

NAME

mio_open, **mio_close**, **mio_read**, **mio_write**, **mio_nfds**, **mio_pollfd**, **mio_revents**, **mio_eof** — sndio interface to MIDI streams

SYNOPSIS

```
#include <sndio.h>

struct mio_hdl *
mio_open(const char *name, unsigned int mode, int nbio_flag);

void
mio_close(struct mio_hdl *hdl);

size_t
mio_read(struct mio_hdl *hdl, void *addr, size_t nbytes);

size_t
mio_write(struct mio_hdl *hdl, const void *addr, size_t nbytes);

int
mio_nfds(struct mio_hdl *hdl);

int
mio_pollfd(struct mio_hdl *hdl, struct pollfd *pfd, int events);

int
mio_revents(struct mio_hdl *hdl, struct pollfd *pfd);

int
mio_eof(struct mio_hdl *hdl);
```

DESCRIPTION

The **sndio** library allows user processes to access midi(4) hardware and sndiod(8) MIDI thru boxes and control ports in a uniform way.

Opening and closing an MIDI stream

First the application must call the **mio_open()** function to obtain a handle representing the newly created stream; later it will be passed as the *hdl* argument of most other functions. The *name* parameter gives the device string discussed in sndio(7). If the program is using a single device and is providing no device chooser, it should be set to MIO_PORTANY to allow the user to select it using the MIDIDEVICE environment variable.

The *mode* parameter gives the direction of the stream. The following are supported:

MIO_OUT	The stream is output-only; data written to the stream will be sent to the hardware or other programs.
MIO_IN	The stream is input-only; received data from the hardware or other programs must be read from the stream.
MIO_IN MIO_OUT	The stream sends and receives data. This mode should be used rather than calling mio_open() twice.

If the *nbio_flag* argument is true (i.e. non-zero), then the **mio_read()** and **mio_write()** functions (see below) will be non-blocking.

The **mio_close()** function closes the stream and frees all allocated resources associated with the **libsndio** handle.

Sending and receiving data

When input mode is selected, the **mio_read()** function must be called to retrieve received data; it must be called often enough to ensure that internal buffers will not overrun. It will store at most *nbytes* bytes at the *addr* location. Unless the *nbio_flag* flag is set, it will block until data becomes avail-



able and will return zero only on error.

When output mode is selected, the **mio_write()** function can be called to provide data to transmit. Unless the *nbio_flag* is set, **mio_write()** will block until the requested amount of data is written.

Non-blocking mode operation

If the *nbio_flag* is set on **mio_open()**, then the **mio_read()** and **mio_write()** functions will never block; if no data is available, they will return zero immediately.

To avoid busy loops when non-blocking mode is used, the `poll(2)` system call can be used to check if data can be read from or written to the stream. The **mio_pollfd()** function prepares the array *pfds* of *pollfd* structures for use with `poll(2)`. The optimal size of the *pfds* array, which the caller must pre-allocate, is provided by the **mio_nfds()** function.

`poll(2)` will sleep until any of the *events* requested with **mio_pollfd()** have occurred. Events are represented as a bit-mask of *POLLIN* and *POLLOUT* constants. The events which woke up `poll(2)` can be obtained with the **mio_revents()** function. If *POLLIN* is set, **mio_read()** can be called without blocking. If *POLLOUT* is set, **mio_write()** can be called without blocking. *POLLHUP* may be set if an error occurs, even if it is not requested with **mio_pollfd()**.

Error handling

Errors related to the MIDI subsystem (like hardware errors or dropped connections) and programming errors (such as a call to **mio_read()** on a play-only stream) are considered fatal. Once an error occurs, all functions which take a *mio_hdl* argument, except **mio_close()** and **mio_eof()**, stop working (i.e. always return 0).

RETURN VALUES

The **mio_open()** function returns the newly created handle on success or NULL on failure.

The **mio_pollfd()** function returns the number of *pollfd* structures filled. The **mio_nfds()** function returns the number of *pollfd* structures the caller must preallocate in order to be sure that **mio_pollfd()** will never overrun.

The **mio_revents()** function returns the bit-mask set by `poll(2)` in the *pfds* array of *pollfd* structures.

The **mio_read()** and **mio_write()** functions return the number of bytes transferred.

The **mio_eof()** function returns 0 if there's no pending error, and a non-zero value if there's an error.

ENVIRONMENT

SENDIO_DEBUG The debug level: may be a value between 0 and 2.

SEE ALSO

`poll(2)`, `midi(4)`, `sndio(7)`, `sndiod(8)`

