `dv_ind` to the memory that `available` points to.

## Parameters

<code>in</code>	<code>dv_ind</code>	a device index
<code>in</code>	<code>grp</code>	an event device group
<code>in, out</code>	<code>available</code>	A pointer to a <code>uint32_t</code> to which the number of available counters will be written

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

## 6.15 System Information Functions

### Functions

- [rsmi\\_status\\_t rsmi\\_compute\\_process\\_info\\_get](#) ([rsmi\\_process\\_info\\_t](#) \*procs, [uint32\\_t](#) \*num\_items)  
*Get process information about processes currently using GPU.*
- [rsmi\\_status\\_t rsmi\\_compute\\_process\\_info\\_by\\_pid\\_get](#) ([uint32\\_t](#) pid, [rsmi\\_process\\_info\\_t](#) \*proc)  
*Get process information about a specific process.*
- [rsmi\\_status\\_t rsmi\\_compute\\_process\\_gpus\\_get](#) ([uint32\\_t](#) pid, [uint32\\_t](#) \*dv\_indices, [uint32\\_t](#) \*num\_devices)  
*Get the device indices currently being used by a process.*

### 6.15.1 Detailed Description

These functions are used to configure, query and control performance counting.

### 6.15.2 Function Documentation

#### 6.15.2.1 [rsmi\\_status\\_t rsmi\\_compute\\_process\\_info\\_get](#) ( [rsmi\\_process\\_info\\_t](#) \*procs, [uint32\\_t](#) \* num\_items )

Get process information about processes currently using GPU.

Given a non-NULL pointer to an array `procs` of [rsmi\\_process\\_info\\_t](#)'s, of length `*num_items`, this function will write up to `*num_items` instances of [rsmi\\_process\\_info\\_t](#) to the memory pointed to by `procs`. These instances contain information about each process utilizing a GPU. If `procs` is not NULL, `num_items` will be updated with the number of processes actually written. If `procs` is NULL, `num_items` will be updated with the number of processes for which there is current process information. Calling this function with `procs` being NULL is a way to determine how much memory should be allocated for when `procs` is not NULL.

#### Parameters

in, out	<code>procs</code>	a pointer to memory provided by the caller to which process information will be written. This may be NULL in which case only <code>num_items</code> will be updated with the number of processes found.
in, out	<code>num_items</code>	A pointer to a <a href="#">uint32_t</a> , which on input, should contain the amount of memory in <a href="#">rsmi_process_info_t</a> 's which have been provided by the <code>procs</code> argument. On output, if <code>procs</code> is non-NULL, this will be updated with the number <a href="#">rsmi_process_info_t</a> structs actually written. If <code>procs</code> is NULL, this argument will be updated with the number processes for which there is information.

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid
<a href="#">RSMI_STATUS_INSUFFICIENT_SIZE</a>	is returned if there were more processes for which information was available, but not enough space was provided as indicated by <code>procs</code> and <code>num_items</code> , on input.

#### 6.15.2.2 [rsmi\\_status\\_t rsmi\\_compute\\_process\\_info\\_by\\_pid\\_get](#) ( [uint32\\_t](#) pid, [rsmi\\_process\\_info\\_t](#) \*proc )

Get process information about a specific process.

Given a pointer to an [rsmi\\_process\\_info\\_t](#) `proc` and a process id `pid`, this function will write the process information for `pid`, if available, to the memory pointed to by `proc`.

## Parameters

in	<i>pid</i>	The process ID for which process information is being requested
in, out	<i>proc</i>	a pointer to a <a href="#">rsmi_process_info_t</a> to which process information for <i>pid</i> will be written if it is found.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid
<a href="#">RSMI_STATUS_NOT_FOUND</a>	is returned if there was no process information found for the provided <i>pid</i>

6.15.2.3 `rsmi_status_t rsmi_compute_process_gpus_get ( uint32_t pid, uint32_t* dv_indices, uint32_t* num_devices )`

Get the device indices currently being used by a process.

Given a process id *pid*, a non-NULL pointer to an array of `uint32_t`'s *dv\_indices* of length *\*num\_devices*, this function will write up to *num\_devices* device indices to the memory pointed to by *dv\_indices*. If *dv\_indices* is not NULL, *num\_devices* will be updated with the number of gpu's currently being used by process *pid*. If *dv\_indices* is NULL, *dv\_indices* will be updated with the number of gpus currently being used by *pid*. Calling this function with *dv\_indices* being NULL is a way to determine how much memory is required for when *dv\_indices* is not NULL.

## Parameters

in	<i>pid</i>	The process id of the process for which the number of gpus currently being used is requested
in, out	<i>dv_indices</i>	a pointer to memory provided by the caller to which indices of devices currently being used by the process will be written. This may be NULL in which case only <i>num_devices</i> will be updated with the number of devices being used.
in, out	<i>num_devices</i>	A pointer to a <code>uint32_t</code> , which on input, should contain the amount of memory in <code>uint32_t</code> 's which have been provided by the <i>dv_indices</i> argument. On output, if <i>dv_indices</i> is non-NULL, this will be updated with the number <code>uint32_t</code> 's actually written. If <i>dv_indices</i> is NULL, this argument will be updated with the number devices being used.

## Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid
<a href="#">RSMI_STATUS_INSUFFICIENT_SIZE</a>	is returned if there were more gpu indices that could have been written, but not enough space was provided as indicated by <i>dv_indices</i> and <i>num_devices</i> , on input.



## 6.16 XGMI Functions

### Functions

- [rsmi\\_status\\_t rsmi\\_dev\\_xgmi\\_error\\_status](#) (uint32\_t dv\_ind, [rsmi\\_xgmi\\_status\\_t](#) \*status)  
*Retrieve the XGMI error status for a device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_xgmi\\_error\\_reset](#) (uint32\_t dv\_ind)  
*Reset the XGMI error status for a device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_xgmi\\_hive\\_id\\_get](#) (uint32\_t dv\_ind, uint64\_t \*hive\_id)  
*Retrieve the XGMI hive id for a device.*

### 6.16.1 Detailed Description

These functions are used to configure, query and control XGMI.

### 6.16.2 Function Documentation

#### 6.16.2.1 [rsmi\\_status\\_t rsmi\\_dev\\_xgmi\\_error\\_status](#) ( uint32\_t dv\_ind, [rsmi\\_xgmi\\_status\\_t](#) \* status )

Retrieve the XGMI error status for a device.

Given a device index [dv\\_ind](#), and a pointer to an [rsmi\\_xgmi\\_status\\_t](#) [status](#), this function will write the current XGMI error state [rsmi\\_xgmi\\_status\\_t](#) for the device [dv\\_ind](#) to the memory pointed to by [status](#).

#### Parameters

in	<a href="#">dv_ind</a>	a device index
in, out	<a href="#">status</a>	A pointer to an <a href="#">rsmi_xgmi_status_t</a> to which the XGMI error state should be written. If this parameter is nullptr, this function will return <a href="#">RSMI_STATUS_INVALID_ARGS</a> if the function is supported with the provided arguments and <a href="#">RSMI_STATUS_NOT_SUPPORTED</a> if it is not supported with the provided arguments.

#### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_NOT_SUPPORTED</a>	installed software or hardware does not support this function with the given arguments
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

#### 6.16.2.2 [rsmi\\_status\\_t rsmi\\_dev\\_xgmi\\_error\\_reset](#) ( uint32\_t dv\_ind )

Reset the XGMI error status for a device.

Given a device index [dv\\_ind](#), this function will reset the current XGMI error state [rsmi\\_xgmi\\_status\\_t](#) for the device [dv\\_ind](#) to [rsmi\\_xgmi\\_status\\_t::RSMI\\_XGMI\\_STATUS\\_NO\\_ERRORS](#)

#### Parameters

in	<a href="#">dv_ind</a>	a device index
----	------------------------	----------------

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
--	-----------------------------------

### 6.16.2.3 `rsmi_status_t rsmi_dev_xgmi_hive_id_get ( uint32_t dv_ind, uint64_t * hive_id )`

Retrieve the XGMI hive id for a device.

Given a device index `dv_ind`, and a pointer to an `uint64_t` `hive_id`, this function will write the current XGMI hive id for the device `dv_ind` to the memory pointed to by `hive_id`.

## Parameters

<code>in</code>	<code>dv_ind</code>	a device index
<code>in, out</code>	<code>hive_id</code>	A pointer to an <code>uint64_t</code> to which the XGMI hive id should be written

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_NOT_SUPPORTED</i></a>	installed software or hardware does not support this function with the given arguments
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

## 6.17 Hardware Topology Functions

### Functions

- [rsmi\\_status\\_t rsmi\\_topo\\_get\\_numa\\_node\\_number](#) (uint32\_t dv\_ind, uint32\_t \*numa\_node)  
*Retrieve the NUMA CPU node number for a device.*
- [rsmi\\_status\\_t rsmi\\_topo\\_get\\_link\\_weight](#) (uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, uint64\_t \*weight)  
*Retrieve the weight for a connection between 2 GPUs.*
- [rsmi\\_status\\_t rsmi\\_minmax\\_bandwidth\\_get](#) (uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, uint64\_t \*min\_bandwidth, uint64\_t \*max\_bandwidth)  
*Retrieve minimal and maximal io link bandwidth between 2 GPUs.*
- [rsmi\\_status\\_t rsmi\\_topo\\_get\\_link\\_type](#) (uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, uint64\_t \*hops, [RSMI\\_IO\\_LINK\\_TYPE](#) \*type)  
*Retrieve the hops and the connection type between 2 GPUs.*
- [rsmi\\_status\\_t rsmi\\_is\\_P2P\\_accessible](#) (uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, bool \*accessible)  
*Return P2P availability status between 2 GPUs.*

### 6.17.1 Detailed Description

These functions are used to query Hardware topology.

### 6.17.2 Function Documentation

#### 6.17.2.1 [rsmi\\_status\\_t rsmi\\_topo\\_get\\_numa\\_node\\_number](#) ( uint32\_t dv\_ind, uint32\_t \* numa\_node )

Retrieve the NUMA CPU node number for a device.

Given a device index `dv_ind`, and a pointer to an `uint32_t` `numa_node`, this function will write the node number of NUMA CPU for the device `dv_ind` to the memory pointed to by `numa_node`.

##### Parameters

in	<code>dv_ind</code>	a device index
in, out	<code>numa_node</code>	A pointer to an <code>uint32_t</code> to which the numa node number should be written.

##### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	call was successful
<a href="#">RSMI_STATUS_INVALID_ARGS</a>	the provided arguments are not valid

#### 6.17.2.2 [rsmi\\_status\\_t rsmi\\_topo\\_get\\_link\\_weight](#) ( uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, uint64\_t \* weight )

Retrieve the weight for a connection between 2 GPUs.

Given a source device index `dv_ind_src` and a destination device index `dv_ind_dst`, and a pointer to an `uint64_t` `weight`, this function will write the weight for the connection between the device `dv_ind_src` and `dv_ind_dst` to the memory pointed to by `weight`.

##### Parameters

in	<code>dv_ind_src</code>	the source device index
----	-------------------------	-------------------------

in	<i>dv_ind_dst</i>	the destination device index
in, out	<i>weight</i>	A pointer to an <code>uint64_t</code> to which the weight for the connection should be written.

**Return values**

<a href="#"><code>RSMI_STATUS_SUCCESS</code></a>	call was successful
<a href="#"><code>RSMI_STATUS_INVALID_ARGS</code></a>	the provided arguments are not valid

### 6.17.2.3 `rsmi_status_t rsmi_minmax_bandwidth_get ( uint32_t dv_ind_src, uint32_t dv_ind_dst, uint64_t * min_bandwidth, uint64_t * max_bandwidth )`

Retrieve minimal and maximal io link bandwidth between 2 GPUs.

Given a source device index `dv_ind_src` and a destination device index `dv_ind_dst`, pointer to an `uint64_t` `min_bandwidth`, and a pointer to `uint64_t` `max_bandwidth`, this function will write theoretical minimal and maximal bandwidth limits. API works if `src` and `dst` are connected via `xgmi` and have 1 hop distance.

**Parameters**

in	<i>dv_ind_src</i>	the source device index
in	<i>dv_ind_dst</i>	the destination device index
in, out	<i>min_bandwidth</i>	A pointer to an <code>uint64_t</code> to which the minimal bandwidth for the connection should be written.
in, out	<i>max_bandwidth</i>	A pointer to an <code>uint64_t</code> to which the maximal bandwidth for the connection should be written.

**Return values**

<a href="#"><code>RSMI_STATUS_SUCCESS</code></a>	call was successful
<a href="#"><code>RSMI_STATUS_INVALID_ARGS</code></a>	the provided arguments are not valid

### 6.17.2.4 `rsmi_status_t rsmi_topo_get_link_type ( uint32_t dv_ind_src, uint32_t dv_ind_dst, uint64_t * hops, RSMI_IO_LINK_TYPE * type )`

Retrieve the hops and the connection type between 2 GPUs.

Given a source device index `dv_ind_src` and a destination device index `dv_ind_dst`, and a pointer to an `uint64_t` `hops` and a pointer to an `RSMI_IO_LINK_TYPE` `type`, this function will write the number of hops and the connection type between the device `dv_ind_src` and `dv_ind_dst` to the memory pointed to by `hops` and `type`.

**Parameters**

in	<i>dv_ind_src</i>	the source device index
in	<i>dv_ind_dst</i>	the destination device index
in, out	<i>hops</i>	A pointer to an <code>uint64_t</code> to which the hops for the connection should be written.
in, out	<i>type</i>	A pointer to an <a href="#"><code>RSMI_IO_LINK_TYPE</code></a> to which the type for the connection should be written.

**Return values**

<a href="#"><code>RSMI_STATUS_SUCCESS</code></a>	call was successful
--	---------------------

<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid
---	--------------------------------------

#### 6.17.2.5 `rsmi_status_t rsmi_is_P2P_accessible ( uint32_t dv_ind_src, uint32_t dv_ind_dst, bool * accessible )`

Return P2P availability status between 2 GPUs.

Given a source device index `dv_ind_src` and a destination device index `dv_ind_dst`, and a pointer to a bool, this function will write the P2P connection status between the device `dv_ind_src` and `dv_ind_dst` to the memory pointed to by `accessible`.

##### Parameters

in	<i>dv_ind_src</i>	the source device index
in	<i>dv_ind_dst</i>	the destination device index
in, out	<i>accessible</i>	A pointer to a bool to which the status for the P2P connection availability should be written.

##### Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	call was successful
<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	the provided arguments are not valid

## 6.18 Supported Functions

### Functions

- `rsmi_status_t rsmi_dev_supported_func_iterator_open (uint32_t dv_ind, rsmi_func_id_iter_handle_t *handle)`

*Get a function name iterator of supported RSMI functions for a device.*

- `rsmi_status_t rsmi_dev_supported_variant_iterator_open (rsmi_func_id_iter_handle_t obj_h, rsmi_func_id_iter_handle_t *var_iter)`

*Get a variant iterator for a given handle.*

- `rsmi_status_t rsmi_func_iter_next (rsmi_func_id_iter_handle_t handle)`

*Advance a function identifier iterator.*

- `rsmi_status_t rsmi_dev_supported_func_iterator_close (rsmi_func_id_iter_handle_t *handle)`

*Close a variant iterator handle.*

- `rsmi_status_t rsmi_func_iter_value_get (rsmi_func_id_iter_handle_t handle, rsmi_func_id_value_t *value)`

*Get the value associated with a function/variant iterator.*

### 6.18.1 Detailed Description

API function support varies by both GPU type and the version of the installed ROCm stack. The functions described in this section can be used to determine, up front, which functions are supported for a given device on a system. If such "up front" knowledge of support for a function is not needed, alternatively, one can call a device related function and check the return code.

Some functions have several variations ("variants") where some variants are supported and others are not. For example, on a given device, `rsmi_dev_temp_metric_get` may support some types of temperature metrics (e.g., `RSMI_TEMP_CRITICAL_HYST`), but not others (e.g., `RSMI_TEMP_EMERGENCY`).

In addition to a top level of variant support for a function, a function may have varying support for monitors/sensors. These are considered "sub-variants" in functions described in this section. Continuing the `rsmi_dev_temp_metric_get` example, if variant `RSMI_TEMP_CRITICAL_HYST` is supported, perhaps only the sub-variant sensors `RSMI_TEMP_TYPE_EDGE` and `RSMI_TEMP_TYPE_EDGE` are supported, but not `RSMI_TEMP_TYPE_MEMORY`.

In cases where a function takes in a sensor id parameter but does not have any "top level" variants, the functions in this section will indicate a default "variant", `RSMI_DEFAULT_VARIANT`, for the top level variant, and the various monitor support will be sub-variants of this.

The functions in this section use the "iterator" concept to list which functions are supported; to list which variants of the supported functions are supported; and finally which monitors/sensors are supported for a variant.

Here is example code that prints out all supported functions, their supported variants and sub-variants. Please see the related descriptions functions and RSMI types.

```

rsmi_func_id_iter_handle_t iter_handle, var_iter, sub_var_iter;
rsmi_func_id_value_t value;
rsmi_status_t err;

for (uint32_t i = 0; i < <number of devices>; ++i) {
    std::cout << "Supported RSMI Functions:" << std::endl;
    std::cout << "\tVariants (Monitors)" << std::endl;

    err = rsmi_dev_supported_func_iterator_open(i, &iter_handle);

    while (1) {
        err = rsmi_func_iter_value_get(iter_handle, &value);
        std::cout << "Function Name: " << value.name << std::endl;

        err = rsmi_dev_supported_variant_iterator_open(iter_handle, &
            var_iter);
        if (err != RSMI_STATUS_NO_DATA) {
            std::cout << "\tVariants/Monitors: ";
            while (1) {
                err = rsmi_func_iter_value_get(var_iter, &value);
                if (value.id == RSMI_DEFAULT_VARIANT) {
                    std::cout << "Default Variant ";
                } else {
                    std::cout << value.id;
                }
                std::cout << " ";

                err =
                    rsmi_dev_supported_variant_iterator_open(var_iter, &
                        sub_var_iter);
                if (err != RSMI_STATUS_NO_DATA) {
                    while (1) {
                        err = rsmi_func_iter_value_get(sub_var_iter, &value);
                        std::cout << value.id << ", ";

                        err = rsmi_func_iter_next(sub_var_iter);

                        if (err == RSMI_STATUS_NO_DATA) {
                            break;
                        }
                    }
                    err = rsmi_dev_supported_func_iterator_close(&sub_var_iter)
                ;
            }

            std::cout << ")", ";";

            err = rsmi_func_iter_next(var_iter);

            if (err == RSMI_STATUS_NO_DATA) {
                break;
            }
        }
        std::cout << std::endl;

        err = rsmi_dev_supported_func_iterator_close(&var_iter);
    }

    err = rsmi_func_iter_next(iter_handle);

    if (err == RSMI_STATUS_NO_DATA) {
        break;
    }
}
err = rsmi_dev_supported_func_iterator_close(&iter_handle);
}

```

## 6.18.2 Function Documentation

### 6.18.2.1 `rsmi_status_t rsmi_dev_supported_func_iterator_open ( uint32_t dv_ind, rsmi_func_id_iter_handle_t * handle )`

Get a function name iterator of supported RSMI functions for a device.

Given a device index `dv_ind`, this function will write a function iterator handle to the caller-provided memory pointed to by `handle`. This handle can be used to iterate through all the supported functions.

Note that although this function takes in `dv_ind` as an argument, `rsmi_dev_supported_func_iterator_open` itself will not be among the functions listed as supported. This is because `rsmi_dev_supported_func_iterator_open` does

not depend on hardware or driver support and should always be supported.



## Parameters

in	<i>dv_ind</i>	a device index of device for which support information is requested
in, out	<i>handle</i>	A pointer to caller-provided memory to which the function iterator will be written.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
--	-----------------------------------

#### 6.18.2.2 `rsmi_status_t rsmi_dev_supported_variant_iterator_open ( rsmi_func_id_iter_handle_t obj_h, rsmi_func_id_iter_handle_t * var_iter )`

Get a variant iterator for a given handle.

Given a [`rsmi\_func\_id\_iter\_handle\_t`](#) `obj_h`, this function will write a function iterator handle to the caller-provided memory pointed to by `var_iter`. This handle can be used to iterate through all the supported variants of the provided handle. `obj_h` may be a handle to a function object, as provided by a call to [`rsmi\_dev\_supported\_func\_iterator\_open`](#), or it may be a variant itself (from a call to [`rsmi\_dev\_supported\_variant\_iterator\_open`](#)), in which case `var_iter` will be an iterator of the sub-variants of `obj_h` (e.g., monitors).

This call allocates a small amount of memory to `var_iter`. To free this memory [`rsmi\_dev\_supported\_func\_iterator\_close`](#) should be called on the returned iterator handle `var_iter` when it is no longer needed.

## Parameters

in	<i>obj_h</i>	an iterator handle for which the variants are being requested
in, out	<i>var_iter</i>	A pointer to caller-provided memory to which the sub-variant iterator will be written.

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
--	-----------------------------------

#### 6.18.2.3 `rsmi_status_t rsmi_func_iter_next ( rsmi_func_id_iter_handle_t handle )`

Advance a function identifier iterator.

Given a function id iterator handle ([`rsmi\_func\_id\_iter\_handle\_t`](#)) `handle`, this function will increment the iterator to point to the next identifier. After a successful call to this function, obtaining the value of the iterator `handle` will provide the value of the next item in the list of functions/variants.

If there are no more items in the list, [`RSMI\_STATUS\_NO\_DATA`](#) is returned.

## Parameters

in	<i>handle</i>	A pointer to an iterator handle to be incremented
----	---------------	---

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
<a href="#"><i>RSMI_STATUS_NO_DATA</i></a>	is returned when list of identifiers has been exhausted

#### 6.18.2.4 `rsmi_status_t rsmi_dev_supported_func_iterator_close ( rsmi_func_id_iter_handle_t * handle )`

Close a variant iterator handle.

Given a pointer to an [`rsmi\_func\_id\_iter\_handle\_t`](#) `handle`, this function will free the resources being used by the handle

## Parameters

in	<i>handle</i>	A pointer to an iterator handle to be closed
----	---------------	--

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
--	-----------------------------------

6.18.2.5 `rsmi_status_t rsmi_func_iter_value_get ( rsmi_func_id_iter_handle_t handle, rsmi_func_id_value_t *  
value )`

Get the value associated with a function/variant iterator.

Given an [`rsmi\_func\_id\_iter\_handle\_t`](#) *handle*, this function will write the identifier of the function/variant to the user provided memory pointed to by *value*.

*value* may point to a function name, a variant id, or a monitor/sensor index, depending on what kind of iterator *handle* is

## Parameters

in	<i>handle</i>	An iterator for which the value is being requested
in, out	<i>value</i>	A pointer to an <a href="#"><code>rsmi_func_id_value_t</code></a> provided by the caller to which this function will write the value associated with <i>handle</i>

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call.
--	-----------------------------------

## 6.19 Event Notification Functions

### Functions

- [rsmi\\_status\\_t rsmi\\_event\\_notification\\_init](#) (uint32\_t dv\_ind)  
*Prepare to collect event notifications for a GPU.*
- [rsmi\\_status\\_t rsmi\\_event\\_notification\\_mask\\_set](#) (uint32\_t dv\_ind, uint64\_t mask)  
*Specify which events to collect for a device.*
- [rsmi\\_status\\_t rsmi\\_event\\_notification\\_get](#) (int timeout\_ms, uint32\_t \*num\_elem, [rsmi\\_evt\\_notification\\_data\\_t](#) \*data)  
*Collect event notifications, waiting a specified amount of time.*
- [rsmi\\_status\\_t rsmi\\_event\\_notification\\_stop](#) (uint32\_t dv\_ind)  
*Close any file handles and free any resources used by event notification for a GPU.*

### 6.19.1 Detailed Description

These functions are used to configure for and get asynchronous event notifications.

### 6.19.2 Function Documentation

#### 6.19.2.1 [rsmi\\_status\\_t rsmi\\_event\\_notification\\_init](#) ( uint32\_t dv\_ind )

Prepare to collect event notifications for a GPU.

This function prepares to collect events for the GPU with device ID `dv_ind`, by initializing any required system parameters. This call may open files which will remain open until [rsmi\\_event\\_notification\\_stop\(\)](#) is called.

##### Parameters

<code>dv_ind</code>	a device index corresponding to the device on which to listen for events
---------------------	--

##### Return values

<a href="#">RSMI_STATUS_SUCCESS</a>	is returned upon successful call.
-------------------------------------	-----------------------------------

#### 6.19.2.2 [rsmi\\_status\\_t rsmi\\_event\\_notification\\_mask\\_set](#) ( uint32\_t dv\_ind, uint64\_t mask )

Specify which events to collect for a device.

Given a device index `dv_ind` and a `mask` consisting of elements of [rsmi\\_evt\\_notification\\_type\\_t](#) OR'd together, this function will listen for the events specified in `mask` on the device corresponding to `dv_ind`.

##### Parameters

<code>dv_ind</code>	a device index corresponding to the device on which to listen for events
<code>mask</code>	Bitmask generated by OR'ing 1 or more elements of <a href="#">rsmi_evt_notification_type_t</a> indicating which event types to listen for, where the <code>rsmi_evt_notification_type_t</code> value indicates the bit field, with bit position starting from 1. For example, if the mask field is 0x0000000000000003, which means first bit, bit 1 (bit position start from 1) and bit 2 are set, which indicate interest in receiving <code>RSMI_EVT_NOTIF_VMFAULT</code> (which has a value of 1) and <code>RSMI_EVT_NOTIF_THERMAL_THROTTLE</code> event (which has a value of 2).

## Return values

<a href="#"><i>RSMI_STATUS_INIT_ERR_OR</i></a>	is returned if <a href="#"><code>rsmi_event_notification_init()</code></a> has not been called before a call to this function
<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	is returned upon successful call

### 6.19.2.3 `rsmi_status_t rsmi_event_notification_get ( int timeout_ms, uint32_t * num_elem, rsmi_evt_notification_data_t * data )`

Collect event notifications, waiting a specified amount of time.

Given a time period `timeout_ms` in milliseconds and a caller- provided buffer of [`rsmi\_evt\_notification\_data\_t`](#)'s `data` with a length (in [`rsmi\_evt\_notification\_data\_t`](#)'s, also specified by the caller) in the memory location pointed to by `num_elem`, this function will collect [`rsmi\_evt\_notification\_type\_t`](#) events for up to `timeout_ms` milliseconds, and write up to `*num_elem` event items to `data`. Upon return `num_elem` is updated with the number of events that were actually written. If events are already present when this function is called, it will write the events to the buffer then poll for new events if there is still caller-provided buffer available to write any new events that would be found.

This function requires prior calls to [`rsmi\_event\_notification\_init\(\)`](#) and [`rsmi\_event\_notification\_mask\_set\(\)`](#). This function polls for the occurrence of the events on the respective devices that were previously specified by [`rsmi\_event\_notification\_mask\_set\(\)`](#).

## Parameters

in	<i>timeout_ms</i>	number of milliseconds to wait for an event to occur
in, out	<i>num_elem</i>	pointer to <code>uint32_t</code> , provided by the caller. On input, this value tells how many <a href="#"><code>rsmi_evt_notification_data_t</code></a> elements are being provided by the caller with <code>data</code> . On output, the location pointed to by <code>num_elem</code> will contain the number of items written to the provided buffer.
out	<i>data</i>	pointer to a caller-provided memory buffer of size <code>num_elem</code> <a href="#"><code>rsmi_evt_notification_data_t</code></a> to which this function may safely write. If there are events found, up to <code>num_elem</code> event items will be written to <code>data</code> .

## Return values

<a href="#"><i>RSMI_STATUS_SUCCESS</i></a>	The function ran successfully. The events that were found are written to <code>data</code> and <code>num_elems</code> is updated with the number of elements that were written.
<a href="#"><i>RSMI_STATUS_NO_DATA</i></a>	No events were found to collect.

### 6.19.2.4 `rsmi_status_t rsmi_event_notification_stop ( uint32_t dv_ind )`

Close any file handles and free any resources used by event notification for a GPU.

Any resources used by event notification for the GPU with device index `dv_ind` will be free with this function. This includes freeing any memory and closing file handles. This should be called for every call to [`rsmi\_event\_notification\_init\(\)`](#)

## Parameters

in	<i>dv_ind</i>	The device index of the GPU for which event notification resources will be free
----	---------------	---

## Return values

<a href="#"><i>RSMI_STATUS_INVALID_ARGS</i></a>	resources for the given device have either already been freed, or were never allocated by <a href="#"><code>rsmi_event_notification_init()</code></a>
---	---

<i>RSML_STATUS_SUCCESS</i>	is returned upon successful call
----------------------------	----------------------------------



## Chapter 7

# Data Structure Documentation

### 7.1 id Union Reference

This union holds the value of an [rsmi\\_func\\_id\\_iter\\_handle\\_t](#). The value may be a function name, or an enumerated variant value of types such as [rsmi\\_memory\\_type\\_t](#), [rsmi\\_temperature\\_metric\\_t](#), etc.

```
#include <rocm_smi.h>
```

#### Data Fields

- `uint64_t id`  
*uint64\_t representation of value*
  - `const char * name`  
*name string (applicable to functions only)*
  - union {
    - [rsmi\\_memory\\_type\\_t](#) `memory_type`  
*< Used for [rsmi\\_memory\\_type\\_t](#) variants*
    - [rsmi\\_temperature\\_metric\\_t](#) `temp_metric`  
*Used for [rsmi\\_event\\_type\\_t](#) variants.*
    - [rsmi\\_event\\_type\\_t](#) `evnt_type`  
*Used for [rsmi\\_event\\_group\\_t](#) variants.*
    - [rsmi\\_event\\_group\\_t](#) `evnt_group`  
*Used for [rsmi\\_clk\\_type\\_t](#) variants.*
    - [rsmi\\_clk\\_type\\_t](#) `clk_type`  
*Used for [rsmi\\_fw\\_block\\_t](#) variants.*
    - [rsmi\\_fw\\_block\\_t](#) `fw_block`  
*Used for [rsmi\\_gpu\\_block\\_t](#) variants.*
    - [rsmi\\_gpu\\_block\\_t](#) `gpu_block_type`
- ```
};
```

#### 7.1.1 Detailed Description

This union holds the value of an [rsmi\\_func\\_id\\_iter\\_handle\\_t](#). The value may be a function name, or an enumerated variant value of types such as [rsmi\\_memory\\_type\\_t](#), [rsmi\\_temperature\\_metric\\_t](#), etc.

#### 7.1.2 Field Documentation

### 7.1.2.1 `rsmi_memory_type_t id::memory_type`

< Used for [rsmi\\_memory\\_type\\_t](#) variants

Used for [rsmi\\_temperature\\_metric\\_t](#) variants

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

- [rocm\\_smi.h](#)

## 7.2 `metrics_table_header_t` Struct Reference

The following structures hold the gpu metrics values for a device.

```
#include <rocm_smi.h>
```

### 7.2.1 Detailed Description

The following structures hold the gpu metrics values for a device.

Size and version information of metrics data

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

- [rocm\\_smi.h](#)

## 7.3 `rsmi_counter_value_t` Struct Reference

```
#include <rocm_smi.h>
```

### Data Fields

- `uint64_t value`  
*Counter value.*
- `uint64_t time_enabled`
- `uint64_t time_running`

### 7.3.1 Detailed Description

Counter value

### 7.3.2 Field Documentation

#### 7.3.2.1 `uint64_t rsmi_counter_value_t::time_enabled`

Time that the counter was enabled (in nanoseconds)

#### 7.3.2.2 `uint64_t rsmi_counter_value_t::time_running`

Time that the counter was running (in nanoseconds)

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

- [rocm\\_smi.h](#)



## 7.4 rsmi\_error\_count\_t Struct Reference

This structure holds error counts.

```
#include <rocm_smi.h>
```

### Data Fields

- uint64\_t [correctable\\_err](#)  
*Accumulated correctable errors.*
- uint64\_t [uncorrectable\\_err](#)  
*Accumulated uncorrectable errors.*

### 7.4.1 Detailed Description

This structure holds error counts.

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

- [rocm\\_smi.h](#)

## 7.5 rsmi\_evt\_notification\_data\_t Struct Reference

```
#include <rocm_smi.h>
```

### Data Fields

- uint32\_t [dv\\_ind](#)  
*Index of device that corresponds to the event.*
- [rsmi\\_evt\\_notification\\_type\\_t](#) [event](#)  
*Event type.*
- char [message](#) [[MAX\\_EVENT\\_NOTIFICATION\\_MSG\\_SIZE](#)]  
*Event message.*

### 7.5.1 Detailed Description

Event notification data returned from event notification API

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

- [rocm\\_smi.h](#)

## 7.6 rsmi\_freq\_volt\_region\_t Struct Reference

This structure holds 2 [rsmi\\_range\\_t](#)'s, one for frequency and one for voltage. These 2 ranges indicate the range of possible values for the corresponding [rsmi\\_od\\_vddc\\_point\\_t](#).

```
#include <rocm_smi.h>
```

## Data Fields

- [rsmi\\_range\\_t freq\\_range](#)  
*The frequency range for this VDDC Curve point.*
- [rsmi\\_range\\_t volt\\_range](#)  
*The voltage range for this VDDC Curve point.*

### 7.6.1 Detailed Description

This structure holds 2 [rsmi\\_range\\_t](#)'s, one for frequency and one for voltage. These 2 ranges indicate the range of possible values for the corresponding [rsmi\\_od\\_vddc\\_point\\_t](#).

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

- [rocm\\_smi.h](#)

## 7.7 rsmi\_frequencies\_t Struct Reference

This structure holds information about clock frequencies.

```
#include <rocm_smi.h>
```

## Data Fields

- uint32\_t [num\\_supported](#)
- uint32\_t [current](#)
- uint64\_t [frequency](#) [[RSMI\\_MAX\\_NUM\\_FREQUENCIES](#)]

### 7.7.1 Detailed Description

This structure holds information about clock frequencies.

### 7.7.2 Field Documentation

#### 7.7.2.1 uint32\_t rsmi\_frequencies\_t::num\_supported

The number of supported frequencies

#### 7.7.2.2 uint32\_t rsmi\_frequencies\_t::current

The current frequency index

#### 7.7.2.3 uint64\_t rsmi\_frequencies\_t::frequency[RSMI\_MAX\_NUM\_FREQUENCIES]

List of frequencies. Only the first num\_supported frequencies are valid.

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

- [rocm\\_smi.h](#)

## 7.8 rsmi\_gpu\_metrics\_t Struct Reference

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

- [rocm\\_smi.h](#)

## 7.9 rsmi\_od\_vddc\_point\_t Struct Reference

This structure represents a point on the frequency-voltage plane.

```
#include <rocm_smi.h>
```

### Data Fields

- uint64\_t [frequency](#)  
*Frequency coordinate (in Hz)*
- uint64\_t [voltage](#)  
*Voltage coordinate (in mV)*

### 7.9.1 Detailed Description

This structure represents a point on the frequency-voltage plane.

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

- [rocm\\_smi.h](#)

## 7.10 rsmi\_od\_volt\_curve\_t Struct Reference

```
#include <rocm_smi.h>
```

### Data Fields

- [rsmi\\_od\\_vddc\\_point\\_t](#) [vc\\_points](#) [RSMI\_NUM\_VOLTAGE\_CURVE\_POINTS]

### 7.10.1 Detailed Description

[RSMI\\_NUM\\_VOLTAGE\\_CURVE\\_POINTS](#) number of [rsmi\\_od\\_vddc\\_point\\_t](#)'s

### 7.10.2 Field Documentation

7.10.2.1 [rsmi\\_od\\_vddc\\_point\\_t](#) [rsmi\\_od\\_volt\\_curve\\_t::vc\\_points](#)[RSMI\_NUM\_VOLTAGE\_CURVE\_POINTS]

Array of [RSMI\\_NUM\\_VOLTAGE\\_CURVE\\_POINTS](#) [rsmi\\_od\\_vddc\\_point\\_t](#)'s that make up the voltage frequency curve points.

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

- [rocm\\_smi.h](#)

## 7.11 rsmi\_od\_volt\_freq\_data\_t Struct Reference

This structure holds the frequency-voltage values for a device.

```
#include <rocm_smi.h>
```

### Data Fields

- [rsmi\\_range\\_t curr\\_sclk\\_range](#)  
*The current SCLK frequency range.*
- [rsmi\\_range\\_t curr\\_mclk\\_range](#)
- [rsmi\\_range\\_t sclk\\_freq\\_limits](#)  
*The range possible of SCLK values.*
- [rsmi\\_range\\_t mclk\\_freq\\_limits](#)  
*The range possible of MCLK values.*
- [rsmi\\_od\\_volt\\_curve\\_t curve](#)  
*The current voltage curve.*
- [uint32\\_t num\\_regions](#)  
*The number of voltage curve regions.*

### 7.11.1 Detailed Description

This structure holds the frequency-voltage values for a device.

### 7.11.2 Field Documentation

#### 7.11.2.1 [rsmi\\_range\\_t rsmi\\_od\\_volt\\_freq\\_data\\_t::curr\\_mclk\\_range](#)

The current MCLK frequency range; (upper bound only)

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

- [rocm\\_smi.h](#)

## 7.12 rsmi\_pcie\_bandwidth\_t Struct Reference

This structure holds information about the possible PCIe bandwidths. Specifically, the possible transfer rates and their associated numbers of lanes are stored here.

```
#include <rocm_smi.h>
```

### Data Fields

- [rsmi\\_frequencies\\_t transfer\\_rate](#)
- [uint32\\_t lanes](#) [[RSMI\\_MAX\\_NUM\\_FREQUENCIES](#)]

### 7.12.1 Detailed Description

This structure holds information about the possible PCIe bandwidths. Specifically, the possible transfer rates and their associated numbers of lanes are stored here.

## 7.12.2 Field Documentation

### 7.12.2.1 rsmi\_frequencies\_t rsmi\_pcie\_bandwidth\_t::transfer\_rate

Transfer rates (T/s) that are possible

### 7.12.2.2 uint32\_t rsmi\_pcie\_bandwidth\_t::lanes[RSMI\_MAX\_NUM\_FREQUENCIES]

List of lanes for corresponding transfer rate. Only the first num\_supported bandwidths are valid.

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

- [rocm\\_smi.h](#)

## 7.13 rsmi\_power\_profile\_status\_t Struct Reference

This structure contains information about which power profiles are supported by the system for a given device, and which power profile is currently active.

```
#include <rocm_smi.h>
```

### Data Fields

- [rsmi\\_bit\\_field\\_t available\\_profiles](#)
- [rsmi\\_power\\_profile\\_preset\\_masks\\_t current](#)
- [uint32\\_t num\\_profiles](#)

### 7.13.1 Detailed Description

This structure contains information about which power profiles are supported by the system for a given device, and which power profile is currently active.

## 7.13.2 Field Documentation

### 7.13.2.1 rsmi\_bit\_field\_t rsmi\_power\_profile\_status\_t::available\_profiles

Which profiles are supported by this system

### 7.13.2.2 rsmi\_power\_profile\_preset\_masks\_t rsmi\_power\_profile\_status\_t::current

Which power profile is currently active

### 7.13.2.3 uint32\_t rsmi\_power\_profile\_status\_t::num\_profiles

How many power profiles are available

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

- [rocm\\_smi.h](#)

## 7.14 rsmi\_process\_info\_t Struct Reference

This structure contains information specific to a process.

```
#include <rocm_smi.h>
```

### Data Fields

- uint32\_t [process\\_id](#)  
*Process ID.*
- uint32\_t [pasid](#)  
*PASID.*
- uint64\_t [vram\\_usage](#)  
*VRAM usage.*
- uint64\_t [sdma\\_usage](#)  
*SDMA usage in microseconds.*
- uint32\_t [cu\\_occupancy](#)  
*Compute Unit usage in percent.*

### 7.14.1 Detailed Description

This structure contains information specific to a process.

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

- [rocm\\_smi.h](#)

## 7.15 rsmi\_range\_t Struct Reference

This structure represents a range (e.g., frequencies or voltages).

```
#include <rocm_smi.h>
```

### Data Fields

- uint64\_t [lower\\_bound](#)  
*Lower bound of range.*
- uint64\_t [upper\\_bound](#)  
*Upper bound of range.*

### 7.15.1 Detailed Description

This structure represents a range (e.g., frequencies or voltages).

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

- [rocm\\_smi.h](#)

## 7.16 rsmi\_retired\_page\_record\_t Struct Reference

Reserved Memory Page Record.

```
#include <rocm_smi.h>
```

### Data Fields

- [uint64\\_t page\\_address](#)  
*Start address of page.*
- [uint64\\_t page\\_size](#)  
*Page size.*
- [rsmi\\_memory\\_page\\_status\\_t status](#)  
*Page "reserved" status.*

#### 7.16.1 Detailed Description

Reserved Memory Page Record.

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

- [rocm\\_smi.h](#)

## 7.17 rsmi\_utilization\_counter\_t Struct Reference

The utilization counter data.

```
#include <rocm_smi.h>
```

### Data Fields

- [RSMI\\_UTILIZATION\\_COUNTER\\_TYPE](#) type  
*Utilization counter type.*
- [uint64\\_t value](#)  
*Utilization counter value.*

#### 7.17.1 Detailed Description

The utilization counter data.

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

- [rocm\\_smi.h](#)

## 7.18 rsmi\_version\_t Struct Reference

This structure holds version information.

```
#include <rocm_smi.h>
```

### Data Fields

- [uint32\\_t major](#)  
*Major version.*
- [uint32\\_t minor](#)  
*Minor version.*
- [uint32\\_t patch](#)

*Patch, build or stepping version.*

- `const char * build`

*Build string.*

### 7.18.1 Detailed Description

This structure holds version information.

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

- [rocm\\_smi.h](#)



## Chapter 8

# File Documentation

### 8.1 rocm\_smi.h File Reference

The rocm\_smi library api is new, and therefore subject to change either at the ABI or API level. Instead of marking every function prototype as "unstable", we are instead saying the API is unstable (i.e., changes are possible) while the major version remains 0. This means that if the API/ABI changes, we will not increment the major version to 1. Once the ABI stabilizes, we will increment the major version to 1, and thereafter increment it on all ABI breaks.

```
#include <stdint.h>
#include <stddef.h>
#include <stdbool.h>
#include "rocm_smi/kfd_ioctl.h"
```

#### Data Structures

- struct [rsmi\\_counter\\_value\\_t](#)
- struct [rsmi\\_evt\\_notification\\_data\\_t](#)
- struct [rsmi\\_utilization\\_counter\\_t](#)  
*The utilization counter data.*
- struct [rsmi\\_retired\\_page\\_record\\_t](#)  
*Reserved Memory Page Record.*
- struct [rsmi\\_power\\_profile\\_status\\_t](#)  
*This structure contains information about which power profiles are supported by the system for a given device, and which power profile is currently active.*
- struct [rsmi\\_frequencies\\_t](#)  
*This structure holds information about clock frequencies.*
- struct [rsmi\\_pcie\\_bandwidth\\_t](#)  
*This structure holds information about the possible PCIe bandwidths. Specifically, the possible transfer rates and their associated numbers of lanes are stored here.*
- struct [rsmi\\_version\\_t](#)  
*This structure holds version information.*
- struct [rsmi\\_range\\_t](#)  
*This structure represents a range (e.g., frequencies or voltages).*
- struct [rsmi\\_od\\_vddc\\_point\\_t](#)  
*This structure represents a point on the frequency-voltage plane.*
- struct [rsmi\\_freq\\_volt\\_region\\_t](#)  
*This structure holds 2 [rsmi\\_range\\_t](#)'s, one for frequency and one for voltage. These 2 ranges indicate the range of possible values for the corresponding [rsmi\\_od\\_vddc\\_point\\_t](#).*

- struct [rsmi\\_od\\_volt\\_curve\\_t](#)
- struct [rsmi\\_od\\_volt\\_freq\\_data\\_t](#)

*This structure holds the frequency-voltage values for a device.*

- struct [metrics\\_table\\_header\\_t](#)

*The following structures hold the gpu metrics values for a device.*

- struct [rsmi\\_gpu\\_metrics\\_t](#)
- struct [rsmi\\_error\\_count\\_t](#)

*This structure holds error counts.*

- struct [rsmi\\_process\\_info\\_t](#)

*This structure contains information specific to a process.*

- union [id](#)

*This union holds the value of an [rsmi\\_func\\_id\\_iter\\_handle\\_t](#). The value may be a function name, or an enumerated variant value of types such as [rsmi\\_memory\\_type\\_t](#), [rsmi\\_temperature\\_metric\\_t](#), etc.*

## Macros

- #define [RSMI\\_MAX\\_NUM\\_FREQUENCIES](#) 32

*Guaranteed maximum possible number of supported frequencies.*

- #define [RSMI\\_MAX\\_FAN\\_SPEED](#) 255

- #define [RSMI\\_NUM\\_VOLTAGE\\_CURVE\\_POINTS](#) 3

*The number of points that make up a voltage-frequency curve definition.*

- #define [RSMI\\_EVENT\\_MASK\\_FROM\\_INDEX\(i\)](#) (1ULL << ((i) - 1))

- #define [MAX\\_EVENT\\_NOTIFICATION\\_MSG\\_SIZE](#) 64

*Maximum number of characters an event notification message will be.*

- #define [RSMI\\_MAX\\_NUM\\_POWER\\_PROFILES](#) (sizeof([rsmi\\_bit\\_field\\_t](#)) \* 8)

*Number of possible power profiles that a system could support.*

- #define [RSMI\\_GPU\\_METRICS\\_API\\_FORMAT\\_VER](#) 1

*The following structure holds the gpu metrics values for a device.*

- #define [RSMI\\_GPU\\_METRICS\\_API\\_CONTENT\\_VER\\_1](#) 1
- #define [RSMI\\_GPU\\_METRICS\\_API\\_CONTENT\\_VER\\_2](#) 2
- #define [RSMI\\_GPU\\_METRICS\\_API\\_CONTENT\\_VER\\_3](#) 3
- #define [RSMI\\_NUM\\_HBM\\_INSTANCES](#) 4
- #define [CENTRIGRADE\\_TO\\_MILLI\\_CENTIGRADE](#) 1000
- #define [RSMI\\_DEFAULT\\_VARIANT](#) 0xFFFFFFFFFFFFFFFF

## Typedefs

- typedef uintptr\_t [rsmi\\_event\\_handle\\_t](#)

*Handle to performance event counter.*

- typedef uint64\_t [rsmi\\_bit\\_field\\_t](#)

*Bitfield used in various RSMI calls.*

- typedef enum [\\_RSMI\\_IO\\_LINK\\_TYPE](#) [RSMI\\_IO\\_LINK\\_TYPE](#)

*Types for IO Link.*

- typedef struct  
rsmi\_func\_id\_iter\_handle \* [rsmi\\_func\\_id\\_iter\\_handle\\_t](#)

*Opaque handle to function-support object.*

- typedef union [id](#) [rsmi\\_func\\_id\\_value\\_t](#)

*This union holds the value of an [rsmi\\_func\\_id\\_iter\\_handle\\_t](#). The value may be a function name, or an enumerated variant value of types such as [rsmi\\_memory\\_type\\_t](#), [rsmi\\_temperature\\_metric\\_t](#), etc.*

## Enumerations

- enum `rsmi_status_t` {  
`RSMI_STATUS_SUCCESS` = 0x0, `RSMI_STATUS_INVALID_ARGS`, `RSMI_STATUS_NOT_SUPPORTED`,  
`RSMI_STATUS_FILE_ERROR`,  
`RSMI_STATUS_PERMISSION`, `RSMI_STATUS_OUT_OF_RESOURCES`, `RSMI_STATUS_INTERNAL_EXCEPTION`, `RSMI_STATUS_INPUT_OUT_OF_BOUNDS`,  
`RSMI_STATUS_INIT_ERROR`, **`RSMI_INITIALIZATION_ERROR`** = `RSMI_STATUS_INIT_ERROR`, `RSMI_STATUS_NOT_YET_IMPLEMENTED`, `RSMI_STATUS_NOT_FOUND`,  
`RSMI_STATUS_INSUFFICIENT_SIZE`, `RSMI_STATUS_INTERRUPT`, `RSMI_STATUS_UNEXPECTED_SIZE`, `RSMI_STATUS_NO_DATA`,  
`RSMI_STATUS_UNEXPECTED_DATA`, `RSMI_STATUS_BUSY`, `RSMI_STATUS_REFCOUNT_OVERFLOW`, `RSMI_STATUS_UNKNOWN_ERROR` = 0xFFFFFFFF }

*Error codes returned by rocm\_smi\_lib functions.*

- enum `rsmi_init_flags_t` { `RSMI_INIT_FLAG_ALL_GPUS` = 0x1, `RSMI_INIT_FLAG_RESRV_TEST1` = 0x8000000000000000 }

*Initialization flags.*

- enum `rsmi_dev_perf_level_t` {  
`RSMI_DEV_PERF_LEVEL_AUTO` = 0, **`RSMI_DEV_PERF_LEVEL_FIRST`** = `RSMI_DEV_PERF_LEVEL_AUTO`, `RSMI_DEV_PERF_LEVEL_LOW`, `RSMI_DEV_PERF_LEVEL_HIGH`,  
`RSMI_DEV_PERF_LEVEL_MANUAL`, `RSMI_DEV_PERF_LEVEL_STABLE_STD`, `RSMI_DEV_PERF_LEVEL_STABLE_PEAK`, `RSMI_DEV_PERF_LEVEL_STABLE_MIN_MCLK`,  
`RSMI_DEV_PERF_LEVEL_STABLE_MIN_SCLK`, `RSMI_DEV_PERF_LEVEL_DETERMINISM`, **`RSMI_DEV_PERF_LEVEL_LAST`** = `RSMI_DEV_PERF_LEVEL_DETERMINISM`, `RSMI_DEV_PERF_LEVEL_UNKNOWN` = 0x100 }

*PowerPlay performance levels.*

- enum `rsmi_sw_component_t` { **`RSMI_SW_COMP_FIRST`** = 0x0, `RSMI_SW_COMP_DRIVER` = `RSMI_SW_COMP_FIRST`, **`RSMI_SW_COMP_LAST`** = `RSMI_SW_COMP_DRIVER` }

*Available clock types.*

- enum `rsmi_event_group_t` { `RSMI_EVNT_GRP_XGMI` = 0, `RSMI_EVNT_GRP_XGMI_DATA_OUT` = 10, **`RSMI_EVNT_GRP_INVALID`** = 0xFFFFFFFF }

*Enum denoting an event group. The value of the enum is the base value for all the event enums in the group.*

- enum `rsmi_event_type_t` {  
**`RSMI_EVNT_FIRST`** = `RSMI_EVNT_GRP_XGMI`, **`RSMI_EVNT_XGMI_FIRST`** = `RSMI_EVNT_GRP_XGMI`,  
`RSMI_EVNT_XGMI_0_NOP_TX` = `RSMI_EVNT_XGMI_FIRST`, `RSMI_EVNT_XGMI_0_REQUEST_TX`,  
`RSMI_EVNT_XGMI_0_RESPONSE_TX`, `RSMI_EVNT_XGMI_0_BEATS_TX`, `RSMI_EVNT_XGMI_1_NOP_TX`,  
`RSMI_EVNT_XGMI_1_REQUEST_TX`,  
`RSMI_EVNT_XGMI_1_RESPONSE_TX`, `RSMI_EVNT_XGMI_1_BEATS_TX`, **`RSMI_EVNT_XGMI_LAST`** =  
`RSMI_EVNT_XGMI_1_BEATS_TX`, **`RSMI_EVNT_XGMI_DATA_OUT_FIRST`** = `RSMI_EVNT_GRP_XGMI_DATA_OUT`,  
**`RSMI_EVNT_XGMI_DATA_OUT_0`** = `RSMI_EVNT_XGMI_DATA_OUT_FIRST`, `RSMI_EVNT_XGMI_DATA_OUT_1`,  
`RSMI_EVNT_XGMI_DATA_OUT_2`, `RSMI_EVNT_XGMI_DATA_OUT_3`,  
`RSMI_EVNT_XGMI_DATA_OUT_4`, `RSMI_EVNT_XGMI_DATA_OUT_5`, **`RSMI_EVNT_XGMI_DATA_OUT_LAST`** =  
`RSMI_EVNT_XGMI_DATA_OUT_5`, **`RSMI_EVNT_LAST`** = `RSMI_EVNT_XGMI_DATA_OUT_LAST` }

*Event type enum. Events belonging to a particular event group `rsmi_event_group_t` should begin enumerating at the `rsmi_event_group_t` value for that group.*

- enum `rsmi_counter_command_t` { `RSMI_CNTR_CMD_START` = 0, `RSMI_CNTR_CMD_STOP` }
- enum `rsmi_evt_notification_type_t` {  
`RSMI_EVT_NOTIF_VMFault` = `KFD_SMI_EVENT_VMFault`, **`RSMI_EVT_NOTIF_FIRST`** = `RSMI_EVT_NOTIF_VMFault`,  
`RSMI_EVT_NOTIF_THERMAL_THROTTLE` = `KFD_SMI_EVENT_THERMAL_THROTTLE`, `RSMI_EVT_NOTIF_GPU_PRE_RESET` = `KFD_SMI_EVENT_GPU_PRE_RESET`,  
`RSMI_EVT_NOTIF_GPU_POST_RESET` = `KFD_SMI_EVENT_GPU_POST_RESET`, **`RSMI_EVT_NOTIF_LAST`** = `RSMI_EVT_NOTIF_GPU_POST_RESET` }
- enum `rsmi_clk_type_t` {  
`RSMI_CLK_TYPE_SYS` = 0x0, **`RSMI_CLK_TYPE_FIRST`** = `RSMI_CLK_TYPE_SYS`, `RSMI_CLK_TYPE_D-`

```
F, RSMI_CLK_TYPE_DCEF,
RSMI_CLK_TYPE_SOC, RSMI_CLK_TYPE_MEM, RSMI_CLK_TYPE_LAST = RSMI_CLK_TYPE_MEM,
RSMI_CLK_INVALID = 0xFFFFFFFF }
```

- enum `rsmi_temperature_metric_t` {  
`RSMI_TEMP_CURRENT` = 0x0, `RSMI_TEMP_FIRST` = `RSMI_TEMP_CURRENT`, `RSMI_TEMP_MAX`, `RSMI_TEMP_MIN`,  
`RSMI_TEMP_MAX_HYST`, `RSMI_TEMP_MIN_HYST`, `RSMI_TEMP_CRITICAL`, `RSMI_TEMP_CRITICAL_HYST`,  
`RSMI_TEMP_EMERGENCY`, `RSMI_TEMP_EMERGENCY_HYST`, `RSMI_TEMP_CRIT_MIN`, `RSMI_TEMP_CRIT_MIN_HYST`,  
`RSMI_TEMP_OFFSET`, `RSMI_TEMP_LOWEST`, `RSMI_TEMP_HIGHEST`, `RSMI_TEMP_LAST` = `RSMI_TEMP_HIGHEST` }

*Temperature Metrics. This enum is used to identify various temperature metrics. Corresponding values will be in millidegrees Celsius.*

- enum `rsmi_temperature_type_t` {  
`RSMI_TEMP_TYPE_FIRST` = 0, `RSMI_TEMP_TYPE_EDGE` = `RSMI_TEMP_TYPE_FIRST`, `RSMI_TEMP_TYPE_JUNCTION`, `RSMI_TEMP_TYPE_MEMORY`,  
`RSMI_TEMP_TYPE_HBM_0`, `RSMI_TEMP_TYPE_HBM_1`, `RSMI_TEMP_TYPE_HBM_2`, `RSMI_TEMP_TYPE_HBM_3`,  
`RSMI_TEMP_TYPE_LAST` = `RSMI_TEMP_TYPE_HBM_3`, `RSMI_TEMP_TYPE_INVALID` = 0xFFFFFFFF }

*This enumeration is used to indicate from which part of the device a temperature reading should be obtained.*

- enum `rsmi_voltage_metric_t` {  
`RSMI_VOLT_CURRENT` = 0x0, `RSMI_VOLT_FIRST` = `RSMI_VOLT_CURRENT`, `RSMI_VOLT_MAX`, `RSMI_VOLT_MIN_CRIT`,  
`RSMI_VOLT_MIN`, `RSMI_VOLT_MAX_CRIT`, `RSMI_VOLT_AVERAGE`, `RSMI_VOLT_LOWEST`,  
`RSMI_VOLT_HIGHEST`, `RSMI_VOLT_LAST` = `RSMI_VOLT_HIGHEST` }

*Voltage Metrics. This enum is used to identify various Voltage metrics. Corresponding values will be in millivolt.*

- enum `rsmi_voltage_type_t` { `RSMI_VOLT_TYPE_FIRST` = 0, `RSMI_VOLT_TYPE_VDDGFX` = `RSMI_VOLT_TYPE_FIRST`, `RSMI_VOLT_TYPE_LAST` = `RSMI_VOLT_TYPE_VDDGFX`, `RSMI_VOLT_TYPE_INVALID` = 0xFFFFFFFF }

*This enumeration is used to indicate which type of voltage reading should be obtained.*

- enum `rsmi_power_profile_preset_masks_t` {  
`RSMI_PWR_PROF_PRST_CUSTOM_MASK` = 0x1, `RSMI_PWR_PROF_PRST_VIDEO_MASK` = 0x2, `RSMI_PWR_PROF_PRST_POWER_SAVING_MASK` = 0x4, `RSMI_PWR_PROF_PRST_COMPUTE_MASK` = 0x8,  
`RSMI_PWR_PROF_PRST_VR_MASK` = 0x10, `RSMI_PWR_PROF_PRST_3D_FULL_SCR_MASK` = 0x20, `RSMI_PWR_PROF_PRST_BOOTUP_DEFAULT` = 0x40, `RSMI_PWR_PROF_PRST_LAST` = `RSMI_PWR_PROF_PRST_BOOTUP_DEFAULT`,  
`RSMI_PWR_PROF_PRST_INVALID` = 0xFFFFFFFFFFFFFFFF }

*Pre-set Profile Selections. These bitmasks can be AND'd with the `rsmi_power_profile_status_t.available_profiles` returned from `rsmi_dev_power_profile_presets_get` to determine which power profiles are supported by the system.*

- enum `rsmi_gpu_block_t` {  
`RSMI_GPU_BLOCK_INVALID` = 0x0000000000000000, `RSMI_GPU_BLOCK_FIRST` = 0x0000000000000001,  
`RSMI_GPU_BLOCK_UMC` = `RSMI_GPU_BLOCK_FIRST`, `RSMI_GPU_BLOCK_SDMA` = 0x0000000000000002,  
`RSMI_GPU_BLOCK_GFX` = 0x0000000000000004, `RSMI_GPU_BLOCK_MMHUB` = 0x0000000000000008,  
`RSMI_GPU_BLOCK_ATHUB` = 0x0000000000000010, `RSMI_GPU_BLOCK_PCIE_BIF` = 0x0000000000000020,  
`RSMI_GPU_BLOCK_HDP` = 0x0000000000000040, `RSMI_GPU_BLOCK_XGMI_WAFL` = 0x0000000000000080,  
`RSMI_GPU_BLOCK_DF` = 0x0000000000000100, `RSMI_GPU_BLOCK_SMN` = 0x0000000000000200,  
`RSMI_GPU_BLOCK_SEM` = 0x0000000000000400, `RSMI_GPU_BLOCK_MP0` = 0x0000000000000800,  
`RSMI_GPU_BLOCK_MP1` = 0x0000000000001000, `RSMI_GPU_BLOCK_FUSE` = 0x0000000000002000,  
`RSMI_GPU_BLOCK_LAST` = `RSMI_GPU_BLOCK_FUSE`, `RSMI_GPU_BLOCK_RESERVED` = 0x8000000000000000  
}

*This enum is used to identify different GPU blocks.*

- enum `rsmi_ras_err_state_t` {  
`RSMI_RAS_ERR_STATE_NONE` = 0, `RSMI_RAS_ERR_STATE_DISABLED`, `RSMI_RAS_ERR_STATE_PARITY`, `RSMI_RAS_ERR_STATE_SING_C`,  
`RSMI_RAS_ERR_STATE_MULT_UC`, `RSMI_RAS_ERR_STATE_POISON`, `RSMI_RAS_ERR_STATE_EN-`

**ABLED**, **RSMI\_RAS\_ERR\_STATE\_LAST** = **RSMI\_RAS\_ERR\_STATE\_ENABLED**,  
**RSMI\_RAS\_ERR\_STATE\_INVALID** = 0xFFFFFFFF }

*The current ECC state.*

- enum **rsmi\_memory\_type\_t** {  
**RSMI\_MEM\_TYPE\_FIRST** = 0, **RSMI\_MEM\_TYPE\_VRAM** = **RSMI\_MEM\_TYPE\_FIRST**, **RSMI\_MEM\_TYPE\_VIS\_VRAM**, **RSMI\_MEM\_TYPE\_GTT**,  
**RSMI\_MEM\_TYPE\_LAST** = **RSMI\_MEM\_TYPE\_GTT** }

*Types of memory.*

- enum **rsmi\_freq\_ind\_t** { **RSMI\_FREQ\_IND\_MIN** = 0, **RSMI\_FREQ\_IND\_MAX** = 1, **RSMI\_FREQ\_IND\_INVALID** = 0xFFFFFFFF }

*The values of this enum are used as frequency identifiers.*

- enum **rsmi\_fw\_block\_t** {  
**RSMI\_FW\_BLOCK\_FIRST** = 0, **RSMI\_FW\_BLOCK\_ASD** = **RSMI\_FW\_BLOCK\_FIRST**, **RSMI\_FW\_BLOCK\_CE**, **RSMI\_FW\_BLOCK\_DMCU**,  
**RSMI\_FW\_BLOCK\_MC**, **RSMI\_FW\_BLOCK\_ME**, **RSMI\_FW\_BLOCK\_MEC**, **RSMI\_FW\_BLOCK\_MEC2**,  
**RSMI\_FW\_BLOCK\_PFP**, **RSMI\_FW\_BLOCK\_RLC**, **RSMI\_FW\_BLOCK\_RLC\_SRLC**, **RSMI\_FW\_BLOCK\_RLC\_SRLG**,  
**RSMI\_FW\_BLOCK\_RLC\_SRLS**, **RSMI\_FW\_BLOCK\_SDMA**, **RSMI\_FW\_BLOCK\_SDMA2**, **RSMI\_FW\_BLOCK\_SMC**,  
**RSMI\_FW\_BLOCK\_SOS**, **RSMI\_FW\_BLOCK\_TA\_RAS**, **RSMI\_FW\_BLOCK\_TA\_XGMI**, **RSMI\_FW\_BLOCK\_UVD**,  
**RSMI\_FW\_BLOCK\_VCE**, **RSMI\_FW\_BLOCK\_VCN**, **RSMI\_FW\_BLOCK\_LAST** = **RSMI\_FW\_BLOCK\_VCN** }

*The values of this enum are used to identify the various firmware blocks.*

- enum **rsmi\_xgmi\_status\_t** { **RSMI\_XGMI\_STATUS\_NO\_ERRORS** = 0, **RSMI\_XGMI\_STATUS\_ERROR**, **RSMI\_XGMI\_STATUS\_MULTIPLE\_ERRORS** }

*XGMI Status.*

- enum **rsmi\_memory\_page\_status\_t** { **RSMI\_MEM\_PAGE\_STATUS\_RESERVED** = 0, **RSMI\_MEM\_PAGE\_STATUS\_PENDING**, **RSMI\_MEM\_PAGE\_STATUS\_UNRESERVABLE** }

*Reserved Memory Page States.*

- enum **\_RSMI\_IO\_LINK\_TYPE** {  
**RSMI\_IOLINK\_TYPE\_UNDEFINED** = 0, **RSMI\_IOLINK\_TYPE\_PCIEXPRESS** = 1, **RSMI\_IOLINK\_TYPE\_XGMI** = 2, **RSMI\_IOLINK\_TYPE\_NUMIOLINKTYPES**,  
**RSMI\_IOLINK\_TYPE\_SIZE** = 0xFFFFFFFF }

*Types for IO Link.*

- enum **RSMI\_UTILIZATION\_COUNTER\_TYPE** { **RSMI\_UTILIZATION\_COUNTER\_FIRST** = 0, **RSMI\_COARSE\_GRAIN\_GFX\_ACTIVITY** = **RSMI\_UTILIZATION\_COUNTER\_FIRST**, **RSMI\_COARSE\_GRAIN\_MEM\_ACTIVITY**, **RSMI\_UTILIZATION\_COUNTER\_LAST** = **RSMI\_COARSE\_GRAIN\_MEM\_ACTIVITY** }

*The utilization counter type.*

## Functions

- rsmi\_status\_t** **rsmi\_init** (uint64\_t init\_flags)  
Initialize ROCm SMI.
- rsmi\_status\_t** **rsmi\_shut\_down** (void)  
Shutdown ROCm SMI.
- rsmi\_status\_t** **rsmi\_num\_monitor\_devices** (uint32\_t \*num\_devices)  
Get the number of devices that have monitor information.
- rsmi\_status\_t** **rsmi\_dev\_id\_get** (uint32\_t dv\_ind, uint16\_t \*id)  
Get the device id associated with the device with provided device index.
- rsmi\_status\_t** **rsmi\_dev\_sku\_get** (uint32\_t dv\_ind, char \*sku)  
Get the SKU for a desired device associated with the device with provided device index.
- rsmi\_status\_t** **rsmi\_dev\_vendor\_id\_get** (uint32\_t dv\_ind, uint16\_t \*id)

- Get the device vendor id associated with the device with provided device index.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_name\\_get](#) (uint32\_t dv\_ind, char \*name, size\_t len)

*Get the name string of a gpu device.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_brand\\_get](#) (uint32\_t dv\_ind, char \*brand, uint32\_t len)

*Get the brand string of a gpu device.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_vendor\\_name\\_get](#) (uint32\_t dv\_ind, char \*name, size\_t len)

*Get the name string for a give vendor ID.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_vram\\_vendor\\_get](#) (uint32\_t dv\_ind, char \*brand, uint32\_t len)

*Get the vram vendor string of a gpu device.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_serial\\_number\\_get](#) (uint32\_t dv\_ind, char \*serial\_num, uint32\_t len)

*Get the serial number string for a device.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_subsystem\\_id\\_get](#) (uint32\_t dv\_ind, uint16\_t \*id)

*Get the subsystem device id associated with the device with provided device index.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_subsystem\\_name\\_get](#) (uint32\_t dv\_ind, char \*name, size\_t len)

*Get the name string for the device subsystem.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_drm\\_render\\_minor\\_get](#) (uint32\_t dv\_ind, uint32\_t \*minor)

*Get the drm minor number associated with this device.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_subsystem\\_vendor\\_id\\_get](#) (uint32\_t dv\_ind, uint16\_t \*id)

*Get the device subsystem vendor id associated with the device with provided device index.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_unique\\_id\\_get](#) (uint32\_t dv\_ind, uint64\_t \*id)

*Get Unique ID.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_bandwidth\\_get](#) (uint32\_t dv\_ind, [rsmi\\_pcie\\_bandwidth\\_t](#) \*bandwidth)

*Get the list of possible PCIe bandwidths that are available.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_id\\_get](#) (uint32\_t dv\_ind, uint64\_t \*bdfid)

*Get the unique PCI device identifier associated for a device.*

  - [rsmi\\_status\\_t rsmi\\_topo\\_numa\\_affinity\\_get](#) (uint32\_t dv\_ind, uint32\_t \*numa\_node)

*Get the NUMA node associated with a device.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_throughput\\_get](#) (uint32\_t dv\_ind, uint64\_t \*sent, uint64\_t \*received, uint64\_t \*max\_pkt\_sz)

*Get PCIe traffic information.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_replay\\_counter\\_get](#) (uint32\_t dv\_ind, uint64\_t \*counter)

*Get PCIe replay counter.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_pci\\_bandwidth\\_set](#) (uint32\_t dv\_ind, uint64\_t bw\_bitmask)

*Control the set of allowed PCIe bandwidths that can be used.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_power\\_ave\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \*power)

*Get the average power consumption of the device with provided device index.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_energy\\_count\\_get](#) (uint32\_t dv\_ind, uint64\_t \*power, float \*counter\_resolution, uint64\_t \*timestamp)

*Get the energy accumulator counter of the device with provided device index.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \*cap)

*Get the cap on power which, when reached, causes the system to take action to reduce power.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_default\\_get](#) (uint32\_t dv\_ind, uint64\_t \*default\_cap)

*Get the default power cap for the device specified by dv\_ind.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_range\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \*max, uint64\_t \*min)

*Get the range of valid values for the power cap.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_power\\_cap\\_set](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t cap)

*Set the power cap value.*

  - [rsmi\\_status\\_t rsmi\\_dev\\_power\\_profile\\_set](#) (uint32\_t dv\_ind, uint32\_t reserved, [rsmi\\_power\\_profile\\_preset\\_masks\\_t](#) profile)

*Set the power profile.*

- [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_total\\_get](#) (uint32\_t dv\_ind, [rsmi\\_memory\\_type\\_t](#) mem\_type, uint64\_t \*total)  
*Get the total amount of memory that exists.*
- [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_usage\\_get](#) (uint32\_t dv\_ind, [rsmi\\_memory\\_type\\_t](#) mem\_type, uint64\_t \*used)  
*Get the current memory usage.*
- [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_busy\\_percent\\_get](#) (uint32\_t dv\_ind, uint32\_t \*busy\_percent)  
*Get percentage of time any device memory is being used.*
- [rsmi\\_status\\_t rsmi\\_dev\\_memory\\_reserved\\_pages\\_get](#) (uint32\_t dv\_ind, uint32\_t \*num\_pages, [rsmi\\_retired\\_page\\_record\\_t](#) \*records)  
*Get information about reserved ("retired") memory pages.*
- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_rpms\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, int64\_t \*speed)  
*Get the fan speed in RPMs of the device with the specified device index and 0-based sensor index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_speed\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, int64\_t \*speed)  
*Get the fan speed for the specified device as a value relative to [RSMI\\_MAX\\_FAN\\_SPEED](#).*
- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_speed\\_max\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t \*max\_speed)  
*Get the max. fan speed of the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_temp\\_metric\\_get](#) (uint32\_t dv\_ind, uint32\_t sensor\_type, [rsmi\\_temperature\\_metric\\_t](#) metric, int64\_t \*temperature)  
*Get the temperature metric value for the specified metric, from the specified temperature sensor on the specified device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_volt\\_metric\\_get](#) (uint32\_t dv\_ind, [rsmi\\_voltage\\_type\\_t](#) sensor\_type, [rsmi\\_voltage\\_metric\\_t](#) metric, int64\_t \*voltage)  
*Get the voltage metric value for the specified metric, from the specified voltage sensor on the specified device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_reset](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind)  
*Reset the fan to automatic driver control.*
- [rsmi\\_status\\_t rsmi\\_dev\\_fan\\_speed\\_set](#) (uint32\_t dv\_ind, uint32\_t sensor\_ind, uint64\_t speed)  
*Set the fan speed for the specified device with the provided speed, in RPMs.*
- [rsmi\\_status\\_t rsmi\\_dev\\_busy\\_percent\\_get](#) (uint32\_t dv\_ind, uint32\_t \*busy\_percent)  
*Get percentage of time device is busy doing any processing.*
- [rsmi\\_status\\_t rsmi\\_utilization\\_count\\_get](#) (uint32\_t dv\_ind, [rsmi\\_utilization\\_counter\\_t](#) utilization\_counters[], uint32\_t count, uint64\_t \*timestamp)  
*Get coarse grain utilization counter of the specified device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_perf\\_level\\_get](#) (uint32\_t dv\_ind, [rsmi\\_dev\\_perf\\_level\\_t](#) \*perf)  
*Get the performance level of the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_perf\\_determinism\\_mode\\_set](#) (uint32\_t dv\_ind, uint64\_t clkvalue)  
*Enter performance determinism mode with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_overdrive\\_level\\_get](#) (uint32\_t dv\_ind, uint32\_t \*od)  
*Get the overdrive percent associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_gpu\\_clk\\_freq\\_get](#) (uint32\_t dv\_ind, [rsmi\\_clk\\_type\\_t](#) clk\_type, [rsmi\\_frequencies\\_t](#) \*f)  
*Get the list of possible system clock speeds of device for a specified clock type.*
- [rsmi\\_status\\_t rsmi\\_dev\\_gpu\\_reset](#) (int32\_t dv\_ind)  
*Reset the gpu associated with the device with provided device index.*
- [rsmi\\_status\\_t rsmi\\_dev\\_od\\_volt\\_info\\_get](#) (uint32\_t dv\_ind, [rsmi\\_od\\_volt\\_freq\\_data\\_t](#) \*odv)  
*This function retrieves the voltage/frequency curve information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_gpu\\_metrics\\_info\\_get](#) (uint32\_t dv\_ind, [rsmi\\_gpu\\_metrics\\_t](#) \*pgpu\_metrics)  
*This function retrieves the gpu metrics information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_clk\\_range\\_set](#) (uint32\_t dv\_ind, uint64\_t minclkvalue, uint64\_t maxclkvalue, [rsmi\\_clk\\_type\\_t](#) clkType)  
*This function sets the clock range information.*
- [rsmi\\_status\\_t rsmi\\_dev\\_od\\_clk\\_info\\_set](#) (uint32\_t dv\_ind, [rsmi\\_freq\\_ind\\_t](#) level, uint64\_t clkvalue, [rsmi\\_clk\\_type\\_t](#) clkType)



*This function sets the clock frequency information.*

- `rsmi_status_t rsmi_dev_od_volt_info_set` (uint32\_t dv\_ind, uint32\_t vpoint, uint64\_t clkvalue, uint64\_t volt-value)

*This function sets 1 of the 3 voltage curve points.*

- `rsmi_status_t rsmi_dev_od_volt_curve_regions_get` (uint32\_t dv\_ind, uint32\_t \*num\_regions, `rsmi_freq_volt-_region_t` \*buffer)

*This function will retrieve the current valid regions in the frequency/voltage space.*

- `rsmi_status_t rsmi_dev_power_profile_presets_get` (uint32\_t dv\_ind, uint32\_t sensor\_ind, `rsmi_power_-_profile_status_t` \*status)

*Get the list of available preset power profiles and an indication of which profile is currently active.*

- `rsmi_status_t rsmi_dev_perf_level_set` (int32\_t dv\_ind, `rsmi_dev_perf_level_t` perf\_lvl)

*Set the PowerPlay performance level associated with the device with provided device index with the provided value.*

- `rsmi_status_t rsmi_dev_perf_level_set_v1` (uint32\_t dv\_ind, `rsmi_dev_perf_level_t` perf\_lvl)

*Set the PowerPlay performance level associated with the device with provided device index with the provided value.*

- `rsmi_status_t rsmi_dev_overdrive_level_set` (int32\_t dv\_ind, uint32\_t od)

*Set the overdrive percent associated with the device with provided device index with the provided value. See details for WARNING.*

- `rsmi_status_t rsmi_dev_overdrive_level_set_v1` (uint32\_t dv\_ind, uint32\_t od)

*Set the overdrive percent associated with the device with provided device index with the provided value. See details for WARNING.*

- `rsmi_status_t rsmi_dev_gpu_clk_freq_set` (uint32\_t dv\_ind, `rsmi_clk_type_t` clk\_type, uint64\_t freq\_bitmask)

*Control the set of allowed frequencies that can be used for the specified clock.*

- `rsmi_status_t rsmi_version_get` (`rsmi_version_t` \*version)

*Get the build version information for the currently running build of RSMI.*

- `rsmi_status_t rsmi_version_str_get` (`rsmi_sw_component_t` component, char \*ver\_str, uint32\_t len)

*Get the driver version string for the current system.*

- `rsmi_status_t rsmi_dev_vbios_version_get` (uint32\_t dv\_ind, char \*vbios, uint32\_t len)

*Get the VBIOS identifier string.*

- `rsmi_status_t rsmi_dev_firmware_version_get` (uint32\_t dv\_ind, `rsmi_fw_block_t` block, uint64\_t \*fw\_version)

*Get the firmware versions for a device.*

- `rsmi_status_t rsmi_dev_ecc_count_get` (uint32\_t dv\_ind, `rsmi_gpu_block_t` block, `rsmi_error_count_t` \*ec)

*Retrieve the error counts for a GPU block.*

- `rsmi_status_t rsmi_dev_ecc_enabled_get` (uint32\_t dv\_ind, uint64\_t \*enabled\_blocks)

*Retrieve the enabled ECC bit-mask.*

- `rsmi_status_t rsmi_dev_ecc_status_get` (uint32\_t dv\_ind, `rsmi_gpu_block_t` block, `rsmi_ras_err_state_t` \*state)

*Retrieve the ECC status for a GPU block.*

- `rsmi_status_t rsmi_status_string` (`rsmi_status_t` status, const char \*\*status\_string)

*Get a description of a provided RSMI error status.*

- `rsmi_status_t rsmi_dev_counter_group_supported` (uint32\_t dv\_ind, `rsmi_event_group_t` group)

*Tell if an event group is supported by a given device.*

- `rsmi_status_t rsmi_dev_counter_create` (uint32\_t dv\_ind, `rsmi_event_type_t` type, `rsmi_event_handle_t` \*evnt\_handle)

*Create a performance counter object.*

- `rsmi_status_t rsmi_dev_counter_destroy` (`rsmi_event_handle_t` evnt\_handle)

*Deallocate a performance counter object.*

- `rsmi_status_t rsmi_counter_control` (`rsmi_event_handle_t` evt\_handle, `rsmi_counter_command_t` cmd, void \*cmd\_args)

*Issue performance counter control commands.*

- `rsmi_status_t rsmi_counter_read` (`rsmi_event_handle_t` evt\_handle, `rsmi_counter_value_t` \*value)

*Read the current value of a performance counter.*



- [rsmi\\_status\\_t rsmi\\_counter\\_available\\_counters\\_get](#) (uint32\_t dv\_ind, [rsmi\\_event\\_group\\_t](#) grp, uint32\_t \*available)  
*Get the number of currently available counters.*
- [rsmi\\_status\\_t rsmi\\_compute\\_process\\_info\\_get](#) ([rsmi\\_process\\_info\\_t](#) \*procs, uint32\_t \*num\_items)  
*Get process information about processes currently using GPU.*
- [rsmi\\_status\\_t rsmi\\_compute\\_process\\_info\\_by\\_pid\\_get](#) (uint32\_t pid, [rsmi\\_process\\_info\\_t](#) \*proc)  
*Get process information about a specific process.*
- [rsmi\\_status\\_t rsmi\\_compute\\_process\\_gpus\\_get](#) (uint32\_t pid, uint32\_t \*dv\_indices, uint32\_t \*num\_devices)  
*Get the device indices currently being used by a process.*
- [rsmi\\_status\\_t rsmi\\_dev\\_xgmi\\_error\\_status](#) (uint32\_t dv\_ind, [rsmi\\_xgmi\\_status\\_t](#) \*status)  
*Retrieve the XGMI error status for a device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_xgmi\\_error\\_reset](#) (uint32\_t dv\_ind)  
*Reset the XGMI error status for a device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_xgmi\\_hive\\_id\\_get](#) (uint32\_t dv\_ind, uint64\_t \*hive\_id)  
*Retrieve the XGMI hive id for a device.*
- [rsmi\\_status\\_t rsmi\\_topo\\_get\\_numa\\_node\\_number](#) (uint32\_t dv\_ind, uint32\_t \*numa\_node)  
*Retrieve the NUMA CPU node number for a device.*
- [rsmi\\_status\\_t rsmi\\_topo\\_get\\_link\\_weight](#) (uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, uint64\_t \*weight)  
*Retrieve the weight for a connection between 2 GPUs.*
- [rsmi\\_status\\_t rsmi\\_minmax\\_bandwidth\\_get](#) (uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, uint64\_t \*min\_bandwidth, uint64\_t \*max\_bandwidth)  
*Retrieve minimal and maximal io link bandwidth between 2 GPUs.*
- [rsmi\\_status\\_t rsmi\\_topo\\_get\\_link\\_type](#) (uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, uint64\_t \*hops, [RSMI\\_IO\\_LINK\\_TYPE](#) \*type)  
*Retrieve the hops and the connection type between 2 GPUs.*
- [rsmi\\_status\\_t rsmi\\_is\\_P2P\\_accessible](#) (uint32\_t dv\_ind\_src, uint32\_t dv\_ind\_dst, bool \*accessible)  
*Return P2P availability status between 2 GPUs.*
- [rsmi\\_status\\_t rsmi\\_dev\\_supported\\_func\\_iterator\\_open](#) (uint32\_t dv\_ind, [rsmi\\_func\\_id\\_iter\\_handle\\_t](#) \*handle)  
*Get a function name iterator of supported RSMI functions for a device.*
- [rsmi\\_status\\_t rsmi\\_dev\\_supported\\_variant\\_iterator\\_open](#) ([rsmi\\_func\\_id\\_iter\\_handle\\_t](#) obj\_h, [rsmi\\_func\\_id\\_iter\\_handle\\_t](#) \*var\_iter)  
*Get a variant iterator for a given handle.*
- [rsmi\\_status\\_t rsmi\\_func\\_iter\\_next](#) ([rsmi\\_func\\_id\\_iter\\_handle\\_t](#) handle)  
*Advance a function identifier iterator.*
- [rsmi\\_status\\_t rsmi\\_dev\\_supported\\_func\\_iterator\\_close](#) ([rsmi\\_func\\_id\\_iter\\_handle\\_t](#) \*handle)  
*Close a variant iterator handle.*
- [rsmi\\_status\\_t rsmi\\_func\\_iter\\_value\\_get](#) ([rsmi\\_func\\_id\\_iter\\_handle\\_t](#) handle, [rsmi\\_func\\_id\\_value\\_t](#) \*value)  
*Get the value associated with a function/variant iterator.*
- [rsmi\\_status\\_t rsmi\\_event\\_notification\\_init](#) (uint32\_t dv\_ind)  
*Prepare to collect event notifications for a GPU.*
- [rsmi\\_status\\_t rsmi\\_event\\_notification\\_mask\\_set](#) (uint32\_t dv\_ind, uint64\_t mask)  
*Specify which events to collect for a device.*
- [rsmi\\_status\\_t rsmi\\_event\\_notification\\_get](#) (int timeout\_ms, uint32\_t \*num\_elem, [rsmi\\_evt\\_notification\\_data\\_t](#) \*data)  
*Collect event notifications, waiting a specified amount of time.*
- [rsmi\\_status\\_t rsmi\\_event\\_notification\\_stop](#) (uint32\_t dv\_ind)  
*Close any file handles and free any resources used by event notification for a GPU.*

### 8.1.1 Detailed Description

The rocm\_smi library api is new, and therefore subject to change either at the ABI or API level. Instead of marking every function prototype as "unstable", we are instead saying the API is unstable (i.e., changes are possible) while the major version remains 0. This means that if the API/ABI changes, we will not increment the major version to 1. Once the ABI stabilizes, we will increment the major version to 1, and thereafter increment it on all ABI breaks. Main header file for the ROCm SMI library. All required function, structure, enum, etc. definitions should be defined in this file.

### 8.1.2 Macro Definition Documentation

#### 8.1.2.1 `#define RSMI_MAX_FAN_SPEED 255`

Maximum possible value for fan speed. Should be used as the denominator when determining fan speed percentage.

#### 8.1.2.2 `#define RSMI_EVENT_MASK_FROM_INDEX( i )(1ULL << ((i) - 1))`

Macro to generate event bitmask from event id

#### 8.1.2.3 `#define RSMI_DEFAULT_VARIANT 0xFFFFFFFFFFFFFFFF`

Place-holder "variant" for functions that have don't have any variants, but do have monitors or sensors.

### 8.1.3 Typedef Documentation

#### 8.1.3.1 `typedef uintptr_t rsmi_event_handle_t`

Handle to performance event counter.

Event counter types

### 8.1.4 Enumeration Type Documentation

#### 8.1.4.1 `enum rsmi_status_t`

Error codes returned by rocm\_smi\_lib functions.

Enumerator

***RSMI\_STATUS\_SUCCESS*** Operation was successful.

***RSMI\_STATUS\_INVALID\_ARGS*** Passed in arguments are not valid.

***RSMI\_STATUS\_NOT\_SUPPORTED*** The requested information or action is not available for the given input, on the given system

***RSMI\_STATUS\_FILE\_ERROR*** Problem accessing a file. This may because the operation is not supported by the Linux kernel version running on the executing machine

***RSMI\_STATUS\_PERMISSION*** Permission denied/EACCESS file error. Many functions require root access to run.

***RSMI\_STATUS\_OUT\_OF\_RESOURCES*** Unable to acquire memory or other resource

***RSMI\_STATUS\_INTERNAL\_EXCEPTION*** An internal exception was caught.

***RSMI\_STATUS\_INPUT\_OUT\_OF\_BOUNDS*** The provided input is out of allowable or safe range

***RSMI\_STATUS\_INIT\_ERROR*** An error occurred when rsmi initializing internal data structures

***RSMI\_STATUS\_NOT\_YET\_IMPLEMENTED*** The requested function has not yet been implemented in the current system for the current devices

***RSMI\_STATUS\_NOT\_FOUND*** An item was searched for but not found

***RSMI\_STATUS\_INSUFFICIENT\_SIZE*** Not enough resources were available for the operation

***RSMI\_STATUS\_INTERRUPT*** An interrupt occurred during execution of function

***RSMI\_STATUS\_UNEXPECTED\_SIZE*** An unexpected amount of data was read

***RSMI\_STATUS\_NO\_DATA*** No data was found for a given input

***RSMI\_STATUS\_UNEXPECTED\_DATA*** The data read or provided to function is not what was expected

***RSMI\_STATUS\_BUSY*** A resource or mutex could not be acquired because it is already being used

***RSMI\_STATUS\_REFCOUNT\_OVERFLOW*** exceeded INT32\_MAX An internal reference counter

***RSMI\_STATUS\_UNKNOWN\_ERROR*** An unknown error occurred.

#### 8.1.4.2 enum rsmi\_init\_flags\_t

Initialization flags.

Initialization flags may be OR'd together and passed to [rsmi\\_init\(\)](#).

Enumerator

***RSMI\_INIT\_FLAG\_ALL\_GPUS*** Attempt to add all GPUs found (including non-AMD) to the list of devices from which SMI information can be retrieved. By default, only AMD devices are enumerated by RSMI.

***RSMI\_INIT\_FLAG\_RESRV\_TEST1*** Reserved for test.

#### 8.1.4.3 enum rsmi\_dev\_perf\_level\_t

PowerPlay performance levels.

Enumerator

***RSMI\_DEV\_PERF\_LEVEL\_AUTO*** Performance level is "auto".

***RSMI\_DEV\_PERF\_LEVEL\_LOW*** Keep PowerPlay levels "low", regardless of workload

***RSMI\_DEV\_PERF\_LEVEL\_HIGH*** Keep PowerPlay levels "high", regardless of workload

***RSMI\_DEV\_PERF\_LEVEL\_MANUAL*** Only use values defined by manually setting the RSMI\_CLK\_TYPE\_ - SYS speed

***RSMI\_DEV\_PERF\_LEVEL\_STABLE\_STD*** Stable power state with profiling clocks

***RSMI\_DEV\_PERF\_LEVEL\_STABLE\_PEAK*** Stable power state with peak clocks.

***RSMI\_DEV\_PERF\_LEVEL\_STABLE\_MIN\_MCLK*** Stable power state with minimum memory clock

***RSMI\_DEV\_PERF\_LEVEL\_STABLE\_MIN\_SCLK*** Stable power state with minimum system clock

***RSMI\_DEV\_PERF\_LEVEL\_DETERMINISM*** Performance determinism state.

***RSMI\_DEV\_PERF\_LEVEL\_UNKNOWN*** Unknown performance level.

#### 8.1.4.4 enum rsmi\_sw\_component\_t

Available clock types.

Software components

Enumerator

***RSMI\_SW\_COMP\_DRIVER*** Driver.

#### 8.1.4.5 enum `rsmi_event_group_t`

Enum denoting an event group. The value of the enum is the base value for all the event enums in the group.

Event Groups

Enumerator

**`RSMI_EVNT_GRP_XGMI`** Data Fabric (XGMI) related events.

**`RSMI_EVNT_GRP_XGMI_DATA_OUT`** XGMI Outbound data.

#### 8.1.4.6 enum `rsmi_event_type_t`

Event type enum. Events belonging to a particular event group `rsmi_event_group_t` should begin enumerating at the `rsmi_event_group_t` value for that group.

Event types

Enumerator

**`RSMI_EVNT_XGMI_0_NOP_TX`** NOPs sent to neighbor 0.

**`RSMI_EVNT_XGMI_0_REQUEST_TX`** Outgoing requests to neighbor 0

**`RSMI_EVNT_XGMI_0_RESPONSE_TX`** Outgoing responses to neighbor 0

**`RSMI_EVNT_XGMI_0_BEATS_TX`** Data beats sent to neighbor 0; Each beat represents 32 bytes.

XGMI throughput can be calculated by multiplying a BEATS event such as `RSMI_EVNT_XGMI_0_BEATS_TX` by 32 and dividing by the time for which event collection occurred, `rsmi_counter_value_t.time_running` (which is in nanoseconds). To get bytes per second, multiply this value by  $10^9$ .

Throughput = BEATS/time\_running \*  $10^9$  (bytes/second)

**`RSMI_EVNT_XGMI_1_NOP_TX`** NOPs sent to neighbor 1.

**`RSMI_EVNT_XGMI_1_REQUEST_TX`** neighbor 1 Outgoing requests to

**`RSMI_EVNT_XGMI_1_RESPONSE_TX`** Outgoing responses to neighbor 1

**`RSMI_EVNT_XGMI_1_BEATS_TX`** Data beats sent to neighbor 1; Each beat represents 32 bytes

**`RSMI_EVNT_XGMI_DATA_OUT_1`** Outbound beats to neighbor 1.

**`RSMI_EVNT_XGMI_DATA_OUT_2`** Outbound beats to neighbor 2.

**`RSMI_EVNT_XGMI_DATA_OUT_3`** Outbound beats to neighbor 3.

**`RSMI_EVNT_XGMI_DATA_OUT_4`** Outbound beats to neighbor 4.

**`RSMI_EVNT_XGMI_DATA_OUT_5`** Outbound beats to neighbor 5.

#### 8.1.4.7 enum `rsmi_counter_command_t`

Event counter commands

Enumerator

**`RSMI_CNTR_CMD_START`** Start the counter.

**`RSMI_CNTR_CMD_STOP`** Stop the counter; note that this should not be used before reading.

#### 8.1.4.8 enum `rsmi_evt_notification_type_t`

Event notification event types

Enumerator

**`RSMI_EVT_NOTIF_VMFault`** VM page fault.

## 8.1.4.9 enum rsmi\_clk\_type\_t

Clock types

Enumerator

- RSMI\_CLK\_TYPE\_SYS** System clock.
- RSMI\_CLK\_TYPE\_DF** Data Fabric clock (for ASICs running on a separate clock)
- RSMI\_CLK\_TYPE\_DCEF** Display Controller Engine clock.
- RSMI\_CLK\_TYPE\_SOC** SOC clock.
- RSMI\_CLK\_TYPE\_MEM** Memory clock.

## 8.1.4.10 enum rsmi\_temperature\_metric\_t

Temperature Metrics. This enum is used to identify various temperature metrics. Corresponding values will be in millidegrees Celcius.

Enumerator

- RSMI\_TEMP\_CURRENT** Temperature current value.
- RSMI\_TEMP\_MAX** Temperature max value.
- RSMI\_TEMP\_MIN** Temperature min value.
- RSMI\_TEMP\_MAX\_HYST** Temperature hysteresis value for max limit. (This is an absolute temperature, not a delta).
- RSMI\_TEMP\_MIN\_HYST** Temperature hysteresis value for min limit. (This is an absolute temperature, not a delta).
- RSMI\_TEMP\_CRITICAL** Temperature critical max value, typically greater than corresponding temp\_max values.
- RSMI\_TEMP\_CRITICAL\_HYST** Temperature hysteresis value for critical limit. (This is an absolute temperature, not a delta).
- RSMI\_TEMP\_EMERGENCY** Temperature emergency max value, for chips supporting more than two upper temperature limits. Must be equal or greater than corresponding temp\_crit values.
- RSMI\_TEMP\_EMERGENCY\_HYST** Temperature hysteresis value for emergency limit. (This is an absolute temperature, not a delta).
- RSMI\_TEMP\_CRIT\_MIN** Temperature critical min value, typically lower than corresponding temperature minimum values.
- RSMI\_TEMP\_CRIT\_MIN\_HYST** Temperature hysteresis value for critical minimum limit. (This is an absolute temperature, not a delta).
- RSMI\_TEMP\_OFFSET** Temperature offset which is added to the temperature reading by the chip.
- RSMI\_TEMP\_LOWEST** Historical minimum temperature.
- RSMI\_TEMP\_HIGHEST** Historical maximum temperature.

## 8.1.4.11 enum rsmi\_temperature\_type\_t

This enumeration is used to indicate from which part of the device a temperature reading should be obtained.

Enumerator

- RSMI\_TEMP\_TYPE\_EDGE** Edge GPU temperature.
- RSMI\_TEMP\_TYPE\_JUNCTION** Junction/hotspot temperature
- RSMI\_TEMP\_TYPE\_MEMORY** VRAM temperature.

***RSMI\_TEMP\_TYPE\_HBM\_0*** HBM temperature instance 0.  
***RSMI\_TEMP\_TYPE\_HBM\_1*** HBM temperature instance 1.  
***RSMI\_TEMP\_TYPE\_HBM\_2*** HBM temperature instance 2.  
***RSMI\_TEMP\_TYPE\_HBM\_3*** HBM temperature instance 3.  
***RSMI\_TEMP\_TYPE\_INVALID*** Invalid type.

#### 8.1.4.12 enum rsmi\_voltage\_metric\_t

Voltage Metrics. This enum is used to identify various Voltage metrics. Corresponding values will be in millivolt.

##### Enumerator

***RSMI\_VOLT\_CURRENT*** Voltage current value.  
***RSMI\_VOLT\_MAX*** Voltage max value.  
***RSMI\_VOLT\_MIN\_CRIT*** Voltage critical min value.  
***RSMI\_VOLT\_MIN*** Voltage min value.  
***RSMI\_VOLT\_MAX\_CRIT*** Voltage critical max value.  
***RSMI\_VOLT\_AVERAGE*** Average voltage.  
***RSMI\_VOLT\_LOWEST*** Historical minimum voltage.  
***RSMI\_VOLT\_HIGHEST*** Historical maximum voltage.

#### 8.1.4.13 enum rsmi\_voltage\_type\_t

This enumeration is used to indicate which type of voltage reading should be obtained.

##### Enumerator

***RSMI\_VOLT\_TYPE\_VDDGFX*** Vddgfx GPU voltage  
***RSMI\_VOLT\_TYPE\_INVALID*** Invalid type.

#### 8.1.4.14 enum rsmi\_power\_profile\_preset\_masks\_t

Pre-set Profile Selections. These bitmasks can be AND'd with the [rsmi\\_power\\_profile\\_status\\_t.available\\_profiles](#) returned from [rsmi\\_dev\\_power\\_profile\\_presets\\_get](#) to determine which power profiles are supported by the system.

##### Enumerator

***RSMI\_PWR\_PROF\_PRST\_CUSTOM\_MASK*** Custom Power Profile.  
***RSMI\_PWR\_PROF\_PRST\_VIDEO\_MASK*** Video Power Profile.  
***RSMI\_PWR\_PROF\_PRST\_POWER\_SAVING\_MASK*** Power Saving Profile.  
***RSMI\_PWR\_PROF\_PRST\_COMPUTE\_MASK*** Compute Saving Profile.  
***RSMI\_PWR\_PROF\_PRST\_VR\_MASK*** VR Power Profile. 3D Full Screen Power Profile  
***RSMI\_PWR\_PROF\_PRST\_BOOTUP\_DEFAULT*** Default Boot Up Profile.  
***RSMI\_PWR\_PROF\_PRST\_LAST*** Invalid power profile.

## 8.1.4.15 enum rsmi\_gpu\_block\_t

This enum is used to identify different GPU blocks.

## Enumerator

**RSMI\_GPU\_BLOCK\_INVALID** Used to indicate an invalid block

**RSMI\_GPU\_BLOCK\_UMC** UMC block.

**RSMI\_GPU\_BLOCK\_SDMA** SDMA block.

**RSMI\_GPU\_BLOCK\_GFX** GFX block.

**RSMI\_GPU\_BLOCK\_MMHUB** MMHUB block.

**RSMI\_GPU\_BLOCK\_ATHUB** ATHUB block.

**RSMI\_GPU\_BLOCK\_PCIE\_BIF** PCIE\_BIF block.

**RSMI\_GPU\_BLOCK\_HDP** HDP block.

**RSMI\_GPU\_BLOCK\_XGMI\_WAFL** XGMI block.

**RSMI\_GPU\_BLOCK\_DF** DF block.

**RSMI\_GPU\_BLOCK\_SMN** SMN block.

**RSMI\_GPU\_BLOCK\_SEM** SEM block.

**RSMI\_GPU\_BLOCK\_MP0** MP0 block.

**RSMI\_GPU\_BLOCK\_MP1** MP1 block.

**RSMI\_GPU\_BLOCK\_FUSE** Fuse block.

**RSMI\_GPU\_BLOCK\_LAST** for supported blocks The highest bit position

## 8.1.4.16 enum rsmi\_ras\_err\_state\_t

The current ECC state.

## Enumerator

**RSMI\_RAS\_ERR\_STATE\_NONE** No current errors.

**RSMI\_RAS\_ERR\_STATE\_DISABLED** ECC is disabled.

**RSMI\_RAS\_ERR\_STATE\_PARITY** ECC errors present, but type unknown.

**RSMI\_RAS\_ERR\_STATE\_SING\_C** Single correctable error.

**RSMI\_RAS\_ERR\_STATE\_MULT\_UC** Multiple uncorrectable errors.

**RSMI\_RAS\_ERR\_STATE\_POISON** Firmware detected error and isolated page. Treat as uncorrectable.

**RSMI\_RAS\_ERR\_STATE\_ENABLED** ECC is enabled.

## 8.1.4.17 enum rsmi\_memory\_type\_t

Types of memory.

## Enumerator

**RSMI\_MEM\_TYPE\_VRAM** VRAM memory.

**RSMI\_MEM\_TYPE\_VIS\_VRAM** VRAM memory that is visible.

**RSMI\_MEM\_TYPE\_GTT** GTT memory.

## 8.1.4.18 enum rsmi\_freq\_ind\_t

The values of this enum are used as frequency identifiers.

## Enumerator

**RSMI\_FREQ\_IND\_MIN** Index used for the minimum frequency value.

**RSMI\_FREQ\_IND\_MAX** Index used for the maximum frequency value.

**RSMI\_FREQ\_IND\_INVALID** An invalid frequency index.

## 8.1.4.19 enum rsmi\_memory\_page\_status\_t

Reserved Memory Page States.

## Enumerator

**RSMI\_MEM\_PAGE\_STATUS\_RESERVED** Reserved. This gpu page is reserved and not available for use

**RSMI\_MEM\_PAGE\_STATUS\_PENDING** Pending. This gpu page is marked as bad and will be marked reserved at the next window.

**RSMI\_MEM\_PAGE\_STATUS\_UNRESERVABLE** Unable to reserve this page.

## 8.1.4.20 enum \_RSMI\_IO\_LINK\_TYPE

Types for IO Link.

## Enumerator

**RSMI\_IOLINK\_TYPE\_UNDEFINED** unknown type.

**RSMI\_IOLINK\_TYPE\_PCIEEXPRESS** PCI Express.

**RSMI\_IOLINK\_TYPE\_XGMI** XGMI.

**RSMI\_IOLINK\_TYPE\_NUMIOLINKTYPES** Number of IO Link types.

**RSMI\_IOLINK\_TYPE\_SIZE** Max of IO Link types.

## 8.1.4.21 enum RSMI\_UTILIZATION\_COUNTER\_TYPE

The utilization counter type.

## Enumerator

**RSMI\_UTILIZATION\_COUNTER\_FIRST** GFX Activity.

**RSMI\_COARSE\_GRAIN\_MEM\_ACTIVITY** Memory Activity.



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