

libcin

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# Chapter 1

## Module Index

### 1.1 Modules

Here is a list of all modules:

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## Chapter 2

# Class Index

### 2.1 Class List

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## Chapter 3

# File Index

### 3.1 File List

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

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src/ <b>cin_register_map.h</b> . . . . .	??
src/ <b>cinregisters.h</b> . . . . .	??
src/ <b>common.h</b> . . . . .	??
src/ <b>config.h</b> . . . . .	??
src/ <b>control.h</b> . . . . .	??
src/ <b>data.h</b> . . . . .	??
src/ <b>descramble.h</b> . . . . .	??
src/ <b>descramble_map.h</b> . . . . .	??
src/ <b>fclk_program.h</b> . . . . .	??
src/ <b>fifo.h</b> . . . . .	??
src/ <b>report.h</b> . . . . .	??
src/ <b>version.h</b> . . . . .	??



## Chapter 4

# Module Documentation

### 4.1 Cin Control Routines

#### Functions

- int [cin\\_ctl\\_init](#) ([cin\\_ctl\\_t](#) \*cin, const char \*ipaddr, uint16\_t oport, uint16\_t iport, uint16\_t soport, uint16\_t siport)
- int [cin\\_ctl\\_destroy](#) ([cin\\_ctl\\_t](#) \*cin)
- int [cin\\_ctl\\_read](#) ([cin\\_ctl\\_t](#) \*cin, uint16\_t reg, uint16\_t \*val)
- int [cin\\_ctl\\_write](#) ([cin\\_ctl\\_t](#) \*cin, uint16\_t reg, uint16\_t val, int wait)
- int [cin\\_ctl\\_stream\\_write](#) ([cin\\_ctl\\_t](#) \*cin, char \*val, int size)
- int [cin\\_ctl\\_write\\_with\\_readback](#) ([cin\\_ctl\\_t](#) \*cin, uint16\_t reg, uint16\_t val)
- int [cin\\_ctl\\_pwr](#) ([cin\\_ctl\\_t](#) \*cin, int pwr)
- int [cin\\_ctl\\_fp\\_pwr](#) ([cin\\_ctl\\_t](#) \*cin, int pwr)
- int [cin\\_ctl\\_fo\\_test\\_pattern](#) ([cin\\_ctl\\_t](#) \*cin, int on\_off)
- int [cin\\_ctl\\_load\\_config](#) ([cin\\_ctl\\_t](#) \*cin, char \*filename)
- int [cin\\_ctl\\_load\\_firmware](#) ([cin\\_ctl\\_t](#) \*cin, char \*filename)
- int [cin\\_ctl\\_set\\_fclk](#) ([cin\\_ctl\\_t](#) \*cin, int clkfreq)
- int [cin\\_ctl\\_get\\_fclk](#) ([cin\\_ctl\\_t](#) \*cin, int \*clkfreq)
- int [cin\\_ctl\\_freeze\\_dco](#) ([cin\\_ctl\\_t](#) \*cin, int freeze)
- int [cin\\_ctl\\_get\\_cfg\\_fpga\\_status](#) ([cin\\_ctl\\_t](#) \*cin, uint16\_t \*\_val)
- int [cin\\_ctl\\_get\\_id](#) ([cin\\_ctl\\_t](#) \*cin, [cin\\_ctl\\_id\\_t](#) \*\_val)
- void [cin\\_ctl\\_display\\_id](#) (FILE \*out, [cin\\_ctl\\_id\\_t](#) val)
- void [cin\\_ctl\\_display\\_fpga\\_status](#) (FILE \*out, uint16\_t val)
- int [cin\\_ctl\\_get\\_dcm\\_status](#) ([cin\\_ctl\\_t](#) \*cin, uint16\_t \*\_val)
- void [cin\\_ctl\\_display\\_dcm\\_status](#) (FILE \*out, uint16\_t \*\_val)
- double [cin\\_ctl\\_current\\_calc](#) (uint16\_t val)
- int [cin\\_ctl\\_get\\_power\\_status](#) ([cin\\_ctl\\_t](#) \*cin, int full, int \*pwr, [cin\\_ctl\\_pwr\\_mon\\_t](#) \*values)
- void [cin\\_ctl\\_display\\_pwr](#) (FILE \*out, [cin\\_ctl\\_pwr\\_mon\\_t](#) \*values)
- void [cin\\_ctl\\_display\\_pwr\\_line](#) (FILE \*out, const char \*msg, [cin\\_ctl\\_pwr\\_val\\_t](#) val)
- int [cin\\_ctl\\_calc\\_vi\\_status](#) ([cin\\_ctl\\_t](#) \*cin, uint16\_t vreg, uint16\_t ireg, double vfact, [cin\\_ctl\\_pwr\\_val\\_t](#) \*vi)
- int [cin\\_ctl\\_get\\_camera\\_pwr](#) ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int [cin\\_ctl\\_set\\_camera\\_pwr](#) ([cin\\_ctl\\_t](#) \*cin, int val)
- int [cin\\_ctl\\_set\\_bias](#) ([cin\\_ctl\\_t](#) \*cin, int val)
- int [cin\\_ctl\\_get\\_bias](#) ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int [cin\\_ctl\\_set\\_clocks](#) ([cin\\_ctl\\_t](#) \*cin, int val)
- int [cin\\_ctl\\_get\\_clocks](#) ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int [cin\\_ctl\\_set\\_trigger](#) ([cin\\_ctl\\_t](#) \*cin, int val)
- int [cin\\_ctl\\_get\\_trigger](#) ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int [cin\\_ctl\\_set\\_focus](#) ([cin\\_ctl\\_t](#) \*cin, int val)

- int **cin\_ctl\_get\_focus** ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int **cin\_ctl\_get\_triggering** ([cin\\_ctl\\_t](#) \*cin, int \*trigger)
- int **cin\_ctl\_int\_trigger\_start** ([cin\\_ctl\\_t](#) \*cin, int nimages)
- int **cin\_ctl\_int\_trigger\_stop** ([cin\\_ctl\\_t](#) \*cin)
- int **cin\_ctl\_ext\_trigger\_start** ([cin\\_ctl\\_t](#) \*cin, int trigger\_mode)
- int **cin\_ctl\_ext\_trigger\_stop** ([cin\\_ctl\\_t](#) \*cin)
- int **cin\_ctl\_set\_exposure\_time** ([cin\\_ctl\\_t](#) \*cin, float e\_time)
- int **cin\_ctl\_set\_trigger\_delay** ([cin\\_ctl\\_t](#) \*cin, float t\_time)
- int **cin\_ctl\_set\_cycle\_time** ([cin\\_ctl\\_t](#) \*cin, float ftime)
- int **cin\_ctl\_frame\_count\_reset** ([cin\\_ctl\\_t](#) \*cin)
- int **cin\_ctl\_set\_mux** ([cin\\_ctl\\_t](#) \*cin, int setting)
- int **cin\_ctl\_get\_mux** ([cin\\_ctl\\_t](#) \*cin, int \*setting)
- int **cin\_ctl\_set\_fcric\_gain** ([cin\\_ctl\\_t](#) \*cin, int gain)
- int **cin\_ctl\_set\_fabric\_address** ([cin\\_ctl\\_t](#) \*cin, char \*ip)
- int **cin\_ctl\_reg\_dump** ([cin\\_ctl\\_t](#) \*cin, FILE \*fp)
- int **cin\_ctl\_get\_bias\_voltages** ([cin\\_ctl\\_t](#) \*cin, float \*voltage)
- int **cin\_ctl\_set\_bias\_voltages** ([cin\\_ctl\\_t](#) \*cin, float \*voltage)
- int **cin\_ctl\_set\_fcric\_clamp** ([cin\\_ctl\\_t](#) \*cin, int clamp)

#### 4.1.1 Detailed Description

#### 4.1.2 Function Documentation

##### 4.1.2.1 int cin\_ctl\_destroy ( [cin\\_ctl\\_t](#) \* cin )

Destroy (close) the cin control library

Close connections, free memory and exit library

Parameters

<i>cin</i>	handle to cin library
------------	-----------------------

Returns

Returns 0 on success non-zero if error

##### 4.1.2.2 int cin\_ctl\_init ( [cin\\_ctl\\_t](#) \* cin, const char \* *ipaddr*, [uint16\\_t](#) *oport*, [uint16\\_t](#) *iport*, [uint16\\_t](#) *soport*, [uint16\\_t](#) *siport* )

Initialize the cin control library

Initialize the control structures and communications with the CIN via the control interface. This function opens the UDP ports and starts a listening thread to receive packets from the CIN.

Parameters

<i>cin</i>	handle to cin library
<i>ipaddr</i>	ip address of CIN base address
<i>oport</i>	output udp port of cin
<i>iport</i>	input udp port of cin
<i>soport</i>	stream output udp port of cin
<i>siport</i>	stream input udp port of cin

Returns

Returns 0 on success non-zero if error

4.1.2.3 int cin\_ctl\_read ( cin\_ctl\_t \* *cin*, uint16\_t *reg*, uint16\_t \* *val* )

Read register from CIN

**Parameters**

<i>cin</i>	handle to cin library
<i>reg</i>	register to read
<i>val</i>	variable to read value of register to

**Returns**

Returns 0 on success non-zero if error

**4.1.2.4 int cin\_ctl\_stream\_write ( cin\_ctl\_t \* cin, char \* val, int size )**

Write stream data to CIN

**Parameters**

<i>cin</i>	handle to cin library
<i>val</i>	array of values to write
<i>size</i>	size of array pointed to by val

Write stream data to cin in form of 16 bit array.

**Returns**

Returns 0 on success non-zero if error

**4.1.2.5 int cin\_ctl\_write ( cin\_ctl\_t \* cin, uint16\_t reg, uint16\_t val, int wait )**

Write register to CIN

**Parameters**

<i>cin</i>	handle to cin library
<i>reg</i>	register to write to
<i>val</i>	value to write to register
<i>wait</i>	if non-zero

Write register value to CIN. If wait is non-zero then wait a sleep time of i CIN\_CTL\_WRITE\_SLEEP before releasing the mutex to add flow control to the cin.

**Returns**

Returns 0 on success non-zero if error

**4.1.2.6 int cin\_ctl\_write\_with\_readback ( cin\_ctl\_t \* cin, uint16\_t reg, uint16\_t val )**

Write register to CIN with readback verification

**Parameters**

<i>cin</i>	handle to cin library
<i>reg</i>	register to write to
<i>val</i>	value to write to register

Write register value to CIN. Follow write with read of register and compare value. CIN\_CTL\_WRITE\_SLEEP before releasing the mutex to add flow control to the cin.

**Returns**

Returns 0 on success non-zero if error

## 4.2 CIN Data Routines

Data group





## Chapter 5

# Class Documentation

### 5.1 cin\_ctl Struct Reference

#### Public Attributes

- [cin\\_port\\_t](#) **ctl\_port**
- [cin\\_port\\_t](#) **stream\_port**
- [cin\\_ctl\\_config\\_t](#) **config**
- [cin\\_ctl\\_listener\\_t](#) \* **listener**
- [pthread\\_mutex\\_t](#) **access**
- [pthread\\_mutexattr\\_t](#) **access\_attr**

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

- [src/cin.h](#)

### 5.2 cin\_ctl\_config Struct Reference

#### Public Attributes

- char **name** [CIN\_CONFIG\_MAX\_STRING]
- char **firmware\_filename** [CIN\_CONFIG\_MAX\_STRING]
- int **overscan**
- int **columns**
- int **fclk**
- uint16\_t **timing** [CIN\_CONFIG\_MAX\_DATA][2]
- int **timing\_len**
- uint16\_t **fcric** [CIN\_CONFIG\_MAX\_DATA][2]
- int **fcric\_len**
- uint16\_t **bias** [CIN\_CONFIG\_MAX\_DATA][2]
- int **bias\_len**

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

- [src/cin.h](#)

## 5.3 cin\_ctl\_id Struct Reference

### Public Attributes

- uint16\_t **board\_id**
- uint16\_t **serial\_no**
- uint16\_t **fpga\_ver**

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

- src/[cin.h](#)

## 5.4 cin\_ctl\_listener Struct Reference

### Public Attributes

- struct [cin\\_port](#) \* **cp**
- [fifo](#) **ctl\_fifo**
- pthread\_t **thread\_id**

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

- src/[cin.h](#)

## 5.5 cin\_ctl\_pwr\_mon\_t Struct Reference

### Public Attributes

- [cin\\_ctl\\_pwr\\_val\\_t](#) **bus\_12v0**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **mgmt\_3v3**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **mgmt\_2v5**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **mgmt\_1v2**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **enet\_1v0**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **s3e\_3v3**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **gen\_3v3**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **gen\_2v5**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **v6\_0v9**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **v6\_1v0**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **v6\_2v5**
- [cin\\_ctl\\_pwr\\_val\\_t](#) **fp**

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

- src/[cin.h](#)

## 5.6 cin\_ctl\_pwr\_val Struct Reference

### Public Attributes

- double **i**

- double **v**

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

- [src/cin.h](#)

## 5.7 cin\_data Struct Reference

### Public Attributes

- [fifo](#) \* **packet\_fifo**
- [fifo](#) \* **frame\_fifo**
- [fifo](#) \* **image\_fifo**
- [cin\\_data\\_threads\\_t](#) **listen\_thread**
- [cin\\_data\\_threads\\_t](#) **assembler\_thread**
- [cin\\_data\\_threads\\_t](#) **descramble\_thread**
- [pthread\\_mutex\\_t](#) **listen\_mutex**
- [pthread\\_mutex\\_t](#) **assembler\_mutex**
- [pthread\\_mutex\\_t](#) **descramble\_mutex**
- [pthread\\_mutex\\_t](#) **stats\_mutex**
- [cin\\_data\\_callbacks\\_t](#) **callbacks**
- [cin\\_port\\_t](#) **dp**
- struct timespec **framerate**
- unsigned long int **dropped\_packets**
- unsigned long int **malformed\_packets**
- [uint16\\_t](#) **last\_frame**
- [descramble\\_map\\_t](#) **map**

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

- [src/cin.h](#)

## 5.8 cin\_data\_callbacks Struct Reference

### Public Attributes

- void (\*)(**push**)([cin\\_data\\_frame\\_t](#) \*)
- void (\*)(**pop**)([cin\\_data\\_frame\\_t](#) \*)
- [cin\\_data\\_frame\\_t](#) \* **frame**

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

- [src/cin.h](#)

## 5.9 cin\_data\_frame Struct Reference

### Public Attributes

- [uint16\\_t](#) \* **data**
- [uint16\\_t](#) **number**
- struct timespec **timestamp**

- int **size\_x**
- int **size\_y**
- void \* **usr\_ptr**

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

- [src/cin.h](#)

## 5.10 cin\_data\_packet Struct Reference

### Public Attributes

- unsigned char \* **data**
- int **size**
- struct timespec **timestamp**

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

- [src/data.h](#)

## 5.11 cin\_data\_proc Struct Reference

### Public Attributes

- void \*(\* **input\_get** )(void \*, int)
- void \*(\* **input\_put** )(void \*, int)
- void \* **input\_args**
- int **reader**
- void \*(\* **output\_put** )(void \*)
- void \*(\* **output\_get** )(void \*)
- void \* **output\_args**
- [cin\\_data\\_t](#) \* **parent**

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

- [src/data.h](#)

## 5.12 cin\_data\_stats Struct Reference

### Public Attributes

- int **last\_frame**
- double **framerate**
- double **datarate**
- double **packet\_percent\_full**
- double **frame\_percent\_full**
- double **image\_percent\_full**
- long int **packet\_overruns**
- long int **frame\_overruns**
- long int **image\_overruns**
- long int **packet\_used**

- long int **frame\_used**
- long int **image\_used**
- long int **dropped\_packets**
- long int **mallformed\_packets**

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

- src/[cin.h](#)

## 5.13 cin\_data\_threads Struct Reference

### Public Attributes

- pthread\_t **thread\_id**
- int **started**

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

- src/[cin.h](#)

## 5.14 cin\_map\_t Struct Reference

### Public Attributes

- char \* **name**
- uint16\_t **reg**

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

- src/cinregisters.h

## 5.15 cin\_port Struct Reference

### Public Attributes

- char \* **srvaddr**
- char \* **cliaddr**
- uint16\_t **srvport**
- uint16\_t **cliport**
- int **sockfd**
- struct timeval **tv**
- struct sockaddr\_in **sin\_srv**
- struct sockaddr\_in **sin\_cli**
- socklen\_t **slen**
- int **rcvbuf**
- int **rcvbuf\_rb**

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

- src/[cin.h](#)

## 5.16 descramble\_map\_t Struct Reference

### Public Attributes

- uint32\_t \* **map**
- int **size\_x**
- int **size\_y**
- int **overscan**
- int **rows**

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

- src/[cin.h](#)

## 5.17 fifo Struct Reference

### Public Attributes

- void \* **data**
- void \* **head**
- void \* **tail** [FIFO\_MAX\_READERS]
- void \* **end**
- int **readers**
- long int **size**
- int **elem\_size**
- int **full**
- long int **overruns**
- pthread\_mutex\_t **mutex**
- pthread\_cond\_t **signal**

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

- src/[cin.h](#)

## Chapter 6

# File Documentation

### 6.1 src/cin.h File Reference

```
#include <stdint.h>
#include <stdio.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <netinet/ip.h>
#include <sys/time.h>
#include <pthread.h>
```

#### Classes

- struct [cin\\_ctl\\_config](#)
- struct [fifo](#)
- struct [cin\\_ctl\\_listener](#)
- struct [cin\\_port](#)
- struct [cin\\_ctl](#)
- struct [cin\\_data\\_frame](#)
- struct [cin\\_data\\_stats](#)
- struct [cin\\_data\\_threads](#)
- struct [cin\\_data\\_callbacks](#)
- struct [descramble\\_map\\_t](#)
- struct [cin\\_data](#)
- struct [cin\\_ctl\\_id](#)
- struct [cin\\_ctl\\_pwr\\_val](#)
- struct [cin\\_ctl\\_pwr\\_mon\\_t](#)

#### Macros

- `#define CIN_CTL_IP "192.168.1.207"`
- `#define CIN_CTL_SVR_PORT 49200`
- `#define CIN_CTL_CLI_PORT 50200`
- `#define CIN_CTL_SVR_FRMW_PORT 49202`
- `#define CIN_CTL_CLI_FRMW_PORT 50202`
- `#define CIN_CTL_MAX_READ_TRIES 10`
- `#define CIN_CTL_MAX_WRITE_TRIES 5`
- `#define CIN_CTL_WRITE_SLEEP 2000`

- #define **CIN\_CTL\_POWER\_ENABLE** 0x001F
- #define **CIN\_CTL\_POWER\_DISABLE** 0x0000
- #define **CIN\_CTL\_FP\_POWER\_ENABLE** 0x0020
- #define **CIN\_CTL\_DCM\_LOCKED** 0x0001
- #define **CIN\_CTL\_DCM\_PSDONE** 0x0002
- #define **CIN\_CTL\_DCM\_STATUS0** 0x0004
- #define **CIN\_CTL\_DCM\_STATUS1** 0x0008
- #define **CIN\_CTL\_DCM\_STATUS2** 0x0010
- #define **CIN\_CTL\_DCM\_TX1\_READY** 0x0020
- #define **CIN\_CTL\_DCM\_TX2\_READY** 0x0040
- #define **CIN\_CTL\_DCM\_ATCA\_ALARM** 0x0080
- #define **CIN\_CTL\_TRIG\_INTERNAL** 0x0000
- #define **CIN\_CTL\_TRIG\_EXTERNAL\_1** 0x0001
- #define **CIN\_CTL\_TRIG\_EXTERNAL\_2** 0x0002
- #define **CIN\_CTL\_TRIG\_EXTERNAL\_BOTH** 0x0003
- #define **CIN\_CTL\_FOCUS\_BIT** 0x0002
- #define **CIN\_CTL\_FCLK\_125** 0x0000
- #define **CIN\_CTL\_FCLK\_200** 0x0001
- #define **CIN\_CTL\_FCLK\_250** 0x0002
- #define **CIN\_CTL\_FCLK\_125\_C** 0x0003
- #define **CIN\_CTL\_FCLK\_200\_C** 0x0004
- #define **CIN\_CTL\_FCLK\_250\_C** 0x0005
- #define **CIN\_CTL\_FCLK\_156\_C** 0x0006
- #define **CIN\_CTL\_FPGA\_STS\_CFG** 0x8000
- #define **CIN\_CTL\_FPGA\_STS\_FP\_PWR** 0x0008
- #define **CIN\_CTL\_DCM\_STS\_ATCA** 0x0080
- #define **CIN\_CTL\_DCM\_STS\_LOCKED** 0x0001
- #define **CIN\_CTL\_DCM\_STS\_OVERRIDE** 0x0800
- #define **CIN\_CTL\_MUX1\_VCLK1** 0x0001
- #define **CIN\_CTL\_MUX1\_VCLK2** 0x0002
- #define **CIN\_CTL\_MUX1\_VCLK3** 0x0003
- #define **CIN\_CTL\_MUX1\_ATG** 0x0004
- #define **CIN\_CTL\_MUX1\_VFCLK1** 0x0005
- #define **CIN\_CTL\_MUX1\_VFCLK2** 0x0006
- #define **CIN\_CTL\_MUX1\_VFCLK3** 0x0007
- #define **CIN\_CTL\_MUX1\_HCLK1** 0x0008
- #define **CIN\_CTL\_MUX1\_HCLK2** 0x0009
- #define **CIN\_CTL\_MUX1\_OSW** 0x000A
- #define **CIN\_CTL\_MUX1\_RST** 0x000B
- #define **CIN\_CTL\_MUX1\_CONVERT** 0x000C
- #define **CIN\_CTL\_MUX1\_SHUTTER** 0x000D
- #define **CIN\_CTL\_MUX1\_SWTRIGGER** 0x000E
- #define **CIN\_CTL\_MUX1\_TRIGMON** 0x000F
- #define **CIN\_CTL\_MUX1\_EXPOSE** 0x0000
- #define **CIN\_CTL\_MUX2\_VCLK1** 0x0010
- #define **CIN\_CTL\_MUX2\_VCLK2** 0x0020
- #define **CIN\_CTL\_MUX2\_VCLK3** 0x0030
- #define **CIN\_CTL\_MUX2\_ATG** 0x0040
- #define **CIN\_CTL\_MUX2\_VFCLK1** 0x0050
- #define **CIN\_CTL\_MUX2\_VFCLK2** 0x0060
- #define **CIN\_CTL\_MUX2\_VFCLK3** 0x0070
- #define **CIN\_CTL\_MUX2\_HCLK1** 0x0080
- #define **CIN\_CTL\_MUX2\_HCLK2** 0x0090
- #define **CIN\_CTL\_MUX2\_HCLK3** 0x00A0
- #define **CIN\_CTL\_MUX2\_OSW** 0x00B0



- **#define CIN\_CTL\_MUX2\_RST** 0x00C0
- **#define CIN\_CTL\_MUX2\_CONVERT** 0x00D0
- **#define CIN\_CTL\_MUX2\_SAVE** 0x00E0
- **#define CIN\_CTL\_MUX2\_HWTRIG** 0x00F0
- **#define CIN\_CTL\_MUX2\_EXPOSE** 0x0000
- **#define CIN\_CTL\_FO\_REG1** 0x821D
- **#define CIN\_CTL\_FO\_REG2** 0x821E
- **#define CIN\_CTL\_FO\_REG3** 0x821F
- **#define CIN\_CTL\_FO\_REG4** 0x8001
- **#define CIN\_CTL\_FO\_REG5** 0x8211
- **#define CIN\_CTL\_FO\_REG6** 0x8212
- **#define CIN\_CTL\_FO\_REG7** 0x8213
- **#define CIN\_DATA\_IP** "10.0.5.207"
- **#define CIN\_DATA\_PORT** 49201
- **#define CIN\_DATA\_CTL\_PORT** 49203
- **#define CIN\_DATA\_MAX\_MTU** 9000
- **#define CIN\_DATA\_UDP\_HEADER** 8
- **#define CIN\_DATA\_MAGIC\_PACKET** UINT64\_C(0x0000F4F3F2F1F000)
- **#define CIN\_DATA\_MAGIC\_PACKET\_MASK** UINT64\_C(0x0000FFFFFFFFFFFF00)
- **#define CIN\_DATA\_TAIL\_MAGIC\_PACKET** UINT64\_C(0x010DF0ADDEF2F1F0)
- **#define CIN\_DATA\_TAIL\_MAGIC\_PACKET\_MASK** UINT64\_C(0xFFFFFFFFFFFFFFF0)
- **#define CIN\_DATA\_DROPPED\_PACKET\_VAL** 0x2000
- **#define CIN\_DATA\_DATA\_MASK** 0x1FFF
- **#define CIN\_DATA\_CTRL\_MASK** 0xE000
- **#define CIN\_DATA\_SIGN\_MASK** 0x1000
- **#define CIN\_DATA\_GAIN\_8** 0xC000
- **#define CIN\_DATA\_GAIN\_4** 0x4000
- **#define CIN\_DATA\_PACKET\_LEN** 8184
- **#define CIN\_DATA\_MAX\_PACKETS** 542
- **#define CIN\_DATA\_RCVBUF** 100
- **#define CIN\_DATA\_MAX\_FRAME\_X** 1152
- **#define CIN\_DATA\_MAX\_FRAME\_Y** 2050
- **#define CIN\_DATA\_MAX\_STREAM** 2400000
- **#define CIN\_DATA\_CCD\_COLS** 96
- **#define CIN\_DATA\_CCD\_COLS\_PER\_CHAN** 10
- **#define CIN\_DATA\_PIPELINE\_FLUSH** 1344
- **#define CIN\_DATA\_MODE\_CALLBACK** 0x01
- **#define NUM\_BIAS\_VOLTAGE** 20
- **#define pt\_posH** 0
- **#define pt\_negH** 1
- **#define pt\_posRG** 2
- **#define pt\_negRG** 3
- **#define pt\_posSW** 4
- **#define pt\_negSW** 5
- **#define pt\_posV** 6
- **#define pt\_negV** 7
- **#define pt\_posTG** 8
- **#define pt\_negTG** 9
- **#define pt\_posVF** 10
- **#define pt\_negVF** 11
- **#define pt\_NEDGE** 12
- **#define pt\_OTG** 13
- **#define pt\_VDDR** 14
- **#define pt\_VDD\_OUT** 15
- **#define pt\_BUF\_Base** 16

- `#define pt_BUF_Delta 17`
- `#define pt_Spare1 18`
- `#define pt_Spare2 19`
- `#define DEBUG_PRINT(fmt,...) if(_debug_print_flag) { fprintf(stderr, "%s:%d:%s(): " fmt, __FILE__, __LINE__, __func__, __VA_ARGS__); }`
- `#define DEBUG_COMMENT(fmt) if(_debug_print_flag) { fprintf(stderr, "%s:%d:%s(): " fmt, __FILE__, __LINE__, __func__); }`
- `#define ERROR_COMMENT(fmt) if(_error_print_flag) { fprintf(stderr, "%s:%d:%s(): " fmt, __FILE__, __LINE__, __func__); }`
- `#define ERROR_PRINT(fmt,...) if(_error_print_flag) { fprintf(stderr, "%s:%d:%s(): " fmt, __FILE__, __LINE__, __func__, __VA_ARGS__); }`
- `#define CIN_CONFIG_MAX_STRING 256`
- `#define CIN_CONFIG_MAX_DATA 5000`
- `#define FIFO_MAX_READERS 10`

## Typedefs

- `typedef struct cin_ctl_config cin_ctl_config_t`
- `typedef struct cin_ctl_listener cin_ctl_listener_t`
- `typedef struct cin_port cin_port_t`
- `typedef struct cin_ctl cin_ctl_t`
- `typedef struct cin_data_frame cin_data_frame_t`
- `typedef struct cin_data_stats cin_data_stats_t`
- `typedef struct cin_data_threads cin_data_threads_t`
- `typedef struct cin_data_callbacks cin_data_callbacks_t`
- `typedef struct cin_data cin_data_t`
- `typedef void(* cin_data_callback)(cin_data_frame_t *)`
- `typedef struct cin_ctl_id cin_ctl_id_t`
- `typedef struct cin_ctl_pwr_val cin_ctl_pwr_val_t`

## Functions

- `void cin_set_debug_print(int debug)`
- `void cin_set_error_print(int error)`
- `void cin_report(FILE *fp, int details)`
- `int cin_ctl_init(cin_ctl_t *cin, const char *ipaddr, uint16_t oport, uint16_t iport, uint16_t soport, uint16_t siport)`
- `int cin_ctl_destroy(cin_ctl_t *cin)`
- `int cin_ctl_read(cin_ctl_t *cin, uint16_t reg, uint16_t *val)`
- `int cin_ctl_write(cin_ctl_t *cin, uint16_t reg, uint16_t val, int wait)`
- `int cin_ctl_stream_write(cin_ctl_t *cin, char *val, int size)`
- `int cin_ctl_write_with_readback(cin_ctl_t *cin, uint16_t reg, uint16_t val)`
- `int cin_ctl_pwr(cin_ctl_t *cin, int pwr)`
- `int cin_ctl_fp_pwr(cin_ctl_t *cin, int pwr)`
- `int cin_ctl_fo_test_pattern(cin_ctl_t *cin, int on_off)`
- `int cin_ctl_load_config(cin_ctl_t *cin, char *filename)`
- `int cin_ctl_load_firmware(cin_ctl_t *cin, char *filename)`
- `int cin_ctl_set_fclk(cin_ctl_t *cin, int clkfreq)`
- `int cin_ctl_get_fclk(cin_ctl_t *cin, int *clkfreq)`
- `int cin_ctl_freeze_dco(cin_ctl_t *cin, int freeze)`
- `int cin_ctl_get_cfg_fpga_status(cin_ctl_t *cin, uint16_t *_val)`
- `int cin_ctl_get_id(cin_ctl_t *cin, cin_ctl_id_t *_val)`
- `void cin_ctl_display_id(FILE *out, cin_ctl_id_t val)`
- `void cin_ctl_display_fpga_status(FILE *out, uint16_t val)`

- int **cin\_ctl\_get\_dcm\_status** ([cin\\_ctl\\_t](#) \*cin, uint16\_t \*\_val)
- void **cin\_ctl\_display\_dcm\_status** (FILE \*out, uint16\_t \*\_val)
- double **cin\_ctl\_current\_calc** (uint16\_t val)
- int **cin\_ctl\_get\_power\_status** ([cin\\_ctl\\_t](#) \*cin, int full, int \*pwr, [cin\\_ctl\\_pwr\\_mon\\_t](#) \*values)
- void **cin\_ctl\_display\_pwr** (FILE \*out, [cin\\_ctl\\_pwr\\_mon\\_t](#) \*values)
- void **cin\_ctl\_display\_pwr\_line** (FILE \*out, const char \*msg, [cin\\_ctl\\_pwr\\_val\\_t](#) val)
- int **cin\_ctl\_calc\_vi\_status** ([cin\\_ctl\\_t](#) \*cin, uint16\_t vreg, uint16\_t ireg, double vfact, [cin\\_ctl\\_pwr\\_val\\_t](#) \*vi)
- int **cin\_ctl\_get\_camera\_pwr** ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int **cin\_ctl\_set\_camera\_pwr** ([cin\\_ctl\\_t](#) \*cin, int val)
- int **cin\_ctl\_set\_bias** ([cin\\_ctl\\_t](#) \*cin, int val)
- int **cin\_ctl\_get\_bias** ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int **cin\_ctl\_set\_clocks** ([cin\\_ctl\\_t](#) \*cin, int val)
- int **cin\_ctl\_get\_clocks** ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int **cin\_ctl\_set\_trigger** ([cin\\_ctl\\_t](#) \*cin, int val)
- int **cin\_ctl\_get\_trigger** ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int **cin\_ctl\_set\_focus** ([cin\\_ctl\\_t](#) \*cin, int val)
- int **cin\_ctl\_get\_focus** ([cin\\_ctl\\_t](#) \*cin, int \*val)
- int **cin\_ctl\_get\_triggering** ([cin\\_ctl\\_t](#) \*cin, int \*trigger)
- int **cin\_ctl\_int\_trigger\_start** ([cin\\_ctl\\_t](#) \*cin, int nimages)
- int **cin\_ctl\_int\_trigger\_stop** ([cin\\_ctl\\_t](#) \*cin)
- int **cin\_ctl\_ext\_trigger\_start** ([cin\\_ctl\\_t](#) \*cin, int trigger\_mode)
- int **cin\_ctl\_ext\_trigger\_stop** ([cin\\_ctl\\_t](#) \*cin)
- int **cin\_ctl\_set\_exposure\_time** ([cin\\_ctl\\_t](#) \*cin, float e\_time)
- int **cin\_ctl\_set\_trigger\_delay** ([cin\\_ctl\\_t](#) \*cin, float t\_time)
- int **cin\_ctl\_set\_cycle\_time** ([cin\\_ctl\\_t](#) \*cin, float ftime)
- int **cin\_ctl\_frame\_count\_reset** ([cin\\_ctl\\_t](#) \*cin)
- int **cin\_ctl\_set\_mux** ([cin\\_ctl\\_t](#) \*cin, int setting)
- int **cin\_ctl\_get\_mux** ([cin\\_ctl\\_t](#) \*cin, int \*setting)
- int **cin\_ctl\_set\_fcric\_gain** ([cin\\_ctl\\_t](#) \*cin, int gain)
- int **cin\_ctl\_set\_fabric\_address** ([cin\\_ctl\\_t](#) \*cin, char \*ip)
- int **cin\_ctl\_reg\_dump** ([cin\\_ctl\\_t](#) \*cin, FILE \*fp)
- int **cin\_ctl\_get\_bias\_voltages** ([cin\\_ctl\\_t](#) \*cin, float \*voltage)
- int **cin\_ctl\_set\_bias\_voltages** ([cin\\_ctl\\_t](#) \*cin, float \*voltage)
- int **cin\_ctl\_set\_fcric\_clamp** ([cin\\_ctl\\_t](#) \*cin, int clamp)
- int **cin\_config\_read\_file** ([cin\\_ctl\\_t](#) \*cin, const char \*file)
- int **cin\_data\_init** ([cin\\_data\\_t](#) \*cin, int mode, int packet\_buffer\_len, int frame\_buffer\_len, char \*ipaddr, uint16\_t port, char \*cin\_ipaddr, uint16\_t [cin\\_port](#), int rcvbuf, cin\_data\_callback push\_callback, cin\_data\_callback pop\_callback, void \*usr\_ptr)
- void **cin\_data\_wait\_for\_threads** ([cin\\_data\\_t](#) \*cin)
- void **cin\_data\_stop\_threads** ([cin\\_data\\_t](#) \*cin)
- struct [cin\\_data\\_frame](#) \* **cin\_data\_get\_next\_frame** ([cin\\_data\\_t](#) \*cin)
- void **cin\_data\_release\_frame** ([cin\\_data\\_t](#) \*cin, int free\_mem)
- struct [cin\\_data\\_frame](#) \* **cin\_data\_get\_buffered\_frame** (void)
- void **cin\_data\_release\_buffered\_frame** (void)
- void **cin\_data\_compute\_stats** ([cin\\_data\\_t](#) \*cin, [cin\\_data\\_stats\\_t](#) \*stats)
- void **cin\_data\_show\_stats** (FILE \*fp, [cin\\_data\\_stats\\_t](#) stats)
- void **cin\_data\_reset\_stats** ([cin\\_data\\_t](#) \*cin)
- int **cin\_data\_set\_descramble\_params** ([cin\\_data\\_t](#) \*cin, int rows, int overscan)
- void **cin\_data\_get\_descramble\_params** ([cin\\_data\\_t](#) \*cin, int \*rows, int \*overscan, int \*xsize, int \*ysize)

## Variables

- const char \* **cin\_build\_git\_time**
- const char \* **cin\_build\_git\_sha**
- const char \* **cin\_build\_version**
- int **\_debug\_print\_flag**
- int **\_error\_print\_flag**

### 6.1.1 Detailed Description

#### Author

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### 6.1.2 LICENSE

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### 6.1.3 DESCRIPTION

header file for CIN communications

### 6.1.4 Function Documentation

**6.1.4.1** `int cin_data_init ( cin_data_t * cin, int mode, int packet_buffer_len, int frame_buffer_len, char * ipaddr, uint16_t port, char * cin_ipaddr, uint16_t cin_port, int rcvbuf, cin_data_callback push_callback, cin_data_callback pop_callback, void * usr_ptr )`

Initialize the cin data library

Initialize the data handling routines and start the threads for listening. mode should be set for the desired output. The packet\_buffer\_len is the length of the packet FIFO in number of packets. The frame\_buffer\_len is the number of data frames to buffer.

## Parameters

<i>cin</i>	Handle to cin data library
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