

RDC

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Contents

1	Data Structure Index	1
1.1	Data Structures	1
2	File Index	3
2.1	File List	3
3	Data Structure Documentation	5
3.1	rdc_device_attributes_t Struct Reference	5
3.1.1	Detailed Description	5
3.2	rdc_field_group_info_t Struct Reference	5
3.2.1	Detailed Description	5
3.2.2	Field Documentation	6
3.2.2.1	field_ids	6
3.3	rdc_field_value Struct Reference	6
3.3.1	Detailed Description	6
3.3.2	Field Documentation	6
3.3.2.1	value	6
3.4	rdc_field_value_data Union Reference	6
3.4.1	Detailed Description	7
3.5	rdc_gpu_usage_info_t Struct Reference	7
3.5.1	Detailed Description	7
3.6	rdc_group_info_t Struct Reference	8
3.6.1	Detailed Description	8
3.6.2	Field Documentation	8
3.6.2.1	entity_ids	8
3.7	rdc_job_group_info_t Struct Reference	8
3.7.1	Detailed Description	8
3.8	rdc_job_info_t Struct Reference	9
3.8.1	Detailed Description	9
3.8.2	Field Documentation	9
3.8.2.1	summary	9
3.9	rdc_stats_summary_t Struct Reference	9

3.9.1	Detailed Description	9
4	File Documentation	11
4.1	rdc.h File Reference	11
4.1.1	Detailed Description	15
4.1.2	Typedef Documentation	15
4.1.2.1	rdc_handle_t	15
4.1.3	Enumeration Type Documentation	15
4.1.3.1	rdc_status_t	15
4.1.3.2	rdc_group_type_t	15
4.1.3.3	rdc_field_t	16
4.1.4	Function Documentation	17
4.1.4.1	rdc_init	17
4.1.4.2	rdc_shutdown	17
4.1.4.3	rdc_start_embedded	17
4.1.4.4	rdc_stop_embedded	18
4.1.4.5	rdc_connect	18
4.1.4.6	rdc_disconnect	18
4.1.4.7	rdc_job_start_stats	19
4.1.4.8	rdc_job_get_stats	19
4.1.4.9	rdc_job_stop_stats	19
4.1.4.10	rdc_job_remove	20
4.1.4.11	rdc_job_remove_all	20
4.1.4.12	rdc_field_update_all	20
4.1.4.13	rdc_device_get_all	20
4.1.4.14	rdc_device_get_attributes	22
4.1.4.15	rdc_group_gpu_create	22
4.1.4.16	rdc_group_gpu_add	22
4.1.4.17	rdc_group_gpu_get_info	23
4.1.4.18	rdc_group_get_all_ids	23
4.1.4.19	rdc_group_gpu_destroy	23
4.1.4.20	rdc_group_field_create	24
4.1.4.21	rdc_group_field_get_info	24
4.1.4.22	rdc_group_field_get_all_ids	24
4.1.4.23	rdc_group_field_destroy	25
4.1.4.24	rdc_field_watch	25
4.1.4.25	rdc_field_get_latest_value	25
4.1.4.26	rdc_field_get_value_since	26
4.1.4.27	rdc_field_unwatch	26
4.1.4.28	rdc_status_string	26

4.1.4.29	field_id_string	27
4.1.4.30	get_field_id_from_name	27

Index**28**

Chapter 1

Data Structure Index

1.1 Data Structures

Here are the data structures with brief descriptions:

rdc_device_attributes_t	Represents attributes corresponding to a device	5
rdc_field_group_info_t	The structure to store the field group info	5
rdc_field_value	The structure to store the field value	6
rdc_field_value_data	Field value data	6
rdc_gpu_usage_info_t	The structure to hold the GPU usage information	7
rdc_group_info_t	The structure to store the group info	8
rdc_job_group_info_t	The structure to store the job info	8
rdc_job_info_t	The structure to hold the job stats	9
rdc_stats_summary_t	The structure to store summary of data	9

Chapter 2

File Index

2.1 File List

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

[rdc.h](#)

The rocm_rdc 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

11

Chapter 3

Data Structure Documentation

3.1 rdc_device_attributes_t Struct Reference

Represents attributes corresponding to a device.

```
#include <rdc.h>
```

Data Fields

- char [device_name](#) [RDC_MAX_STR_LENGTH]
Name of the device.

3.1.1 Detailed Description

Represents attributes corresponding to a device.

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

- [rdc.h](#)

3.2 rdc_field_group_info_t Struct Reference

The structure to store the field group info.

```
#include <rdc.h>
```

Data Fields

- uint32_t [count](#)
count of fields in the group
- char [group_name](#) [RDC_MAX_STR_LENGTH]
field group name
- [rdc_field_t field_ids](#) [RDC_MAX_FIELD_IDS_PER_FIELD_GROUP]

3.2.1 Detailed Description

The structure to store the field group info.

3.2.2 Field Documentation

3.2.2.1 `rdc_field_t rdc_field_group_info_t::field_ids[RDC_MAX_FIELD_IDS_PER_FIELD_GROUP]`

The list of fields in the group

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

- [rdc.h](#)

3.3 `rdc_field_value` Struct Reference

The structure to store the field value.

```
#include <rdc.h>
```

Data Fields

- [rdc_field_t field_id](#)
The field id of the value.
- `int` [status](#)
RDC_ST_OK or error status.
- `uint64_t` [ts](#)
Timestamp in usec since 1970.
- [rdc_field_type_t](#) [type](#)
The field type.
- [rdc_field_value_data](#) [value](#)

3.3.1 Detailed Description

The structure to store the field value.

3.3.2 Field Documentation

3.3.2.1 `rdc_field_value_data rdc_field_value::value`

Value of the field. Value type depends on the field type.

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

- [rdc.h](#)

3.4 `rdc_field_value_data` Union Reference

Field value data.

```
#include <rdc.h>
```

Data Fields

- `int64_t` [l_int](#)
- `double` [dbl](#)
- `char` [str](#) [[RDC_MAX_STR_LENGTH](#)]

3.4.1 Detailed Description

Field value data.

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

- [rdc.h](#)

3.5 rdc_gpu_usage_info_t Struct Reference

The structure to hold the GPU usage information.

```
#include <rdc.h>
```

Data Fields

- `uint32_t` [gpu_id](#)
GPU_ID_INVALID for summary information.
- `uint64_t` [start_time](#)
The time to start the watching.
- `uint64_t` [end_time](#)
The time to stop the watching.
- `uint64_t` [energy_consumed](#)
GPU Energy consumed.
- `uint64_t` [ecc_correct](#)
Correctable errors.
- `uint64_t` [ecc_uncorrect](#)
Uncorrrtable errors.
- `rdc_stats_summary_t` [pcie_tx](#)
Bytes sent over PCIe stats.
- `rdc_stats_summary_t` [pcie_rx](#)
Bytes received over PCIe stats.
- `rdc_stats_summary_t` [power_usage](#)
GPU Power usage stats.
- `rdc_stats_summary_t` [gpu_clock](#)
GPU Clock speed stats.
- `rdc_stats_summary_t` [memory_clock](#)
Mem. Clock speed stats.
- `rdc_stats_summary_t` [gpu_utilization](#)
GPU Utilization stats.
- `rdc_stats_summary_t` [gpu_temperature](#)
GPU temperature stats.
- `uint64_t` [max_gpu_memory_used](#)
Maximum GPU memory used.
- `rdc_stats_summary_t` [memory_utilization](#)
Memory Utilization statistics.

3.5.1 Detailed Description

The structure to hold the GPU usage information.

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

- [rdc.h](#)

3.6 rdc_group_info_t Struct Reference

The structure to store the group info.

```
#include <rdc.h>
```

Data Fields

- unsigned int [count](#)
count of GPUs in the group
- char [group_name](#) [RDC_MAX_STR_LENGTH]
group name
- uint32_t [entity_ids](#) [RDC_GROUP_MAX_ENTITIES]

3.6.1 Detailed Description

The structure to store the group info.

3.6.2 Field Documentation

3.6.2.1 uint32_t rdc_group_info_t::entity_ids[RDC_GROUP_MAX_ENTITIES]

The list of entities in the group

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

- [rdc.h](#)

3.7 rdc_job_group_info_t Struct Reference

The structure to store the job info.

```
#include <rdc.h>
```

Data Fields

- char [job_id](#) [RDC_MAX_STR_LENGTH]
job id
- [rdc_gpu_group_t](#) [group_id](#)
group name
- uint64_t [start_time](#)
job start time
- uint64_t [stop_time](#)
job stop time

3.7.1 Detailed Description

The structure to store the job info.

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

- [rdc.h](#)

3.8 rdc_job_info_t Struct Reference

The structure to hold the job stats.

```
#include <rdc.h>
```

Data Fields

- [uint32_t num_gpus](#)
Number of GPUs used by job.
- [rdc_gpu_usage_info_t summary](#)
- [rdc_gpu_usage_info_t gpus](#) [16]
Job usage summary statistics by GPU.

3.8.1 Detailed Description

The structure to hold the job stats.

3.8.2 Field Documentation

3.8.2.1 [rdc_gpu_usage_info_t](#) [rdc_job_info_t::summary](#)

Job usage summary statistics (overall)

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

- [rdc.h](#)

3.9 rdc_stats_summary_t Struct Reference

The structure to store summary of data.

```
#include <rdc.h>
```

Data Fields

- [uint64_t max_value](#)
Maximum value measured.
- [uint64_t min_value](#)
Minimum value measured.
- [uint64_t average](#)
Average value measured.
- [double standard_deviation](#)
The standard deviation.

3.9.1 Detailed Description

The structure to store summary of data.

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

- [rdc.h](#)

Chapter 4

File Documentation

4.1 rdc.h File Reference

The rocm_rdc 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>
```

Data Structures

- struct [rdc_device_attributes_t](#)
Represents attributes corresponding to a device.
- struct [rdc_group_info_t](#)
The structure to store the group info.
- struct [rdc_stats_summary_t](#)
The structure to store summary of data.
- struct [rdc_gpu_usage_info_t](#)
The structure to hold the GPU usage information.
- struct [rdc_job_info_t](#)
The structure to hold the job stats.
- union [rdc_field_value_data](#)
Field value data.
- struct [rdc_field_value](#)
The structure to store the field value.
- struct [rdc_field_group_info_t](#)
The structure to store the field group info.
- struct [rdc_job_group_info_t](#)
The structure to store the job info.

Macros

- #define [GPU_ID_INVALID](#) -1
ID used to represent an invalid GPU.
- #define [RDC_GROUP_ALL_GPUS](#) -1000
Used to specify all GPUs.

- `#define RDC_JOB_STATS_FIELDS -1000`
Used to specify all stats fields.
- `#define RDC_MAX_STR_LENGTH 256`
The max rdc field string length.
- `#define RDC_GROUP_MAX_ENTITIES 64`
The max entities in a group.
- `#define RDC_MAX_NUM_DEVICES 16`
Max number of GPUs supported by RDC.
- `#define RDC_MAX_FIELD_IDS_PER_FIELD_GROUP 128`
The max fields in a field group.
- `#define RDC_MAX_NUM_GROUPS 64`
The max number of groups.
- `#define RDC_MAX_NUM_FIELD_GROUPS 64`
The max number of the field groups.
- `#define RDC_EVT_IS_NOTIF_FIELD(FIELD) ((FIELD) >= RDC_EVT_NOTIF_FIRST && (FIELD) <= RDC_EVT_NOTIF_LAST)`

Typedefs

- `typedef void * rdc_handle_t`
handlers used in various rdc calls
- `typedef uint32_t rdc_gpu_group_t`
GPU Group ID type.
- `typedef uint32_t rdc_field_grp_t`
Field group ID type.

Enumerations

- `enum rdc_status_t {`
`RDC_ST_OK = 0, RDC_ST_NOT_SUPPORTED, RDC_ST_MSI_ERROR, RDC_ST_FAIL_LOAD_MODULE,`
`RDC_ST_INVALID_HANDLER, RDC_ST_BAD_PARAMETER, RDC_ST_NOT_FOUND, RDC_ST_CONFLICT,`
`RDC_ST_CLIENT_ERROR, RDC_ST_ALREADY_EXIST, RDC_ST_MAX_LIMIT, RDC_ST_INSUFF_RESOURCES,`
`RDC_ST_FILE_ERROR, RDC_ST_NO_DATA, RDC_ST_PERM_ERROR, RDC_ST_UNKNOWN_ERROR`
`= 0xFFFFFFFF }`
Error codes returned by rocm_rdc_lib functions.
- `enum rdc_operation_mode_t { RDC_OPERATION_MODE_AUTO = 0, RDC_OPERATION_MODE_MANUAL }`
rdc operation mode rdc can run in auto mode where background threads will collect metrics. When run in manual mode, the user needs to periodically call rdc_field_update_all for data collection.
- `enum rdc_group_type_t { RDC_GROUP_DEFAULT = 0, RDC_GROUP_EMPTY }`
type of GPU group
- `enum rdc_field_type_t { INTEGER = 0, DOUBLE, STRING, BLOB }`
the type stored in the filed value
- `enum rdc_field_t {`
`RDC_FI_INVALID = 0, RDC_FI_GPU_COUNT = 1, RDC_FI_DEV_NAME, RDC_FI_GPU_CLOCK = 100,`
`RDC_FI_MEM_CLOCK, RDC_FI_MEMORY_TEMP = 200, RDC_FI_GPU_TEMP, RDC_FI_POWER_USAGE = 300,`
`RDC_FI_PCIE_TX = 400, RDC_FI_PCIE_RX, RDC_FI_GPU_UTIL = 500, RDC_FI_GPU_MEMORY_USAGE,`
`RDC_FI_GPU_MEMORY_TOTAL, RDC_FI_ECC_CORRECT_TOTAL = 600, RDC_FI_ECC_UNCORRECTED`

```

T_TOTAL, RDC_FI_ECC_SDMA_SEC,
RDC_FI_ECC_SDMA_DED, RDC_FI_ECC_GFX_SEC, RDC_FI_ECC_GFX_DED, RDC_FI_ECC_MMHU-
B_SEC,
RDC_FI_ECC_MMHUB_DED, RDC_FI_ECC_ATHUB_SEC, RDC_FI_ECC_ATHUB_DED, RDC_FI_ECC_-
BIF_SEC,
RDC_FI_ECC_BIF_DED, RDC_FI_ECC_HDP_SEC, RDC_FI_ECC_HDP_DED, RDC_FI_ECC_XGMI_WA-
FL_SEC,
RDC_FI_ECC_XGMI_WAFL_DED, RDC_FI_ECC_DF_SEC, RDC_FI_ECC_DF_DED, RDC_FI_ECC_SM-
N_SEC,
RDC_FI_ECC_SMN_DED, RDC_FI_ECC_SEM_SEC, RDC_FI_ECC_SEM_DED, RDC_FI_ECC_MP0_SE-
C,
RDC_FI_ECC_MP0_DED, RDC_FI_ECC_MP1_SEC, RDC_FI_ECC_MP1_DED, RDC_FI_ECC_FUSE_S-
EC,
RDC_FI_ECC_FUSE_DED, RDC_FI_ECC_UMC_SEC, RDC_FI_ECC_UMC_DED, RDC_EVNT_XGMI_0_-
NOP_TX = 1000,
RDC_EVNT_XGMI_0_REQ_TX, RDC_EVNT_XGMI_0_RESP_TX, RDC_EVNT_XGMI_0_BEATS_TX, RD-
C_EVNT_XGMI_1_NOP_TX,
RDC_EVNT_XGMI_1_REQ_TX, RDC_EVNT_XGMI_1_RESP_TX, RDC_EVNT_XGMI_1_BEATS_TX, RD-
C_EVNT_XGMI_0_THRPUT = 1500,
RDC_EVNT_XGMI_1_THRPUT, RDC_EVNT_XGMI_2_THRPUT, RDC_EVNT_XGMI_3_THRPUT, RDC_-
EVNT_XGMI_4_THRPUT,
RDC_EVNT_XGMI_5_THRPUT, RDC_EVNT_NOTIF_VMFAULT = 2000, RDC_EVNT_NOTIF_FIRST = R-
DC_EVNT_NOTIF_VMFAULT, RDC_EVNT_NOTIF_THERMAL_THROTTLE,
RDC_EVNT_NOTIF_PRE_RESET, RDC_EVNT_NOTIF_POST_RESET, RDC_EVNT_NOTIF_LAST = RD-
C_EVNT_NOTIF_POST_RESET }

```

Functions

- `rdc_status_t rdc_init (uint64_t init_flags)`
Initialize ROCm RDC.
- `rdc_status_t rdc_shutdown ()`
Shutdown ROCm RDC.
- `rdc_status_t rdc_start_embedded (rdc_operation_mode_t op_mode, rdc_handle_t *p_rdc_handle)`
Start embedded RDC agent within this process.
- `rdc_status_t rdc_stop_embedded (rdc_handle_t p_rdc_handle)`
Stop embedded RDC agent.
- `rdc_status_t rdc_connect (const char *ipAndPort, rdc_handle_t *p_rdc_handle, const char *root_ca, const char *client_cert, const char *client_key)`
Connect to rdcd daemon.
- `rdc_status_t rdc_disconnect (rdc_handle_t p_rdc_handle)`
Disconnect from rdcd daemon.
- `rdc_status_t rdc_job_start_stats (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id, const char job_id[64], uint64_t update_freq)`
Request the RDC to watch the job stats.
- `rdc_status_t rdc_job_get_stats (rdc_handle_t p_rdc_handle, const char job_id[64], rdc_job_info_t *p_job_info)`
Get the stats of the job using the job id.
- `rdc_status_t rdc_job_stop_stats (rdc_handle_t p_rdc_handle, const char job_id[64])`
Request RDC to stop watching the stats of the job.
- `rdc_status_t rdc_job_remove (rdc_handle_t p_rdc_handle, const char job_id[64])`
Request RDC to stop tracking the job given by job_id.
- `rdc_status_t rdc_job_remove_all (rdc_handle_t p_rdc_handle)`
Request RDC to stop tracking all the jobs.
- `rdc_status_t rdc_field_update_all (rdc_handle_t p_rdc_handle, uint32_t wait_for_update)`

Request RDC to update all fields to be watched.

- `rdc_status_t rdc_device_get_all (rdc_handle_t p_rdc_handle, uint32_t gpu_index_list[RDC_MAX_NUM_DEVICES], uint32_t *count)`

Get indexes corresponding to all the devices on the system.

- `rdc_status_t rdc_device_get_attributes (rdc_handle_t p_rdc_handle, uint32_t gpu_index, rdc_device_attributes_t *p_rdc_attr)`

Gets device attributes corresponding to the gpu_index.

- `rdc_status_t rdc_group_gpu_create (rdc_handle_t p_rdc_handle, rdc_group_type_t type, const char *group_name, rdc_gpu_group_t *p_rdc_group_id)`

Create a group contains multiple GPUs.

- `rdc_status_t rdc_group_gpu_add (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id, uint32_t gpu_index)`

Add a GPU to the group.

- `rdc_status_t rdc_group_gpu_get_info (rdc_handle_t p_rdc_handle, rdc_gpu_group_t p_rdc_group_id, rdc_group_info_t *p_rdc_group_info)`

Get information about a GPU group.

- `rdc_status_t rdc_group_get_all_ids (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id_list[], uint32_t *count)`

Used to get information about all GPU groups in the system.

- `rdc_status_t rdc_group_gpu_destroy (rdc_handle_t p_rdc_handle, rdc_gpu_group_t p_rdc_group_id)`

Destroy GPU group represented by p_rdc_group_id.

- `rdc_status_t rdc_group_field_create (rdc_handle_t p_rdc_handle, uint32_t num_field_ids, rdc_field_t *field_ids, const char *field_group_name, rdc_field_grp_t *rdc_field_group_id)`

create a group of fields

- `rdc_status_t rdc_group_field_get_info (rdc_handle_t p_rdc_handle, rdc_field_grp_t rdc_field_group_id, rdc_field_group_info_t *field_group_info)`

Get information about a field group.

- `rdc_status_t rdc_group_field_get_all_ids (rdc_handle_t p_rdc_handle, rdc_field_grp_t field_group_id_list[], uint32_t *count)`

Used to get information about all field groups in the system.

- `rdc_status_t rdc_group_field_destroy (rdc_handle_t p_rdc_handle, rdc_field_grp_t rdc_field_group_id)`

Destroy field group represented by rdc_field_group_id.

- `rdc_status_t rdc_field_watch (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id, rdc_field_grp_t field_group_id, uint64_t update_freq, double max_keep_age, uint32_t max_keep_samples)`

Request the RDC start recording updates for a given field collection.

- `rdc_status_t rdc_field_get_latest_value (rdc_handle_t p_rdc_handle, uint32_t gpu_index, rdc_field_t field, rdc_field_value *value)`

Request a latest cached field of a GPU.

- `rdc_status_t rdc_field_get_value_since (rdc_handle_t p_rdc_handle, uint32_t gpu_index, rdc_field_t field, uint64_t since_time_stamp, uint64_t *next_since_time_stamp, rdc_field_value *value)`

Request a history cached field of a GPU.

- `rdc_status_t rdc_field_unwatch (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id, rdc_field_grp_t field_group_id)`

Stop record updates for a given field collection.

- `const char * rdc_status_string (rdc_status_t status)`

Get a description of a provided RDC error status.

- `const char * field_id_string (rdc_field_t field_id)`

Get the name of a field.

- `rdc_field_t get_field_id_from_name (const char *name)`

Get the field id from name.

4.1.1 Detailed Description

The rocm_rdc 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 RDC library. All required function, structure, enum, etc. definitions should be defined in this file.

4.1.2 Typedef Documentation

4.1.2.1 typedef void* rdc_handle_t

handlers used in various rdc calls

Handle used for an RDC session

4.1.3 Enumeration Type Documentation

4.1.3.1 enum rdc_status_t

Error codes returned by rocm_rdc_lib functions.

Enumerator

RDC_ST_OK Success.
RDC_ST_NOT_SUPPORTED Not supported feature.
RDC_ST_MSI_ERROR The MSI library error.
RDC_ST_FAIL_LOAD_MODULE Fail to load the library.
RDC_ST_INVALID_HANDLER Invalid handler.
RDC_ST_BAD_PARAMETER A parameter is invalid.
RDC_ST_NOT_FOUND Cannot find the value.
RDC_ST_CONFLICT Conflict with current state.
RDC_ST_CLIENT_ERROR The RDC client error.
RDC_ST_ALREADY_EXIST The item already exists.
RDC_ST_MAX_LIMIT Max limit recording for the object.
RDC_ST_INSUFF_RESOURCES Not enough resources to complete operation
RDC_ST_FILE_ERROR Failed to access a file.
RDC_ST_NO_DATA Data was requested, but none was found
RDC_ST_PERM_ERROR Insufficient permission to complete operation
RDC_ST_UNKNOWN_ERROR Unknown error.

4.1.3.2 enum rdc_group_type_t

type of GPU group

Enumerator

RDC_GROUP_DEFAULT All GPUs on the Node.
RDC_GROUP_EMPTY Empty group.

4.1.3.3 enum rdc_field_t

These enums are used to specify a particular field to be retrieved.

Enumerator

RDC_FI_INVALID Identifier fields. Invalid field value

RDC_FI_GPU_COUNT GPU count in the system.

RDC_FI_DEV_NAME Name of the device.

RDC_FI_GPU_CLOCK The current clock for the GPU.

RDC_FI_MEM_CLOCK Clock for the memory.

RDC_FI_MEMORY_TEMP Memory temperature for the device.

RDC_FI_GPU_TEMP Current temperature for the device.

RDC_FI_POWER_USAGE Power usage for the device.

RDC_FI_PCIE_TX PCIe Tx utilization information.

RDC_FI_PCIE_RX PCIe Rx utilization information.

RDC_FI_GPU_UTIL GPU Utilization.

RDC_FI_GPU_MEMORY_USAGE Memory usage of the GPU instance.

RDC_FI_GPU_MEMORY_TOTAL Total memory of the GPU instance.

RDC_FI_ECC_CORRECT_TOTAL ECC related fields. Accumulated correctable ECC errors

RDC_FI_ECC_UNCORRECT_TOTAL Accumulated uncorrectable ECC errors.

RDC_FI_ECC_SDMA_SEC SDMA Single Error Correction.

RDC_FI_ECC_SDMA_DED SDMA Double Error Detection.

RDC_FI_ECC_GFX_SEC GFX Single Error Correction.

RDC_FI_ECC_GFX_DED GFX Double Error Detection.

RDC_FI_ECC_MMHUB_SEC MMHUB Single Error Correction.

RDC_FI_ECC_MMHUB_DED MMHUB Double Error Detection.

RDC_FI_ECC_ATHUB_SEC ATHUB Single Error Correction.

RDC_FI_ECC_ATHUB_DED ATHUB Double Error Detection.

RDC_FI_ECC_BIF_SEC BIF Single Error Correction.

RDC_FI_ECC_BIF_DED BIF Double Error Detection.

RDC_FI_ECC_HDP_SEC HDP Single Error Correction.

RDC_FI_ECC_HDP_DED HDP Double Error Detection.

RDC_FI_ECC_XGMI_WAFL_SEC XGMI WAFL Single Error Correction.

RDC_FI_ECC_XGMI_WAFL_DED XGMI WAFL Double Error Detection.

RDC_FI_ECC_DF_SEC DF Single Error Correction.

RDC_FI_ECC_DF_DED DF Double Error Detection.

RDC_FI_ECC_SMN_SEC SMN Single Error Correction.

RDC_FI_ECC_SMN_DED SMN Double Error Detection.

RDC_FI_ECC_SEM_SEC SEM Single Error Correction.

RDC_FI_ECC_SEM_DED SEM Double Error Detection.

RDC_FI_ECC_MP0_SEC MP0 Single Error Correction.

RDC_FI_ECC_MP0_DED MP0 Double Error Detection.

RDC_FI_ECC_MP1_SEC MP1 Single Error Correction.

RDC_FI_ECC_MP1_DED MP1 Double Error Detection.

RDC_FI_ECC_FUSE_SEC FUSE Single Error Correction.

RDC_FI_ECC_FUSE_DED FUSE Double Error Detection.

RDC_FL_ECC_UMC_SEC UMC Single Error Correction.

RDC_FL_ECC_UMC_DED UMC Double Error Detection.

RDC_EVNT_XGMI_0_NOP_TX NOPs sent to neighbor 0.

RDC_EVNT_XGMI_0_REQ_TX Outgoing requests to neighbor 0

RDC_EVNT_XGMI_0_RESP_TX Outgoing responses to neighbor 0

RDC_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)

RDC_EVNT_XGMI_1_NOP_TX NOPs sent to neighbor 1.

RDC_EVNT_XGMI_1_REQ_TX Outgoing requests to neighbor 1

RDC_EVNT_XGMI_1_RESP_TX Outgoing responses to neighbor 1

RDC_EVNT_XGMI_1_BEATS_TX Data beats sent to neighbor 1; Each beat represents 32 bytes

RDC_EVNT_XGMI_0_THRPUT Transmit throughput to XGMI neighbor 0 in bytes/sec

RDC_EVNT_XGMI_1_THRPUT Transmit throughput to XGMI neighbor 1 in bytes/sec

RDC_EVNT_XGMI_2_THRPUT Transmit throughput to XGMI neighbor 2 in bytes/sec

RDC_EVNT_XGMI_3_THRPUT Transmit throughput to XGMI neighbor 3 in bytes/sec

RDC_EVNT_XGMI_4_THRPUT Transmit throughput to XGMI neighbor 4 in bytes/sec

RDC_EVNT_XGMI_5_THRPUT Transmit throughput to XGMI neighbor 5 in bytes/sec

RDC_EVNT_NOTIF_VMFAULT VM page fault.

RDC_EVNT_NOTIF_THERMAL_THROTTLE Clock frequency has decreased due to temperature rise

RDC_EVNT_NOTIF_PRE_RESET GPU reset is about to occur.

RDC_EVNT_NOTIF_POST_RESET GPU reset just occurred.

4.1.4 Function Documentation

4.1.4.1 `rdc_status_t rdc_init (uint64_t init_flags)`

Initialize ROCm RDC.

When called, this initializes internal data structures, including those corresponding to sources of information that RDC provides. This must be called before `rdc_start_embedded()` or `rdc_connect()`

Parameters

<code>in</code>	<code>init_flags</code>	<code>init_flags</code> Bit flags that tell RDC how to initialize.
-----------------	-------------------------	--------------------------------------------------------------------

Return values

<code>RDC_ST_OK</code>	is returned upon successful call.
------------------------	-----------------------------------

4.1.4.2 `rdc_status_t rdc_shutdown ()`

Shutdown ROCm RDC.

Do any necessary clean up.

4.1.4.3 `rdc_status_t rdc_start_embedded (rdc_operation_mode_t op_mode, rdc_handle_t * p_rdc_handle)`

Start embedded RDC agent within this process.

The RDC is loaded as library so that it does not require `rdcd` daemon. In this mode, the user has to periodically call `rdc_field_update_all()` when `op_mode` is `RDC_OPERATION_MODE_MANUAL`, which tells RDC to collect the stats.

Parameters

in	<i>op_mode</i>	Operation modes. When RDC_OPERATION_MODE_AUTO, RDC schedules background task to collect the stats. When RDC_OPERATION_MODE_MANUAL, the user needs to call rdc_field_update_all() periodically.
in, out	<i>p_rdc_handle</i>	Caller provided pointer to rdc_handle_t. Upon successful call, the value will contain the handler for following API calls.

Return values

RDC_ST_OK	is returned upon successful call.
---------------------------	-----------------------------------

4.1.4.4 rdc_status_t rdc_stop_embedded (rdc_handle_t p_rdc_handle)

Stop embedded RDC agent.

Stop the embedded RDC agent, and p_rdc_handle becomes invalid after this call.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler that come from rdc_start_embedded() .
----	---------------------	-----------------------------------------------------------------------

Return values

RDC_ST_OK	is returned upon successful call.
---------------------------	-----------------------------------

4.1.4.5 rdc_status_t rdc_connect (const char * ipAndPort, rdc_handle_t * p_rdc_handle, const char * root_ca, const char * client_cert, const char * client_key)

Connect to rdc daemon.

This method is used to connect to a remote stand-alone rdc daemon.

Parameters

in	<i>ipAndPort</i>	The IP and port of the remote rdc. The ipAndPort can be specified in this x.x.x.x:yyyy format, where x.x.x.x is the IP address and yyyy is the port.
in, out	<i>p_rdc_handle</i>	Caller provided pointer to rdc_handle_t. Upon successful call, the value will contain the handler for following API calls.
in	<i>root_ca</i>	The root CA stored in the string in pem format. Set it as nullptr if the communication is not encrypted.
in	<i>client_cert</i>	The client certificate stored in the string in pem format. Set it as nullptr if the communication is not encrypted.
in	<i>client_key</i>	The client key stored in the string in pem format. Set it as nullptr if the communication is not encrypted.

Return values

RDC_ST_OK	is returned upon successful call.
---------------------------	-----------------------------------

4.1.4.6 rdc_status_t rdc_disconnect (rdc_handle_t p_rdc_handle)

Disconnect from rdc daemon.

Disconnect from rdc daemon, and p_rdc_handle becomes invalid after this call.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler that come from rdc_connect() .
----	---------------------	----------------------------------------------------------------

Return values

RDC_ST_OK	is returned upon successful call.
---------------------------	-----------------------------------

4.1.4.7 `rdc_status_t rdc_job_start_stats (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id, const char job_id[64], uint64_t update_freq)`

Request the RDC to watch the job stats.

This should be executed as part of job prologue. The summary job stats can be retrieved using [rdc_job_get_stats\(\)](#). In RDC_OPERATION_MODE_MANUAL, user must call [rdc_field_update_all\(1\)](#) at least once, before call [rdc_job_get_stats\(\)](#)

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>group_id</i>	The group of GPUs to be watched.
in	<i>job_id</i>	The name of the job.
in	<i>update_freq</i>	How often to update this field in usec.

Return values

RDC_ST_OK	is returned upon successful call.
---------------------------	-----------------------------------

4.1.4.8 `rdc_status_t rdc_job_get_stats (rdc_handle_t p_rdc_handle, const char job_id[64], rdc_job_info_t * p_job_info)`

Get the stats of the job using the job id.

The stats can be retrieved at any point when the job is in process.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>job_id</i>	The name of the job.
in, out	<i>p_job_info</i>	Caller provided pointer to rdc_job_info_t . Upon successful call, the value will contain the stats of the job.

Return values

RDC_ST_OK	is returned upon successful call.
---------------------------	-----------------------------------

4.1.4.9 `rdc_status_t rdc_job_stop_stats (rdc_handle_t p_rdc_handle, const char job_id[64])`

Request RDC to stop watching the stats of the job.

This should be execute as part of job epilogue. The job Id remains available to view the stats at any point. You must call [rdc_watch_job_fields\(\)](#) before this call.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
----	---------------------	------------------

in	<i>job_id</i>	The name of the job.
----	---------------	----------------------

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.10 `rdc_status_t rdc_job_remove (rdc_handle_t p_rdc_handle, const char job_id[64])`

Request RDC to stop tracking the job given by *job_id*.

After this call, you will no longer be able to call [`rdc_job_get_stats\(\)`](#) on this *job_id*. But you will be able to reuse the *job_id* after this call.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>job_id</i>	The name of the job.

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.11 `rdc_status_t rdc_job_remove_all (rdc_handle_t p_rdc_handle)`

Request RDC to stop tracking all the jobs.

After this call, you will no longer be able to call [`rdc_job_get_stats\(\)`](#) on any job id. But you will be able to reuse the any previous used job id after this call.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
----	---------------------	------------------

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.12 `rdc_status_t rdc_field_update_all (rdc_handle_t p_rdc_handle, uint32_t wait_for_update)`

Request RDC to update all fields to be watched.

In `RDC_OPERATION_MODE_MANUAL`, the user must call this method periodically.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>wait_for_update</i>	Whether or not to wait for the update loop to complete before returning to the caller 1=wait. 0=do not wait.

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.13 `rdc_status_t rdc_device_get_all (rdc_handle_t p_rdc_handle, uint32_t gpu_index_list[RDC_MAX_NUM_DEVICES], uint32_t * count)`

Get indexes corresponding to all the devices on the system.

Indexes represents RDC GPU Id corresponding to each GPU on the system and is immutable during the lifespan of the engine. The list should be queried again if the engine is restarted.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
out	<i>gpu_index_list</i>	Array reference to fill GPU indexes present on the system.
out	<i>count</i>	Number of GPUs returned in <i>gpu_index_list</i> .

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.14 `rdc_status_t rdc_device_get_attributes (rdc_handle_t p_rdc_handle, uint32_t gpu_index, rdc_device_attributes_t * p_rdc_attr)`

Gets device attributes corresponding to the *gpu_index*.

Fetch the attributes, such as device name, of a GPU.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>gpu_index</i>	GPU index corresponding to which the attributes should be fetched
out	<i>p_rdc_attr</i>	GPU attribute corresponding to the <i>gpu_index</i> .

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.15 `rdc_status_t rdc_group_gpu_create (rdc_handle_t p_rdc_handle, rdc_group_type_t type, const char * group_name, rdc_gpu_group_t * p_rdc_group_id)`

Create a group contains multiple GPUs.

This method can create a group contains multiple GPUs. Instead of executing an operation separately for each GPU, the RDC group enables the user to execute same operation on all the GPUs present in the group as a single API call.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>type</i>	The type of the group. <code>RDC_GROUP_DEFAULT</code> includes all the GPUs on the node, and <code>RDC_GROUP_EMPTY</code> creates an empty group.
in	<i>group_name</i>	The group name specified as NULL terminated C String
in, out	<i>p_rdc_group_id</i>	Caller provided pointer to <code>rdc_gpu_group_t</code> . Upon successful call, the value will contain the group id for following group API calls.

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.16 `rdc_status_t rdc_group_gpu_add (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id, uint32_t gpu_index)`

Add a GPU to the group.

This method can add a GPU to the group

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>group_id</i>	The group id to which the GPU will be added.
in	<i>gpu_index</i>	The GPU index to be added to the group.

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.17 `rdc_status_t rdc_group_gpu_get_info (rdc_handle_t p_rdc_handle, rdc_gpu_group_t p_rdc_group_id, rdc_group_info_t * p_rdc_group_info)`

Get information about a GPU group.

Get detail information about a GPU group created by `rdc_group_gpu_create`

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>p_rdc_group_id</i>	The GPU group handler created by <code>rdc_group_gpu_create</code>
out	<i>p_rdc_group_info</i>	The information of the GPU group <code>p_rdc_group_id</code> .

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.18 `rdc_status_t rdc_group_get_all_ids (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id_list[], uint32_t * count)`

Used to get information about all GPU groups in the system.

Get the list of GPU group ids in the system.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
out	<i>group_id_list</i>	Array reference to fill GPU group ids in the system.
out	<i>count</i>	Number of GPU group returned in <code>group_id_list</code> .

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.19 `rdc_status_t rdc_group_gpu_destroy (rdc_handle_t p_rdc_handle, rdc_gpu_group_t p_rdc_group_id)`

Destroy GPU group represented by `p_rdc_group_id`.

Delete the logic group represented by `p_rdc_group_id`

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>p_rdc_group_id</i>	The group id

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.20 **rdc_status_t** rdc_group_field_create (**rdc_handle_t** *p_rdc_handle*, **uint32_t** *num_field_ids*, **rdc_field_t** * *field_ids*, **const char** * *field_group_name*, **rdc_field_grp_t** * *rdc_field_group_id*)

create a group of fields

The user can create a group of fields and perform an operation on a group of fields at once.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>num_field_ids</i>	Number of field IDs that are being provided in <i>field_ids</i> .
in	<i>field_ids</i>	Field IDs to be added to the newly-created field group.
in	<i>field_group_name</i>	Unique name for this group of fields.
out	<i>rdc_field_group_id</i>	Handle to the newly-created field group

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.21 **rdc_status_t** rdc_group_field_get_info (**rdc_handle_t** *p_rdc_handle*, **rdc_field_grp_t** *rdc_field_group_id*, **rdc_field_group_info_t** * *field_group_info*)

Get information about a field group.

Get detail information about a field group created by `rdc_group_field_create`

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>rdc_field_group_id</i>	The field group handler created by <code>rdc_group_field_create</code>
out	<i>field_group_info</i>	The information of the field group <code>rdc_field_group_id</code> .

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.22 **rdc_status_t** rdc_group_field_get_all_ids (**rdc_handle_t** *p_rdc_handle*, **rdc_field_grp_t** *field_group_id_list*[], **uint32_t** * *count*)

Used to get information about all field groups in the system.

Get the list of field group ids in the system.

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
out	<i>field_group_id_list</i>	Array reference to fill field group ids in the system.

out	count	Number of field group returned in field_group_id_list.
-----	-------	--------------------------------------------------------

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.23 `rdc_status_t rdc_group_field_destroy (rdc_handle_t p_rdc_handle, rdc_field_grp_t rdc_field_group_id)`

Destroy field group represented by rdc_field_group_id.

Delete the logic group represented by rdc_field_group_id

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>rdc_field_group_id</i>	The field group id

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.24 `rdc_status_t rdc_field_watch (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id, rdc_field_grp_t field_group_id, uint64_t update_freq, double max_keep_age, uint32_t max_keep_samples)`

Request the RDC start recording updates for a given field collection.

Note that the first update of the field will not occur until the next field update cycle. To force a field update cycle, user must call rdc_field_update_all(1)

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>group_id</i>	The group of GPUs to be watched.
in	<i>field_group_id</i>	The collection of fields to record
in	<i>update_freq</i>	How often to update fields in usec.
in	<i>max_keep_age</i>	How long to keep data for fields in seconds.
in	<i>max_keep_samples</i>	Maximum number of samples to keep. 0=no limit.

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.25 `rdc_status_t rdc_field_get_latest_value (rdc_handle_t p_rdc_handle, uint32_t gpu_index, rdc_field_t field, rdc_field_value * value)`

Request a latest cached field of a GPU.

Note that the field can be cached after called rdc_field_watch

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>gpu_index</i>	The GPU index.

in	<i>field</i>	The field id
out	<i>value</i>	The field value got from cache.

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.26 `rdc_status_t rdc_field_get_value_since (rdc_handle_t p_rdc_handle, uint32_t gpu_index, rdc_field_t field, uint64_t since_time_stamp, uint64_t * next_since_time_stamp, rdc_field_value * value)`

Request a history cached field of a GPU.

Note that the field can be cached after called `rdc_field_watch`

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>gpu_index</i>	The GPU index.
in	<i>field</i>	The field id
in	<i>since_time_ - stamp</i>	Timestamp to request values since in usec since 1970.
out	<i>next_since_time - stamp</i>	Timestamp to use for sinceTimestamp on next call to this function
out	<i>value</i>	The field value got from cache.

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.27 `rdc_status_t rdc_field_unwatch (rdc_handle_t p_rdc_handle, rdc_gpu_group_t group_id, rdc_field_grp_t field_group_id)`

Stop record updates for a given field collection.

The cache of those fields will not be updated after this call

Parameters

in	<i>p_rdc_handle</i>	The RDC handler.
in	<i>group_id</i>	The GPU group id.
in	<i>field_group_id</i>	The field group id.

Return values

<i>RDC_ST_OK</i>	is returned upon successful call.
----------------------------------	-----------------------------------

4.1.4.28 `const char* rdc_status_string (rdc_status_t status)`

Get a description of a provided RDC error status.

return the string in human readable format.

Parameters

in	<i>status</i>	The RDC status.
----	---------------	-----------------

Return values

	<i>The</i>	string to describe the RDC status.
--	------------	------------------------------------

4.1.4.29 `const char* field_id_string (rdc_field_t field_id)`

Get the name of a field.

return the string in human readable format.

Parameters

in	<i>field_id</i>	The field id.
----	-----------------	---------------

Return values

	<i>The</i>	string to describe the field.
--	------------	-------------------------------

4.1.4.30 `rdc_field_t get_field_id_from_name (const char * name)`

Get the field id from name.

return the field id from field name.

Parameters

in	<i>name</i>	The field name.
----	-------------	-----------------

Return values

	<i>return</i>	RDC_FI_INVALID if the field name is invalid.
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Index

entity_ids
 rdc_group_info_t, 8

field_id_string
 rdc.h, 27

field_ids
 rdc_field_group_info_t, 6

get_field_id_from_name
 rdc.h, 27

RDC_EVNT_NOTIF_POST_RESET
 rdc.h, 17

RDC_EVNT_NOTIF_PRE_RESET
 rdc.h, 17

RDC_EVNT_NOTIF_THERMAL_THROTTLE
 rdc.h, 17

RDC_EVNT_NOTIF_VMFAULT
 rdc.h, 17

RDC_EVNT_XGMI_0_BEATS_TX
 rdc.h, 17

RDC_EVNT_XGMI_0_NOP_TX
 rdc.h, 17

RDC_EVNT_XGMI_0_REQ_TX
 rdc.h, 17

RDC_EVNT_XGMI_0_RESP_TX
 rdc.h, 17

RDC_EVNT_XGMI_0_THRPUT
 rdc.h, 17

RDC_EVNT_XGMI_1_BEATS_TX
 rdc.h, 17

RDC_EVNT_XGMI_1_NOP_TX
 rdc.h, 17

RDC_EVNT_XGMI_1_REQ_TX
 rdc.h, 17

RDC_EVNT_XGMI_1_RESP_TX
 rdc.h, 17

RDC_EVNT_XGMI_1_THRPUT
 rdc.h, 17

RDC_EVNT_XGMI_2_THRPUT
 rdc.h, 17

RDC_EVNT_XGMI_3_THRPUT
 rdc.h, 17

RDC_EVNT_XGMI_4_THRPUT
 rdc.h, 17

RDC_EVNT_XGMI_5_THRPUT
 rdc.h, 17

RDC_FI_DEV_NAME
 rdc.h, 16

RDC_FI_ECC_ATHUB_DED
 rdc.h, 16

RDC_FI_ECC_ATHUB_SEC
 rdc.h, 16

RDC_FI_ECC_BIF_DED
 rdc.h, 16

RDC_FI_ECC_BIF_SEC
 rdc.h, 16

RDC_FI_ECC_CORRECT_TOTAL
 rdc.h, 16

RDC_FI_ECC_DF_DED
 rdc.h, 16

RDC_FI_ECC_DF_SEC
 rdc.h, 16

RDC_FI_ECC_FUSE_DED
 rdc.h, 16

RDC_FI_ECC_FUSE_SEC
 rdc.h, 16

RDC_FI_ECC_GFX_DED
 rdc.h, 16

RDC_FI_ECC_GFX_SEC
 rdc.h, 16

RDC_FI_ECC_HDP_DED
 rdc.h, 16

RDC_FI_ECC_HDP_SEC
 rdc.h, 16

RDC_FI_ECC_MMHUB_DED
 rdc.h, 16

RDC_FI_ECC_MMHUB_SEC
 rdc.h, 16

RDC_FI_ECC_MP0_DED
 rdc.h, 16

RDC_FI_ECC_MP0_SEC
 rdc.h, 16

RDC_FI_ECC_MP1_DED
 rdc.h, 16

RDC_FI_ECC_MP1_SEC
 rdc.h, 16

RDC_FI_ECC_SDMA_DED
 rdc.h, 16

RDC_FI_ECC_SDMA_SEC
 rdc.h, 16

RDC_FI_ECC_SEM_DED
 rdc.h, 16

RDC_FI_ECC_SEM_SEC
 rdc.h, 16

RDC_FI_ECC_SMN_DED
 rdc.h, 16

RDC_FI_ECC_SMN_SEC
 rdc.h, 16

RDC_FI_ECC_UMC_DED
rdc.h, 17

RDC_FI_ECC_UMC_SEC
rdc.h, 16

RDC_FI_ECC_UNCORRECT_TOTAL
rdc.h, 16

RDC_FI_ECC_XGMI_WAFL_DED
rdc.h, 16

RDC_FI_ECC_XGMI_WAFL_SEC
rdc.h, 16

RDC_FI_GPU_CLOCK
rdc.h, 16

RDC_FI_GPU_COUNT
rdc.h, 16

RDC_FI_GPU_MEMORY_TOTAL
rdc.h, 16

RDC_FI_GPU_MEMORY_USAGE
rdc.h, 16

RDC_FI_GPU_TEMP
rdc.h, 16

RDC_FI_GPU_UTIL
rdc.h, 16

RDC_FI_INVALID
rdc.h, 16

RDC_FI_MEM_CLOCK
rdc.h, 16

RDC_FI_MEMORY_TEMP
rdc.h, 16

RDC_FI_PCIE_RX
rdc.h, 16

RDC_FI_PCIE_TX
rdc.h, 16

RDC_FI_POWER_USAGE
rdc.h, 16

RDC_GROUP_DEFAULT
rdc.h, 15

RDC_GROUP_EMPTY
rdc.h, 15

RDC_ST_ALREADY_EXIST
rdc.h, 15

RDC_ST_BAD_PARAMETER
rdc.h, 15

RDC_ST_CLIENT_ERROR
rdc.h, 15

RDC_ST_CONFLICT
rdc.h, 15

RDC_ST_FAIL_LOAD_MODULE
rdc.h, 15

RDC_ST_FILE_ERROR
rdc.h, 15

RDC_ST_INSUFF_RESOURCES
rdc.h, 15

RDC_ST_INVALID_HANDLER
rdc.h, 15

RDC_ST_MAX_LIMIT
rdc.h, 15

RDC_ST_MSI_ERROR
rdc.h, 15

RDC_ST_NO_DATA
rdc.h, 15

RDC_ST_NOT_FOUND
rdc.h, 15

RDC_ST_NOT_SUPPORTED
rdc.h, 15

RDC_ST_OK
rdc.h, 15

RDC_ST_PERM_ERROR
rdc.h, 15

RDC_ST_UNKNOWN_ERROR
rdc.h, 15

rdc.h

RDC_EVNT_NOTIF_POST_RESET, 17

RDC_EVNT_NOTIF_PRE_RESET, 17

RDC_EVNT_NOTIF_THERMAL_THROTTLE, 17

RDC_EVNT_NOTIF_VMFault, 17

RDC_EVNT_XGMI_0_BEATS_TX, 17

RDC_EVNT_XGMI_0_NOP_TX, 17

RDC_EVNT_XGMI_0_REQ_TX, 17

RDC_EVNT_XGMI_0_RESP_TX, 17

RDC_EVNT_XGMI_0_THRPUT, 17

RDC_EVNT_XGMI_1_BEATS_TX, 17

RDC_EVNT_XGMI_1_NOP_TX, 17

RDC_EVNT_XGMI_1_REQ_TX, 17

RDC_EVNT_XGMI_1_RESP_TX, 17

RDC_EVNT_XGMI_1_THRPUT, 17

RDC_EVNT_XGMI_2_THRPUT, 17

RDC_EVNT_XGMI_3_THRPUT, 17

RDC_EVNT_XGMI_4_THRPUT, 17

RDC_EVNT_XGMI_5_THRPUT, 17

RDC_FI_DEV_NAME, 16

RDC_FI_ECC_ATHUB_DED, 16

RDC_FI_ECC_ATHUB_SEC, 16

RDC_FI_ECC_BIF_DED, 16

RDC_FI_ECC_BIF_SEC, 16

RDC_FI_ECC_CORRECT_TOTAL, 16

RDC_FI_ECC_DF_DED, 16

RDC_FI_ECC_DF_SEC, 16

RDC_FI_ECC_FUSE_DED, 16

RDC_FI_ECC_FUSE_SEC, 16

RDC_FI_ECC_GFX_DED, 16

RDC_FI_ECC_GFX_SEC, 16

RDC_FI_ECC_HDP_DED, 16

RDC_FI_ECC_HDP_SEC, 16

RDC_FI_ECC_MMHUB_DED, 16

RDC_FI_ECC_MMHUB_SEC, 16

RDC_FI_ECC_MP0_DED, 16

RDC_FI_ECC_MP0_SEC, 16

RDC_FI_ECC_MP1_DED, 16

RDC_FI_ECC_MP1_SEC, 16

RDC_FI_ECC_SDMA_DED, 16

RDC_FI_ECC_SDMA_SEC, 16

RDC_FI_ECC_SEM_DED, 16

RDC_FI_ECC_SEM_SEC, 16

RDC_FI_ECC_SMN_DED, 16

RDC_FI_ECC_SMN_SEC, 16

RDC_FI_ECC_UMC_DED, 17

- RDC_FI_ECC_UMC_SEC, 16
- RDC_FI_ECC_UNCORRECT_TOTAL, 16
- RDC_FI_ECC_XGMI_WAFL_DED, 16
- RDC_FI_ECC_XGMI_WAFL_SEC, 16
- RDC_FI_GPU_CLOCK, 16
- RDC_FI_GPU_COUNT, 16
- RDC_FI_GPU_MEMORY_TOTAL, 16
- RDC_FI_GPU_MEMORY_USAGE, 16
- RDC_FI_GPU_TEMP, 16
- RDC_FI_GPU_UTIL, 16
- RDC_FI_INVALID, 16
- RDC_FI_MEM_CLOCK, 16
- RDC_FI_MEMORY_TEMP, 16
- RDC_FI_PCIE_RX, 16
- RDC_FI_PCIE_TX, 16
- RDC_FI_POWER_USAGE, 16
- RDC_GROUP_DEFAULT, 15
- RDC_GROUP_EMPTY, 15
- RDC_ST_ALREADY_EXIST, 15
- RDC_ST_BAD_PARAMETER, 15
- RDC_ST_CLIENT_ERROR, 15
- RDC_ST_CONFLICT, 15
- RDC_ST_FAIL_LOAD_MODULE, 15
- RDC_ST_FILE_ERROR, 15
- RDC_ST_INSUFF_RESOURCES, 15
- RDC_ST_INVALID_HANDLER, 15
- RDC_ST_MAX_LIMIT, 15
- RDC_ST_MSI_ERROR, 15
- RDC_ST_NO_DATA, 15
- RDC_ST_NOT_FOUND, 15
- RDC_ST_NOT_SUPPORTED, 15
- RDC_ST_OK, 15
- RDC_ST_PERM_ERROR, 15
- RDC_ST_UNKNOWN_ERROR, 15
- rdc.h, 11
 - field_id_string, 27
 - get_field_id_from_name, 27
 - rdc_connect, 18
 - rdc_device_get_all, 20
 - rdc_device_get_attributes, 22
 - rdc_disconnect, 18
 - rdc_field_get_latest_value, 25
 - rdc_field_get_value_since, 26
 - rdc_field_t, 15
 - rdc_field_unwatch, 26
 - rdc_field_update_all, 20
 - rdc_field_watch, 25
 - rdc_group_field_create, 24
 - rdc_group_field_destroy, 25
 - rdc_group_field_get_all_ids, 24
 - rdc_group_field_get_info, 24
 - rdc_group_get_all_ids, 23
 - rdc_group_gpu_add, 22
 - rdc_group_gpu_create, 22
 - rdc_group_gpu_destroy, 23
 - rdc_group_gpu_get_info, 23
 - rdc_group_type_t, 15
 - rdc_handle_t, 15
 - rdc_init, 17
 - rdc_job_get_stats, 19
 - rdc_job_remove, 20
 - rdc_job_remove_all, 20
 - rdc_job_start_stats, 19
 - rdc_job_stop_stats, 19
 - rdc_shutdown, 17
 - rdc_start_embedded, 17
 - rdc_status_string, 26
 - rdc_status_t, 15
 - rdc_stop_embedded, 18
 - rdc_connect
 - rdc.h, 18
 - rdc_device_attributes_t, 5
 - rdc_device_get_all
 - rdc.h, 20
 - rdc_device_get_attributes
 - rdc.h, 22
 - rdc_disconnect
 - rdc.h, 18
 - rdc_field_get_latest_value
 - rdc.h, 25
 - rdc_field_get_value_since
 - rdc.h, 26
 - rdc_field_group_info_t, 5
 - field_ids, 6
 - rdc_field_t
 - rdc.h, 15
 - rdc_field_unwatch
 - rdc.h, 26
 - rdc_field_update_all
 - rdc.h, 20
 - rdc_field_value, 6
 - value, 6
 - rdc_field_value_data, 6
 - rdc_field_watch
 - rdc.h, 25
 - rdc_gpu_usage_info_t, 7
 - rdc_group_field_create
 - rdc.h, 24
 - rdc_group_field_destroy
 - rdc.h, 25
 - rdc_group_field_get_all_ids
 - rdc.h, 24
 - rdc_group_field_get_info
 - rdc.h, 24
 - rdc_group_get_all_ids
 - rdc.h, 23
 - rdc_group_gpu_add
 - rdc.h, 22
 - rdc_group_gpu_create
 - rdc.h, 22
 - rdc_group_gpu_destroy
 - rdc.h, 23
 - rdc_group_gpu_get_info
 - rdc.h, 23
 - rdc_group_info_t, 8
 - entity_ids, 8

- rdc_group_type_t
 - rdc.h, [15](#)
- rdc_handle_t
 - rdc.h, [15](#)
- rdc_init
 - rdc.h, [17](#)
- rdc_job_get_stats
 - rdc.h, [19](#)
- rdc_job_group_info_t, [8](#)
- rdc_job_info_t, [9](#)
 - summary, [9](#)
- rdc_job_remove
 - rdc.h, [20](#)
- rdc_job_remove_all
 - rdc.h, [20](#)
- rdc_job_start_stats
 - rdc.h, [19](#)
- rdc_job_stop_stats
 - rdc.h, [19](#)
- rdc_shutdown
 - rdc.h, [17](#)
- rdc_start_embedded
 - rdc.h, [17](#)
- rdc_stats_summary_t, [9](#)
- rdc_status_string
 - rdc.h, [26](#)
- rdc_status_t
 - rdc.h, [15](#)
- rdc_stop_embedded
 - rdc.h, [18](#)
- summary
 - rdc_job_info_t, [9](#)
- value
 - rdc_field_value, [6](#)