

PlayStation®2 EE Library Reference

Release 2.4.3

Sif Libraries

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Summary Table of Contents

About This Manual	v
Changes Since Last Release	v
Related Documentation	v
Typographic Conventions	v
Developer Support	v
Chapter 1: Multithreaded SIF Remote Procedure Calls (for EE)	1-1
Structures	1-3
Functions	1-6
Chapter 2: Standard IOP Services	2-1
Structures	2-3
Functions	2-4
IOP Reboot Module Replacement Functions	2-22
Chapter 3: SIF Command	3-1
Structures	3-3
Functions	3-7
Chapter 4: SIF DMA	4-1
Structures	4-3
Functions	4-4
Chapter 5: SIF Remote Procedure Call	5-1
Structures	5-3
Functions	5-10

About This Manual

This is the Runtime Library Release 2.4.3 version of the *PlayStation®2 EE Library Reference - Sif Libraries* manual.

The purpose of this manual is to define all available PlayStation®2 EE sif library structures and functions. The companion *PlayStation®2 EE Library Overview - Sif Libraries* describes the structure and purpose of the libraries.

Changes Since Last Release

Chapter 2: Standard IOP Services

- In the "Syntax" section of `sceSifAlloclopHeap()`, an error in the type of the first argument has been corrected.

Related Documentation

Library specifications for the IOP can be found in the *PlayStation®2 IOP Library Reference* manuals and the *PlayStation®2 IOP Library Overview* manuals.

Note: the Developer Support Web site posts current developments regarding the Libraries and also provides notice of future documentation releases and upgrades.

Typographic Conventions

Certain Typographic Conventions are used throughout this manual to clarify the meaning of the text:

Convention	Meaning
<code>courier</code>	Indicates literal program code.
<i>italic</i>	Indicates names of arguments and structure members (in structure/function definitions only).
medium bold	Indicates data types and structure/function names (in structure/function definitions only).
blue	Indicates a hyperlink.

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Chapter 1: Multithreaded SIF Remote Procedure Calls (for EE)

Table of Contents

Structures	1-3
sceSifMClientData	1-3
sceSifMEndFunc	1-4
sceSifMRpcData	1-5
Functions	1-6
sceSifMBindRpc	1-6
sceSifMBindRpcParam	1-8
sceSifMCallRpc	1-10
sceSifMInitRpc	1-12
sceSifMUnBindRpc	1-13

Structures

sceSifMClientData

RPC client information

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
emrpc	2.1	March 26, 2001

Structure

```
typedef struct _sifm_client_data {
    struct _sifM_rpc_data rpcd;
    unsigned int command;
    void *buff;
    void *cbuff;
    sceSifEndFunc func;
    void *para;
    void *serve;
    int sema;
    int unbind;
} sceSifMClientData;
```

The members are set automatically, so it is not necessary to set them in the program.

Description

This structure is used to store client information obtained with sceSifMBindRpc().

Also used when calling a service function with sceSifMCallRpc().

See also

sceSifMBindRpc(), sceSifMCallRpc()

sceSifMEndFunc

RPC end function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
emrpc	2.1	January 22, 2001

Structure

```
typedef void (*sceSifMEndFunc)(
```

```
    void *data);
```

Address of data passed when function is called

Description

This function is called in the interrupt area after the RPC service function ends.

When the function is called, the address of *data* is passed. (In this version of MSIF RPC, EndFunc is unimplemented.)

See also

sceSifMCallRpc()

sceSifMRpcData

RPC client data header

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
emrpc	2.1	January 22, 2001

Structure

```
typedef struct _sifm_rpc_data {  
    void *paddr;           Packet address  
    unsigned int pid;       Packet ID  
    int tid;               Thread ID  
    unsigned int mode;      Call mode  
} sceSifMRpcData;
```

Description

Data header common to RPC clients.

See also

sceSifMClientData

Functions

sceSifMBindRpc

Get RPC service function data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
emrpc	2.1	March 26, 2001

Syntax

```
int sceSifMBindRpc(
    SceSifMClientData *bd,           Pointer to structure that receives the client information
    unsigned int request,            Request ID
    unsigned int mode)               Call mode. Normally 0, but specify the following constant,
                                    as needed:
                                    SIF_RPCM_NOWAIT: Asynchronous execution
                                    (currently unimplemented)
```

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

This function obtains from the server the client information required to send a request.

The function is required on the client side.

When this function is called, a check is made by the server to determine whether or not the service function associated with the *request* ID is registered. If it is registered, the client information that is used as the call key, is returned to the *sceSifMClientData* structure specified by *bd*.

Normally, the thread that called this function transitions to sleep state and waits for a reply from the server. In the SIF RPC, sleep state can be avoided by specifying SIF_RPCM_NOWAIT. However, in the MSIF RPC, this feature has not been implemented.

When this function is used, a thread that catches the operation of *sceMCallRpc()* is created on the IOP. The receive buffer, stack size and priority for that thread are 2kbyte, 8kbyte and 32. Use *sceSifMBindRpcParam()* to specify these values.

Notes

In the EE, a locally maintained semaphore is used to wait for completion, and sleep state is not used.

Whether or not the service function is registered (i.e., whether or not the Bind was successful) can be determined by checking to see if the *serve* member of the returned *sceSifMClientData* contains a nonzero value. The code to do this is shown below:

```
#define BIND_ID 0x12345678

while(1){
    if (sceSifMBindRpc( &cd0, BIND_ID, 0) < 0) {
        printf("bind errr\n");
        exit(-1);
    }
    if (cd0.serve != 0) break;
}
```

Furthermore, when such code is used and there is frequent communication from the EE to the IOP, because the EE is very fast, the IOP will almost always transition to stop state. Therefore, requests should be issued in short intervals.

Return value

0	Server successfully notified
Negative (<0)	Failed to issue

sceSifMBindRpcParam

Lookup RPC service function data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
emrpc	2.2	March 26, 2001

Syntax

```
int sceSifMBindRpcParam(
    sceSifMClientData *bd,           Pointer to the structure that receives the client information
    unsigned int request,           Client identifier
    unsigned int mode,              Calling mode. Usually 0, however, the following constant
                                   can be specified if necessary.
                                   SIF_RPCM_NOWAIT Asynchronous execution
                                   (Currently unimplemented)
    unsigned int buffersize,        Specifies the size of the receiving buffer to catch the send
                                   data from sceSifMCallRpc()
    unsigned int stacksize,         Specifies the size of the stack for the thread on the IOP
                                   side that performs the sceSifMCallRpc() request. The size
                                   should be specified as 512 bytes or more.
    int priority)                  Specifies the priority for the thread on the IOP side that
                                   performs the sceSifMCallRpc() request. Specify a value
                                   more than 10 as the values below 10 are used by the
                                   system.
```

Calling conditions

Can be called from a thread

Multithread safe (must be called in interrupt-enabled state)

Description

Acquires client information from the server necessary for sending the request.

This function is required on the client side.

When this function is called, a check is made on the server as to whether the service function of the request identifier, specified by the request argument, has been registered. If it has been registered then the client information that is the key for this call is returned in the sceSifMClientData structure that has been specified by the bd argument.

Usually, the thread that has called this function enters into a sleep state until there is a reply from the server. If SIF RPC has specified SIF_RPCM_NOWAIT, then the thread proceeds as is without sleeping, however, this has not been implemented in MSIF RPC.

When this function is used, a thread for catching the sceMCallRpc() operation is created on the IOP. The values of buffersize/stacksize/priority are used for the receive buffer, stack size and priority for that thread.

Notes

The EE waits for completion using an internally reserved semaphore, and does not sleep.

Whether the service function has been registered or not (whether Bind has succeeded or not) can be determined from whether the serve member of the returned sceSifMClientData has a value other than 0. In this case, the code is as follows.

```
#define BIND_ID 0x12345678

while(1){
    if (sceSifMBindRpc( &cd0, BIND_ID, 0) < 0) {
        printf("bind errr\n");
        exit(-1);
    }
    if (cd0.serve != 0) break;
}
```

Moreover, with the above code, if frequent communication is performed from the EE to the IOP, then since the EE is much faster, the IOP will almost be in stop state. Therefore, requests should be issued in small intervals.

Return value

0	Successful notification to the server
Negative(<0)	Failed to issue

sceSifMCallRpc

Call RPC service function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
emrpc	2.1	March 26, 2001

Syntax

```

int sceSifMCallRpc(
    sceSifMClientData *bd,           Client information from a Bind
    unsigned int fno,                Number passed to called service function
    unsigned int mode,               Call mode. Normally 0, but the following constants are
                                    masked and specified, as needed:
                                    SIF_RPCM_NOWAIT: Asynchronous execution
                                    (Currently unimplemented)
                                    SIF_RPCM_NOWBDC: No cache write-back
    void *send,                      Send data buffer (16/4-byte alignment in EE/IOP)
    int ssize,                      Size of send data (bytes, 16/4-byte units in EE/IOP)
    void *receive,                  Receive data buffer (16/4-byte alignment in EE/IOP)
    int rsize,                      Size of receive data (bytes, 16/4byte units in EE/IOP)
    sceSifMEndFunc *end_func,      Function executed at the end when interrupts are inhibited
    void *end_para)                Address of end_func parameter

```

The upper limit of ssize/rsize is (1Mbyte - 16bytes), which is the upper limit for data sent in one DMA.

Note: In the current implementation, the upper limit of ssize is 2048 bytes.

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

This function calls a registered service function and is used on the client side.

The argument *bd* contains a pointer to the client information structure from a Bind, which should be prepared in advance with `sceSifMBindRpc()`.

ssize bytes of data specified in the *send* argument is sent to the server and passed to the service function as the second/third argument(s). *fno* is passed as the first argument.

After the service function executes, the return value address points to *rsize* bytes of data which are sent back to the area specified by the *receive* argument.

Normally, the thread that called `sceSifMCallRpc()` transitions to sleep state and waits for a reply from the server. In the SIF RPC, sleep state can be avoided by specifying `SIF_RPCM_NOWAIT`. However, in the MSIF RPC, this feature has not been implemented.

When calling `sceSiMCallRpc()` with the same `sceSifMClientData`, a semaphore should be used for blocking.

Notes

In the EE, a locally maintained semaphore is used to wait for completion, and sleep state is not used. Also, when the data residing in the EE's cache is sent/received, it is written back to memory. However, when `SIF_RPCM_NOWBDC` is masked in *mode*, the data is not written back.

Return value

0	Server successfully notified
Negative (<0)	Failed to issue

sceSifMInitRpc

Initialize MSIF RPC API

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
emrpc	2.1	March 26, 2001

Syntax

```
void sceSifMInitRpc(
```

unsigned int *mode*)

Start-up mode (fixed at 0 in the current implementation)

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

This function initializes the MSIF RPC API.

It initializes the internal variables and registers command functions for handling requests in the system buffer of the MSIF command API.

Initialization must be performed by both the server and the client.

In order to synchronize server and client, internally one side waits in the function until the other side is called.

Return Value

None

sceSifMUnBindRpc

Delete server thread

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
emrpc	2.1	March 26, 2001

Syntax

```
int sceSifMUnBindRpc(
    sceSifMClientData *bd,           Client information from a Bind
    unsigned int mode)               Call mode. Normally 0, but specify the following constant,
                                    as needed:
                                    SIF_RPCM_NOWAIT: Asynchronous execution
                                    (Currently unimplemented)
```

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

This function is used to delete a server thread created on the server by sceSifMBindRpc(), when the thread ends.

When this function is called, whether or not a Bind completed for the client information specified by the *bd* argument is checked on the server. If the service function is registered, the server thread created by the server during the Bind is deleted.

This server thread must be in dormant state when the server is notified of the UnBind request. Normally, the thread that called this function transitions to sleep state and waits for a reply from the server. In the SIF RPC, sleep state can be avoided by specifying SIF_RPCM_NOWAIT. However, in the MSIF RPC, this feature has not been implemented.

Notes

The EE uses an internally allocated semaphore to wait for the end of this function and does not enter sleep state. Whether or not the UnBind was successful can be determined by checking to see if the command member of the returned sceSifMClientData is SIFM_UB_OK. The code to do this is shown below:

```
#define BIND_ID  0x12345678

while(1){
    if (sceSifMUnBindRpc( &cd0, BIND_ID, 0) < 0) {
        printf("bind errr\n");
        exit(-1);
    }
    if (cd0.command == SIFM_UB_OK) break;
}
```

Furthermore, when such code is used and there is frequent communication from the EE to the IOP, because the EE is very fast, the IOP will almost always transition to stop state. Therefore, requests should be issued in short intervals.

Return value

SIFM_UB_OK	Server thread deletion succeeded
SIFM_UB_NOT_DORMANT	Server thread was not in dormant state.
SIFM_UB_NOT_EXIST	Specified server thread does not exist.
Negative (<0)	Failed to issue

Chapter 2: Standard IOP Services

Table of Contents

Structures	2-3
sceExecData	2-3
Functions	2-4
sceSifAllocIopHeap	2-4
sceSifAllocSysMemory	2-5
sceSifFreeIopHeap	2-6
sceSifFreeSysMemory	2-7
sceSifInitIopHeap	2-8
sceSifLoadElf	2-9
sceSifLoadElfPart	2-10
sceSifLoadFileReset	2-11
sceSifLoadIopHeap	2-12
sceSifLoadModule	2-13
sceSifLoadModuleBuffer	2-14
sceSifLoadStartModule	2-16
sceSifLoadStartModuleBuffer	2-17
sceSifSearchModuleByAddress	2-18
sceSifSearchModuleByName	2-19
sceSifStopModule	2-20
sceSifUnloadModule	2-21
IOP Reboot Module Replacement Functions	2-22
sceSifRebootIop	2-22
sceSifSyncIop	2-23

Structures

sceExecData

Object's execution data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.2	January 27, 2000

Structure

```
typedef struct {
    unsigned int epc;           Object entry point
    unsigned int gp;             Object global point
    unsigned int sp;             Object stack point
    unsigned int dummy;          Unused
} sceExecData;
```

Description

This structure stores the execution information for objects loaded using `sceSifLoadElf()` and `sceSifLoadElfPart()`.

See also

`sceSifLoadElf()`, `sceSifLoadElfPart()`

Functions

sceSifAlloclopHeap

Allocate IOP heap area

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.2	January 4, 2002

Syntax

```
#include <sifdev.h>
```

```
void *sceSifAlloclopHeap(
```

```
    unsigned int size)           Size to be allocated (in bytes)
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

An AllocSysMemory(0,size,NULL) is performed on the IOP side and the address of allocated memory is returned.

sceSifInitlopHeap() must be called before sceSifAlloclopHeap().

Use sceSifFreelopHeap() to free memory areas allocated with sceSifAlloclopHeap().

Return value

NULL: failed

Non-NULL: return value of IOP's AllocSysMemory()

sceSifAllocSysMemory

Allocate IOP-side heap area

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.3	July 2, 2001

Syntax

```
#include <sifdev.h>
```

```
void *sceSifAllocSysMemory(
```

```
    int type,                      Memory allocation policy (0, 1, 2)
```

```
    unsigned int size,             Size to be allocated (in bytes)
```

```
    void *addr)                   Specified address when type = 2
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-enabled state)

Description

This function performs AllocSysMemory(type,size,addr) on the IOP and returns the address that it obtained.

This function enables you to specify a memory area to be allocated.

sceSifInitIopHeap() must be called in advance.

Return value

NULL Processing failed

Other than NULL Return value of AllocSysMemory() from the IOP

sceSifFreeIopHeap

Free IOP heap area

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.2	July 2, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifFreeIopHeap(
```

```
    void *addr)           Address to be freed (IOP memory address)
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

This function frees the memory area that was allocated with sceSifAllocIopHeap().

Return value

< 0: failed

0: successful

sceSifFreeSysMemory

Free IOP-side heap area

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.3	July 2, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifFreeSysMemory(
```

```
    void *addr)           Address (IOP memory address) to be freed
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-enabled state)

Description

This function performs FreeSysMemory(addr) on the IOP side and returns its return value.

It frees the memory area that was allocated with sceSifAllocSysMemory().

sceSifInitIopHeap() must be called in advance.

Return value

< 0 Processing failed

0 Processing succeeded

sceSifInitIopHeap

Prepare for IOP heap area operations

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.2	March 26, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifInitIopHeap(void)
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

Performs initialization for IOP heap operations.

sceSifInitRpc(0) must be called before sceSifInitIopHeap().

Return value

0: successful

< 0: failed

sceSifLoadElf

Load ELF object in EE memory

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.4	March 26, 2001

Syntax

#include <sifdev.h>

int sceSifLoadElf(

const char *objfile,	File name of object to be loaded (251 characters max.)
----------------------	--

sceExecData *data)	Object's execution information
--------------------	--------------------------------

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

DescriptionTransfers the file name specified by *objfile* to EE memory, as an ELF-format file.

sceSifInitRpc(0) should be called before using this function.

Return value

0: Load succeeded

< 0: Load failed

-SCE_EBINDMISS	Binding to the IOP module failed
-SCE_EVERSIONMISS	The IOP module version does not match
-SCE_ECALLMISS	RPC to the IOP failed.
-SCE_ELOADMISS	Load failed (there is no file, file is not ELF format, etc.)

sceSifLoadElfPart

Load part of an ELF object in EE memory

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.4	March 26, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifLoadElfPart(
```

```
    const char *objfile,           Filename of object to be loaded (251 characters max.)
```

```
    const char *secname,          Name of section to be loaded (251 characters max.)
```

```
    sceExecData *data)           Object's execution information
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

Transfers the filename specified by *objfile* to EE memory, as an ELF-format file, then loads only the section name (.text and .bss) specified by *secname*.

sceSifInitRpc(0) should be called before using this function.

Return value

0: Load succeeded

< 0: Load failed

-SCE_EBINDMISS	Binding to the IOP module failed
-SCE_EVERSIONMISS	The IOP module version does not match
-SCE_ECALLMISS	RPC to the IOP failed.
-SCE_ELOADMISS	Load failed (there is no file, file is not ELF format, etc.)

sceSifLoadFileReset

Invalidate module load service's bind information

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.4	March 26, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifLoadFileReset(void)
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

After the IOP side is reset, the RPC bind information of the module load service is invalidated, so be sure to call this function.

Return value

Currently, always returns 0.

sceSifLoadIopHeap

Load specified file into IOP memory

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.2	March 26, 2001

Syntax**#include** <sifdev.h>**int** sceSifLoadIopHeap(**const char** *fname,

Filename to be loaded (any name that can be used for open() by IOP. 252 characters max)

void *addr)

IOP memory address

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

Performs an open() on the IOP with the specified filename *fname*. If successful, the contents of the file are loaded into the memory address indicated by *addr*.

sceSifInitIopHeap() must be called before sceSifLoadIopHeap().

Return value

< 0: failed

0: successful

sceSifLoadModule

Load module into IOP memory

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.2	March 26, 2001

Syntax

```
#include <sifdev.h>
int sceSifLoadModule (
    const char *module,           Filename of module to be loaded (251 characters max.)
    int args,                     Size of argp
    const char *argp)            Parameters passed when module is loaded (251 characters max.)
```

Calling conditions

Can be called from a thread
 Not multithread safe (must be called in an interrupt-enabled state)

Description

The filename specified by *module* is sent to the IOP as the filename of the IOP module to be loaded then LoadStartModule() is executed.

args/argp are passed directly to LoadStartModule() as parameters *args/argp*.

Multiple NULL-delimited strings can be used for *argp*. These strings will be sent to the module initialization function in order as *arg[1]..arg[n]*. For more information, please refer to the description of LoadStartModule() for the IOP.

sceSifInitRpc(0) must be called before sceSifLoadModule().

Return value

0 or greater: Successfully loaded. Module number.
 < 0: Load failed

-SCE_EBINDMISS	Binding to the IOP module failed
-SCE_EVERSIONMISS	The IOP module version does not match
-SCE_ECALLMISS	RPC to the IOP failed.
Other than above	Return value of LoadStartModule() on the IOP

sceSifLoadModuleBuffer

Load module from specified memory of IOP

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.1	March 26, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifLoadModuleBuffer (
```

```
    const void *addr,           IOP address of IOP module base
    int args,                   Size of argp
    const char *argp)           Arguments (at most 251 characters) that are passed when module
                                is loaded.
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

This function sends the data at the area specified by the *addr* argument to the IOP as the address of the IOP module that should be loaded, and executes LoadModuleBuffer()/StartModule().

args and *argp* are assigned as is, as the *args* and *argp* arguments of StartModule().

For *argp*, multiple character strings separated by NULLs can be specified. These multiple character strings are assigned sequentially from the beginning as arg[1] ... arg[n] in the module initialization function.

For details, refer to the description of IOP LoadModuleBuffer()/StartModule().

sceSifInitRpc(0) must be called in advance.

An example of the use of this function is shown below. In this case, sio2man.irx is loaded.

```
int fd, size;
void *mem,*iopaddr;
sceSifDmaData sd;

sceSifInitRpc(0);
sceSifInitIopHeap();

// Send irx module data to the EE
fd = sceOpen( "host0:sio2man.irx", SCE_RDONLY );
if( fd < 0 ) {
    // Open failed: Error processing
}
size = sceLseek( fd, 0, SCE_SEEK_END);
sceLseek( fd , 0, SCE_SEEK_SET);
if ((mem = (void *)memalign(64, size)) == NULL) {
    // Memory allocation failed: Error processing
}
if (size != sceRead(fd, mem, size)) {
    // File read failed: Error processing
}
sceClose(fd);

// Memory allocation on IOP
iopaddr = sceSifAllocIopHeap( size );
```

```
// Send module data to IOP
sd.data = (unsigned int) mem;
sd.addr = (unsigned int) iopaddr;
sd.size = size;
sd.mode = 0;
sceSifSetDma( &sd, 1);

// Load module buffer
if (sceSifLoadModuleBuffer(iopaddr, 0, NULL) < 0) {
    // Loading failed: Error processing
}

// Free unneeded memory in EE/IOP
free(mem);
sceSifFreeIopHeap(iopaddr);
```

Return value

0 or more	Loading was successful
< 0	Loading failed

sceSifLoadStartModule

Load and execute module in IOP memory

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.2	March 26, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifLoadStartModule (
```

const char *module,	Filename of the module to be loaded (max. 251 chars)
int args,	Size of argp
const char *argp,	Argument passed when the module is loaded (max. 251 chars)
int *result)	Specifies a pointer to the variable that stores the value returned by the initialization routine of the module.

Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-enabled state)

Description

This is a function in which the result value has been added to the sceSifLoadModule() function.

For details, refer to sceSifLoadModule() and LoadStartModule() for the IOP.

sceSifInitRpc(0) must be called in advance.

Return value

>= 0	Loading successful. Number of modules.
< 0	Loading failed.
-SCE_EBINDMISS	Failure binding to the IOP-side module
-SCE_EVERSIONMISS	Version of the IOP-side module does not match
-SCE_ECALLMISS	RPC to the IOP failed
Other than above	Return value of LoadStartModule() on the IOP side

sceSifLoadStartModuleBuffer

Load and execute module from specified memory of IOP

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.2	March 26, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifLoadStartModuleBuffer (
```

const void *addr,	IOP address of start of IOP module.
int args,	Size of <i>argp</i>
const char *argp,	Argument passed when the module is loaded (max. 251 chars)
int *result)	Specifies a pointer to the variable that stores the value returned by the initialization routine of the module.

Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-enabled state)

Description

This is a function in which the result value has been added to the sceSifLoadModuleBuffer() function.

For details, refer to sceSifLoadModuleBuffer() and LoadModuleBuffer()/StartModule() for the IOP.

sceSifInitRpc(0) must be called in advance.

Return value

>= 0	Loading successful.
< 0	Loading failed.

sceSifSearchModuleByAddress

Find IOP module ID by address

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.3	January 4, 2002

Syntax**#include** <sifdev.h>**int** sceSifSearchModuleByAddress(
const void *addr) Address for finding IOP module ID
Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-enabled state)

Description

This function returns the module ID of the IOP module that is present at the specified address.

This function calls the IOP function SearchModuleByAddress().

For details, see the IOP function SearchModuleByAddress().

Return value

>= 0 Relevant module ID

< 0 Search failed

sceSifSearchModuleByName

Find IOP module ID by name

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.3	July 2, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifSearchModuleByName (
```

```
    const char *modulename)           Module name of IOP module to find (max 251 characters)
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-enabled state)

Description

This function finds the IOP module having the specified name and returns its module ID.

This function calls the IOP function SearchModuleByName().

For details, see the IOP function SearchModuleByName().

Return value

>= 0 Relevant module ID

< 0 Search failed

sceSifStopModule

Stop IOP module

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.3	July 2, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifStopModule (
```

```
    int modid,
```

Module ID of IOP module to be stopped

```
    int args,
```

argp size

```
    const char *argp,
```

Arguments passed when module is stopped (max 251 characters)

```
    int *result)
```

Pointer to variable for storing value returned by module stopping routine

Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-enabled state)

Description

This function calls the IOP function StopModule() to stop an IOP module.

For details, refer to the IOP function StopModule().

Return value

≥ 0 Stopping succeeded.

< 0 Stopping failed.

sceSifUnloadModule

Unload IOP module

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	2.3	July 2, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifUnloadModule (
```

```
    int modid)                Module ID of IOP module to be unloaded
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-enabled state)

Description

This function calls the IOP function UnloadModule() to unload an IOP module.

For details, refer to the IOP function UnloadModule().

Return value

≥ 0 Unloading succeeded.

< 0 Unloading failed.

IOP Reboot Module Replacement Functions

sceSifRebootIop

Reboot the IOP system

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.1	March 26, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifRebootIop(
```

```
    const char *imgfile)           Replacement module image filename (maximum 70  
                                   characters)
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

Reboots the IOP system service and replaces default modules.

Return value

If processing fails: 0

If processing succeeds: Non-zero value

sceSifSynclop

Confirm whether the IOP was restarted

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
iserv	1.1	March 26, 2001

Syntax

```
#include <sifdev.h>
```

```
int sceSifSynclop(void)
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

Confirms that an IOP system service reboot has completed.

Return value

If IOP system service rebooting has completed: 1

Otherwise: 0

Chapter 3: SIF Command

Table of Contents

Structures	3-3
sceSifCmdData	3-3
sceSifCmdHandler	3-4
sceSifCmdHdr	3-5
sceSifCmdSRData	3-6
Functions	3-7
sceSifAddCmdHandler	3-7
sceSifExitCmd	3-8
sceSifGetSreg	3-9
sceSifInitCmd	3-10
sceSifRemoveCmdHandler	3-11
sceSifSendCmd	3-12
sceSifSendCmdIntr	3-13
sceSifSetCmdBuffer	3-14
sceSifSetSreg	3-15

Structures

sceSifCmdData

Command function registration data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	January 27, 2000

Structure

```
typedef struct {
    sceSifCmdHandler func;           Command function.
    void data;                       Address of data passed as argument when function is
                                    executed
} sceSifCmdData;
```

Description

This is the data structure used when registering a command function.

sceSifCmdHandler

Command function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	January 27, 2000

Structure

```
typedef void (*sceSifCmdHandler)(
```

```
void *pkt,
```

Address of copy of command packet specified by
sceSifSendCmd()

```
void *data)
```

Address of data registered together with command
function by sceSifAddCmdHandler

Description

This function is executed during a DMA interrupt that occurs due to the sceSifSendCmd() function. At this time, the addresses of the sender's command packet and receiver's specified data are passed as arguments.

sceSifCmdHdr

Command packet header

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	January 27, 2000

Structure

```
typedef struct {
    unsigned int psize:8;           Size of command packet including this header (16 <= psize <= 112)
    unsigned int dsize:24;          Size of accompanying data that is sent together with packet
    unsigned int daddr;             Address of accompanying data
    unsigned int fcode;             Number of command function that is called
    unsigned int opt;              Data area that programmer can use
} sceSifCmdHdr;
```

Description

A command packet is at most 112 bytes of data beginning with this data structure.

sceSifCmdSRData

Software register update packet

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	February 29, 2000

Structure

```
typedef struct {
    sceSifCmdHdr hdr;           Command packet header
    int rno;                     Software register number (0 to 31)
    unsigned int value;         Setting value
} sceSifCmdSRData;
```

Description

The SIF Command API system has 32 arrays (software registers), each of which has a size of 32 bits. System registers having numbers 0 to 7 are used by the system, and the remaining software registers can be used by user programs. The functions for using these software registers are also registered by default.

To set a software register on the target side, use this structure as follows. (This example sets register number 31 on the target side to the value 0xff.)

```
sceSifCmdSRData d;
d.rno = 31;
d.value = 0xff;
sceSifSendData(SIF_CMDC_SET_SREG,&d,sizeof(d),0,0,0);
```

To get or set a software register value on the local side, use the `sceSifGetSreg()` or `sceSifSetSreg()` functions.

See also

`sceSifGetSreg()`, `sceSifSetSreg()`

Functions

sceSifAddCmdHandler

Register command function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	July 2, 2001

Syntax

```
#include <sifcmd.h>
void sceSifAddCmdHandler(
    unsigned int pos,           Position in buffer for registering command function
    sceSifCmdHandler f,        Command function to be registered
    void *data)                Address of data that is passed to command function f
```

Calling conditions

- Can be called from an interrupt handler
- Can be called from a thread
- Not multithread safe (must be called in an interrupt-disabled state)

Description

Registers a function (command function) that will be called when a command packet in the buffer that was registered using the sceSifSetCmdBuffer() function is invoked.

Notes

Since command functions are executed as interrupt handlers, special care is required when programming. Refer to the “Interrupt Handler Descriptions” section of \overview\eekernel for details.

Return value

None

sceSifExitCmd

Terminate SIF Command API

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	March 26, 2001

Syntax

```
#include <sifcmd.h>
```

```
void sceSifExitCmd(void)
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

Removes the interrupt function that was registered by the sceSifInitCmd() function.

When the SIF Command API is used before an object transition occurs on the EE, this function must be used to remove the interrupt function, and sceSifInitCmd() must be called by the new object.

Return value

None

sceSifGetSreg

Get software register contents

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	March 26, 2001

Syntax

#include <sifcmd.h>

unsigned int sceSifGetSreg(

int *no*) Register number (0 to 31)**Calling conditions**

Can be called from a thread

Not multithread safe

Description

Gets the value of a local-side software register. The initial value of software registers is zero.

Return value

Register contents

sceSifInitCmd

Initialize SIF Command API

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	March 26, 2001

Syntax**#include** <sifcmd.h>**void** sceSifInitCmd(void)**Calling conditions**

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

Initializes the SIF Command API. Registers an interrupt function for initializing internal variables and processing commands.

The side that calls sceSifInitCmd() first (either EE or IOP) will be synchronized with the other side. Consequently, when this function is called, one side will enter a wait state until the function is called by the other side.

Return value

None

sceSifRemoveCmdHandler

Remove command function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	March 26, 2001

Syntax

```
#include <sifcmd.h>
```

```
void sceSifRemoveCmdHandler(
```

```
    unsigned int pos)           Position in buffer of function to be removed
```

Calling conditions

Can be called from a thread

Not multithread safe (must be called in an interrupt-enabled state)

Description

Deletes the function that was registered at buffer position *pos*.

Return value

None

sceSifSendCmd

Send command packet

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	March 26, 2001

Syntax

#include <sifcmd.h>

unsigned int sceSifSendCmd(

 unsigned int *pos*,

Position of function to be called (position registered by the sceSifAddCmdHandler() function)

 void **cp*,

Command (command packet) address

 int *ps*,Command packet size in bytes (16 <= *ps* <= 112 bytes) void **src*,

Address of additional data to be sent

 void **dest*,

Address of target's additional data

 int *size*)

Size of additional data in bytes

Calling conditions

Can be called from an interrupt handler

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Uses sceSifSetDma() to send a command packet. Then calls the command function that is registered at position *pos* on the target side.

Successful delivery of the command to the target can be determined from the return value, and by calling the sceSifDmaStat() function.

cp, *src*, and *dest* should be placed at addresses that are aligned on 16-byte boundaries for the EE and on 4-byte boundaries for the IOP. *size* is a multiple of 16 bytes for the EE and a multiple of 4 bytes for the IOP.

For the EE, although *cp* is written back if it is in the cache, since *src* is not, it is the programmer's responsibility to make sure that it is flushed from the cache.

The isceSendCmd() function should be called within an interrupt function (for both the EE and IOP).

Notes

The *size* maximum is the DMA maximum 1Mbyte - 16bytes which can be sent at one time.

Return value

Queuing identifier used by sceSifSetDma() function

0: Queuing failed

Non-zero: Queuing identifier

sceSifSendCmdIntr

Send command packet

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	2.2	March 26, 2001

Syntax

```
#include <sifcmd.h>
```

```
unsigned int sceSifSendCmdIntr (
```

<code>unsigned int pos,</code>	Position of the function to call (the position registered with sceSifAddCmdHandler())
--------------------------------	---

<code>void *cp,</code>	Address of the command (command packet)
------------------------	---

<code>int ps,</code>	Size of the command packet (bytes) (between 16 and 112 bytes)
----------------------	---

<code>void *src,</code>	Address of data sent together (appended data)
-------------------------	---

<code>void *dest,</code>	Address of the destination sending the appended data
--------------------------	--

<code>int size,</code>	Size of the appended data (bytes)
------------------------	-----------------------------------

<code>void (*func)(void *),</code>	Function that is called after sending the command
------------------------------------	---

<code>void *data)</code>	Argument passed to <i>func</i>
--------------------------	--------------------------------

Calling conditions

Can be called from an interrupt handler

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

After sending the command, func() is called as the interrupt function. At that time, data is passed as the argument. Other than this, it is similar to sceSifSendCmd().

For interrupt-disabled areas, refer to isceSifSendCmdIntr().

At present, this function has been implemented only for the IOP.

Return value

Queuing identifier for the used sceSifSetDma()

0 Queuing failure

Other than 0 Queuing identifier

sceSifSetCmdBuffer

Register command function buffer

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	July 2, 2001

Syntax**#include** <sifcmd.h>**sceSifCmdData * sceSifSetCmdBuffer(****sceSifCmdData *db,** Starting address of buffer**int size)** Size of buffer**Calling conditions**

Can be called from a thread

Not multithread safe (must be called in an interrupt-disabled state)

Description

Sets a buffer for registering a function (command function) that will be invoked by the SIF Command API. Initially, no buffer is registered.

Return value

Address of buffer that had been previously registered.

sceSifSetSreg

Set software register contents

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifcmd	1.1	March 26, 2001

Syntax

#include <sifcmd.h>

unsigned int sceSifSetSreg(

int *no*, Register number (0 to 31)unsigned int *value*) Value to be set in register**Calling conditions**

Can be called from a thread

Not multithread safe

Description

Sets the specified value in the local-side software register.

Return value

Value that was set.

Chapter 4: SIF DMA

Table of Contents

Structures	4-3
sceSifDmaData	4-3
Functions	4-4
sceSifDmaStat / isceSifDmaStat	4-4
sceSifSetDChain / isceSifSetDChain	4-5
sceSifSetDma / isceSifSetDma	4-6
sceSifSetDmaIntr	4-7

Structures

sceSifDmaData

DMA data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifdma	1.1	October 6, 2000

Structure

typedef struct {

u_int data;	Address of data to be sent (must be aligned on a 16-byte boundary for the EE and on a 4-byte boundary for the IOP)
u_int addr;	Target address to which data is to be sent (must be aligned on a 16-byte boundary for the EE and on a 4-byte boundary for the IOP)
u_int size;	Data size (16-byte units for the EE and 4-byte units for the IOP)
u_int mode;	Note: Currently, this should only be set to 0 (mode where no interrupt is issued). Do not use SIF DMA related interrupts since they are currently used only with SIF CMD. SIF_DMA_INT_I: Interrupt after transfer ends sender) SIF_DMA_INT_O: Interrupt after transfer ends receiver) SIF_DMA_TAG : 1 qword at beginning of data may be used as TAG (can be specified only by the EE) SIF_DMA_ERT: Stop IOP DMA after transfer (can be specified only by the EE)

} sceSifDmaData;

Description

This structure is used to specify the address of the data to be DMA transferred, the destination address, the size, and the mode.

The addresses must be aligned on a 16-byte boundary for the EE and on a 4-byte boundary for the IOP.

The size is in units of 16-bytes for the EE and in units of 4-bytes for the IOP. The maximum number of units transferred at one time (with one sceSifDmaData) is (1M - 16) bytes.

See also

sceSifSetDma()

Functions

sceSifDmaStat / isceSifDmaStat

Get queuing state

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifdma	1.1	March 26, 2001

Syntax

```
#include <sif.h>
```

```
int sceSifDmaStat(
```

```
    unsigned int id)           Queuing identifier returned by sceSifSetDma()
```

```
int isceSifDmaStat(
```

```
    unsigned int id)           Queuing identifier returned by sceSifSetDma()
```

Calling conditions

sceSifDmaStat	EE	Can be called from a thread
		Multithread safe (must be called in an interrupt-enabled state)
	IOP	Can be called from a thread
		Not multithread safe (must be called in an interrupt-disabled state)
isceSifDmaStat		Can be called from an interrupt handler

Description

Checks the DMA state of the specified *id*.

Notes

For the EE, isceSifSetDma() should be used within an interrupt function.

Return value

Positive (>0): Queued and standing by

0: DMA execution in progress

Negative (<0): DMA completed

sceSifSetDChain / isceSifSetDChain

Set DMA channel again

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifdma	1.1	March 26, 2001

Syntax

```
#include <sif.h>
```

```
void sceSifSetDChain(void)
```

```
void isceSifSetDChain(void)
```

Calling conditions

sceSifSetDChain	EE	Can be called from a thread Multithread safe (must be called in an interrupt-enabled state)
	IOP	Can be called from a thread Not multithread safe (must be called in an interrupt-disabled state)
isceSifSetDChain		Can be called from an interrupt handler

Description

When a DMA transfer cannot be received due to an interrupt or another cause, the DMA channel can be set again on the receiving side by executing this function.

For the EE, if a SIF DMA interrupt from the IOP occurs, this function must be used to set the channel again since the DMA receiving channel will be closed.

For the IOP, if SIF_DMA_ERT has been specified, this function must be used to set the channel again since the receiving channel will be similarly closed.

Notes

For the EE, isceSifSetDChain() should be called within an interrupt function.

sceSifSetDma / isceSifSetDma

Perform DMA transfer to target's memory

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifdma	1.1	March 26, 2001

Syntax

#include <sif.h>

```
unsigned int sceSifSetDma(
    sceSifDmaData *sdd,          DMA contents
    int len)                     sdd data count
```

```
unsigned int isceSifSetDma(
    sceSifDmaData *sdd,          DMA contents
    int len)                     sdd data count
```

Calling conditions

sceSifSetDma	EE	Can be called from a thread
		Multithread safe (must be called in an interrupt-enabled state)
	IOP	Can be called from a thread
		Not multithread safe (must be called in an interrupt-disabled state)
isceSifSetDma		Can be called from an interrupt handler

Description

Uses DMA to send data to the receiver's address.

Multiple data can be specified at one time by using the sceSifDmaData structure.

If a DMA transfer is already in progress, the request is queued so that the next transfer will begin after the current transfer completes.

Over time, the same value may be returned for the queuing identifier.

With the current implementation, the queue count is 32 ring buffers for the EE and 32 double buffers per side for the IOP. As a result, the DMA completion interrupt function resides in the IOP.

Notes

For the EE, isceSifSetDma() should be used within an interrupt function.

For the IOP, this function must be called when interrupts are disabled.

SPR cannot be handled in the current implementation.

Return value

Non-zero: The queuing identifier is returned

0: Queuing failed

sceSifSetDmaIntr

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifdma	2.2	March 26, 2001

Syntax

```
#include <sif.h>
```

```
unsigned int sceSifSetDmaIntr(
```

sceSifDmaData * <i>sdd</i> ,	Contents of DMA
int <i>len</i> ,	Number of <i>sdd</i> data
void (* <i>func</i>)(void *),	Function that is called after completion of DMA
void * <i>data</i>)	Argument passed to <i>func</i>

Calling conditions

Can be called from a thread

Not multithread safe (must be called in interrupt-disabled state)

Description

After the completion of data transfer, *func()* is called as the interrupt function. At that time, *data* is passed as the argument. Other than this, it is similar to *sceSifSetDma()*.

At present, this function has been implemented only for the IOP.

Notes

For the IOP, this function must be called from an interrupt-disabled area.

The SPR cannot be handled in the current implementation.

Return value

Other than 0 Queuing identifier

0 Queuing failure

Chapter 5: SIF Remote Procedure Call

Table of Contents

Structures	5-3
sceSifClientData	5-3
sceSifEndFunc	5-4
sceSifQueueData	5-5
sceSifReceiveData	5-6
sceSifRpcData	5-7
sceSifRpcFunc	5-8
sceSifServeData	5-9
Functions	5-10
sceSifBindRpc	5-10
sceSifCallRpc	5-12
sceSifCheckStatRpc	5-14
sceSifExecRequest	5-15
sceSifGetNextRequest	5-16
sceSifGetOtherData	5-17
sceSifInitRpc	5-18
sceSifRegisterRpc	5-19
sceSifRemoveRpc	5-20
sceSifRemoveRpcQueue	5-21
sceSifRpcLoop	5-22
sceSifSetRpcQueue	5-23

Structures

sceSifClientData

RPC client information

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	July 24, 2000

Structure

```
typedef struct _sif_client_data {
    struct _sif_rpc_data rpcd;
    unsigned int command;
    void *buff;
    void *cbuff;
    sceSifEndFunc func;
    void *para;
    struct _sif_serve_data *serve;
} sceSifClientData;
```

Description

This structure stores client information that was obtained by `sceSifBindRpc()`. Because the members are automatically set, there is no need to set them in the program. This structure is also used when a service function is called by `sceSifCallRpc()`.

See also

`sceSifBindRpc()`, `sceSifCallRpc()`, `sceSifCheckStatRpc()`

sceSifEndFunc

RPC end function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	January 27, 2000

Structure

```
typedef void (* sceSifEndFunc)(
```

```
    void *data);
```

Data address passed when function is called

Description

This function is called in an interrupt area when the RPC service function ends. At this time the address of data is passed.

See also

sceSifCallRpc()

sceSifQueueData

RPC request queue data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	July 24, 2000

Structure

```
typedef struct _sif_queue_data {
    int key;
    int active;
    struct _sif_serve_data *link;
    struct _sif_serve_data *start;
    struct _sif_serve_data *end;
    struct _sif_queue_data *next;
} sceSifQueueData;
```

Description

This structure queues requests that were received by the server. Because the members are automatically set, there is no need to set them in the program.

See also

sceSifSetRpcQueue(), sceSifRegisterRpc(), sceSifGetNextRequest(), sceSifRpcLoop()

sceSifReceiveData

RPC data receive information

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	July 24, 2000

Structure

```
typedef struct _sif_receive_data {  
    struct _sif_rpc_datarpcd;  
    void *src;  
    void *dest;  
    int size;  
} sceSifReceiveData;
```

Description

This structure stores control data when data from the target is received using DMA. Because the members are automatically set, there is no need to set them in the program.

See also

sceSifCheckStatRpc(), sceSifGetOtherData()

sceSifRpcData

RPC client data header

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	July 24, 2000

Structure

```
typedef struct _sif_rpc_data {
    void *paddr;           Packet address
    unsigned int pid;       Packet ID
    int tid;               Thread ID
    unsigned int mode;      Call mode
} sceSifRpcData;
```

Description

Common header data for RPC clients.

See also

sceSifClientData(), sceSifReceiveData(), sceSifCheckStatRpc()

sceSifRpcFunc

RPC service function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	January 27, 2000

Structure

```
typedef void * (* sceSifRpcFunc)(
    unsigned int fno,           fno of sceSifCallRpc()
    void *data,                Address where receive data is stored
    int size)                  Size of receive data
```

Description

This is an RPC service function that is executed by the server. It is registered using `sceSifRegisterRpc()` and is executed using `sceSifExecRequest()` when a request is received.

The return value of this function is the address of the data that is returned to the client that issued the request. The destination address and data size are specified by the client.

See also

`sceSifRegisterRpc()`

sceSifServeData

RPC server data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	July 24, 2000

Structure

```
typedef struct _sif_serve_data {
    unsigned int command;
    sceSifRpcFunc func;
    void *buff;
    int size;
    sceSifRpcFunc cfunc;
    void *cbuff;
    int csize;
    sceSifClientData *client;
    void *paddr;
    unsigned int fno;
    void *receive;
    int rsize;
    int rmode;
    unsigned int rid;
    struct _sif_serve_data *link;
    struct _sif_serve_data *next;
    struct _sif_queue_data *base;
} sceSifServeData;
```

Description

This structure registers various pieces of information used to identify a request that was accepted by the server. This information includes the identifier, service function, and receive data address.

Because the members are automatically set, there is no need to set them in the program.

See also

sceSifExecRequest(), sceSifGetNextRequest(), sceSifRegisterRpc()

Functions

sceSifBindRpc

Search RPC service function data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax

```
#include <sifrpc.h>
```

```
int sceSifBindRpc(
```

```
    sceSifClientData *bd,
```

Pointer to structure for fetching client information

```
    unsigned int request,
```

Request identifier

```
    unsigned int mode)
```

Calling mode. This is usually zero. Specify the following constant when necessary:

SIF_RPCM_NOWAIT: Asynchronous execution

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Gets required client information from the server to send a request. This function is needed by the client.

When this function is called, it checks whether the service function for the request identifier specified by the *request* argument has been registered on the server. If it has been registered, it returns client information in the *sceSifClientData* structure specified by the *bd* argument, that will subsequently be used as the calling key.

Normally, the thread that called this function is in Sleep state until there is a reply from the server. If SIF_RPCM_NOWAIT has been specified for the mode argument, control exits directly without the thread entering Sleep state. In this case, the completion of processing on the server can be confirmed by using the *sceSifCheckStatRpc()* function.

Notes

From release 1.4, the EE uses the internally reserved semaphore to wait for completion, instead of Sleep.

Whether or not the service function had been registered (whether Bind succeeded) can be determined by whether a non-zero value is set for the *serve* member of *sceSifClientData*. This is shown below.

```
#define BIND_ID  0x12345678
while(1){
    if (sceSifBindRpc( &cd0, BIND_ID, 0) < 0) {
        printf("bind errr\n");
        exit(-1);
    }
    if (cd0.serve != 0) break;
}
```

If requests are frequently sent from the EE to the IOP using code such as that shown above, the IOP will be practically stopped because the EE is quite fast. Therefore, a small interval should be inserted between requests.

Return value

0: Notification to server succeeded

Negative (<0): Execution failed

sceSifCallRpc

Call RPC service function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax

```
#include <sifrpc.h>
```

```
int sceSifCallRpc(
```

```
    sceSifClientData *bd,
```

Client information for which Bind has completed

```
    unsigned int fno,
```

Number to be passed to the service function that is called

```
    unsigned int mode,
```

Calling mode. This is usually zero. Specify the following constants as a mask when necessary:

SIF_RPCM_NOWAIT: Asynchronous execution

SIF_RPCM_NOWBDC: No cache writeback

```
    void *send,
```

Data buffer to be sent (16-byte/4-byte alignment for EE/IOP)

```
    int ssize,
```

Data size to be sent (bytes; 16-byte/4-byte units for EE/IOP)

```
    void *receive,
```

Data buffer to be received (16-byte/4-byte alignment for EE/IOP)

```
    int rsize,
```

Data size to be received (bytes; 16-byte/4-byte units for EE/IOP)

```
    sceSifEndFunc *end_func,
```

Function that is executed when execution ends and interrupts are disabled

```
    void *end_para)
```

Address of *end_func* parameter

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Calls a service function that has been registered. This function is used by the client.

For the *bd* argument, specify the client information structure that had previously used the `sceSifBindRpc()` function to complete the Bind.

ssize bytes of the data specified by the *send* argument are sent to the server, and the *send* and *ssize* argument values are passed as the second and third arguments to the service function. The *fno* argument value is passed as the first argument.

After the service function is executed, *rsize* bytes of the data at the address indicated by the service function's return value are sent back to the area specified by the *receive* argument.

After execution ends, the function specified by the *end_func* argument is called when interrupts are disabled.

Normally, the thread that called the `sceSifCallRpc()` function is in Sleep state until there is a reply from the server. If SIF_RPCM_NOWAIT has been masked in advance for the mode argument, control exits directly without the thread entering Sleep state. In this case, the completion of processing on the server can be confirmed by using the `sceSifCheckStatRpc()` function.

Notes

From release 1.4, the EE uses the internally reserved semaphore to wait for completion, instead of Sleep.

For the EE, although writeback is performed for send/receive data that has been loaded in the cache, if SIF_RPCM_DOWBDC has been masked in advance for the *mode* argument, writeback will not be performed.

With the current implementation, a service function cannot be reentrant. Always confirm that execution has ended before calling the next function.

The "*ssize*" and "*rsize*" maximum is the maximum DMA 1Mbyte - 16 bytes which can be sent at one time.

Since the completion processing function `end_func` is executed as an interrupt handler, special care is required when programming. Refer to the "Interrupt Handler Descriptions" section of \overview\eekernel for details.

Return value

0: Notification to server succeeded

Negative (<0): Execution failed

sceSifCheckStatRpc

Determine RPC status

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax**#include** <sifrpc.h>**int sceSifCheckStatRpc(**
sceSifRpcData *bd) Pointer to sceSifRpcData structure
Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

This function determines the state of the sceSifBindRpc(), sceSifCallRpc(), and sceSifGetOtherData() functions. It is primarily used to determine the end of execution when the function was invoked with SIF_RPCM_NOWAIT.

For the *bd* argument, specify sceSifClientData or sceSifReceiveData by casting it to sceSifRpcData.

Return value

1: Execution in progress

0: Execution ended

sceSifExecRequest

Execute service function

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax

```
#include <sifrpc.h>
```

```
void sceSifExecRequest(
```

```
    sceSifServeData *sa);          Pointer to request
```

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Executes the service function corresponding to a request.

This function is required for the server.

Return value

None

sceSifGetNextRequest

Get RPC request

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax

```
#include <sifrpc.h>
```

```
sceSifServeData * sceSifGetNextRequest(
```

```
    sceSifQueueData *dp)
```

Pointer to request receive queue set by the
sceSifSetRpcQueue() function

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Gets the sceSifQueueData structure, which represents the received request, from the receive queue. This function is required for the server.

If the return value is not zero, the service function will be executed when the pointer is passed to the sceSifExecRequest() function.

Return value

0: No request

Non-zero: Pointer to request

sceSifGetOtherData

Fetch target-side data

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax

```
#include <sifrpc.h>
int sceSifGetOtherData(
    sceSifReceiveData *bd,      Pointer to sceSifReceiveData structure
    void *src,                  Target-side data address (16-byte/4-byte alignment for EE/IOP)
    void *dest,                  Transfer destination address (16-byte/4-byte alignment for EE/IOP)
    int size,                    Size of data to be transferred
    unsigned int mode)           Calling mode. This is usually zero. Specify the following constant as
                                a mask when necessary:
                                SIF_RPCCM_NOWAIT: Asynchronous execution
```

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

This function transfers data from the target-side address *src* to the local-side address *dest*.

Normally, the thread that called the `sceSifReceiveRpc()` function is in Sleep state until there is a reply from the target. If `SIF_RPCCM_NOWAIT` has been masked in advance for *mode*, control exits directly without the thread entering Sleep state. In this case, the completion of processing can be confirmed by using the `sceSifCheckStatRpc()` function.

Notes

From release 1.4, the EE uses the internally reserved semaphore to wait for completion, instead of Sleep.

Return value

0: Notification to target side succeeded

Negative (<0): Execution failed

sceSifInitRpc

Initialize SIF RPC API

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax**#include** <sifrpc.h>**void** sceSifInitRpc(
unsigned int *mode*)

Startup mode (In the current implementation, this value is fixed at 0.)

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Initializes the SIF RPC API.

Registers a command function for initializing internal variables and processing requests in the system buffer of the SIF Command API.

This function must be executed on both the server and client.

Since the sceSifInitRpc() function internally calls the sceSifInitCmd() function, for synchronization purposes, one side will enter a wait state within this function until the function is called by the other side.

Return value

None

sceSifRegisterRpc

Register RPC service function in receive queue

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax

```
#include <sifrpc.h>
```

```
void sceSifRegisterRpc(
```

```
    sceSifServeData *serve,           Pointer to structure for storing service function information
```

```
    unsigned int request,             Request identifier
```

```
    sceSifRpcFunc func,              Service function to be executed when request is received
```

```
    void *buff,                      Data address that is argument of func
```

```
    sceSifRpcFunc cfunc,             Function that is executed when interrupts are disabled  
                                     and sceSifCancelRpc() is invoked
```

```
    void *cbuff,                     Buffer that is argument of cfunc
```

```
    sceSifQueueData *qd)             Receive queue structure for registering serve structure
```

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Registers the specified request identifier and service function in the receive queue structure. This function is required for the server.

The request identifier is one that is used by the sceSifBindRpc() function to search for a service function. A request identifier for which the highest-order bit (bit 31) is set to 1 cannot be specified (this kind of request identifier is for system use).

If the sceSifCallRpc() function is called from the client side, the request is entered in the receive queue by the function that was registered using the SIF Command API. After the SIF Command function that is executed as an interrupt function ends, the request is fetched from the receive queue using a normal context, and the service function *func* is executed. When *func* execution ends, the data at the address specified by its return value is returned to the address specified by the receive argument of the sceSifCallRpc() function. However, the size of the data that is returned is limited to the size specified by the *rsize* argument of the sceSifCallRpc() function.

With the current implementation, a service function cannot be reentrant. Always confirm that execution of the current function completes before calling the next function. Even if the function itself is reentrant, this restriction holds to reduce the queuing structure and the amount of traffic between the EE and IOP.

sceSifCancelRpc() is currently not implemented.

Return value

None

sceSifRemoveRpc

Remove RPC service functions

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.5	July 2, 2001

Syntax**#include <sifrpc.h>****sceSifServeData *sceSifRegisterRpc(**

sceSifServeData *serve, Pointer to structure where service function information is stored

sceSifQueueData *qd) Receive queue structure which registers the *serve* structure

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Removes the request identifier and service functions from the receive queue structure.

When unloading the IOP module, the receive queue registered by this function must be removed from the queue structure.

Return value

NULL: Failure (not registered in the receive queue)

Other than NULL: Success

sceSifRemoveRpcQueue

Remove RPC receive queue registration

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.5	July 2, 2001

Syntax

```
#include <sifrpc.h>
```

```
sceSifQueueData *sceSifRemoveRpcQueue(
```

```
    sceSifQueueData *dq)           Receive queue structure
```

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Removes the receive queue of the RPC request from the RPC system.

When removing the IOP module, remove the queue structure registered in the RPC system.

Return value

NULL: Failure (not registered)

Other than NULL: Success

sceSifRpcLoop

Wait for request

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax

```
#include <sifrpc.h>
```

```
void sceSifRpcLoop(
```

```
    sceSifQueueData *pd)
```

Pointer to request receive queue set by the
sceSifSetRpcQueue() function

Calling conditions

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Causes the execution thread to enter a loop in which it repeatedly waits for a request and executes a service. This function is required for the server.

When this function is called, the execution thread enters Sleep state until a request from the client is received. When a request is received, Wakeup is invoked, and the service function of the request is executed. After execution ends, the execution thread enters Sleep state again. Therefore, the request receive queue specified by *pd* must be the queue for which the thread ID was specified in the second argument, at the time it was registered by the sceSifSetRpcQueue() function.

The source code of sceSifRpcLoop() is shown below for reference.

```

void sceSifRpcLoop(sceSifQueueData *qd)
{
    sceSifServeData *rdp;
    while(1) {
        /* Get processing function */
        while ((rdp = sceSifGetNextRequest(qd))) {
            /* Execute function */
            sceSifExecRequest(rdp);
        }
        /* Sleep until next command arrives */
        SleepThread();
    }
    return;
}

```

Return value

None (control does not return from this function)

sceSifSetRpcQueue

Register RPC receive queue

<i>Library</i>	<i>Introduced</i>	<i>Documentation last modified</i>
sifrpc	1.1	March 26, 2001

Syntax**#include** <sifrpc.h>**void sceSifSetRpcQueue(** **sceSifQueueData** *dq, Receive queue structure **int** key) Thread ID. A negative number (<0) will cause a busy wait to occur.**Calling conditions**

Can be called from a thread

Multithread safe (must be called in an interrupt-enabled state)

Description

Registers an RPC request receive queue in the RPC system.

This function is required for the server.

Normally a thread ID is specified for the *key* argument so that Wakeup will be performed for the thread each time a request arrives from a client. If a negative number (<0) is specified for *key*, Wakeup will not be performed and a busy wait will occur.

Return value

None

