# Seagull PCI

## *DSP API Guide*

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# Seagull PCI

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| Function | Description |
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| Seagull_PCI_Open (see page 7) | Opens Seagull_PCI_handle_t (see page 13) |

### Types

| Type | Description |
|---|---|
| Seagull_PCI_attrs_t (see page 10) | typedef of struct Seagull_PCI_attrs_s (see page 3) |
| Seagull_PCI_FXN_close (see page 11) | Close Seagull_PCI_handle_t (see page 13) |
| Seagull_PCI_FXN_load_fpga (see page 12) | Loads the FPGA |
| Seagull_PCI_handle_t (see page 13) | typedef of struct Seagull_PCI_handle_s (see page 4) |

### Structs, Records, Enums

| Struct, Record, Enum | Description |
|---|---|
| Seagull_PCI_attrs_s (see page 3) | structure for initalizing Seagull_PCI for Seagull_PCI_Open (see page 7) |
| Seagull_PCI_handle_s (see page 4) | structure for using the Seagull_PCI |

# 1.1 Structs, Records, Enums

### Structs

| Struct | Description |
|---|---|
| Seagull_PCI_attrs_s (see page 3) | structure for initalizing Seagull_PCI for Seagull_PCI_Open (see page 7) |
| Seagull_PCI_handle_s (see page 4) | structure for using the Seagull_PCI |

# 1.1.1 Seagull_PCI_attrs_s

```
struct Seagull_PCI_attrs_s {
  int open_gpio;
  int open_timers;
  int card_type;
};
```

**File**

Seagull_PCIExp.h (see page 15)

**Description**

structure for initalizing Seagull_PCI for Seagull_PCI_Open (see page 7)

# 1.1.2 Seagull_PCI_handle_s

```
struct Seagull_PCI_handle_s {
  Seagull_PCI_FXN_close close;
  Seagull_PCI_FXN_load_fpga load_fpga;
  GPIO_Handle gpio_handle;
  TIMER_Handle timer1_handle, timer2_handle;
  int loads_fpga;
};
```

**File**

Seagull_PCIExp.h (see page 15)

**Members**

| Members | Description |
|---|---|
| `GPIO_Handle gpio_handle;` | GPIO handle opened by lib |
| `TIMER_Handle timer1_handle;` | timer handles opened by lib |
| `TIMER_Handle timer2_handle;` | timer handles opened by lib |
| `int loads_fpga;` | whether this DSP can load an FPGA |

**Description**

structure for using the Seagull_PCI

# 1.2 Functions

### Functions

| Function | Description |
|---|---|
| Seagull_PCI_Get_Version (see page 6) | Get version for this library |
| Seagull_PCI_Open (see page 7) | Opens Seagull_PCI_handle_t (see page 13) |

# 1.2.1 Seagull_PCI_Get_Version

Get version for this library

```
MANGOERROR_error_t Seagull_PCI_Get_Version(MANGOBIOS_version_t * version);
```

**File**

Seagull_PCIExp.h (see page 15)

**Returns**

Status

**Return Values**

| Return Values | Description |
|---|---|
| MANGOERROR_SUCCESS | Success |

**Description**

Gets version information for Seagull_PCI Library

**Remarks**

None

**Example**

```
int errorCode;
MANGOBIOS_version_t version;

errorCode = Seagull_PCI_Get_Version(
 &version
 );
```

# 1.2.2 Seagull_PCI_Open

Opens Seagull_PCI_handle_t (see page 13)

```
MANGOERROR_error_t Seagull_PCI_Open(Seagull_PCI_handle_t * handle, const
Seagull_PCI_attrs_t * attrs);
```

**File**

Seagull_PCIExp.h (see page 15)

**Parameters**

| Parameters | Description |
|---|---|
| `Seagull_PCI_handle_t * handle` | Pointer for handle |
| `const Seagull_PCI_attrs_t * attrs` | Pointer to attrs |

**Returns**

Status

**Return Values**

| Return Values | Description |
|---|---|
| `MANGOERROR_SUCCESS` | Success |
| `MANGOERROR_RESOURCE_UNAVAILABLE` | - Seagull_PCI_Open has already been called (handle already open).<br>- attrs->open_gpio is true, but the call to GPIO_open for GPIO_DEV0 fails<br>- attrs->open_timers is true, but call to TIMER_open for TIMER_DEV1 or TIMER_DEV2 fails. |

**Description**

Initializes handle for using a Seagull_PCI board. This function will fail if called more than once without a call to handle.close() in between.

**Remarks**

**Card types** - When opening the board handle you must set the attrs.card_type attribute to 1 or 2. Type 1 is a legacy version of the Seagull PCI board, recognizable by many patch-wires on the board. All new boards are of type 2. If in doubt, try both types until loading the FPGA succeeds.

If attrs.open_gpio is true, then the gpio will be reset and opened. The GPIO_Handle is stored in the Seagull_PCI_handle_t (see page 13) structure, and can be copied from there for use by the application. For card type 1, GPIO must be opened by this function to enable load FPGA. This is not necessary for type 2.

If attrs.open_timers is true, then timer devices 1 and 2 will be opened. The handles for both are also stored in the card handle structure. For card type 2, timer handles must be opened by this function to enable load FPGA. This is not necessary for type 1.

After returning from this function, seagull_pci.loads_fpga will contain 1 if loading FPGA is possible from this DSP or 0 if not. DSPs 1, 3, 5, 7 should return 1 and DSPs 2, 4, 6, 8 should return 0. If this behavior is not observed you may have chosen a wrong card_type.

**Example**

```
Seagull_PCI_handle_t seagull_pci;
Seagull_PCI_attrs_t attrs;
int errorCode;
attrs.open_gpio = 0;
attrs.open_timers = 1;
attrs.card_type = 2;
errorCode = Seagull_PCI_Open(
 &seagull_pci,
 &attrs
```

```
);
```

# 1.3 Types

### Types

| Type | Description |
|---|---|
| Seagull_PCI_attrs_t (see page 10) | typedef of struct Seagull_PCI_attrs_s (see page 3) |
| Seagull_PCI_FXN_close (see page 11) | Close Seagull_PCI_handle_t (see page 13) |
| Seagull_PCI_FXN_load_fpga (see page 12) | Loads the FPGA |
| Seagull_PCI_handle_t (see page 13) | typedef of struct Seagull_PCI_handle_s (see page 4) |

## 1.3.1 Seagull_PCI_attrs_t

```
typedef struct Seagull_PCI_attrs_s Seagull_PCI_attrs_t;
```

**File**

Seagull_PCIExp.h (see page 15)

**Description**

typedef of struct Seagull_PCI_attrs_s (see page 3)

# 1.3.2 Seagull_PCI_FXN_close

Close Seagull_PCI_handle_t (see page 13)

```
typedef MANGOERROR_error_t (* Seagull_PCI_FXN_close)();
```

**File**

Seagull_PCIExp.h (see page 15)

**Returns**

Status

**Return Values**

| Return Values | Description |
|---|---|
| MANGOERROR_SUCCESS | Success |
| MANGOERROR_ERR_INVALID_PARAMETER | Seagull_PCI library was not previously opened successfully. |

**Description**

Closes library. The library can be reopened using Seagull_PCI_Open (see page 7)()

**Remarks**

None

**Example**

```
int errorCode;
errorCode = seagull_pci.close(
 );
```

# 1.3.3 Seagull_PCI_FXN_load_fpga

Loads the FPGA

```
typedef MANGOERROR_error_t (* Seagull_PCI_FXN_load_fpga)(const unsigned char * fpga_config,
unsigned int size);
```

### File

Seagull_PCIExp.h (see page 15)

### Parameters

| Parameters | Description |
|---|---|
| fpga_config | Pointer to char array of FPGA data |
| size | Number of bytes of FPGA data |

### Returns

Status

### Return Values

| Return Values | Description |
|---|---|
| MANGOERROR_SUCCESS | Success |
| MANGOERROR_ERR_INVALID_HANDLE | Seagull_PCI library has not been opened successfully. |
| MANGOERROR_TIMEOUT | FPGA is not responding with appropriate pin response. |

### Description

Resets, and loads the FPGA.

### Remarks

None.

### Example

```
const unsigned char fpga_data[] = {
#include "top.ttf"
};

int fpga_size = sizeof(fpga_data);
int errorCode;
errorCode = seagull_pci->load_fpga(
 fpga_data,
 fpga_size
 );
```

## 1.3.4 Seagull_PCI_handle_t

```
typedef struct Seagull_PCI_handle_s Seagull_PCI_handle_t;
```

**File**

Seagull_PCIExp.h (see page 15)

**Description**

typedef of struct Seagull_PCI_handle_s (see page 4)

# 1.4 Files

### Files

| File | Description |
|---|---|
| Seagull_PCIExp.h (see page 15) | Seagull_PCI library exported header file |

# 1.4.1 Seagull_PCIExp.h

Seagull_PCI library exported header file

### Description

Seagull_PCI library exported api declarations

### Remarks

Requires <csl_gpio.h>, <csl_timer.h>, "MangoError.h", "MangoBios.h"

### History

| Author | Change Description |
|---|---|
| Nachum Kanovsky | Created |

### Functions

| Function | Description |
|---|---|
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### Structs

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