libmbspex
1.7

C API library for PEXOR/KINPEX boards with MBS

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Chapter 1

File Index

1.1 File List

Here is a list of all files with brief descriptions:

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Chapter 2

File Documentation

2.1  libmbspex.c File Reference

```c
#include "libmbspex.h"
#include <errno.h>
#include <string.h>
#include <stdio.h>
#include <sys/stat.h>
#include <fcntl.h>
```

Defines

- `#define RON "\x1B[7m"
- `#define RES "\x1B[0m"

Functions

- `int mbspex_open (int devnum)`
  open file handle of pex device number devnum.

- `int mbspex_close (int handle)`
  close file handle

- `int mbspex_reset (int handle)`
  reset dma and sfp engines

- `int mbspex_slave_init (int handle, long l_sfp, long l_n_slaves)`
  initialize chain at l_sfp with l_n_slaves number of slaves

- `int mbspex_slave_wr (int handle, long l_sfp, long l_slave, long l_slave_off, long l_dat)`
  write data word l_dat to sfp, slave and memory offset l_slave_off

- `int mbspex_slave_config (int handle, struct pex_bus_config *config)`
write block of configuration data to driver

- **int mbspex_slave_rd** (int handle, long l_sfp, long l_slave, long l_slave_off, long *l_dat)
  - read data word *l_dat from sfp, slave and memory offset l_slave_off

- **int mbspex_send_and_receive_tok** (int handle, long l_sfp, long l_toggle, unsigned long l_dma_target, unsigned long *pl_transfersize, long *pl_check_comm, long *pl_check_token, long *pl_check_slaves)
  - send token request to pexor device of handle at chain sfp with l_toggle word (sets frontend buffer) l_dma_target specifies physical address of target buffer for token data DMA returns some result check words: pl_transfersize: size of transferred dma in bytes pl_check_comm: l_comm pl_check_token: toggle and mode bits pl_check_slaves: nr.

- **int mbspex_send_tok** (int handle, long l_sfp_p, long l_toggle)
  - sends token to all SFPs of pexor device handle, marked bitwise in l_sfp_p pattern: 1: sfp 0, 2: sfp 1, 4: sfp 2, 8: sfp 3, 0xf: all four SFPs toggle specifies

- **int mbspex_receive_tok** (int handle, long l_sfp, unsigned long l_dma_target, unsigned long *pl_transfersize, long *pl_check_comm, long *pl_check_token, long *pl_check_slaves)
  - receive token data from l_sfp after previous request from pexor device handle l_dma_target specifies physical address of target buffer for token data DMA returns some result check words: pl_transfersize: size of transferred dma in bytes pl_check_comm: l_comm pl_check_token: toggle bit pl_check_slaves: nr.

- **long mbspex_get_tok_datasize** (int handle, long l_sfp, long slave_id)
  - read token data size of sfp and slave id from internal pex registers

- **long mbspex_get_tok_memsize** (int handle, long l_sfp)
  - read token memory size of sfp from internal pex registers

- **int mbspex_getconfigured_slaves** (int handle, struct pex_sfp_links *setup)
  - retrieve actual slave configuration at sfp chains and put to external structure

- **int mbspex_register_wr** (int handle, unsigned char s_bar, long l_address, long l_dat)
  - write value of l_dat to board l_address on mapped bar

- **int mbspex_register_rd** (int handle, unsigned char s_bar, long l_address, long *l_dat)
  - read value of &l_dat from board l_address on mapped bar

- **int mbspex_dma_rd** (int handle, long source, long dest, long size, int burst)
  - transfer dma of size bytes from board source to host dest addresses.

- **int mbspex_dma_rd_virt** (int handle, unsigned int source, unsigned long virtdest, unsigned int size, unsigned int burst)
  - transfer dma of size bytes from board source to virtual user space dest address.

- **int mbspex_map_pipe** (int handle, unsigned long startaddress, unsigned long size)
- **int mbspex_unmap_pipe** (int handle)
2.1 libmbspex.c File Reference

2.1.1 Define Documentation

2.1.1.1 #define RES "\x1B[0m"

Definition at line 13 of file libmbspex.c.
Referenced by mbspex_dma_rd(), mbspex_dma_rd_virt(), mbspex_get_configured_slaves(), mbspex_map_pipe(), mbspex_receive_tok(), mbspex_register_rd(), mbspex_register_wr(), mbspex_send_and_receive_tok(), mbspex_send_tok(), mbspex_slave_config(), mbspex_slave_rd(), mbspex_slave_wr(), and mbspex_unmap_pipe().

2.1.1.2 #define RON "\x1B[7m"

Definition at line 12 of file libmbspex.c.
Referenced by mbspex_dma_rd(), mbspex_dma_rd_virt(), mbspex_get_configured_slaves(), mbspex_map_pipe(), mbspex_receive_tok(), mbspex_register_rd(), mbspex_register_wr(), mbspex_send_and_receive_tok(), mbspex_send_tok(), mbspex_slave_config(), mbspex_slave_rd(), mbspex_slave_wr(), and mbspex_unmap_pipe().

2.1.2 Function Documentation

2.1.2.1 int mbspex_close ( int handle )

close file handle
Definition at line 36 of file libmbspex.c.
References mbspex_assert_handle.

2.1.2.2 int mbspex_dma_rd ( int handle, long source, long dest, long size, int burst )

transfer dma of size bytes from board source to host dest addresses.
burst size may be specified, or 0 for automatic burst adjustment in driver returns real number of bytes transferred, or -1 in case of error This function will no sooner return than dma is complete
Definition at line 310 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.1.2.3 int mbspex_dma_rd_virt ( int handle, unsigned int source, unsigned long virtdest, unsigned int size, unsigned int burst )

transfer dma of size bytes from board source to virtual user space dest address.
Destination memory must be part of the virtual mbs pipe that has been mapped at initalization to sg list burst size may be specified, or 0 for automatic burst adjustment in driver returns real number of bytes transferred, or -1 in case of error This function will no sooner return than dma is complete
Definition at line 330 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.
2.1.2.4 int mbspex_get_configured_slaves ( int handle, struct pex_sfp_links * setup )

retrieve actual slave configuration at sfp chains and put to external structure
Definition at line 258 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.1.2.5 long mbspex_get_tok_datasize ( int handle, long l_sfp, long slave_id )

read token data size of sfp and slave id from internal pex registers
Definition at line 237 of file libmbspex.c.
References mbspex_assert_handle, mbspex_register_rd(), mbspex_register_wr(), MBSPEX_REP_TOKEN_DATA_SIZE, and MBSPEX_TOKEN_DATA_SIZE_SEL.

2.1.2.6 long mbspex_get_tok_memsize ( int handle, long l_sfp )

read token memory size of sfp from internal pex registers
Definition at line 250 of file libmbspex.c.
References mbspex_assert_handle, mbspex_register_rd(), and MBSPEX_TOKEN_MEMORY_SIZE.

2.1.2.7 int mbspex_map_pipe ( int handle, unsigned long startaddress, unsigned long size )

Definition at line 349 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.1.2.8 int mbspex_open ( int devnum )

open file handle of pex device number devnum.
Return value is handle
Definition at line 17 of file libmbspex.c.
References printm().

2.1.2.9 int mbspex_receive_tok ( int handle, long l_sfp, unsigned long l_dma_target, unsigned long * pl_transfersize, long * pl_check_comm, long * pl_check_token, long * pl_check_slaves )

receive token data from l_sfp after previous request from pexor device handle l.ldma_target specifies physical address of target buffer for token data DMA returns some result check words: pl_transfersize: size of transferred dma in bytes pl_check_comm: l_comm pl_check_token: toggle bit pl_check_slaves: nr. of slaves connected to token chain
Definition at line 210 of file libmbspex.c.
References printm(), RES, and RON.
2.1.2.10  int mbspex_register_rd ( int handle, unsigned char s_bar, long l_address, long * l_dat )

read value of &l_dat from board l_address on mapped bar
Definition at line 291 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.
Referenced by mbspex_get_tok_datasize(), and mbspex_get_tok_memsize().

2.1.2.11  int mbspex_register_wr ( int handle, unsigned char s_bar, long l_address, long l_dat )

write value of l_dat to board l_address on mapped bar
Definition at line 273 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.
Referenced by mbspex_get_tok_datasize().

2.1.2.12  int mbspex_reset ( int handle )

reset dma and sfp engines
Definition at line 44 of file libmbspex.c.
References mbspex_assert_handle, and printm().

2.1.2.13  int mbspex_send_and_receive_tok ( int handle, long l_sfp, long l_toggle, unsigned long l_dma_target, unsigned long * pl_transfersize, long * pl_check_comm, long * pl_check_token, long * pl_check_slaves )

send token request to pexor device of handle at chain sfp with l_toggle word (sets frontend buffer) l_dma_target specifies physical address of target buffer for token data DMA returns some result check words: pl_transfersize: size of transferred dma in bytes pl_check_comm: l_comm pl_check_token: toggle and mode bits pl_check_slaves: nr.
of slaves connected to token chain
Definition at line 154 of file libmbspex.c.
References printm(), RES, and RON.

2.1.2.14  int mbspex_send_tok ( int handle, long l_sfp_p, long l_toggle )

sends token to all SFPs of pexor device handle, marked bitwise in l_sfp_p pattern: 1: sfp 0, 2: sfp 1, 4: sfp 2, 8: sfp 3, 0xf: all four SFPs toggle specifies
Definition at line 187 of file libmbspex.c.
References printm(), RES, and RON.

2.1.2.15  int mbspex_slave_config ( int handle, struct pex_bus_config * config )

write block of configuration data to driver
Definition at line 101 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.1.2.16 int mbspex_slave_init ( int handle, long l_sfp, long l_n_slaves )

initialize chain at l_sfp with l_n_slaves number of slaves
Definition at line 60 of file libmbspex.c.
References mbspex_assert_handle, and printm().

2.1.2.17 int mbspex_slave_rd ( int handle, long l_sfp, long l_slave, long l_slave_off, long * l_dat )

read data word *l_dat from sfp, slave and memory offset l_slave_off
Definition at line 128 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.1.2.18 int mbspex_slave_wr ( int handle, long l_sfp, long l_slave, long l_slave_off, long l_dat )

write data word l_dat to sfp, slave and memory offset l_slave_off
Definition at line 81 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.1.2.19 int mbspex_unmap_pipe ( int handle )

Definition at line 366 of file libmbspex.c.
References printm(), RES, and RON.

2.2 libmbspex.h File Reference

C user library to work with mbspex.ko kernel module.
#include "../include/pex_user.h"

Defines

- #define MBSPEX_TK_DSIZE_SEL 0x210a0
  
  these internal registers are used from library instead of implementing dedicated ioctl calls.

- #define MBSPEX_TK_MEM_SIZE 0x210b0
- #define MBSPEX_REP_TK_DSIZE 0x21090
- #define mbspex_assert_handle(handle)
Functions

• void printm (char *,...)
• int mbspex_open (int devnum)
  open file handle of pex device number devnum.

• int mbspex_close (int handle)
  close file handle

• int mbspex_reset (int handle)
  reset dma and sfp engines

• int mbspex_slave_rd (int handle, long l_sfp, long l_slave, long l_slave_off, long *l_dat)
  read data word *l_dat from sfp, slave and memory offset l_slave_off

• int mbspex_slave_wr (int handle, long l_sfp, long l_slave, long l_slave_off, long l_dat)
  write data word l_dat to sfp, slave and memory offset l_slave_off

• int mbspex_slave_init (int handle, long l_sfp, long l_n_slaves)
  initialize chain at l_sfp with l_n_slaves number of slaves

• int mbspex_slave_config (int handle, struct pex_bus_config *config)
  write block of configuration data to driver

• int mbspex_send_and_receive_tok (int handle, long l_sfp, long l_toggle, unsigned long l_dma_target, unsigned long *pl_transfersize, long *pl_check_comm, long *pl_check_token, long *pl_check_slaves)
  send token request to pexor device of handle at chain sfp with l_toggle word (sets frontend buffer) l_dma_target specifies physical address of target buffer for token data DMA returns some result check words:
  pl_transfersize: size of transferred dma in bytes
  pl_check_comm: l_comm
  pl_check_token: toggle and mode bits
  pl_check_slaves: nr.

• int mbspex_send_tok (int handle, long l_sfp_p, long l_toggle)
  sends token to all SFPs of pexor device handle, marked bitwise in l_sfp_p pattern: 1: sfp 0, 2: sfp 1, 4: sfp 2, 8: sfp 3, 0xf: all four SFPs
toggle specifies

• int mbspex_receive_tok (int handle, long l_sfp, unsigned long l_dma_target, unsigned long *pl_transfersize, long *pl_check_comm, long *pl_check_token, long *pl_check_slaves)
  receive token data from l_sfp after previous request from pexor device handle l_dma_target specifies physical address of target buffer for token data DMA returns some result check words:
  pl_transfersize: size of transferred dma in bytes
  pl_check_comm: l_comm
  pl_check_token: toggle bit
  pl_check_slaves: nr.

• long mbspex_get_tok_datasize (int handle, long l_sfp, long slave_id)
  read token data size of sfp and slave id from internal pex registers

• long mbspex_get_tok_memsize (int handle, long l_sfp)
  read token memory size of sfp from internal pex registers

• int mbspex_get_configured_slaves (int handle, struct pex_sfp_links *setup)
  retrieve actual slave configuration at sfp chains and put to external structure
• int mbspex_register_wr (int handle, unsigned char s_bar, long l_address, long l_dat)
  write value of l_dat to board l_address on mapped bar

• int mbspex_register_rd (int handle, unsigned char s_bar, long l_address, long *l_dat)
  read value of &l_dat from board l_address on mapped bar

• int mbspex_dma_rd (int handle, long source, long dest, long size, int burst)
  transfer dma of size bytes from board source to host dest addresses.

• int mbspex_dma_rd_virt (int handle, unsigned int source, unsigned long virtdest, unsigned int size, unsigned int burst)
  transfer dma of size bytes from board source to virtual user space dest address.

• int mbspex_map_pipe (int handle, unsigned long startaddress, unsigned long size)

• int mbspex_unmap_pipe (int handle)

2.2.1 Detailed Description

C user library to work with mbspex.ko kernel module.

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Date

26-August-2014

Definition in file libmbspex.h.

2.2.2 Define Documentation

2.2.2.1 #define mbspex_assert_handle(handle)

Value:

if(handle < 0) {
  printm("Error: illegal file handle %d \n", handle);
  return -1;
}

Definition at line 33 of file libmbspex.h.

Referenced by mbspex_close(), mbspex_dma_rd(), mbspex_dma_rd_virt(), mbspex_get_configured_slaves(), mbspex_get_tok_datasize(), mbspex_get_tok_memsize(), mbspex_map_pipe(), mbspex_register_rd(), mbspex_register_wr(), mbspex_reset(), mbspex_slave_config(), mbspex_slave_init(), mbspex_slave_rd(), and mbspex_slave_wr().

2.2.2.2 #define MBSPEX_REP_TK_DSIZE 0x21090

Definition at line 30 of file libmbspex.h.

Referenced by mbspex_get_tok_datasize().
2.2 libmbspex.h File Reference

2.2.2.3 #define MBSPEX_TK_DSIZE_SEL 0x210a0

these internal registers are used from library instead of implementing dedicated ioctl calls.
They are not part of driver user includes!
Definition at line 28 of file libmbspex.h.
Referenced by mbspe_get_tok_datasize().

2.2.2.4 #define MBSPEX_TK_MEM_SIZE 0x210b0

Definition at line 29 of file libmbspex.h.
Referenced by mbspe_get_tok_memsize().

2.2.3 Function Documentation

2.2.3.1 int mbspex_close ( int handle )

close file handle
Definition at line 36 of file libmbspex.c.
References mbspex_assert_handle.

2.2.3.2 int mbspex_dma_rd ( int handle, long source, long dest, long size, int burst )

transfer dma of size bytes from board source to host dest addresses.
burst size may be specified, or 0 for automatic burst adjustment in driver returns real number of bytes
transferred, or -1 in case of error This function will no sooner return than dma is complete
Definition at line 310 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.2.3.3 int mbspex_dma_rd_virt ( int handle, unsigned int source, unsigned long virtdest, unsigned int size, unsigned int burst )

transfer dma of size bytes from board source to virtual user space dest address.
Destination memory must be part of the virtual mbs pipe that has been mapped at initalizatio to sg list
burst size may be specified, or 0 for automatic burst adjustment in driver returns real number of bytes
transferred, or -1 in case of error This function will no sooner return than dma is complete
Definition at line 330 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.2.3.4 int mbspex_get_configured_slaves ( int handle, struct pex_sfp_links * setup )

retrieve actual slave configuration at sfp chains and put to external structure
Definition at line 258 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.
2.2.3.5  long mbspex_get_tok_datasize ( int handle, long l_sfp, long slave_id )

read token data size of sfp and slave id from internal pex registers
Definition at line 237 of file libmbspex.c.
References mbspex_assert_handle, mbspex_register_rd(), mbspex_register_wr(), MBSPEX_REP_TK_-DSIZE, and MBSPEX_TK_DSIZ-SEL.

2.2.3.6  long mbspex_get_tok_memsize ( int handle, long l_sfp )

read token memory size of sfp from internal pex registers
Definition at line 250 of file libmbspex.c.
References mbspex_assert_handle, mbspex_register_rd(), and MBSPEX_TK_MEM_SIZE.

2.2.3.7  int mbspex_map_pipe ( int handle, unsigned long startaddress, unsigned long size )

Definition at line 349 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.2.3.8  int mbspex_open ( int devnum )

open file handle of pex device number devnum.
Return value is handle
Definition at line 17 of file libmbspex.c.
References printm().

2.2.3.9  int mbspex_receive_tok ( int handle, long l_sfp, unsigned long l_dma_target, unsigned long * pl_transfersize, long * pl_check_comm, long * pl_check_token, long * pl_check_slaves )

receive token data from l_sfp after previous request from pexor device handle l_ldma_target specifies physical address of target buffer for token data DMA returns some result check words: pl_transfersize: size of transferred dma in bytes pl_check_comm: l_comm pl_check_token: toggle bit pl_check_slaves: nr. of slaves connected to token chain
Definition at line 210 of file libmbspex.c.
References printm(), RES, and RON.

2.2.3.10 int mbspex_register_rd ( int handle, unsigned char s_bar, long l_address, long * l_dat )

read value of &l_dat from board l_address on mapped bar
Definition at line 291 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.
Referenced by mbspex_get_tok_datasize(), and mbspex_get_tok_memsize().
2.2.3.11  int mbspex_register_wr ( int handle, unsigned char s_bar, long l_address, long l_dat )
write value of l_dat to board l_address on mapped bar
Definition at line 273 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.
Referenced by mbspex_get_tok_datasize().

2.2.3.12  int mbspex_reset ( int handle )
reset dma and sfp engines
Definition at line 44 of file libmbspex.c.
References mbspex_assert_handle, and printm().

2.2.3.13  int mbspex_send_and_receive_tok ( int handle, long l_sfp, long l_toggle, unsigned long l_dma_target, unsigned long * pl_transfersize, long * pl_check_comm, long * pl_check_token, long * pl_check_slaves )
send token request to pexor device of handle at chain sfp with l_toggle word (sets frontend buffer) l_dma_target specifies physical address of target buffer for token data DMA returns some result check words: pl_transfersize: size of transferred dma in bytes pl_check_comm: l_comm pl_check_token: toggle and mode bits pl_check_slaves: nr. of slaves connected to token chain
Definition at line 154 of file libmbspex.c.
References printm(), RES, and RON.

2.2.3.14  int mbspex_send_tok ( int handle, long l_sfp_p, long l_toggle )
sends token to all SFPs of pexor device handle, marked bitwise in l_sfp_p pattern: 1: sfp 0, 2: sfp 1, 4: sfp 2, 8: sfp 3, 0xf: all four SFPs toggle specifies
Definition at line 187 of file libmbspex.c.
References printm(), RES, and RON.

2.2.3.15  int mbspex_slave_config ( int handle, struct pex_bus_config * config )
write block of configuration data to driver
Definition at line 101 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.2.3.16  int mbspex_slave_init ( int handle, long l_sfp, long l_n_slaves )
initialize chain at l_sfp with l_n_slaves number of slaves
Definition at line 60 of file libmbspex.c.
References mbspex_assert_handle, and printm().
2.2.3.17 int mbspex_slave_rd ( int handle, long l_sfp, long l_slave, long l_slave_off, long * l_dat )

read data word *l_dat from sfp, slave and memory offset l_slave_off
Definition at line 128 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.2.3.18 int mbspex_slave_wr ( int handle, long l_sfp, long l_slave, long l_slave_off, long l_dat )

write data word l_dat to sfp, slave and memory offset l_slave_off
Definition at line 81 of file libmbspex.c.
References mbspex_assert_handle, printm(), RES, and RON.

2.2.3.19 int mbspex_unmap_pipe ( int handle )

Definition at line 366 of file libmbspex.c.
References printm(), RES, and RON.

2.2.3.20 void printm ( char *, ... )

Referenced by mbspex_dma_rd(), mbspex_dma_rd_virt(), mbspex_get_configured_slaves(), mbspex_unmap_pipe(), mbspex_open(), mbspex_receive_tok(), mbspex_register_rd(), mbspex_register_wr(), mbspex_reset(), mbspex_send_and_receive_tok(), mbspex_send_tok(), mbspex_slave_config(), mbspex_slave_init(), mbspex_slave_rd(), mbspex_slave_wr(), and mbspex_unmap_pipe().
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