man pages section 3: Curses Library Functions

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Contents

Preface

Both novice users and those familar with the SunOS operating system can use online man pages to obtain information about the system and its features. A man page is intended to answer concisely the question "What does it do?" The man pages in general comprise a reference manual. They are not intended to be a tutorial.

Overview

The following contains a brief description of each man page section and the information it references:

- Section 1 describes, in alphabetical order, commands available with the operating system.
- Section 1M describes, in alphabetical order, commands that are used chiefly for system maintenance and administration purposes.
- Section 2 describes all of the system calls. Most of these calls have one or more error returns. An error condition is indicated by an otherwise impossible returned value.
- Section 3 describes functions found in various libraries, other than those functions that directly invoke UNIX system primitives, which are described in Section 2.
- Section 4 outlines the formats of various files. The C structure declarations for the file formats are given where applicable.
- Section 5 contains miscellaneous documentation such as character-set tables.
- Section 7 describes various special files that refer to specific hardware peripherals and device drivers. STREAMS software drivers, modules and the STREAMS-generic set of system calls are also described.
- Section 9E describes the DDI (Device Driver Interface)/DKI (Driver/Kernel Interface), DDI-only, and DKI-only entry-point routines a developer can include in a device driver.
- Section 9F describes the kernel functions available for use by device drivers.
- Section 9S describes the data structures used by drivers to share information between the driver and the kernel.

Below is a generic format for man pages. The man pages of each manual section generally follow this order, but include only needed headings. For example, if there are no bugs to report,

there is no BUGS section. See the `intro` pages for more information and detail about each section, and `man(1)` for more information about man pages in general.

NAME — This section gives the names of the commands or functions documented, followed by a brief description of what they do.

SYNOPSIS — This section shows the syntax of commands or functions. When a command or file does not exist in the standard path, its full path name is shown. Options and arguments are alphabetized, with single letter arguments first, and options with arguments next, unless a different argument order is required.

The following special characters are used in this section:

- [ ] — Brackets. The option or argument enclosed in these brackets is optional. If the brackets are omitted, the argument must be specified.
- . . . — Ellipses. Several values can be provided for the previous argument, or the previous argument can be specified multiple times, for example, "`filename...`".
- | — Separator. Only one of the arguments separated by this character can be specified at a time.
- { } — Braces. The options and/or arguments enclosed within braces are interdependent, such that everything enclosed must be treated as a unit.

PROTOCOL — This section occurs only in subsection 3R to indicate the protocol description file.

DESCRIPTION — This section defines the functionality and behavior of the service. Thus it describes concisely what the command does. It does not discuss OPTIONS or cite EXAMPLES. Interactive commands, subcommands, requests, macros, and functions are described under USAGE.

IOCTL — This section appears on pages in Section 7 only. Only the device class that supplies appropriate parameters to the `ioctl(2)` system call is called `ioctl` and generates its own heading. `ioctl` calls for a specific device are listed alphabetically (on the man page for that specific device).

	`ioctl` calls are used for a particular class of devices all of which have an `io` ending, such as `mtio(7I)`.
OPTIONS	This section lists the command options with a concise summary of what each option does. The options are listed literally and in the order they appear in the SYNOPSIS section. Possible arguments to options are discussed under the option, and where appropriate, default values are supplied.
OPERANDS	This section lists the command operands and describes how they affect the actions of the command.
OUTPUT	This section describes the output – standard output, standard error, or output files – generated by the command.
RETURN VALUES	If the man page documents functions that return values, this section lists these values and describes the conditions under which they are returned. If a function can return only constant values, such as 0 or –1, these values are listed in tagged paragraphs. Otherwise, a single paragraph describes the return values of each function. Functions declared void do not return values, so they are not discussed in RETURN VALUES.
ERRORS	On failure, most functions place an error code in the global variable `errno` indicating why they failed. This section lists alphabetically all error codes a function can generate and describes the conditions that cause each error. When more than one condition can cause the same error, each condition is described in a separate paragraph under the error code.
USAGE	This section lists special rules, features, and commands that require in-depth explanations. The subsections listed here are used to explain built-in functionality: Commands Modifiers Variables Expressions Input Grammar
EXAMPLES	This section provides examples of usage or of how to use a command or function. Wherever possible a complete

	example including command-line entry and machine response is shown. Whenever an example is given, the prompt is shown as `example%`, or if the user must be superuser, `example#`. Examples are followed by explanations, variable substitution rules, or returned values. Most examples illustrate concepts from the SYNOPSIS, DESCRIPTION, OPTIONS, and USAGE sections.
ENVIRONMENT VARIABLES	This section lists any environment variables that the command or function affects, followed by a brief description of the effect.
EXIT STATUS	This section lists the values the command returns to the calling program or shell and the conditions that cause these values to be returned. Usually, zero is returned for successful completion, and values other than zero for various error conditions.
FILES	This section lists all file names referred to by the man page, files of interest, and files created or required by commands. Each is followed by a descriptive summary or explanation.
ATTRIBUTES	This section lists characteristics of commands, utilities, and device drivers by defining the attribute type and its corresponding value. See `attributes(5)` for more information.
SEE ALSO	This section lists references to other man pages, in-house documentation, and outside publications.
DIAGNOSTICS	This section lists diagnostic messages with a brief explanation of the condition causing the error.
WARNINGS	This section lists warnings about special conditions which could seriously affect your working conditions. This is not a list of diagnostics.
NOTES	This section lists additional information that does not belong anywhere else on the page. It takes the form of an aside to the user, covering points of special interest. Critical information is never covered here.
BUGS	This section describes known bugs and, wherever possible, suggests workarounds.

REFERENCE

Curses Library Functions

Name addch, mvaddch, mvwaddch, waddch – add a character (with rendition) to a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library ... ]

#include <curses.h>

int addch(const chtype ch);

int mvaddch(int y, int x, const chtype ch);

int mvwaddch(WINDOW *win, int y, int x, const chtype ch);

int waddch(WINDOW *win, const chtype ch);
```

Description The `addch()` function writes a character to the `stdscr` window at the current cursor position. The `mvaddch()` and `mvwaddch()` functions write the character to the position indicated by the *x* (column) and *y* (row) parameters. The `mvaddch()` function writes the character to the `stdscr` window, while `mvwaddch()` writes the character to the window specified by *win*. The `waddch()` function is identical to `addch()`, but writes the character to the window specified by *win*.

These functions advance the cursor after writing the character. Characters that do not fit on the end of the current line are wrapped to the beginning of the next line unless the current line is the last line of the window and scrolling is disabled. In that situation, characters which extend beyond the end of the line are discarded.

When *ch* is a backspace, carriage return, newline, or tab, X/Open Curses moves the cursor appropriately. Each tab character moves the cursor to the next tab stop. By default, tab stops occur every eight columns. When *ch* is a control character other than backspace, carriage return, newline, or tab, it is written using ^*x* notation, where *x* is a printable character. When X/Open Curses writes *ch* to the last character position on a line, it automatically generates a newline. When *ch* is written to the last character position of a scrolling region and `scrollok()` is enabled, X/Open Curses scrolls the scrolling region up one line (see `clearok`(3XCURSES)).

Parameters

wchstr	Is a pointer to the `cchar_t` string to be copied to the window.
n	Is the maximum number of characters to be copied from *wchstr*. If *n* is less than 0, the entire string is written or as much of it as fits on the line.
y	Is the y (row) coordinate of the starting position of *wchstr* in the window.
x	Is the x (column) coordinate of the starting position of *wchstr* in the window.
win	Is a pointer to the window to which the string is to be copied.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also attroff(3XCURSES), bkgdset(3XCURSES), doupdate(3XCURSES), inch(3XCURSES), insch(3XCURSES), libcurses(3XCURSES), nl(3XCURSES), printw(3XCURSES), scrollok(3XCURSES), scrl(3XCURSES), terminfo(4), attributes(5), standards(5)

Name addchstr, addchnstr, mvaddchstr, mvaddchnstr, mvwaddchnstr, mvwaddchstr, waddchstr, waddchnstr – copy a character string (with renditions) to a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library ... ]

#include <curses.h>

int addchstr(const chtype *chstr);

int addchnstr(const chtype *chstr, int n);

int mvaddchnstr(int y, int x, const chtype *chstr, int n);

int mvaddchstr(int y, int x, const chtype *chstr);

int mvwaddchnstr(WINDOW *win, int y, int x, const chtype *chstr, int n);

int mvwaddchstr(WINDOW *win, int y, int x, const chtype *chstr);

int waddchstr(WINDOW *win, const chtype *chstr);

int waddchnstr(WINDOW *win, const chtype *chstr, int n);
```

Description The `addchstr()` function copies the `chtype` character string to the `stdscr` window at the current cursor position. The `mvaddchstr()` and `mvwaddchstr()` functions copy the character string to the starting position indicated by the *x* (column) and *y* (row) parameters (the former to the `stdscr` window; the latter to window *win*). The `waddchstr()` is identical to `addchstr()`, but writes to the window specified by *win*.

The `addchnstr()`, `waddchnstr()`, `mvaddchnstr()`, and `mvwaddchnstr()` functions write *n* characters to the window, or as many as will fit on the line. If *n* is less than 0, the entire string is written, or as much of it as fits on the line. The former two functions place the string at the current cursor position; the latter two commands use the position specified by the *x* and *y* parameters.

These functions differ from the `addstr(3XCURSES)` set of functions in two important respects. First, these functions do *not* advance the cursor after writing the string to the window. Second, the current window rendition is not combined with the character; only the attributes that are already part of the `chtype` character are used.

Parameters

chstr	Is a pointer to the `chtype` string to be copied to the window.
n	Is the maximum number of characters to be copied from *chstr*. If *n* is less than 0, the entire string is written or as much of it as fits on the line.
y	Is the y (row) coordinate of the starting position of *chstr* in the window.
x	Is the x (column) coordinate of the starting position of *chstr* in the window.
win	Is a pointer to the window to which the string is to be copied.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also addch(3XCURSES), addnstr(3XCURSES), attroff(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name addnstr, addstr, mvaddnstr, mvaddstr, mvwaddnstr, mvwaddstr, waddnstr, waddstr – add a multi-byte character string (without rendition) to a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library ... ]

#include <curses.h>

int addnstr(const char *str, int n);

int addstr(const char *str);

int mvaddnstr(int y, int x, const char *str, int n);

int mvaddstr(int y, int x, const char *str);

int mvwaddnstr(WINDOW *win, int y, int x, const char *str, int n);

int mvwaddstr(WINDOW *win, int y, int x, const char *str);

int waddstr(WINDOW *win, const char *str);

int waddnstr(WINDOW *win, const char *str, int n);
```

Description The `addstr()` function writes a null-terminated string of multi-byte characters to the `stdscr` window at the current cursor position. The `waddstr()` function performs an identical action, but writes the character to the window specified by *win*. The `mvaddstr()` and `mvwaddstr()` functions write the string to the position indicated by the *x* (column) and *y* (row) parameters (the former to the `stdscr` window; the latter to window *win*).

The `addnstr()`, `waddnstr()`, `mvaddnstr()`, and `mvwaddnstr()` functions are similar but write at most *n* characters to the window. If *n* is less than 0, the entire string is written.

All of these functions advance the cursor after writing the string.

These functions are functionally equivalent to calling the corresponding function from the `addch`(3XCURSES) set of functions once for each character in the string. Refer to the `curses`(3XCURSES) man page for a complete description of special character handling and of the interaction between the window rendition (or background character and rendition) and the character written.

Note that these functions differ from the `addchstr()` set of functions in that the `addchstr`(3XCURSES) functions copy the string as is (without combining each character with the window rendition or the background character and rendition.

Parameters

str Is a pointer to the character string that is to be written to the window.

n Is the maximum number of characters to be copied from *str*. If *n* is less than 0, the entire string is written or as much of it as fits on the line.

y Is the y (row) coordinate of the starting position of *str* in the window.

x Is the x (column) coordinate of the starting position of *str* in the window.

win Is a pointer to the window in which the string is to be written.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also addch(3XCURSES), addchstr(3XCURSES), curses(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name addnwstr, addwstr, mvaddnwstr, mvaddwstr, mvwaddnwstr, mvwaddwstr, waddnwstr, waddwstr – add a wide-character string to a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library ... ]

#include <curses.h>

int addnwstr(const wchar_t *wstr, int n);

int addwstr(const wchar_t *wstr);

int mvaddnwstr(int y, int x, const wchar_t *wstr, int n);

int mvaddwstr(int y, int x, const wchar_t *wstr);

int mvwaddnwstr(WINDOW*win, int y, int x, const wchar_t *wstr, int n);

int mvwaddwstr(WINDOW*win, int y, int x, const wchar_t *wstr);

int waddnwstr(WINDOW*win, const wchar_t *wstr, int n);

int waddwstr(WINDOW*win, const wchar_t *wstr);
```

Description The `addwstr()` function writes a null-terminated wide-character string to the `stdscr` window at the current cursor position. The `waddwstr()` function performs an identical action, but writes the string to the window specified by *win*. The `mvaddwstr()` and `mvwaddwstr()` functions write the string to the position indicated by the *x* (column) and *y* (row) parameters (the former to the `stdscr` window; the latter to window *win*).

The `addnwstr()`, `waddnwstr()`, `mvaddnwstr()`, and `mvwaddnwstr()` functions write at most *n* characters to the window. If *n* is less than 0, the entire string is written. The former two functions place the characters at the current cursor position; the latter two commands use the position specified by the *x* and *y* parameters.

All of these functions advance the cursor after writing the string.

These functions are functionally equivalent to building a `cchar_t` from the `wchar_t` and the window rendition (or background character and rendition) and calling the `wadd_wch(3XCURSES)` function once for each `wchar_t` in the string. Refer to the `curses(3XCURSES)` man page for a complete description of special character handling and of the interaction between the window rendition (or background character and rendition) and the character written.

Note that these functions differ from the `add_wchnstr(3XCURSES)` set of functions in that the latter copy the string as is (without combining each character with the foreground and background attributes of the window).

Parameters

wstr	Is a pointer to the wide-character string that is to be written to the window.
n	Is the maximum number of characters to be copied from *wstr*. If *n* is less than 0, the entire string is written or as much of it as fits on the line.
y	Is the y (row) coordinate of the starting position of *wstr* in the window.
x	Is the x (column) coordinate of the starting position of *wstr* in the window.
win	Is a pointer to the window in which the string is to be written.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also add_wch(3XCURSES), add_wchnstr(3XCURSES), curses(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name add_wch, mvadd_wch, mvwadd_wch, wadd_wch – add a complex character (with rendition) to a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library ... ]

#include <curses.h>

int add_wch(const cchar_t *wch);

int wadd_wch(WINDOW *win, const cchar_t *wch);

int mvadd_wch(int y, int x, const cchar_t *wch);

int mvwadd_wch(WINDOW *win, int y, int x, const cchar_t *wch);
```

Description The `add_wch()` function writes a complex character to the `stdscr` window at the current cursor position. The `mvadd_wch()` and `mvwadd_wch()` functions write the character to the position indicated by the *x* (column) and *y* (row) parameters. The `mvadd_wch()` function writes the character to the `stdscr` window, while `mvwadd_wch()` writes the character to the window specified by *win*. The `wadd_wch()` function is identical to `add_wch()`, but writes the character to the window specified by *win*. These functions advance the cursor after writing the character.

If *wch* is a spacing complex character, X/Open Curses replaces any previous character at the specified location with *wch* (and its rendition). If *wch* is a non-spacing complex character, X/Open Curses preserves all existing characters at the specified location and adds the non-spacing characters of *wch* to the spacing complex character. It ignores the rendition associated with *wch*.

Characters that do not fit on the end of the current line are wrapped to the beginning of the next line unless the current line is the last line of the window and scrolling is disabled. In that situation, X/Open Curses discards characters which extend beyond the end of the line.

When *wch* is a backspace, carriage return, newline, or tab, X/Open Curses moves the cursor appropriately as described in the `curses(3XCURSES)` man page. Each tab character moves the cursor to the next tab stop. By default, tab stops occur every eight columns. When *wch* is a control character other than a backspace, carriage return, newline, or tab, it is written using ^*x* notation, where *x* is a printable character. When X/Open Curses writes *wch* to the last character position on a line, it automatically generates a newline. When *wch* is written to the last character position of a scrolling region and `scrollok()` is enabled, X/Open Curses scrolls the scrolling region up one line (see `clearok(3XCURSES)`).

Parameters

wch Is the character/attribute pair (rendition) to be written to the window.

win Is a pointer to the window in which the character is to be written.

y Is the y (row) coordinate of the character's position in the window.

x Is the x (column) coordinate of the character's position in the window.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also attr_off(3XCURSES), bkgrndset(3XCURSES), curses(3XCURSES), doupdate(3XCURSES), in_wch(3XCURSES), ins_wch(3XCURSES), libcurses(3XCURSES), nl(3XCURSES), printw(3XCURSES), scrollok(3XCURSES), scrl(3XCURSES), setscrreg(3XCURSES), terminfo(4), attributes(5), standards(5)

Name add_wchnstr, add_wchstr, mvadd_wchnstr, mvadd_wchstr, mvwadd_wchnstr, mvwadd_wchstr, wadd_wchnstr, wadd_wchstr – copy a string of complex characters (with renditions) to a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library ... ]

#include <curses.h>

int add_wchnstr(const cchar_t *wchstr, int n);

int add_wchstr(const cchar_t *wchstr);

int mvadd_wchnstr(int y, int x, const cchar_t *wchstr, int n);

int mvadd_wchstr(int y, int x, const cchar_t *wchstr);

int mvwadd_wchnstr(WINDOW *win, int y, int x,
     const cchar_t *wchstr, int n);

int mvwadd_wchstr(WINDOW *win, int y, int x, const cchar_t *wchstr);

int wadd_wchstr(WINDOW *win, const cchar_t *wchstr);

int wadd_wchnstr(WINDOW *win, const cchar_t *wchstr, int n);
```

Description The `add_wchstr()` function copies the string of `cchar_t` characters to the `stdscr` window at the current cursor position. The `mvadd_wchstr()` and `mvwadd_wchstr()` functions copy the string to the starting position indicated by the *x* (column) and *y* (row) parameters (the former to the `stdscr` window; the latter to window *win*). The `wadd_wchstr()` is identical to `add_wchstr()`, but writes to the window specified by *win*.

The `add_wchnstr()`, `wadd_wchnstr()`, `mvadd_wchnstr()`, and `mvwadd_wchnstr()` functions write *n* characters to the window, or as many as will fit on the line. If *n* is less than 0, the entire string is written, or as much of it as fits on the line. The former two functions place the string at the current cursor position; the latter two commands use the position specified by the *x* and *y* parameters.

These functions differ from the `addwstr(3XCURSES)` set of functions in two important respects. First, these functions do *not* advance the cursor after writing the string to the window. Second, the current window rendition (that is, the combination of attributes and color pair) is not combined with the character; only those attributes that are already part of the `cchar_t` character are used.

Parameters

wchstr Is a pointer to the `cchar_t` string to be copied to the window.

n Is the maximum number of characters to be copied from *wchstr*. If *n* is less than 0, the entire string is written or as much of it as fits on the line.

y Is the y (row) coordinate of the starting position of *wchstr* in the window.

x Is the x (column) coordinate of the starting position of *wchstr* in the window.

win Is a pointer to the window to which the string is to be copied.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also addnwstr(3XCURSES), add_wch(3XCURSES), attr_off(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name attr_get, attr_off, attr_on, attr_set, color_set, wattr_get, wattr_off, wattr_on, wattr_set, wcolor_set – control window attributes

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int attr_get(attr_t *attrs, short *color, void *opts);

int attr_off(attr_t attrs, void *opts);

int attr_on(attr_t attrs, void *opts);

int attr_set(attr_t attrs, short color, void *opts);

int color_set(short *color, void *opts);

int wattr_get(WINDOW *win, attr_t attrs, short *color, void *opts);

int wattr_off(WINDOW *win, attr_t attrs, void *opts);

int wattr_on(WINDOW *win, attr_t attrs, void *opts);

int wattr_set(WINDOW *win, attr_t attrs, short color, void *opts);

int wcolor_set(WINDOW *win, short color, void *opts);
```

Description The `attr_get()` function retrieves the current rendition of *stdscr*. The `wattr_get()` function retrieves the current rendition of window *win*. If *attrs* or *color* is a null pointer, no information is retrieved.

The `attr_off()` and `attr_on()` functions unset and set, respectively, the specified window attributes of `stdscr`. These functions only affect the attributes specified; attributes that existed before the call are retained.

The `wattr_off()` and `wattr_on()` functions unset or set the specified attributes for window *win*.

The `attr_set()` and `wattr_set()` functions change the rendition of `stdscr` and *win*; the old values are not retained.

The `color_set()` and `wcolor_set()` functions set the window color of `stdscr` and *win* to *color*.

The attributes and color pairs that can be used are specified in the `Attributes`, `Color Pairs`, and `Renditions` section of the `curses`(3XCURSES) man page.

Parameters

attrs Is a pointer to the foreground window attributes to be set or unset.

color Is a pointer to a color pair number .

opts Is reserved for future use.

win Is a pointer to the window in which attribute changes are to be made.

Return Values These functions always return `OK`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `add_wch`(3XCURSES), `addnwstr`(3XCURSES), `attroff`(3XCURSES), `bkgrndset`(3XCURSES), `curses`(3XCURSES), `init_color`(3XCURSES), `libcurses`(3XCURSES), `start_color`(3XCURSES), `attributes(5)`, `standards(5)`

Name attroff, attron, attrset, wattroff, wattron, wattrset – change foreground window attributes

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int attroff(int attrs);

int attron(int attrs);

int attrset(int attrs);

int wattroff(WINDOW *win, int attrs);

int wattron(WINDOW *win, int attrs);

int wattrset(WINDOW *win, int attrs);
```

Description The `attroff()` and `attron()` functions unset and set, respectively, the specified window attributes of `stdscr`. These functions only affect the attributes specified; attributes that existed before the call are retained. The `wattroff()` and `wattron()` functions unset or set the specified attributes for window *win*.

The `attrset()` and `wattrset()` functions change the specified window renditions of `stdscr` and *win* to new values; the old values are not retained.

The attributes that can be used are specified in the `Attributes, Color Pairs, and Renditions` section of the `curses(3XCURSES)` man page.

Here is an example that prints some text using the current window rendition, adds underlining, changes the attributes, prints more text, then changes the attributes back.

```
printw("This word is");
attron(A_UNDERLINE);
printw("underlined.");
attroff(A_NORMAL);
printw("This is back to normal text.\n");
refresh( );
```

Parameters

attrs are the foreground window attributes to be set or unset.

win Is a pointer to the window in which attribute changes are to be made.

Return Values These functions always return `OK` or 1.

Errors None.

Usage All of these functions may be macros.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also addch(3XCURSES), addnstr(3XCURSES), attr_get(3XCURSES), bkgdset(3XCURSES), curses(3XCURSES), init_color(3XCURSES), libcurses(3XCURSES), start_color(3XCURSES), attributes(5), standards(5)

Name baudrate – return terminal baud rate

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int baudrate(void);
```

Description The `baudrate()` function returns the terminal's data communication line and output speed in bits per second (for example, 9600).

Return Values The `baudrate()` function returns the output speed of the terminal.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name beep, flash – activate audio-visual alarm

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int beep(void);

int flash(void);
```

Description The `beep()` and `flash()` functions produce an audio and visual alarm on the terminal, respectively. If the terminal has the capability, `beep()` sounds a bell or beep and `flash()` flashes the screen. One alarm is substituted for another if the terminal does not support the capability called (see `terminfo(4)` `bel` and `flash` capabilities). For example, a call to `beep()` for a terminal without that capability results in a flash.

Return Values These functions always return `OK`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `terminfo(4)`, `attributes(5)`, `standards(5)`

Name bkgd, bkgdset, getbkgd, wbkgd, wbkgdset – set or get the background character (and rendition) of window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int bkgd(chtype ch);

void bkgdset(chtype ch);

chtype getbkgd(WINDOW *win);

int wbkgd(WINDOW *win, chtype ch);

void wbkgdset(WINDOW *win, chtype ch);
```

Description The `bkgdset()` and `wbkgdset()` functions turn off the previous background attributes, logical OR the requested attributes into the window rendition, and set the background property of the current or specified window based on the information in *ch*. If *ch* refers to a multi-column character, the results are undefined.

The `bkgd()` and `wbkgd()` functions turn off the previous background attributes, logical OR the requested attributes into the window rendition, and set the background property of the current or specified window and then apply this setting to every character position in that window:

- The rendition of every character on the screen is changed to the new window rendition.
- Wherever the former background character appears, it is changed to the new background character.

The `getbkgd()` function extracts the specified window's background character and rendition.

Parameters

ch Is the background character to be set.

win Is a pointer to the window in which the background character is to be set.

Return Values Upon successful completion, the `bkgd()` and `wbkgd()` functions return `OK`. Otherwise, they return `ERR`.

The `bkgdset()` and `wbkgdset()` functions do not return a value.

Upon successful completion, the `getbkgd()` function returns the specified window's background character and rendition. Otherwise, it returns `(chtype)ERR`.

Errors No errors are defined.

Usage These functions are only guaranteed to operate reliably on character sets in which each character fits into a single byte, whose attributes can be expressed using only constants with the A_ prefix.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also addch(3XCURSES), addchstr(3XCURSES), attroff(3XCURSES), bkgrnd(3XCURSES), clear(3XCURSES), clrtoeol(3XCURSES), clrtobot(3XCURSES), erase(3XCURSES), inch(3XCURSES), libcurses(3XCURSES), mvprintw(3XCURSES), attributes(5), standards(5)

Name bkgrnd, bkgrndset, getbkgrnd, wbkgrnd, wbkgrndset, wgetbkgrnd – set or get the background character (and rendition) of window using a complex character

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int bkgrnd(const cchar_t *wch);

void bkgrndset(const cchar_t *wch);

int getbkgrnd(cchar_t *wch);

int wbkgrnd(WINDOW *win, const cchar_t *wch);

void wbkgrndset(WINDOW *win, const cchar_t *wch);

int wgetbkgrnd(WINDOW *win, cchar_t *wch);
```

Description The `bkgrndset()` and `wbkgrndset()` functions turn off the previous background attributes, logical OR the requested attributes into the window rendition, and set the background property of the current or specified window based on the information in *wch*.

The `bkgrnd()` and `wbkgrnd()` functions turn off the previous background attributes, logical OR the requested attributes into the window rendition, and set the background property of the current or specified window and then apply this setting to every character position in that window:

- The rendition of every character on the screen is changed to the new window rendition.
- Wherever the former background character appears, it is changed to the new background character.

If *wch* refers to a non-spacing complex character for `bkgrnd()`, `bkgrndset()`, `wbkgrnd()`, and `wbkgrndset()`, then *wch* is added to the existing spacing complex character that is the background character. If *wch* refers to a multi-column character, the results are unspecified.

The `getbkgrnd()` and `wgetbkgrnd()` functions store, into the area pointed to buy *wch*, the window's background character and rendition.

Parameters

wch Is a pointer to the complex background character to be set.

win Is a pointer to the window in which the complex background character is to be set.

Return Values The `bkgrndset()` and `wbkgrndset()` functions do not return a value.

Upon successful completion, the other functions return `OK`. Otherwise, they return `ERR`.

Errors No errors are defined.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also add_wch(3XCURSES), add_wchnstr(3XCURSES), addch(3XCURSES), addchstr(3XCURSES), attroff(3XCURSES), bkgd(3XCURSES), clear(3XCURSES), clrtoeol(3XCURSES), clrtobot(3XCURSES), erase(3XCURSES), inch(3XCURSES), libcurses(3XCURSES), mvprintw(3XCURSES), attributes(5), standards(5)

Name border, box, wborder – add a single-byte border to a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int border(chtype ls, chtype rs, chtype ts, chtype bs, chtype tl,
     chtype tr, chtype bl, chtype br);

int wborder(WINDOW *win, chtype ls, chtype rs, chtype ts, chtype bs,
     chtype tl,chtype tr, chtype bl, chtype br);

int box(WINDOW *win, chtype verch, chtype horch);
```

Description The `border()` and `wborder()` functions draw a border around the specified window. All parameters must be single-byte characters whose rendition can be expressed using only constants beginning with `ACS_`. A parameter with the value of 0 is replaced by the default value.

Constant Values for Borders

Parameter	Default Constant	Default Character
verch	ACS_VLINE	|
horch	ACS_HLINE	-
ls	ACS_VLINE	|
rs	ACS_VLINE	|
ts	ACS_HLINE	-
bs	ACS_HLINE	-
bl	ACS_BLCORNER	+
br	ACS_BRCORNER	+
tl	ACS_ULCORNER	+
tr	ACS_URCORNER	+

The call

```
box(win,
verch, horch)
```

is a short form for

```
wborder(win,
verch, verch,
horch, horch, 0, 0, 0,
0)
```

When the window is boxed, the bottom and top rows and right and left columns overwrite existing text.

Parameters

ls	Is the character and rendition used for the left side of the border.
rs	Is the character and rendition used for the right side of the border.
ts	Is the character and rendition used for the top of the border.
bs	Is the character and rendition used for the bottom of the border.
tl	Is the character and rendition used for the top-left corner of the border.
tr	Is the character and rendition used for the top-right corner of the border.
bl	Is the character and rendition used for the bottom-left corner of the border.
br	Is the character and rendition used for the bottom-right corner of the border.
win	Is the pointer to the window in which the border or box is to be drawn.
verch	Is the character and rendition used for the left and right columns of the box.
horch	Is the character and rendition used for the top and bottom rows of the box.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also add_wch(3XCURSES), addch(3XCURSES), attr_get(3XCURSES), attroff(3XCURSES), border_set(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name border_set, box_set, wborder_set – use complex characters (and renditions) to draw borders

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int border_set(const cchar_t *ls, const cchar_t *rs, const cchar_t *ts,
     const cchar_t *bs, const cchar_t *tl, const cchar_t *tr,
     const cchar_t *bl,const cchar_t *br);

int wborder_set(WINDOW *win, const cchar_t *ls, const cchar_t *rs,
     const cchar_t *ts,const cchar_t *bs, const cchar_t *tl,
     const cchar_t *tr, const cchar_t *bl,const cchar_t *br);

int box_set(WINDOW *win, const cchar_t *verch, const cchar_t *horch);
```

Description The `border_set()` and `wborder_set()` functions draw a border around the specified window. All parameters must be spacing complex characters with renditions. A parameter which is a null pointer is replaced by the default character.

`Constant Values for Borders`

Constant Values for Borders		
Parameter	**Default Constant**	**Default Character**
verch	WACS_VLINE	|
horch	WACS_HLINE	-
ls	WACS_VLINE	|
rs	WACS_VLINE	|
ts	WACS_HLINE	-
bs	WACS_HLINE	-
bl	WACS_BLCORNER	+
br	WACS_BRCORNER	+
tl	WACS_ULCORNER	+
tr	WACS_URCORNER	+

The call

`box_set(`*win*`,`
verch`,` *horch*`)`

is a short form for

```
wborder(win,
verch, verch,
horch, horch, NULL,
NULL, NULL, NULL, NULL)
```

When the window is boxed, the bottom and top rows and right and left columns are unavailable for text.

Parameters

ls	Is the character and rendition used for the left side of the border.
rs	Is the character and rendition used for the right side of the border.
ts	Is the character and rendition used for the top of the border.
bs	Is the character and rendition used for the bottom of the border.
tl	Is the character and rendition used for the top-left corner of the border.
tr	Is the character and rendition used for the top-right corner of the border.
bl	Is the character and rendition used for the bottom-left corner of the border.
br	Is the character and rendition used for the bottom-right corner of the border.
win	Is the pointer to the window in which the border or box is to be drawn.
verch	Is the character and rendition used for the left and right columns of the box.
horch	Is the character and rendition used for the top and bottom rows of the box.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also add_wch(3XCURSES), addch(3XCURSES), attr_get(3XCURSES), attroff(3XCURSES), border(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name can_change_color, color_content, COLOR_PAIR, has_colors, init_color, init_pair, pair_content, PAIR_NUMBER, start_color, COLOR_PAIRS, COLORS – manipulate color information

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

bool can_change_color(void);

int color_content(short color, short *red, short *green, short *blue);

int COLOR_PAIR(int n);

bool has_colors(void);

int init_color(short color, short red, short green, short blue);

int init_pair(short pair, short f, short b);

int pair_content(short pair, short *f, short *b);

int PAIR_NUMBER(int value);

int start_color(voidextern int COLOR_PAIRS;

extern int COLORS;
```

Description These functions manipulate color on terminals that support color.

Querying Capabilities The `has_colors()` function indicates whether the terminal is a color terminal. The `can_change_color()` function indicates whether the terminal is a color terminal on which colors can be redefined.

Initialization The `start_color()` function must be called to enable use of colors and before any color manipulation function is called. The function initializes eight basic colors (black, red, green, yellow, blue, magenta, cyan, and white) that can be specified by the color macros (such as `COLOR_BLACK`) defined in <`curses.h`>. The initial appearance of these colors is unspecified.

The function also initializes two global external variables:

- `COLORS` defines the number of colors that the terminal supports. See `Color Identification` below. If `COLORS` is 0, the terminal does not support redefinition of colors and `can_change_color()` will return `FALSE`.
- `COLOR_PAIRS` defines the maximum number of color-pairs that the terminal supports. See `User-defined Color Pairs` below.

The `start_color()` function also restores the colors on the terminal to terminal-specific initial values. The initial background color is assumed to be black for all terminals.

Color Identification

The `init_color()` function redefines color number *color*, on terminals that support the redefinition of colors, to have the red, green, and blue intensity components specified by *red*, *green*, and *blue*, respectively. Calling `init_color()` also changes all occurrences of the specified color on the screen to the new definition.

The `color_content()` function identifies the intensity components of color number *color*. It stores the red, green, and blue intensity components of this color in the addresses pointed to by *red*, *green*, and *blue*, respectively.

For both functions, the *color* argument must be in the range from 0 to and including `COLORS`−1. Valid intensity value range from 0 (no intensity component) up to and including 1000 (maximum intensity in that component).

User-defined Color Pairs

Calling `init_pair()` defines or redefines color-pair number *pair* to have foreground color *f* and background color *b*. Calling `init_pair()` changes any characters that were displayed in the color pair's old definition to the new definition and refreshes the screen.

After defining the color pair, the macro `COLOR_PAIR(`*n*`)` returns the value of color pair *n*. This value is the color attribute as it would be extracted from a `chtype`. Controversy, the macro `COLOR_NUMBER(`*value*`)` returns the color pair number associated with the color attribute *value*.

The `pair_content()` retrieves the component colors of a color-pair number *pair*. It stores the foreground and background color numbers in the variables pointed to by *f* and *b*, respectively.

With `init_pair()` and `pair_content()`, the value of *pair* must be in a range from 0 to and including `COLOR_PAIRS`−1. Valid values for *f* and *b* are the range from 0 to and including `COLORS`−1.

Parameters

color	Is the number of the color for which to provide information (0 to `COLORS`−1).
red	Is a pointer to the RGB value for the amount of red in *color*.
green	Is a pointer to the RGB value for the amount of green in *color*.
blue	Is a pointer to the RGB value for the amount of blue in *color*.
n	Is the number of a color pair.
pair	Is the number of the color pair for which to provide information (1 to `COLOR_PAIRS`−1).
f	Is a pointer to the number of the foreground color (0 to `COLORS`−1) in *pair*.
b	Is a pointer to the number of the background color (0 to `COLORS`−1) in *pair*.
value	Is a color attribute value.

Return Values

The `has_colors()` function returns `TRUE` if the terminal can manipulate colors. Otherwise, it returns `FALSE`.

The `can_change_color()` function returns `TRUE` if the terminal supports colors and is able to change their definitions. Otherwise, it returns `FALSE`.

Upon successful completion, the other functions return `OK`. Otherwise, they return `ERR`.

Errors No errors are defined.

USAGE To use these functions, `start_color()` must be called, usually right after `initscr`(3XCURSES).

The `can_change_color()` and `has_colors()` functions facilitate writing terminal-independent applications. For example, a programmer can use them to decide whether to use color or some other video attribute.

On color terminals, a typical value of `COLORS` is 8 and the macros such as `COLOR_BLACK` return a value within the range from 0 to and including 7. However, applications cannot rely on this to be true.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `attroff`(3XCURSES), `delscreen`(3XCURSES), `initscr`(3XCURSES), `libcurses`(3XCURSES), `attributes`(5), `standards`(5)

Name cbreak, nocbreak, noraw, raw – set input mode controls

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int cbreak(void);

int nocbreak(void);

int noraw(void);

int raw(void);
```

Description The `cbreak()` function enables the character input mode. This overrides any previous call to the `raw()` function and turns the `stty` flag `ICANON` off.

The `nocbreak()` function sets the line canonical mode and turns the `stty` flag `ICANON` on without touching the `ISIG` or `IXON` flags.

The `noraw()` function sets the line canonical mode and turns the `stty` flags `ICANON`, `ISIG`, and `IXON` all on.

The `raw()` function sets the character input mode and turns the `stty` flags `ICANON`, `ISIG`, and `IXON` all off. This mode provides maximum control over input.

It is important to remember that the terminal may or may not be in character mode operation initially. Most interactive programs require `cbreak()` to be enabled.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `getch(3XCURSES)`, `halfdelay(3XCURSES)`, `nodelay(3XCURSES)`, `timeout(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`, `termio(7I)`

Name chgat, mvchgat, mvwchgat, wchgat – change the rendition of characters in a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int chgat(int n, attr_t attr, short color, const void *opts);

int mvchgat(int y, int x, int n, attr_t attr, short color,
     const void *opts);

int mvwchgat(WINDOW *win, int y, int x, int n, attr_t attr,
     short color, const void *opts);

int wchgat(WINDOW *win, int n, attr_t attr, short color,
     const void *opts);
```

Description These functions change the renditions of the next *n* characters in the current or specified window (or of the remaining characters on the current or specified line, if *n* is –1), beginning at the current or specified cursor position. The attributes and colors are specified by *attr* and *color* as for setcchar(3XCURSES).

These function neither update the cursor nor perform wrapping.

A value of *n* that is greater than the remaining characters on a line is not an error.

The *opts* argument is reserved for definition in a future release. Currently, the application must provide a null pointer for *opts*.

Parameters

n	Is the number of characters whose rendition is to be changed.
attr	Is the set of attributes to be assigned to the characters.
color	Is the new color pair to be assigned to the characters.
opts	Is reserved for future use. Currently, this must be a null pointer.
y	Is the y (row) coordinate of the starting position in the window.
x	Is the x (column) coordinate of the starting position in the window. changed in the window.
win	Is a pointer to the window in which the rendition of characters is to be changed.

Return Values Upon successful completion, these functions returned OK. Otherwise, they return ERR.

Errors No errors are defined.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also bkgrnd(3XCURSES), libcurses(3XCURSES), setcchar(3XCURSES), attributes(5), standards(5)

Name clear, erase, wclear, werase – clear a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int clear(void);

int erase(void);

int wclear(WINDOW *win);

int werase(WINDOW *win);
```

Description The `clear()` and `erase()` functions clear `stdscr`, destroying its previous contents. The `wclear()` and `werase()` functions perform the same action, but clear the window specified by *win* instead of `stdscr`.

The `clear()` and `wclear()` functions also call the `clearok()` function. This function clears and redraws the entire screen on the next call to `refresh`(3XCURSES) or `wrefresh`(3XCURSES) for the window.

The current background character (and attributes) is used to clear the screen.

Parameters

win Is a pointer to the window that is to be cleared.

Errors

`OK` Successful completion.

`ERR` An error occurred.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `bkgdset`(3XCURSES), `clearok`(3XCURSES), `clrtobot`(3XCURSES), `clrtoeol`(3XCURSES), `doupdate`(3XCURSES), `libcurses`(3XCURSES), `refresh`(3XCURSES), `wrefresh`(3XCURSES), `attributes`(5), `standards`(5)

Name clearok, idlok, leaveok, scrollok, setscrreg, wsetscrreg – terminal output control functions

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int clearok(WINDOW *win, bool bf);

int idlok(WINDOW *win, bool bf);

int leaveok(WINDOW *win, bool bf);

int scrollok(WINDOW *win, bool bf);

int setscrreg(int top, int bot);

int wsetscrreg(WINDOW *win, int top, int bot);
```

Description These functions set options that deal with the output within Curses functions.

The `clearok()` function assigns the value of *bf* to an internal flag in the specified window that governs clearing of the screen during a refresh. If, during a refresh operation on the specified window, the flag in *curscr* is `TRUE` or the flag in the specified window is `TRUE`, `clearok()` clears the screen, redraws it in its entirety, and sets the flag to `FALSE` in *curscr* and in the specified window. The initial state is unspecified

The `idlok()` function specifies whether the implementation may use the hardware insert-line, delete-line, and scroll features of terminals so equipped. If *bf* is `TRUE`, use of these features is enabled. If *bf* is `FALSE`, use of these features is disabled and lines are instead redrawn as required. The initial state is `FALSE`.

The `leaveok()` function controls the cursor position after a refresh operation. If *bf* is `TRUE`, refresh operations on the specified window may leave the terminal's cursor at an arbitrary position. If *bf* is `FALSE`, then at the end of any refresh operation, the terminal's cursor is positioned at the cursor position contained in the specified window. The initial state is `FALSE`.

The `scrollok()` function controls the use of scrolling.If *bf* is `TRUE`, then scrolling is enabled for the specified window. If *bf* is `FALSE`, scrolling is disabled for the specified window. The initial state is `FALSE`.

The `setscrreg()` and `wsetscrreg()` functions define a software scrolling region in the current or specified window. The *top* and *bottom* arguments are the line numbers of the first and last line defining the scrolling region. (Line 0 is the top line of the window.) If this option and `scrollok()` are enabled, an attempt to move off the last line of the margin causes all lines in the scrolling region to scroll one line in the direction of the first line. Only characters in the window are scrolled. If a software scrolling region is set and `scrollok()` is not enabled, an attempt to move off the last line of the margin does not reposition any lines in the scrolling region.

Parameters

win Is a pointer to a window.

bf Is a Boolean expression.

top Is the top line of the scrolling region (top of the window is line 0).

bot Is the bottom line of the scrolling region (top of the window is line 0).

Return Values

Upon successful completion, the `setscrreg()` and `wsetscrreg()` functions return `OK`. Otherwise, they return `ERR`.

The other functions always return `OK`.

Errors

No errors are defined.

USAGE

The only reason to enable the `idlok()` feature is to use scrolling to achieve the visual effect of motion of a partial window, such as for a screen editor. In other cases, the feature can be visually annoying.

The `leaveok()` option provides greater efficiency for applications that do not use the cursor.

Attributes

See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also

`bkgdset`(3XCURSES), `clear`(3XCURSES), `doupdate`(3XCURSES), `libcurses`(3XCURSES), `scrl`(3XCURSES), `attributes(5)`, `standards(5)`

Name clrtobot, wclrtobot – clear to the end of a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int clrtobot(void);

int wclrtobot(WINDOW *win);
```

Description The `clrtobot()` function clears all characters in the `stdscr` window from the cursor to the end of the window. The `wclrtobot()` function performs the same action in the window specified by *win* instead of in `stdscr`. The current background character (and rendition) is used to clear the screen.

If the clearing action results in clearing only a portion of a multicolumn character, background characters are displayed in place of the remaining portion.

Parameters *win* Is a pointer to the window that is to be cleared.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `bkgdset`(3XCURSES), `clear`(3XCURSES), `clearok`(3XCURSES), `clrtoeol`(3XCURSES), `libcurses`(3XCURSES), `attributes(5)`, `standards(5)`

Name clrtoeol, wclrtoeol – clear to the end of a line

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int clrtoeol(void);

int wclrtoeol(WINDOW *win);
```

Description The `clrtoeol()` function clears the current line from the cursor to the right margin in the `stdscr` window. The `wclrtoeol()` function performs the same action, but in the window specified by *win* instead of `stdscr`. The current background character (and rendition) is used to clear the screen.

If the clearing action results in clearing only a portion of a multicolumn character, background characters are displayed in place of the remaining portion.

Parameters *win* Is a pointer to the window in which to clear to the end of the line.

Return Values On success, these functions return `OK`. Otherwise, they return `FALSE`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `bkgdset(3XCURSES)`, `clear(3XCURSES)`, `clearok(3XCURSES)`, `clrtobot(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name COLS – number of columns on terminal screen

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include -L /usr/xpg4/lib \
-R /usr/xpg4/lib -lcurses [ library... ]

c89 [ flag... ] file... -lcurses [ library ... ]

#include <curses.h>

extern int COLS;
```

Description The external variable `COLS` indicates the number of columns on the terminal screen.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `initscr(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name copywin – overlay or overwrite any portion of window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int copywin(const WINDOW *srcwin, WINDOW *dstwin, int sminrow, int smincol,
     int dminrow, int dmincol, int dmaxrow, int dmaxcol, int overlay);
```

Parameters

srcwin Is a pointer to the source window to be copied.

dstwin Is a pointer to the destination window to be overlayed or overwritten.

sminrow Is the row coordinate of the upper left corner of the rectangular area on the source window to be copied.

smincol Is the column coordinate of the upper left corner of the rectangular area on the source window to be copied.

dminrow Is the row coordinate of the upper left corner of the rectangular area on the destination window to be overlayed or overwritten.

dmincol Is the column coordinate of the upper left corner of the rectangular area on destination window to be overlayed or overwritten.

dmaxrow Is the row coordinate of the lower right corner of the rectangular area on the destination window to be overlayed or overwritten.

dmaxcol Is the column coordinate of the lower right corner of the rectangular area on the destination window to be overlayed or overwritten.

overlay Is a `TRUE` or `FALSE` value that determines whether the destination window is overlayed or overwritten.

Description The `copywin()` function provides a finer granularity of control over the `overlay(3XCURSES)` and `overwrite(3XCURSES)` functions. As in the `prefresh()` function (see `newpad(3XCURSES)`), a rectangle is specified in the destination window, (*dminrow*, *dmincol*) and (*dmaxrow*, *dmaxcol*), and the upper-left-corner coordinates of the source window, (*smincol*, *sminrow*). If *overlay* is `TRUE`, then copying is non-destructive, as in `overlay()`. If *overlay* is `FALSE`, then copying is destructive, as in `overwrite()`.

Return Values Upon successful completion, the `copywin()` function returns `OK`. Otherwise, it returns `ERR`.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `curses(3XCURSES)`, `libcurses(3XCURSES)`, `newpad(3XCURSES)`, `overlay(3XCURSES)`, `attributes(5)`, `standards(5)`

Name curs_addch, addch, waddch, mvaddch, mvwaddch, echochar, wechochar – add a character (with attributes) to a curses window and advance cursor

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

int addch(chtype ch);

int waddch(WINDOW *win, chtype ch);

int mvaddch(int y, int x, chtype ch);

int mvwaddch(WINDOW *win, int y, int x, chtype ch);

int echochar(chtype ch);

int wechochar(WINDOW *win, chtype ch);
```

Description With the `addch()`, `waddch()`, `mvaddch()`, and `mvwaddch()` routines, the character *ch* is put into the window at the current cursor position of the window and the position of the window cursor is advanced. Its function is similar to that of `putchar()`. At the right margin, an automatic newline is performed. At the bottom of the scrolling region, if `scrollok()` is enabled, the scrolling region is scrolled up one line.

If *ch* is a tab, newline, or backspace, the cursor is moved appropriately within the window. A newline also does a `clrtoeol()` before moving. Tabs are considered to be at every eighth column. If *ch* is another control character, it is drawn in the ^*X* notation. Calling `winch()` after adding a control character does not return the control character, but instead returns the representation of the control character. See `curs_inch(3CURSES)`.

Video attributes can be combined with a character by OR-ing them into the parameter. This results in these attributes also being set. (The intent here is that text, including attributes, can be copied from one place to another using `inch()` and `addch()`.) (see `standout()`, predefined video attribute constants, on the `curs_attr(3CURSES)` page).

The `echochar()` and `wechochar()` routines are functionally equivalent to a call to `addch()` followed by a call to `refresh()`, or a call to `waddch` followed by a call to `wrefresh()`. The knowledge that only a single character is being output is taken into consideration and, for non-control characters, a considerable performance gain might be seen by using these routines instead of their equivalents.

Line Graphics The following variables may be used to add line drawing characters to the screen with routines of the `addch()` family. When variables are defined for the terminal, the `A_ALTCHARSET` bit is turned on (see `curs_attr(3CURSES)`). Otherwise, the default character listed below is stored in the variable. The names chosen are consistent with the VT100 nomenclature.

Name	Default	Glyph Description
ACS_ULCORNER	+	upper left-hand corner

Name	Default	Glyph Description
ACS_LLCORNER	+	lower left-hand corner
ACS_URCORNER	+	upper right-hand corner
ACS_LRCORNER	+	lower right-hand corner
ACS_RTEE	+	right tee
ACS_LTEE	+	left tee
ACS_BTEE	+	bottom tee
ACS_TTEE	+	top tee
ACS_HLINE	-	horizontal line
ACS_VLINE	|	vertical line
ACS_PLUS	+	plus
ACS_S1	-	scan line 1
ACS_S9	-	scan line 9
ACS_DIAMOND	+	diamond
ACS_CKBOARD	:	checker board (stipple)
ACS_DEGREE	'	degree symbol
ACS_PLMINUS	#	plus/minus
ACS_BULLET	o	bullet
ACS_LARROW	<	arrow pointing left
ACS_RARROW	>	arrow pointing right
ACS_DARROW	v	arrow pointing down
ACS_UARROW	^	arrow pointing up
ACS_BOARD	#	board of squares
ACS_LANTERN	#	lantern symbol
ACS_BLOCK	#	solid square block

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curs_attr(3CURSES), curs_clear(3CURSES), curs_inch(3CURSES), curs_outopts(3CURSES), curs_refresh(3CURSES), curses(3CURSES), putc(3C), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Note that addch(), mvaddch(), mvwaddch(), and echochar() may be macros.

Name curs_addchstr, addchstr, addchnstr, waddchstr, waddchnstr, mvaddchstr, mvaddchnstr, mvwaddchstr, mvwaddchnstr – add string of characters and attributes to a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int addchstr(chtype *chstr);

int addchnstr(chtype *chstr, int n);

int waddchstr(WINDOW *win, chtype *chstr);

int waddchnstr(WINDOW *win, chtype *chstr, int n);

int mvaddchstr(int y, int x, chtype *chstr);

int mvaddchnstr(int y, int x, chtype *chstr, int n);

int mvwaddchstr(WINDOW *win, int y, int x, chtype *chstr);

int mvwaddchnstr(WINDOW *win, int y, int x, chtype *chstr, int n);
```

Description All of these routines copy *chstr* directly into the window image structure starting at the current cursor position. The four routines with *n* as the last argument copy at most *n* elements, but no more than will fit on the line. If *n*=-1 then the whole string is copied, to the maximum number that fit on the line.

The position of the window cursor is not advanced. These routines works faster than waddnstr() (see curs_addstr(3CURSES)) because they merely copy *chstr* into the window image structure. On the other hand, care must be taken when using these functions because they do not perform any kind of checking (such as for the newline character), they do not advance the current cursor position, and they truncate the string, rather then wrapping it around to the next line.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curs_addstr(3CURSES), curses(3CURSES), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Note that all routines except waddchnstr() and waddchstr() may be macros.

Name curs_addstr, addstr, addnstr, waddstr, waddnstr, mvaddstr, mvaddnstr, mvwaddstr, mvwaddnstr – add a string of characters to a curses window and advance cursor

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int addstr(char *str);

int addnstr(char *str, int n);

int waddstr(WINDOW *win, char *str);

int waddnstr(WINDOW *win, char *str, int n);

int mvaddstr(int y, int x, char *str);

int mvaddnstr(int y, int x, char *str, int n);

int mvwaddstr(WINDOW *win, int y, int x, char *str);

int mvwaddnstr(WINDOW *win, int y, int x, char *str, int n);
```

Description All of these routines write all the characters of the null terminated character string *str* on the given window. It is similar to calling `waddch()` once for each character in the string. The four routines with *n* as the last argument write at most *n* characters. If *n* is negative, then the entire string will be added.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_addch(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that all routines except `waddstr()` and `waddnstr()` may not be macros.

Name curs_addwch, addwch, waddwch, mvaddwch, mvwaddwch, echowchar, wechowchar – add a wchar_t character (with attributes) to a curses window and advance cursor

Synopsis

```
cc  [flag]... file... -lcurses [library]...

#include<curses.h>

int addwch(chtype wch);

int waddwch(WINDOW *win, chtype wch);

int mvaddwch(int y, int x, chtype wch);

int mvwaddwch(WINDOW *win, int y, int x, chtype wch);

int echowchar(chtype wch);

int wechowchar(WINDOW *win, chtype wch);
```

Description The `addwch()`,`waddwch()`,`mvaddwch()`, and `mvwaddwch()` routines put the character *wch*, holding a `wchar_t` character, into the window at the current cursor position of the window and advance the position of the window cursor. Their function is similar to that of `putwchar(3C)` in the C multibyte library. At the right margin, an automatic newline is performed. At the bottom of the scrolling region, if `scrollok` is enabled, the scrolling region is scrolled up one line.

If *wch* is a tab, newline, or backspace, the cursor is moved appropriately within the window. A newline also does a `clrtoeol(3CURSES)` before moving. Tabs are considered to be at every eighth column. If *wch* is another control character, it is drawn in the ^*X* notation. Calling `winwch(3CURSES)` after adding a control character does not return the control character, but instead returns the representation of the control character.

Video attributes can be combined with a `wchar_t` character by OR-ing them into the parameter. This results in these attributes also being set. (The intent here is that text, including attributes, can be copied from one place to another using `inwch()` and `addwch()`.) See `standout(3CURSES)`, predefined video attribute constants.

The `echowchar()` and `wechowchar()` routines are functionally equivalent to a call to `addwch()` followed by a call to `refresh(3CURSES)`, or a call to `waddwch()` followed by a call to `wrefresh(3CURSES)`. The knowledge that only a single character is being output is taken into consideration and, for non-control characters, a considerable performance gain might be seen by using these routines instead of their equivalents.

Line Graphics The following variables may be used to add line drawing characters to the screen with routines of the `addwch()` family. When variables are defined for the terminal, the `A_ALTCHARSET` bit is turned on. (See `curs_attr(3CURSES)`). Otherwise, the default character listed below is stored in the variable. The names chosen are consistent with the VT100 nomenclature.

Name	Default	Glyph Description
ACS_ULCORNER	+	upper left-hand corner
ACS_LLCORNER	+	lower left-hand corner
ACS_URCORNER	+	upper right-hand corner
ACS_LRCORNER	+	lower right-hand corner
ACS_RTEE	+	right tee
ACS_LTEE	+	left tee
ACS_BTEE	+	bottom tee
ACS_TTEE	+	top tee
ACS_HLINE	-	horizontal line
ACS_VLINE	|	vertical line
ACS_PLUS	+	plus
ACS_S1	-	scan line 1
ACS_S9	-	scan line 9
ACS_DIAMOND	+	diamond
ACS_CKBOARD	:	checker board (stipple)
ACS_DEGREE	'	degree symbol
ACS_PLMINUS	#	plus/minus
ACS_BULLET	o	bullet
ACS_LARROW	<	arrow pointing left
ACS_RARRROW	>	arrow pointing right
ACS_DARROW	v	arrow pointing down
ACS_UARROW	^	arrow pointing up
ACS_BOARD	#	board of squares
ACS_LANTERN	#	lantern symbol
ACS_BLOCK	#	solid square block

Return Value All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion, unless otherwise noted in the preceding routine descriptions.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also putwchar(3C), clrtoeol(3CURSES), curses(3CURSES), curs_attr(3CURSES), curs_inwch(3CURSES), curs_outopts(3CURSES), refresh(3CURSES), standout(3CURSES), winwch(3CURSES), wrefresh(3CURSES), attributes(5)

Notes The header file <curses.h> automatically includes the header files <stdio.h>, <unctrl.h> and <widec.h>.

Note that addwch(), mvaddwch(), mvwaddwch(), and echowchar() may be macros.

None of these routines can use the color attribute in chtype.

Name curs_addwchstr, addwchstr, addwchnstr, waddwchstr, waddwchnstr, mvaddwchstr, mvaddwchnstr, mvwaddwchstr, mvwaddwchnstr – add string of wchar_t characters (and attributes) to a curses window

Synopsis

```
cc  [flag]... file... -lcurses [library]...

#include<curses.h>

int addwchstr(chtype *wchstr);

int addwchnstr(chtype *wchstr, int n);

int waddwchstr(WINDOW *win, chtype *wchstr);

int waddwchnstr(WINDOW *win, chtype *wchstr, int n);

int mvaddwchstr(int y, int x, chtype *wchstr);

int mvaddwchnstr(int y,  int x, chtype *wchstr, int n);

int mvwaddwchstr(WINDOW *win, int y, int x,  chtype *wchstr);

int mvwaddwchnstr(WINDOW *win, int y, int x , chtype *wchstr, int n);
```

Description All of these routines copy *wchstr*, which points to a string of `wchar_t` characters, directly into the window image structure starting at the current cursor position. The four routines with *n* as the last argument copy at most *n* elements, but no more than will fit on the line. If *n*=−1 then the whole string is copied, to the maximum number that fit on the line.

The position of the window cursor is not advanced. These routines work faster than `waddnwstr(3CURSES)` because they merely copy *wchstr* into the window image structure. On the other hand, care must be taken when using these functions because they don't perform any kind of checking (such as for the newline character), they do not advance the current cursor position, and they truncate the string, rather than wrapping it around to the new line.

Return Value All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion, unless otherwise noted in the preceding routine descriptions.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `waddnwstr(3CURSES)`, `attributes(5)`

Notes The header file <`curses.h`> automatically includes the header files <`stdio.h`>, <`unctrl.h`> and <`widec.h`>.

Note that all routines except `waddwchnstr()` may be macros.

None of these routines can use the color attribute in `chtype`.

Name curs_addwstr, addwstr, addnwstr, waddwstr, waddnwstr, mvaddwstr, mvaddnwstr, mvwaddwstr, mvwaddnwstr – add a string of wchar_t characters to a curses window and advance cursor

Synopsis

```
cc  [flag]... file... -lcurses [library]...

#include<curses.h>

int addwstr(wchar_t *wstr);

int addnwstr(wchar_t *wstr, int n);

int waddwstr(WINDOW *win, wchar_t *wstr);

int waddnwstr(WINDOW *win, wchar_t *wstr, int n);

int mvaddwstr(int y, int x, wchar_t *wstr);

int mvaddnwstr(int y, int x, wchar_t *wstr, int n);

int mvwaddwstr(WINDOW *win, int y, int x , wchar_t *wstr);

int mvwaddnwstr(WINDOW *win, int y, int x, wchar_t *wstr, int n);
```

Description All of these routines write all the characters of the null-terminated `wchar_t` character string `wstr` on the given window. The effect is similar to calling `waddwch(3CURSES)` once for each `wchar_t` character in the string. The four routines with *n* as the last argument write at most *n* `wchar_t` characters. If *n* is negative, then the entire string will be added.

Return Value All routines return the integer `ERR` upon failure and an integer value other than `ERR` upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `waddwch(3CURSES)`, `attributes(5)`

Notes The header file <`curses.h`> automatically includes the header files <`stdio.h`>, <`nctrl.h`> and <`widec.h`>.

Note that all of these routines except `waddwstr()` and `waddnwstr()` may be macros.

Name curs_alecompat, movenextch, wmovenextch, moveprevch, wmoveprevch, adjcurspos, wadjcurspos – these functions are added to ALE curses library for moving the cursor by character.

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

int movenextch(void);

int wmovenextch(WINDOW *win);

int moveprevch(void);

int wmoveprevch(WINDOW *win);

int adjcurspos(void);

int wadjcurspos(WINDOW *win);
```

Description `movenextch()` and `wmovenextch()` move the cursor to the next character to the right. If the next character is a multicolumn character, the cursor is positioned on the first (left-most) column of that character. The new cursor position will be on the next character, even if the cursor was originally positioned on the left-most column of a multicolumn character. Note that the simple cursor increment (`++x`) does not guarantee movement to the next character, if the cursor was originally positioned on a multicolumn character. `getyx(3CURSES)` can be used to find the new position.

`moveprevc()` and `wmoveprevch()` routines are the opposite of `movenextch()` and `wmovenextch()`, moving the cursor to the left-most column of the previous character.

`adjcurspos()` and `wadjcurspos()` move the cursor to the first(left-most) column of the multicolumn character that the cursor is presently on. If the cursor is already on the first column, or if the cursor is on a single-column character, these routines will have no effect.

Return Value All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `getyx(3CURSES)`, `attributes(5)`

Notes The header file `<curses.h>` automatically includes the header files `<stdio.h>`, `<unctrl.h>` and `<widec.h>`.

Note that `movenextch()`, `moveprevch()`, and `adjcurspos()` may be macros.

Name curs_attr, attroff, wattroff, attron, wattron, attrset, wattrset, standend, wstandend, standout, wstandout – curses character and window attribute control routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int attroff(int attrs);

int wattroff(WINDOW *win, int attrs);

int attron(int attrs);

int wattron(WINDOW *win, int attrs);

int attrset(int attrs);

int wattrset(WINDOW *win, int attrs);

int standend(void);

int wstandend(WINDOW *win);

int standout(void);

int wstandout(WINDOW *win);
```

Description All of these routines manipulate the current attributes of the named window. The current attributes of a window are applied to all characters that are written into the window with `waddch()`, `waddstr()`, and `wprintw()`. Attributes are a property of the character, and move with the character through any scrolling and insert/delete line/character operations. To the extent possible on the particular terminal, they are displayed as the graphic rendition of characters put on the screen.

The routine `attrset()` sets the current attributes of the given window to *attrs*. The routine `attroff()` turns off the named attributes without turning any other attributes on or off. The routine `attron()` turns on the named attributes without affecting any others. The routine `standout()` is the same as `attron(A_STANDOUT)`. The routine `standend()` is the same as `attrset()`, that is, it turns off all attributes.

Attributes The following video attributes, defined in `<curses.h>`, can be passed to the routines `attron()`, `attroff()`, and `attrset()`, or OR-ed with the characters passed to `addch()`.

A_STANDOUT	Best highlighting mode of the terminal
A_UNDERLINE	Underlining
A_REVERSE	Reverse video
A_BLINK	Blinking
A_DIM	Half bright
A_BOLD	Extra bright or bold
A_ALTCHARSET	Alternate character set

A_CHARTEXT Bit-mask to extract a character

COLOR_PAIR(*n*) Color-pair number *n*

The following macro is the reverse of `COLOR_PAIR(`*n*`)`:

PAIR_NUMBER(*attrs*) Returns the pair number associated with the `COLOR_PAIR(`*n*`)` attribute

Return Values These routines always return 1.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_addch(3CURSES)`, `curs_addstr(3CURSES)`, `curs_printw(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `attroff()`, `wattroff()`, `attron()`, `wattron()`, `wattrset()`, `standend()`, and `standout()` may be macros.

Name curs_beep, beep, flash – curses bell and screen flash routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int beep(void);

int flash(void);
```

Description The `beep()` and `flash()` routines are used to signal the terminal user. The routine `beep()` sounds the audible alarm on the terminal, if possible; if that is not possible, it flashes the screen (visible bell), if that is possible. The routine `flash()` flashes the screen, and if that is not possible, sounds the audible signal. If neither signal is possible, nothing happens. Nearly all terminals have an audible signal (bell or beep), but only some can flash the screen.

Return Values These routines always return `OK`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Name curs_bkgd, bkgd, bkgdset, wbkgdset, wbkgd – curses window background manipulation routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int bkgd(chtype ch);

void bkgdset(chtype ch);

void wbkgdset(WINDOW *win, chtype ch);

int wbkgd(WINDOW *win, chtype ch);
```

Description The `bkgdsets()` and `wbkgdset()` routines manipulate the background of the named window. Background is a `chtype` consisting of any combination of attributes and a character. The attribute part of the background is combined (ORed) with all non-blank characters that are written into the window with `waddch()`. Both the character and attribute parts of the background are combined with the blank characters. The background becomes a property of the character and moves with the character through any scrolling and insert/delete line/character operations. To the extent possible on a particular terminal, the attribute part of the background is displayed as the graphic rendition of the character put on the screen.

The `bkgd()` and `wbkgd()` routines combine the new background with every position in the window. Background is any combination of attributes and a character. Only the attribute part is used to set the background of non-blank characters, while both character and attributes are used for blank positions. To the extent possible on a particular terminal, the attribute part of the background is displayed as the graphic rendition of the character put on the screen.

Return Values `bkgd()` and `wbkgd()` return the integer `OK`, or a non-negative integer, if `immedok()` is set. See `curs_outopts(3CURSES)`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_addch(3CURSES)`, `curs_outopts(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `bkgdset()` and `bkgd()` may be macros.

Name curs_border, border, wborder, box, whline, wvline – create curses borders, horizontal and vertical lines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int border(chtype ls, chtype rs, chtype ts, chtype bs, chtype tl,
     chtype tr, chtype bl,chtype br);

int wborder(WINDOW *win, chtype ls, chtype rs, chtype ts,
     chtype bs, chtype tl, chtype tr, chtype bl, chtype br);

int box(WINDOW *win, chtype verch, chtype horch);

int hline(chtype ch, int n);

int whline(WINDOW *win, chtype ch, int n);

int vline(chtype ch, int n);

int wvline(WINDOW *win, chtype ch, int n);
```

Description With the `border()`, `wborder()`, and `box()` routines, a border is drawn around the edges of the window. The arguments and attributes are:

`ls`	left side of the border
`rs`	right side of the border
`ts`	top side of the border
`bs`	bottom side of the border
`tl`	top left-hand corner
`tr`	top right-hand corner
`bl`	bottom left-hand corner
`br`	bottom right-hand corner

If any of these arguments is zero, then the following default values (defined in `<curses.h>`) are used respectively instead: `ACS_VLINE`, `ACS_VLINE`, `ACS_HLINE`, `ACS_HLINE`, `ACS_ULCORNER`, `ACS_URCORNER`, `ACS_BLCORNER`, `ACS_BRCORNER`.

`box(`*win*`,` *verch*`,` *horch*`)` is a shorthand for the following call:

`wborder(`*win*`,` *verch*`,` *verch*`,` *horch*`,` `horch` `,` `0`, `0`, `0`, `0`)`

`hline()` and `whline()` draw a horizontal (left to right) line using *ch* starting at the current cursor position in the window. The current cursor position is not changed. The line is at most *n* characters long, or as many as fit into the window.

`vline()` and `wvline()` draw a vertical (top to bottom) line using *ch* starting at the current cursor position in the window. The current cursor position is not changed. The line is at most *n* characters long, or as many as fit into the window.

Return Values All routines return the integer `OK`, or a non-negative integer if `immedok()` is set. See `curs_outopts(3CURSES)`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_outopts(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `border()` and `box()` may be macros.

Name curs_clear, erase, werase, clear, wclear, clrtobot, wclrtobot, clrtoeol, wclrtoeol – clear all or part of a curses window

Synopsis

```
cc [ flag... ] file ... -lcurses [ library ... ]
#include <curses.h>

int erase(void);

int werase(WINDOW *win);

int clear(void);

int wclear(WINDOW *win);

int clrtobot(void);

int wclrtobot(WINDOW *win);

int clrtoeol(void);

int wclrtoeol(WINDOW *win);
```

Description The `erase()` and `werase()` routines copy blanks to every position in the window.

The `clear()` and `wclear()` routines are like `erase()` and `werase()`, but they also call `clearok()`, so that the screen is cleared completely on the next call to `wrefresh()` for that window and repainted from scratch.

The `clrtobot()` and `wclrtobot()` routines erase all lines below the cursor in the window. Also, the current line to the right of the cursor, inclusive, is erased.

The `clrtoeol()` and `wclrtoeol()` routines erase the current line to the right of the cursor, inclusive.

Return Values All routines return the integer `OK`, or a non-negative integer if `immedok()` is set. See `curs_outopts(3CURSES)`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_outopts(3CURSES)`, `curs_refresh(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `erase()`, `werase()`, `clear()`, `wclear()`, `clrtobot()`, and `clrtoeol()` may be macros.

Name curs_color, start_color, init_pair, init_color, has_colors, can_change_color, color_content, pair_content – curses color manipulation functions

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int start_color(void);

int init_pair(short pair, short fg, short bg);

int init_color(short color, short red, short green, short blue);

bool has_colors(void);

bool can_change_color(void);

int color_content(short color, short *redp, short *greenp, short *bluep);

int pair_content(short pair, short *fgp, short *bgp);
```

Description

Overview

`curses` provides routines that manipulate color on color alphanumeric terminals. To use these routines `start_color()` must be called, usually right after `initscr()`. See `curs_initscr(3CURSES)`. Colors are always used in pairs (referred to as color-pairs). A color-pair consists of a foreground color (for characters) and a background color (for the field on which the characters are displayed). A programmer initializes a color-pair with the routine `init_pair`. After it has been initialized, `COLOR_PAIR(`*n*`)`, a macro defined in `<curses.h>`, can be used in the same ways other video attributes can be used. If a terminal is capable of redefining colors, the programmer can use the routine `init_color()` to change the definition of a color. The routines `has_colors()` and `can_change_color()` return `TRUE` or `FALSE`, depending on whether the terminal has color capabilities and whether the programmer can change the colors. The routine `color_content()` allows a programmer to identify the amounts of red, green, and blue components in an initialized color. The routine `pair_content()` allows a programmer to find out how a given color-pair is currently defined.

Routine Descriptions

The `start_color()` routine requires no arguments. It must be called if the programmer wants to use colors, and before any other color manipulation routine is called. It is good practice to call this routine right after `initscr()`. `start_color()` initializes eight basic colors (black, red, green, yellow, blue, magenta, cyan, and white), and two global variables, `COLORS` and `COLOR_PAIRS` (respectively defining the maximum number of colors and color-pairs the terminal can support). It also restores the colors on the terminal to the values they had when the terminal was just turned on.

The `init_pair()` routine changes the definition of a color-pair. It takes three arguments: the number of the color-pair to be changed, the foreground color number, and the background color number. The value of the first argument must be between `1` and `COLOR_PAIRS`–1. The value of the second and third arguments must be between 0 and `COLORS`. If the color-pair was previously initialized, the screen is refreshed and all occurrences of that color-pair is changed to the new definition.

The `init_color()` routine changes the definition of a color. It takes four arguments: the number of the color to be changed followed by three RGB values (for the amounts of red, green, and blue components). The value of the first argument must be between `0` and `COLORS`. (See the section `Colors` for the default color index.) Each of the last three arguments must be a value between 0 and 1000. When `init_color()` is used, all occurrences of that color on the screen immediately change to the new definition.

The `has_colors()` routine requires no arguments. It returns `TRUE` if the terminal can manipulate colors; otherwise, it returns `FALSE`. This routine facilitates writing terminal-independent programs. For example, a programmer can use it to decide whether to use color or some other video attribute.

The `can_change_color()` routine requires no arguments. It returns `TRUE` if the terminal supports colors and can change their definitions; other, it returns `FALSE`. This routine facilitates writing terminal-independent programs.

The `color_content()` routine gives users a way to find the intensity of the red, green, and blue (RGB) components in a color. It requires four arguments: the color number, and three addresses of `shorts` for storing the information about the amounts of red, green, and blue components in the given color. The value of the first argument must be between 0 and `COLORS`. The values that are stored at the addresses pointed to by the last three arguments are between 0 (no component) and 1000 (maximum amount of component).

The `pair_content()` routine allows users to find out what colors a given color-pair consists of. It requires three arguments: the color-pair number, and two addresses of `shorts` for storing the foreground and the background color numbers. The value of the first argument must be between 1 and `COLOR_PAIRS`–1. The values that are stored at the addresses pointed to by the second and third arguments are between 0 and `COLORS`.

Colors

In `<curses.h>` the following macros are defined. These are the default colors. `curses` also assumes that `COLOR_BLACK` is the default background color for all terminals.

```
COLOR_BLACK
COLOR_RED
COLOR_GREEN
COLOR_YELLOW
COLOR_BLUE
COLOR_MAGENTA
COLOR_CYAN
COLOR_WHITE
```

Return Values

All routines that return an integer return `ERR` upon failure and `OK` upon successful completion.

Attributes

See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curs_attr(3CURSES), curs_initscr(3CURSES), curses(3CURSES), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Name curscr – current window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include -L /usr/xpg4/lib \
-R /usr/xpg4/lib -lcurses [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

extern WINDOW *curscr;
```

Description The external variable `curscr` points to an internal data structure. It can be specified as an argument to certain functions such as `clearok`(3XCURSES).

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `clearok`(3XCURSES), `libcurses`(3XCURSES), `attributes`(5), `standards`(5)

Name curs_delch, delch, wdelch, mvdelch, mvwdelch – delete character under cursor in a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int delch(void);

int wdelch(WINDOW *win);

int mvdelch(int y, int x);

int mvwdelch(WINDOW *win, int y, int x);
```

Description With these routines the character under the cursor in the window is deleted; all characters to the right of the cursor on the same line are moved to the left one position and the last character on the line is filled with a blank. The cursor position does not change (after moving to *y*, *x*, if specified). This does not imply use of the hardware delete character feature.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Note that delch(), mvdelch(), and mvwdelch() may be macros.

Name curs_deleteln, deleteln, wdeleteln, insdelln, winsdelln, insertln, winsertln – delete and insert lines in a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int deleteln(void);

int wdeleteln(WINDOW *win);

int insdelln(int n);

int winsdelln(WINDOW *win, int n);

int insertln(void);

int winsertln(WINDOW *win);
```

Description With the `deleteln()` and `wdeleteln()` routines, the line under the cursor in the window is deleted; all lines below the current line are moved up one line. The bottom line of the window is cleared. The cursor position does not change. This does not imply use of a hardware delete line feature.

With the `insdelln()` and `winsdelln()` routines, for positive *n*, insert *n* lines into the specified window above the current line. The *n* bottom lines are lost. For negative *n*, delete *n* lines (starting with the one under the cursor), and move the remaining lines up. The bottom *n* lines are cleared. The current cursor position remains the same.

With the `insertln()` and `insertln()` routines, a blank line is inserted above the current line and the bottom line is lost. This does not imply use of a hardware insert line feature.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that all but `winsdelln()` may be macros.

Name curses – CRT screen handling and optimization package

Synopsis

```
cc [ flag... ] file.. .–lcurses [ library... ]
#include <curses.h>
```

Description The curses library routines give the user a terminal-independent method of updating character screens with reasonable optimization.

The curses package allows: overall screen, window and pad manipulation; output to windows and pads; reading terminal input; control over terminal and curses input and output options; environment query routines; color manipulation; use of soft label keys; terminfo access; and access to low-level curses routines.

To initialize the routines, the routine initscr() or newterm() must be called before any of the other routines that deal with windows and screens are used. The routine endwin() must be called before exiting. To get character-at-a-time input without echoing (most interactive, screen oriented programs want this), the following sequence should be used:

```
initscr,cbreak,noecho;
```

Most programs would additionally use the sequence:

```
nonl,intrflush(stdscr,FALSE),keypad(stdscr,TRUE);
```

Before a curses program is run, the tab stops of the terminal should be set and its initialization strings, if defined, must be output. This can be done by executing the tput init command after the shell environment variable TERM has been exported. (See terminfo(4) for further details.)

The curses library permits manipulation of data structures, called *windows*, which can be thought of as two-dimensional arrays of characters representing all or part of a CRT screen. A default window called stdscr, which is the size of the terminal screen, is supplied. Others may be created with newwin(3CURSES).

Windows are referred to by variables declared as WINDOW *. These data structures are manipulated with routines described on 3CURSES pages (whose names begin "curs_"). Among which the most basic routines are move(3CURSES) and addch(3CURSES). More general versions of these routines are included with names beginning with w, allowing the user to specify a window. The routines not beginning with w affect stdscr.

After using routines to manipulate a window, refresh(3CURSES) is called, telling curses to make the user's CRT screen look like stdscr. The characters in a window are actually of type chtype, (character and attribute data) so that other information about the character may also be stored with each character.

Special windows called *pads* may also be manipulated. These are windows which are not constrained to the size of the screen and whose contents need not be completely displayed. See curs_pad(3CURSES) for more information.

In addition to drawing characters on the screen, video attributes and colors may be included, causing the characters to show up in such modes as underlined, in reverse video, or in color on terminals that support such display enhancements. Line drawing characters may be specified to be output. On input, curses is also able to translate arrow and function keys that transmit escape sequences into single values. The video attributes, line drawing characters, and input values use names, defined in <curses.h>, such as A_REVERSE, ACS_HLINE, and KEY_LEFT.

If the environment variables LINES and COLUMNS are set, or if the program is executing in a window environment, line and column information in the environment will override information read by *terminfo*. This would effect a program running in an AT&T 630 layer, for example, where the size of a screen is changeable.

If the environment variable TERMINFO is defined, any program using curses checks for a local terminal definition before checking in the standard place. For example, if TERM is set to att4424, then the compiled terminal definition is found in

/usr/share/lib/terminfo/a/att4424.

(The ‘a' is copied from the first letter of att4424 to avoid creation of huge directories.) However, if TERMINFO is set to $HOME/myterms, curses first checks

$HOME/myterms/a/att4424,

and if that fails, it then checks

/usr/share/lib/terminfo/a/att4424.

This is useful for developing experimental definitions or when write permission in /usr/share/lib/terminfo is not available.

The integer variables LINES and COLS are defined in <curses.h> and will be filled in by initscr with the size of the screen. The constants TRUE and FALSE have the values 1 and 0, respectively.

The curses routines also define the WINDOW * variable curscr which is used for certain low-level operations like clearing and redrawing a screen containing garbage. The curscr can be used in only a few routines.

International Functions

The number of bytes and the number of columns to hold a character from the supplementary character set is locale-specific (locale category LC_CTYPE) and can be specified in the character class table.

For editing, operating at the character level is entirely appropriate. For screen formatting, arbitrary movement of characters on screen is not desirable.

Overwriting characters (addch, for example) operates on a screen level. Overwriting a character by a character that requires a different number of columns may produce *orphaned columns*. These orphaned columns are filled with background characters.

Inserting characters (`insch`, for example) operates on a character level (that is, at the character boundaries). The specified character is inserted right before the character, regardless of which column of a character the cursor points to. Before insertion, the cursor position is adjusted to the first column of the character.

As with inserting characters, deleting characters (`delch`, for example) operates on a character level (that is, at the character boundaries). The character at the cursor is deleted whichever column of the character the cursor points to. Before deletion, the cursor position is adjusted to the first column of the character.

A *multi-column* character cannot be put on the last column of a line. When such attempts are made, the last column is set to the background character. In addition, when such an operation creates orphaned columns, the orphaned columns are filled with background characters.

Overlapping and overwriting a window follows the operation of overwriting characters around its edge. The orphaned columns, if any, are handled as in the character operations.

The cursor is allowed to be placed anywhere in a window. If the insertion or deletion is made when the cursor points to the second or later column position of a character that holds multiple columns, the cursor is adjusted to the first column of the character before the insertion or deletion.

Routine and Argument Names

Many `curses` routines have two or more versions. The routines prefixed with `w` require a window argument. The routines prefixed with `p` require a pad argument. Those without a prefix generally use `stdscr`.

The routines prefixed with `mv` require an *x* and *y* coordinate to move to before performing the appropriate action. The `mv` routines imply a call to `move`(3CURSES) before the call to the other routine. The coordinate *y* always refers to the row (of the window), and *x* always refers to the column. The upper left-hand corner is always (0,0), not (1,1).

The routines prefixed with `mvw` take both a window argument and *x* and *y* coordinates. The window argument is always specified before the coordinates.

In each case, *win* is the window affected, and *pad* is the pad affected; *win* and *pad* are always pointers to type `WINDOW`

Option setting routines require a Boolean flag *bf* with the value `TRUE` or `FALSE`; *bf* is always of type `bool`. The variables *ch* and *attrs* below are always of type `chtype`. The types `WINDOW`, `SCREEN`, `bool`, and `chtype` are defined in `<curses.h>`. The type `TERMINAL` is defined in `<term.h>`. All other arguments are integers.

Routine Name Index

The following table lists each `curses` routine and the name of the manual page on which it is described.

curses Routine Name	Manual Page Name
addch	`curs_addch`(3CURSES)

addchnstr	curs_addchstr(3CURSES)
addchstr	curs_addchstr(3CURSES)
addnstr	curs_addstr(3CURSES)
addnwstr	curs_addwstr(3CURSES)
addstr	curs_addstr(3CURSES)
addwch	curs_addwch(3CURSES)
addwchnstr	curs_addwchstr(3CURSES)
addwchstr	curs_addwchstr(3CURSES)
addwstr	curs_addwstr(3CURSES)
adjcurspos	curs_alecompat(3CURSES)
attroff	curs_attr(3CURSES)
attron	curs_attr(3CURSES)
attrset	curs_attr(3CURSES)
baudrate	curs_termattrs(3CURSES)
beep	curs_beep(3CURSES)
bkgd	curs_bkgd(3CURSES)
bkgdset	curs_bkgd(3CURSES)
border	curs_border(3CURSES)
box	curs_border(3CURSES)
can_change_color	curs_color(3CURSES)
cbreak	curs_inopts(3CURSES)
clear	curs_clear(3CURSES)
clearok	curs_outopts(3CURSES)
clrtobot	curs_clear(3CURSES)
clrtoeol	curs_clear(3CURSES)
color_content	curs_color(3CURSES)
copywin	curs_overlay(3CURSES)
curs_set	curs_kernel(3CURSES)
def_prog_mode	curs_kernel(3CURSES)

def_shell_mode	curs_kernel(3CURSES)
del_curterm	curs_terminfo(3CURSES)
delay_output	curs_util(3CURSES)
delch	curs_delch(3CURSES)
deleteln	curs_deleteln(3CURSES)
delscreen	curs_initscr(3CURSES)
delwin	curs_window(3CURSES)
derwin	curs_window(3CURSES)
doupdate	curs_refresh(3CURSES)
dupwin	curs_window(3CURSES)
echo	curs_inopts(3CURSES)
echochar	curs_addch(3CURSES)
echowchar	curs_addwch(3CURSES)
endwin	curs_initscr(3CURSES)
erase	curs_clear(3CURSES)
erasechar	curs_termattrs(3CURSES)
filter	curs_util(3CURSES)
flash	curs_beep(3CURSES)
flushinp	curs_util(3CURSES)
getbegyx	curs_getyx(3CURSES)
getch	curs_getch(3CURSES)
getmaxyx	curs_getyx(3CURSES)
getnwstr	curs_getwstr(3CURSES)
getparyx	curs_getyx(3CURSES)
getstr	curs_getstr(3CURSES)
getsyx	curs_kernel(3CURSES)
getwch	curs_getwch(3CURSES)
getwin	curs_util(3CURSES)
getwstr	curs_getwstr(3CURSES)

getyx	curs_getyx(3CURSES)
halfdelay	curs_inopts(3CURSES)
has_colors	curs_color(3CURSES)
has_ic	curs_termattrs(3CURSES)
has_il	curs_termattrs(3CURSES)
idcok	curs_outopts(3CURSES)
idlok	curs_outopts(3CURSES)
immedok	curs_outopts(3CURSES)
inch	curs_inch(3CURSES)
inchnstr	curs_inchstr(3CURSES)
inchstr	curs_inchstr(3CURSES)
init_color	curs_color(3CURSES)
init_pair	curs_color(3CURSES)
initscr	curs_initscr(3CURSES)
innstr	curs_instr(3CURSES)
innwstr	curs_inwstr(3CURSES)
insch	curs_insch(3CURSES)
insdelln	curs_deleteln(3CURSES)
insertln	curs_deleteln(3CURSES)
insnstr	curs_insstr(3CURSES)
insnwstr	curs_inswstr(3CURSES)
insstr	curs_insstr(3CURSES)
instr	curs_instr(3CURSES)
inswch	curs_inswch(3CURSES)
inswstr	curs_inswstr(3CURSES)
intrflush	curs_inopts(3CURSES)
inwch	curs_inwch(3CURSES)
inwchnstr	curs_inwchstr(3CURSES)
inwchstr	curs_inwchstr(3CURSES)

inwstr	curs_inwstr(3CURSES)
is_linetouched	curs_touch(3CURSES)
is_wintouched	curs_touch(3CURSES)
isendwin	curs_initscr(3CURSES)
keyname	curs_util(3CURSES)
keypad	curs_inopts(3CURSES)
killchar	curs_termattrs(3CURSES)
leaveok	curs_outopts(3CURSES)
longname	curs_termattrs(3CURSES)
meta	curs_inopts(3CURSES)
move	curs_move(3CURSES)
movenextch	curs_alecompat(3CURSES)
moveprevch	curs_alecompat(3CURSES)
mvaddch	curs_addch(3CURSES)
mvaddchnstr	curs_addchstr(3CURSES)
mvaddchstr	curs_addchstr(3CURSES)
mvaddnstr	curs_addstr(3CURSES)
mvaddnwstr	curs_addwstr(3CURSES)
mvaddstr	curs_addstr(3CURSES)
mvaddwch	curs_addwch(3CURSES)
mvaddwchnstr	curs_addwchstr(3CURSES)
mvaddwchstr	curs_addwchstr(3CURSES)
mvaddwstr	curs_addwstr(3CURSES)
mvcur	curs_terminfo(3CURSES)
mvdelch	curs_delch(3CURSES)
mvderwin	curs_window(3CURSES)
mvgetch	curs_getch(3CURSES)
mvgetnwstr	curs_getwstr(3CURSES)
mvgetstr	curs_getstr(3CURSES)

mvgetwch	curs_getwch(3CURSES)
mvgetwstr	curs_getwstr(3CURSES)
mvinch	curs_inch(3CURSES)
mvinchnstr	curs_inchstr(3CURSES)
mvinchstr	curs_inchstr(3CURSES)
mvinnstr	curs_instr(3CURSES)
mvinnwstr	curs_inwstr(3CURSES)
mvinsch	curs_insch(3CURSES)
mvinsnstr	curs_insstr(3CURSES)
mvinsnwstr	curs_inswstr(3CURSES)
mvinsstr	curs_insstr(3CURSES)
mvinstr	curs_instr(3CURSES)
mvinswch	curs_inswch(3CURSES)
mvinswstr	curs_inswstr(3CURSES)
mvinwch	curs_inwch(3CURSES)
mvinwchnstr	curs_inwchstr(3CURSES)
mvinwchstr	curs_inwchstr(3CURSES)
mvinwstr	curs_inwstr(3CURSES)
mvprintw	curs_printw(3CURSES)
mvscanw	curs_scanw(3CURSES)
mvwaddch	curs_addch(3CURSES)
mvwaddchnstr	curs_addchstr(3CURSES)
mvwaddchstr	curs_addchstr(3CURSES)
mvwaddnstr	curs_addstr(3CURSES)
mvwaddnwstr	curs_addwstr(3CURSES)
mvwaddstr	curs_addstr(3CURSES)
mvwaddwch	curs_addwch(3CURSES)
mvwaddwchnstr	curs_addwchstr(3CURSES)
mvwaddwchstr	curs_addwchstr(3CURSES)

mvwaddwstr	curs_addwstr(3CURSES)
mvwdelch	curs_delch(3CURSES)
mvwgetch	curs_getch(3CURSES)
mvwgetnwstr	curs_getwstr(3CURSES)
mvwgetstr	curs_getstr(3CURSES)
mvwgetwch	curs_getwch(3CURSES)
mvwgetwstr	curs_getwstr(3CURSES)
mvwin	curs_window(3CURSES)
mvwinch	curs_inch(3CURSES)
mvwinchnstr	curs_inchstr(3CURSES)
mvwinchstr	curs_inchstr(3CURSES)
mvwinnstr	curs_instr(3CURSES)
mvwinnwstr	curs_inwstr(3CURSES)
mvwinsch	curs_insch(3CURSES)
mvwinsnstr	curs_insstr(3CURSES)
mvwinsstr	curs_insstr(3CURSES)
mvwinstr	curs_instr(3CURSES)
mvwinswch	curs_inswch(3CURSES)
mvwinswstr	curs_inswstr(3CURSES)
mvwinwch	curs_inwch(3CURSES)
mvwinwchnstr	curs_inwchstr(3CURSES)
mvwinwchstr	curs_inwchstr(3CURSES)
mvwinwstr	curs_inwstr(3CURSES)
mvwprintw	curs_printw(3CURSES)
mvwscanw	curs_scanw(3CURSES)
napms	curs_kernel(3CURSES)
newpad	curs_pad(3CURSES)
newterm	curs_initscr(3CURSES)
newwin	curs_window(3CURSES)

nl	curs_outopts(3CURSES)
nocbreak	curs_inopts(3CURSES)
nodelay	curs_inopts(3CURSES)
noecho	curs_inopts(3CURSES)
nonl	curs_outopts(3CURSES)
noqiflush	curs_inopts(3CURSES)
noraw	curs_inopts(3CURSES)
notimeout	curs_inopts(3CURSES)
overlay	curs_overlay(3CURSES)
overwrite	curs_overlay(3CURSES)
pair_content	curs_color(3CURSES)
pechochar	curs_pad(3CURSES)
pechowchar	curs_pad(3CURSES)
pnoutrefresh	curs_pad(3CURSES)
prefresh	curs_pad(3CURSES)
printw	curs_printw(3CURSES)
putp	curs_terminfo(3CURSES)
putwin	curs_util(3CURSES)
qiflush	curs_inopts(3CURSES)
raw	curs_inopts(3CURSES)
redrawwin	curs_refresh(3CURSES)
refresh	curs_refresh(3CURSES)
reset_prog_mode	curs_kernel(3CURSES)
reset_shell_mode	curs_kernel(3CURSES)
resetty	curs_kernel(3CURSES)
restartterm	curs_terminfo(3CURSES)
ripoffline	curs_kernel(3CURSES)
savetty	curs_kernel(3CURSES)
scanw	curs_scanw(3CURSES)

scr_dump	curs_scr_dump(3CURSES)
scr_init	curs_scr_dump(3CURSES)
scr_restore	curs_scr_dump(3CURSES)
scr_set	curs_scr_dump(3CURSES)
scroll	curs_scroll(3CURSES)
scrollok	curs_outopts(3CURSES)
set_curterm	curs_terminfo(3CURSES)
set_term	curs_initscr(3CURSES)
setscrreg	curs_outopts(3CURSES)
setsyx	curs_kernel(3CURSES)
setterm	curs_terminfo(3CURSES)
setupterm	curs_terminfo(3CURSES)
slk_attroff	curs_slk(3CURSES)
slk_attron	curs_slk(3CURSES)
slk_attrset	curs_slk(3CURSES)
slk_clear	curs_slk(3CURSES)
slk_init	curs_slk(3CURSES)
slk_label	curs_slk(3CURSES)
slk_noutrefresh	curs_slk(3CURSES)
slk_refresh	curs_slk(3CURSES)
slk_restore	curs_slk(3CURSES)
slk_set	curs_slk(3CURSES)
slk_touch	curs_slk(3CURSES)
srcl	curs_scroll(3CURSES)
standend	curs_attr(3CURSES)
standout	curs_attr(3CURSES)
start_color	curs_color(3CURSES)
subpad	curs_pad(3CURSES)
subwin	curs_window(3CURSES)

syncok	curs_window(3CURSES)
termattrs	curs_termattrs(3CURSES)
termname	curs_termattrs(3CURSES)
tgetent	curs_termcap(3CURSES)
tgetflag	curs_termcap(3CURSES)
tgetnum	curs_termcap(3CURSES)
tgetstr	curs_termcap(3CURSES)
tgoto	curs_termcap(3CURSES)
tigetflag	curs_terminfo(3CURSES)
tigetnum	curs_terminfo(3CURSES)
tigetstr	curs_terminfo(3CURSES)
timeout	curs_inopts(3CURSES)
touchline	curs_touch(3CURSES)
touchwin	curs_touch(3CURSES)
tparm	curs_terminfo(3CURSES)
tputs	curs_terminfo(3CURSES)
typeahead	curs_inopts(3CURSES)
unctrl	curs_util(3CURSES)
ungetch	curs_getch(3CURSES)
ungetwch	curs_getwch(3CURSES)
untouchwin	curs_touch(3CURSES)
use_env	curs_util(3CURSES)
vidattr	curs_terminfo(3CURSES)
vidputs	curs_terminfo(3CURSES)
vwprintw	curs_printw(3CURSES)
vwscanw	curs_scanw(3CURSES)
waddch	curs_addch(3CURSES)
waddchnstr	curs_addchstr(3CURSES)
waddchstr	curs_addchstr(3CURSES)

waddnstr	curs_addstr(3CURSES)
waddnwstr	curs_addwstr(3CURSES)
waddstr	curs_addstr(3CURSES)
waddwch	curs_addwch(3CURSES)
waddwchnstr	curs_addwchstr(3CURSES)
waddwchstr	curs_addwchstr(3CURSES)
waddwstr	curs_addwstr(3CURSES)
wadjcurspos	curs_alecompat(3CURSES)
wattroff	curs_attr(3CURSES)
wattron	curs_attr(3CURSES)
wattrset	curs_attr(3CURSES)
wbkgd	curs_bkgd(3CURSES)
wbkgdset	curs_bkgd(3CURSES)
wborder	curs_border(3CURSES)
wclear	curs_clear(3CURSES)
wclrtobot	curs_clear(3CURSES)
wclrtoeol	curs_clear(3CURSES)
wcursyncup	curs_window(3CURSES)
wdelch	curs_delch(3CURSES)
wdeleteln	curs_deleteln(3CURSES)
wechochar	curs_addch(3CURSES)
wechowchar	curs_addwch(3CURSES)
werase	curs_clear(3CURSES)
wgetch	curs_getch(3CURSES)
wgetnstr	curs_getstr(3CURSES)
wgetnwstr	curs_getwstr(3CURSES)
wgetstr	curs_getstr(3CURSES)
wgetwch	curs_getwch(3CURSES)
wgetwstr	curs_getwstr(3CURSES)

whline	curs_border(3CURSES)
winch	curs_inch(3CURSES)
winchnstr	curs_inchstr(3CURSES)
winchstr	curs_inchstr(3CURSES)
winnstr	curs_instr(3CURSES)
winnwstr	curs_inwstr(3CURSES)
winsch	curs_insch(3CURSES)
winsdelln	curs_deleteln(3CURSES)
winsertln	curs_deleteln(3CURSES)
winsnstr	curs_insstr(3CURSES)
winsnwstr	curs_inswstr(3CURSES)
winsstr	curs_insstr(3CURSES)
winstr	curs_instr(3CURSES)
winswch	curs_inswch(3CURSES)
winswstr	curs_inswstr(3CURSES)
winwch	curs_inwch(3CURSES)
winwchnstr	curs_inwchstr(3CURSES)
winwchstr	curs_inwchstr(3CURSES)
winwstr	curs_inwstr(3CURSES)
wmove	curs_move(3CURSES)
wmovenextch	curs_alecompat(3CURSES)
wmoveprevch	curs_alecompat(3CURSES)
wnoutrefresh	curs_refresh(3CURSES)
wprintw	curs_printw(3CURSES)
wredrawln	curs_refresh(3CURSES)
wrefresh	curs_refresh(3CURSES)
wscanw	curs_scanw(3CURSES)
wscrl	curs_scroll(3CURSES)
wsetscrreg	curs_outopts(3CURSES)

wstandend	curs_attr(3CURSES)
wstandout	curs_attr(3CURSES)
wsyncdown	curs_window(3CURSES)
wsyncup	curs_window(3CURSES)
wtimeout	curs_inopts(3CURSES)
wtouchln	curs_touch(3CURSES)
wvline	curs_border(3CURSES)

Return Values Routines that return an integer return ERR upon failure and an integer value other than ERR upon successful completion, unless otherwise noted in the routine descriptions.

All macros return the value of the w version, except setscrreg(), wsetscrreg(), getyx(), getbegyx(), and getmaxyx(). The return values of setscrreg(), wsetscrreg(), getyx(), getbegyx(), and getmaxyx() are undefined (that is, these should not be used as the right-hand side of assignment statements).

Routines that return pointers return NULL on error.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3XCURSES), libcurses(3LIB), libcurses(3XCURSES), terminfo(4), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Name curses – introduction and overview of X/Open Curses

Description The Curses screen management package conforms fully with Issue 4, Version 2 of the X/Open Curses specification. It provides a set of internationalized functions and macros for creating and modifying input and output to a terminal screen. This includes functions for creating windows, highlighting text, writing to the screen, reading from user input, and moving the cursor.

X/Open Curses is a terminal-independent package, providing a common user interface to a variety of terminal types. Its portability is facilitated by the Terminfo database which contains a compiled definition of each terminal type. By referring to the database information X/Open Curses gains access to low-level details about individual terminals.

X/Open Curses tailors its activities to the terminal type specified by the `TERM` environment variable. The `TERM` environment variable may be set in the Korn Shell (see `ksh(1)`) by typing:

`export TERM=`*terminal_name*

To set environment variables using other command line interfaces or shells, see the `environ(5)` manual page.

Three additional environment variables are useful, and can be set in the Korn Shell:

1. If you have an alternate Terminfo database containing terminal types that are not available in the system default database `/usr/share/lib/terminfo`, you can specify the `TERMINFO` environment variable to point to this alternate database:

   `export TERMINFO=`*path*

   This *path* specifies the location of the alternate compiled Terminfo database whose structure consists of directory names 0 to 9 and a to z (which represent the first letter of the compiled terminal definition file name).

   The alternate database specified by `TERMINFO` is examined before the system default database. If the terminal type specified by `TERM` cannot be found in either database, the default terminal type *dumb* is assumed.

2. To specify a window width smaller than your screen width (for example, in situations where your communications line is slow), set the `COLUMNS` environment variable to the number of vertical columns you want between the left and right margins:

   `export COLUMNS=`*number*

   The *number* of columns may be set to a number smaller than the screen size; however, if set larger than the screen or window width, the results are undefined.

   The value set using this environment variable takes precedence over the value normally used for the terminal.

3. To specify a window height smaller than your current screen height (for example, in situations where your communications line is slow), override the `LINES` environment variable by setting it to a smaller number of horizontal lines:

`export LINES=`*number*

The *number* of lines may be set to a number smaller than the screen height; however, if set larger than the screen or window height, the results are undefined.

The value set using this environment variable takes precedence over the value normally used for the terminal.

Data Types

X/Open Curses defines the following data types:

`attr_t` An integral type that holds an OR-ed set of attributes. The attributes acceptable are those which begin with the `WA_` prefix .

`bool` Boolean data type.

`cchar_t` A type that refers to a string consisting of a spacing wide character, up to 5 non-spacing wide characters, and zero or more attributes of any type. See Attributes, Color Pairs, and Renditions. A null `cchar_t` object terminates arrays of `cchar_t` objects.

`chtype` An integral type whose values are formed by OR-ing an "`unsigned char`" with a color pair. and with zero or more attributes. The attributes acceptable are those which begin with the `A_` prefix and `COLOR_PAIR`(3XCURSES)

`SCREEN` An opaque data type associated with a terminal's display screen.

`TERMINAL` An opaque data type associated with a terminal. It contains information about the terminal's capabilities (as defined by `terminfo`), the terminal modes, and current state of input/output operations.

`wchar_t` An integral data type whose values represent wide characters.

`WINDOW` An opaque data type associated with a window.

Screens, Windows, and Terminals

The X/Open Curses manual pages refer at various points to screens, windows (also subwindows, derived windows, and pads), and terminals. The following list defines each of these terms.

Screen A screen is a terminal's physical output device. The `SCREEN` data type is associated with a terminal.

Window Window objects are two-dimensional arrays of characters and their renditions. X/Open Curses provides *stdscr*, a default window which is the size of of the terminal screen. You can use the `newwin`(3XCURSES) function to create others.

To refer to a window, use a variable declared as `WINDOW *`. X/Open Curses includes both functions that modify *stdscr*, and more general versions that let you specify a window.

There are three sub-types of windows:

Subwindow	A window which has been created within another window (the parent window) and whose position has been specified with absolute screen coordinates. The derwin(3XCURSES) and subwin(3XCURSES) functions can be used to create subwindows.
Derived Window	A subwindow whose position is defined relative to the parent window's coordinates rather than in absolute terms.
Pad	A special type of window that can be larger than the screen. For more information, see the newpad(3XCURSES) man page.
Terminal	A terminal is the input and output device which character-based applications use to interact with the user. The TERMINAL data type is associated with such a device.

Attributes, Color Pairs, and Renditions

A character's rendition consists of its attributes (such as underlining or reverse video) and its color pair (the foreground and background colors). When using waddstr(3XCURSES), waddchstr(3XCURSES), wprintw(3XCURSES), winsch(3XCURSES), and so on, the window's rendition is combined with that character's renditions. The window rendition is the attributes and color set using the attroff(3XCURSES) and attr_off(3XCURSES) sets of functions. The window's background character and rendition are set with the bkgdset(3XCURSES) and bkgrndset(3XCURSES) sets of functions.

When spaces are written to the screen, the background character and window rendition replace the space. For example, if the background rendition and character is A_UNDERLINE|'*', text written to the window appears underlined and the spaces appear as underlined asterisks.

Each character written retains the rendition that it has obtained. This allows the character to be copied "as is" to or from a window with the addchstr(3XCURSES) or inch(3XCURSES) functions.

A_ Constant Values for Attributes

You can specify Attributes, Color Pairs, and Renditions attributes using the constants listed in the tables below. The following constants modify objects of type chtype:

Constant	Description
A_ALTCHARSET	Alternate character set
A_ATTRIBUTES	Bit-mask to extract attributes
A_BLINK	Blinking
A_BOLD	Bold
A_CHARTEXT	Bit-mask to extract a character

Constant	Description
A_COLOR	Bit-mask to extract color-pair information
A_DIM	Half-bright
A_INVIS	Invisible
A_PROTECT	Protected
A_REVERSE	Reverse video
A_STANDOUT	Highlights specific to terminal
A_UNDERLINE	Underline

WA_ Constant Values for Attributes

The following constants modify objects of type attr_t:

Constant	Description
WA_ALTCHARSET	Alternate character set
WA_ATTRIBUTES	Attribute mask
WA_BLINK	Blinking
WA_BOLD	Bold
WA_DIM	Half-bright
WA_HORIZONTAL	Horizontal highlight
WA_INVIS	Invisible
WA_LEFT	Left highlist
WA_LOW	Low highlist
WA_PROTECT	Protected
WA_REVERSE	Reverse video
WA_RIGHT	Right highlight
WA_STANDOUT	Highlights specific to terminal
WA_TOP	Top highlight
WA_UNDERLINE	Underline
WA_VERTICAL	Vertical highlight

Color Macros

Colors always appear in pairs; the foreground color of the character itself and the background color of the field on which it is displayed. The following color macros are defined:

Macro	Description
COLOR_BLACK	Black
COLOR_BLUE	Blue
COLOR_GREEN	Green
COLOR_CYAN	Cyan
COLOR_RED	Red
COLOR_MAGENTA	Magenta
COLOR_YELLOW	Yellow
COLOR_WHITE	White

Together, a character's attributes and its color pair form the character's rendition. A character's rendition moves with the character during any scrolling or insert/delete operations. If your terminal lacks support for the specified rendition, X/Open Curses may substitute a different rendition.

The COLOR_PAIR(3XCURSES) function modifies a chtype object. The PAIR_NUMBER(3XCURSES) function extracts the color pair from a chtype object.

Functions for Modifying a Window's Color

The following functions modify a window's color:

Function	Description
attr_set(), wattr_set( )	Change the window's rendition.
color_set(), wcolor_set( )	Set the window's color

Non-Spacing Characters

When the wcwidth(3C) function returns a width of zero for a character, that character is called a non-spacing character. Non-spacing characters can be written to a window. Each non-spacing character is associated with a spacing character (that is, one which does not have a width of zero) and modifies that character. You cannot address a non-spacing character directly. Whenever you perform an X/Open Curses operation on the associated character, you are implicitly addressing the non-spacing character.

Non-spacing characters do not have a rendition. For functions that use wide characters and a rendition, X/Open Curses ignores any rendition specified for non-spacing characters. Multi-column characters have one rendition that applies to all columns spanned.

Complex Characters

The `cchar_t` date type represents a complex character. A complex character may contain a spacing character, its associated non-spacing characters, and its rendition. This implementation of complex characters supports up to 5 non-spacing characters for each spacing character.

When a `cchar_t` object representing a non-spacing complex character is written to the screen, its rendition is not used, but rather it becomes associated with the rendition of the existing character at that location. The `setcchar(3XCURSES)` function initializes an object of type `cchar_t`. The `getcchar(3XCURSES)` function extracts the contents of a `cchar_t` object.

Display Operations

In adding internationalization support to X/Open Curses, every attempt was made to minimize the number of changes to the historical CURSES package. This enables programs written to use the historical implementation of CURSES to use the internationalized version with little or no modification. The following rules apply to the internationalized X/Open Curses package:

- The cursor can be placed anywhere in the window. Window and screen origins are (0,0).
- A multi-column character cannot be displayed in the last column, because the character would appear truncated. Instead, the background character is displayed in the last column and the multi-column character appears at the beginning of the next line. This is called wrapping.

  If the original line is the last line in the scroll region and scrolling is enabled, X/Open Curses moves the contents of each line in the region to the previous line. The first line of the region is lost. The last line of the scrolling region contains any wrapped characters. The remainder of that line is filled with the background character. If scrolling is disabled, X/Open Curses truncates any character that would extend past the last column of the screen.
- Overwrites operate on screen columns. If displaying a single-column or multi-column character results in overwriting only a portion of a multi-column character or characters, background characters are displayed in place of the non-overwritten portions.
- Insertions and deletions operate on whole characters. The cursor is moved to the first column of the character prior to performing the operation.

Overlapping Windows

When windows overlap, it may be necessary to overwrite only part of a multi-column character. As mentioned earlier, the non-overwritten portions are replaced with the background character. This results in issues concerning the `overwrite(3XCURSES)`, `overlay(3XCURSES)`, `copywin(3XCURSES)`, `wnoutrefresh(3XCURSES)`, and `wrefresh(3XCURSES)` functions.

Special Characters

Some functions assign special meanings to certain special characters:

Backspace	Moves the cursor one column towards the beginning of the line. If the cursor was already at the beginning of the line, it remains there. All subsequent characters are added or inserted at this point.

Carriage Return	Moves the cursor to the beginning of the current line. If the cursor was already at the beginning of the line, it remains there. All subsequent characters are added or inserted at this point.
Newline	When adding characters, X/Open Curses fills the remainder of the line with the background character (effectively truncating the newline) and scrolls the window as described earlier. All subsequent characters are inserted at the start of the new line. When inserting characters, X/Open Curses fills the remainder of the line with the background character (effectively truncating the line), moves the cursor to the beginning of a new line, and scrolls the window as described earlier. All subsequent characters are placed at the start of the new line.
Tab	moves subsequent characters to next horizontal tab strop. Default tab stops are set at 0, 8, 16, and so on. When adding or inserting characters, X/Open Curses inserts or adds the background character into each column until the next tab stop is reached. If there are no remaining tab stops on the current line, wrapping and scrolling occur as described earlier.
Control Characters	When X/Open Curses functions perform special character processing, they convert control characters to the ^*X* notation, where *X* is a single-column character (uppercase, if it is a letter) and writes that notation to the window. Functions that retrieve text from the window will retrieve the converted notation not the original.

X/Open Curses displays non-printable bytes, that have their high bit set, using the `M-`*X* meta notation where *X* is the non-printable byte with its high bit turned off.

Input Processing

There are four input modes possible with X/Open Curses that affect the behavior of input functions like `getch(3XCURSES)` and `getnstr(3XCURSES)`.

Line Canonical (Cooked)	In line input mode, the terminal driver handles the input of line units as well as `SIGERASE` and `SIGKILL` character processing. See `termio(7I)` for more information. In this mode, the `getch()` and `getnstr()` functions will not return until a complete line has been read by the terminal driver, at which point only the requested number of bytes/characters are returned. The rest of the line unit remains unread until subsequent call to the `getch()` or `getnstr()` functions.

	The functions nocbreak(3XCURSES) and noraw(3XCURSES) are used to enter this mode. These functions are described on the cbreak(3XCURSES) man page which also details which termios flags are enabled. Of the modes available, this one gives applications the least amount of control over input. However, it is the only input mode possible on a block mode terminal.
cbreak Mode	Byte/character input provides a finer degree of control. The terminal driver passes each byte read to the application without interpreting erase and kill characters. It is the application's responsibility to handle line editing. It is unknown whether the signal characters (SIGINTR, SIGQUIT, SIGSUSP) and flow control characters (SIGSTART, SIGSTOP) are enabled. To ensure that they are, call the noraw() function first, then call the cbreak() function.
halfdelay Mode	This is the same as the cbreak() mode with a timeout. The terminal driver waits for a byte to be received or for a timer to expire, in which case the getch() function either returns a byte or ERR respectively. This mode overrides timeouts set for an individual window with the wtimeout() function.
raw Mode	This mode provides byte/character input with the most control for an application. It is similar to cbreak() mode, but also disables signal character processing (SIGINTR, SIGSUSP, SIGQUIT) and flow control processing (SIGSTART, SIGSTOP) so that the application can process them as it wants.

These modes affect all X/Open Curses input. The default input mode is inherited from the parent process when the application starts up.

A timeout similar to halfdelay(3XCURSES) can be applied to individual windows (see timeout(3XCURSES)). The nodelay(3XCURSES) function is equivalent to setting wtimeout(3XCURSES) for a window with a zero timeout (non-blocking) or infinite delay (blocking).

To handle function keys, keypad(3XCURSES) must be enabled. When it is enabled, the getch() function returns a KEY_ constant for a uniquely encoded key defined for that terminal. When keypad() is disabled, the getch() function returns the individual bytes composing the function key (see getch(3XCURSES) and wget_wch(3XCURSES)). By default, keypad() is disabled.

When processing function keys, once the first byte is recognized, a timer is set for each subsequent byte in the sequence. If any byte in the function key sequence is not received

before the timer expires, the bytes already received are pushed into a buffer and the original first byte is returned. Subsequent X/Open Curses input would take bytes from the buffer until exhausted, after which new input from the terminal will be requested. Enabling and disabling of the function key interbyte timer is handled by the `notimeout(3XCURSES)` function. By default, `notimeout()` is disabled (that is, the timer is used).

X/Open Curses always disables the terminal driver's echo processing. The `echo(3XCURSES)` and `noecho(3XCURSES)` functions control X/Open Curses software echoing. When software echoing is enabled, X/Open Curses input functions echo printable characters, control keys, and meta keys in the input window at the last cursor position. Functions keys are never echoed. When software echoing is disabled, it is the application's responsibility to handle echoing.

Examples

EXAMPLE 1 Copying Single-Column Characters Over Single-Column Characters

In the upcoming examples, some characters have special meanings:

- `{`, `[`, and `(` represent the left halves of multi-column characters. `}`, `]`, and `)` represent the corresponding right halves of the same multi-column characters.
- Alphanumeric characters and periods (`.`) represent single-column characters.
- The number sign (#) represents the background character.

```
copywin(s, t, 0, 1, 0, 1, 1, 3, 0)

            s               t         →     t
        abcdef        ......          .bcd..
        ghijkl        ......          .hij..
```

There are no special problems with this situation.

EXAMPLE 2 Copying Multi-column Characters Over Single-Column Characters

```
copywin(s, t, 0, 1, 0, 1, 1, 3, 0)

            s               t         →     t
        a[]def        ......          .[]d..
        gh()kl        ......          .h()..
```

There are no special problems with this situation.

EXAMPLE 3 Copying Single-Column Characters From Source Overlaps Multi-column Characters In Target

```
copywin(s, t, 0, 1, 0, 1, 1, 3, 0)

            s               t         →     t
        abcdef        []....          #bcd..
        ghijk tol        ...().          .hij#.
```

EXAMPLE 3 Copying Single-Column Characters From Source Overlaps Multi-column Characters In Target *(Continued)*

Overwriting multi-column characters in `t` has resulted in the `#` background characters being required to erase the remaining halves of the target's multi-column characters.

EXAMPLE 4 Copy Incomplete Multi-column Characters From Source To Target.

```
copywin(s, t, 0, 1, 0, 1, 1, 3, 0)

           s               t         →     t
       []cdef        123456          []cd56
       ghi()l        789012          7hi()2
```

The `]` and `(` halves of the multi-column characters have been copied from the source and expanded in the target outside of the specified target region.

Consider a pop-up dialog box that contains single-column characters and a base window that contains multi-column characters and you do the following:

```
save=dupwin(dialog);     /* create backing store */
overwrite(cursor, save); /* save region to be overlayed */
wrefresh(dialog);        /* display dialog */
wrefresh(save);          /* restore screen image */
delwin(save);            /* release backing store */
```

You can use code similar to this to implement generic `popup()` and `popdown()` routines in a variety of CURSES implementations (including BSD UNIX, and UNIX System V). In the simple case where the base window contains single-column characters only, it would correctly restore the image that appeared on the screen before the dialog box was displayed.

However, with multi-column characters, the `overwrite()` function might save a region with incomplete multi-column characters. The `wrefresh(dialog)` statement results in the behavior described in example 3 above. The behavior described in this example (that is, example 4) allows the `wrefresh(save)` statement to restore the window correctly.

EXAMPLE 5 Copying An Incomplete Multi-column Character To Region Next To Screen Margin (Not A Window Edge)

Two cases of copying an incomplete multi-column character to a region next to a screen margin follow:

```
copywin(s, t, 0, 1, 0, 0, 1, 2, 0)

           s               t         →     t
       []cdef        123456          #cd456
       ghijkl        789012          hij012
```

EXAMPLE 5 Copying An Incomplete Multi-column Character To Region Next To Screen Margin (Not A Window Edge) *(Continued)*

The background character (#) replaces the] character that would have been copied from the source, because it is not possible to expand the multi-column character to its complete form.

```
copywin(s, t, 0, 1, 0, 3, 1, 5, 0)

          s               t          →     t
       abcdef         123456           123bcd
       ghi()l         789012           789hi#
```

This second example is the same as the first, but with the right margin.

Attributes

See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also

ksh(1), COLOR_PAIR(3XCURSES), PAIR_NUMBER(3XCURSES), addchstr(3XCURSES), attr_off(3XCURSES), attroff(3XCURSES), bkgdset(3XCURSES), bkgrndset(3XCURSES), cbreak(3XCURSES), copywin(3XCURSES), derwin(3XCURSES), echo(3XCURSES), getcchar(3XCURSES), getch(3XCURSES), getnstr(3XCURSES), halfdelay(3XCURSES), inch(3XCURSES), keypad(3XCURSES), libcurses(3XCURSES), newpad(3XCURSES), newwin(3XCURSES), nocbreak(3XCURSES), nodelay(3XCURSES), noecho(3XCURSES), noraw(3XCURSES), notimeout(3XCURSES), overlay(3XCURSES), overwrite(3XCURSES), setcchar(3XCURSES), subwin(3XCURSES), timeout(3XCURSES), waddchstr(3XCURSES), waddstr(3XCURSES), wcwidth(3C), wget_wch(3XCURSES), winsch(3XCURSES), wnoutrefresh(3XCURSES), wprintw(3XCURSES), wrefresh(3XCURSES), wtimeout(3XCURSES), attributes(5), environ(5), standards(5), termio(7I)

Name curs_getch, getch, wgetch, mvgetch, mvwgetch, ungetch – get (or push back) characters from curses terminal keyboard

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int getch(void);

int wgetch(WINDOW *win);

int mvgetch(int y, int x);

int mvwgetch(WINDOW *win, int y, int x);

int ungetch(int ch);
```

Description With the `getch()`, `wgetch()`, `mvgetch()`, and `mvwgetch()` routines a character is read from the terminal associated with the window. In no-delay mode, if no input is waiting, the value `ERR` is returned. In delay mode, the program waits until the system passes text through to the program. Depending on the setting of `cbreak()`, this is after one character (cbreak mode), or after the first newline (nocbreak mode). In half-delay mode, the program waits until a character is typed or the specified timeout has been reached. Unless `noecho()` has been set, the character will also be echoed into the designated window.

If the window is not a pad, and it has been moved or modified since the last call to `wrefresh()`, `wrefresh()` will be called before another character is read.

If `keypad()` is `TRUE`, and a function key is pressed, the token for that function key is returned instead of the raw characters. Possible function keys are defined in `<curses.h>` with integers beginning with `0401`, whose names begin with `KEY_`. If a character that could be the beginning of a function key (such as escape) is received, `curses` sets a timer. If the remainder of the sequence does not come in within the designated time, the character is passed through; otherwise, the function key value is returned. For this reason, many terminals experience a delay between the time a user presses the escape key and the escape is returned to the program. Since tokens returned by these routines are outside the ASCII range, they are not printable.

The `ungetch()` routine places *ch* back onto the input queue to be returned by the next call to `wgetch()`.

Function Keys The following function keys, defined in `<curses.h>`, might be returned by `getch()` if `keypad()` has been enabled. Note that not all of these may be supported on a particular terminal if the terminal does not transmit a unique code when the key is pressed or if the definition for the key is not present in the *terminfo* database.

Name	Key name
KEY_BREAK	Break key
KEY_DOWN	The four arrow keys ...

Name	Key name
KEY_UP	
KEY_LEFT	
KEY_RIGHT	
KEY_HOME	Home key (upward+left arrow)
KEY_BACKSPACE	Backspace
KEY_F0	Function keys; space for 64 keys is reserved.
KEY_F(n)	For $0 \leq n \leq 63$
KEY_DL	Delete line
KEY_IL	Insert line
KEY_DC	Delete character
KEY_IC	Insert char or enter insert mode
KEY_EIC	Exit insert char mode
KEY_CLEAR	Clear screen
KEY_EOS	Clear to end of screen
KEY_EOL	Clear to end of line
KEY_SF	Scroll 1 line forward
KEY_SR	Scroll 1 line backward (reverse)
KEY_NPAGE	Next page
KEY_PPAGE	Previous page
KEY_STAB	Set tab
KEY_CTAB	Clear tab
KEY_CATAB	Clear all tabs
KEY_ENTER	Enter or send
KEY_SRESET	Soft (partial) reset
KEY_RESET	Reset or hard reset
KEY_PRINT	Print or copy
KEY_LL	Home down or bottom (lower left). Keypad is arranged like this: (Row 1) A1 up A3 (Row 2) left B2 right (Row 3) C1 down C3

Name	Key name
KEY_A1	Upper left of keypad
KEY_A3	Upper right of keypad
KEY_B2	Center of keypad
KEY_C1	Lower left of keypad
KEY_C3	Lower right of keypad
KEY_BTAB	Back tab key
KEY_BEG	Beg(inning) key
KEY_CANCEL	Cancel key
KEY_CLOSE	Close key
KEY_COMMAND	Cmd (command) key
KEY_COPY	Copy key
KEY_CREATE	Create key
KEY_END	End key
KEY_EXIT	Exit key
KEY_FIND	Find key
KEY_HELP	Help key
KEY_MARK	Mark key
KEY_MESSAGE	Message key
KEY_MOVE	Move key
KEY_NEXT	Next object key
KEY_OPEN	Open key
KEY_OPTIONS	Options key
KEY_PREVIOUS	Previous object key
KEY_REDO	Redo key
KEY_REFERENCE	Reference key
KEY_REFRESH	Refresh key
KEY_REPLACE	Replace key
KEY_RESTART	Restart key

Name	Key name
KEY_RESUME	Resume key
KEY_SAVE	Save key
KEY_SBEG	Shifted beginning key
KEY_SCANCEL	Shifted cancel key
KEY_SCOMMAND	Shifted command key
KEY_SCOPY	Shifted copy key
KEY_SCREATE	Shifted create key
KEY_SDC	Shifted delete char key
KEY_SDL	Shifted delete line key
KEY_SELECT	Select key
KEY_SEND	Shifted end key
KEY_SEOL	Shifted clear line key
KEY_SEXIT	Shifted exit key
KEY_SFIND	Shifted find key
KEY_SHELP	Shifted help key
KEY_SHOME	Shifted home key
KEY_SIC	Shifted input key
KEY_SLEFT	Shifted left arrow key
KEY_SMESSAGE	Shifted message key
KEY_SMOVE	Shifted move key
KEY_SNEXT	Shifted next key
KEY_SOPTIONS	Shifted options key
KEY_SPREVIOUS	Shifted prev key
KEY_SPRINT	Shifted print key
KEY_SREDO	Shifted redo key
KEY_SREPLACE	Shifted replace key
KEY_SRIGHT	Shifted right arrow
KEY_SRSUME	Shifted resume key

Name	Key name
KEY_SSAVE	Shifted save key
KEY_SSUSPEND	Shifted suspend key
KEY_SUNDO	Shifted undo key
KEY_SUSPEND	Suspend key
KEY_UNDO	Undo key

Return Values All routines return the integer ERR upon failure. The `ungetch()` routine returns an integer value other than ERR upon successful completion. The other routines return the next input character or function key code upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_inopts(3CURSES)`, `curs_move(3CURSES)`, `curs_refresh(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Use of the escape key for a single character function is discouraged.

When using `getch()`, `wgetch()`, `mvgetch()`, or `mvwgetch()`, `nocbreak` mode (`nocbreak()`) and `echo` mode (`echo()`) should not be used at the same time. Depending on the state of the tty driver when each character is typed, the program may produce undesirable results.

Note that `getch()`, `mvgetch()`, and `mvwgetch()` may be macros.

Name curs_getstr, getstr, wgetstr, mvgetstr, mvwgetstr, wgetnstr – get character strings from curses terminal keyboard

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int getstr(char *str);

int wgetstr(WINDOW *win, char *str);

int mvgetstr(int y, int x, char *str);

int mvwgetstr(WINDOW *win, int y, int x, char *str);

int wgetnstr(WINDOW *win, char *str, int n);
```

Description The effect of `getstr()` is as though a series of calls to `getch()` were made, until a newline or carriage return is received. The resulting value is placed in the area pointed to by the character pointer *str*. `wgetnstr()` reads at most *n* characters, thus preventing a possible overflow of the input buffer. The user's erase and kill characters are interpreted, as well as any special keys (such as function keys, HOME key, and CLEAR key.)

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_getch(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `getstr()`, `mvgetstr()`, and `mvwgetstr()` may be macros.

Name curs_getwch, getwch, wgetwch, mvgetwch, mvwgetwch, ungetwch – get (or push back) wchar_t characters from curses terminal keyboard

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

int getwch(void);

int wgetwch(WINDOW *win);

int mvgetwch(int y, int x);

int mvwgetwch(WINDOW *win, int y, int x);

int ungetwch(int wch);
```

Description The `getwch()`, `wgetwch()`, `mvgetwch()`, and `mvwgetwch()` routines read an EUC character from the terminal associated with the window, transform it into a `wchar_t` character, and return a `wchar_t` character. In no-delay mode, if no input is waiting, the value `ERR` is returned. In delay mode, the program waits until the system passes text through to the program. Depending on the setting of `cbreak`, this is after one character (`cbreak` mode), or after the first newline (`nocbreak` mode). In `half-delay` mode, the program waits until a character is typed or the specified timeout has been reached. Unless `noecho` has been set, the character will also be echoed into the designated window.

If the window is not a pad, and it has been moved or modified since the last call to `wrefresh(3CURSES)`, `wrefresh` will be called before another character is read.

If `keypad` is `TRUE`, and a function key is pressed, the token for that function key is returned instead of the raw characters. Possible function keys are defined in `<curses.h>` with integers beginning with `0401`, whose names begin with `KEY_`. If a character that could be the beginning of a function key (such as escape) is received, `curses(3CURSES)` sets a timer. If the remainder of the sequence does not come in within the designated time, the character is passed through; otherwise, the function key value is returned. For this reason, many terminals experience a delay between the time a user presses the escape key and the escape is returned to the program.

The `ungetwch()` routine places `wch` back onto the input queue to be returned by the next call to `wgetwch()`.

Function Keys The following function keys, defined in `<curses.h>`, might be returned by `getwch()` if `keypad` has been enabled. Note that not all of these may be supported on a particular terminal if the terminal does not transmit a unique code when the key is pressed or if the definition for the key is not present in the `terminfo(4)` database.

Name	*Key name*
KEY_BREAK	Break key
KEY_DOWN	The four arrow keys ...

Name	*Key name*
KEY_UP	
KEY_LEFT	
KEY_RIGHT	
KEY_HOME	Home key (upward+left arrow)
KEY_BACKSPACE	Backspace
KEY_F0	Function keys; space for 64 keys is reserved.
KEY_F(*n*)	For $0 \leq n \leq 63$
KEY_DL	Delete line
KEY_IL	Insert line
KEY_DC	Delete character
KEY_IC	Insert char or enter insert mode
KEY_EIC	Exit insert char mode
KEY_CLEAR	Clear screen
KEY_EOS	Clear to end of screen
KEY_EOL	Clear to end of line
KEY_SF	Scroll 1 line forward
KEY_SR	Scroll 1 line backward (reverse)
KEY_NPAGE	Next page
KEY_PPAGE	Previous page
KEY_STAB	Set tab
KEY_CTAB	Clear tab
KEY_CATAB	Clear all tabs
KEY_ENTER	Enter or send
KEY_SRESET	Soft (partial) reset
KEY_RESET	Reset or hard reset
KEY_PRINT	Print or copy
KEY_LL	Home down or bottom (lower left). Keypad is arranged like this: A1 up A3 left B2 right C1 down C3

Name	*Key name*
KEY_A1	Upper left of keypad
KEY_A3	Upper right of keypad
KEY_B2	Center of keypad
KEY_C1	Lower left of keypad
KEY_C3	Lower right of keypad
KEY_BTAB	Back tab key
KEY_BEG	Beg(inning) key
KEY_CANCEL	Cancel key
KEY_CLOSE	Close key
KEY_COMMAND	Cmd (command) key
KEY_COPY	Copy key
KEY_CREATE	Create key
KEY_END	End key
KEY_EXIT	Exit key
KEY_FIND	Find key
KEY_HELP	Help key
KEY_MARK	Mark key
KEY_MESSAGE	Message key
KEY_MOVE	Move key
KEY_NEXT	Next object key
KEY_OPEN	Open key
KEY_OPTIONS	Options key
KEY_PREVIOUS	Previous object key
KEY_REDO	Redo key
KEY_REFERENCE	Reference key
KEY_REFRESH	Refresh key
KEY_REPLACE	Replace key
KEY_RESTART	Restart key

Name	*Key name*
KEY_RESUME	Resume key
KEY_SAVE	Save key
KEY_SBEG	Shifted beginning key
KEY_SCANCEL	Shifted cancel key
KEY_SCOMMAND	Shifted command key
KEY_SCOPY	Shifted copy key
KEY_SCREATE	Shifted create key
KEY_SDC	Shifted delete char key
KEY_SDL	Shifted delete line key
KEY_SELECT	Select key
KEY_SEND	Shifted end key
KEY_SEOL	Shifted clear line key
KEY_SEXIT	Shifted exit key
KEY_SFIND	Shifted find key
KEY_SHELP	Shifted help key
KEY_SHOME	Shifted home key
KEY_SIC	Shifted input key
KEY_SLEFT	Shifted left arrow key
KEY_SMESSAGE	Shifted message key
KEY_SMOVE	Shifted move key
KEY_SNEXT	Shifted next key
KEY_SOPTIONS	Shifted options key
KEY_SPREVIOUS	Shifted prev key
KEY_SPRINT	Shifted print key
KEY_SREDO	Shifted redo key
KEY_SREPLACE	Shifted replace key
KEY_SRIGHT	Shifted right arrow
KEY_SRSUME	Shifted resume key

Name	*Key name*
KEY_SSAVE	Shifted save key
KEY_SSUSPEND	Shifted suspend key
KEY_SUNDO	Shifted undo key
KEY_SUSPEND	Suspend key
KEY_UNDO	Undo key

Return Value All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `curs_inopts(3CURSES)`, `curs_move(3CURSES)`, `wrefresh(3CURSES)`, `terminfo(4)`, `attributes(5)`

Notes The header file <`curses.h`> automatically includes the header files <`stdio.h`>, <`unctrl.h`> and <`widec.h`>.

Use of the escape key by a programmer for a single character function is discouraged.

When using `getwch()`, `wgetwch()`, `mvgetwch()`, or `mvwgetwch()`, `nocbreak` mode and `echo` mode should not be used at the same time. Depending on the state of the tty driver when each character is typed, the program may produce undesirable results.

Note that `getwch()`, `mvgetwch()`, and `mvwgetwch()` may be macros.

Name curs_getwstr, getwstr, getnwstr, wgetwstr, wgetnwstr, mvgetwstr, mvgetnwstr, mvwgetwstr, mvwgetnwstr – get wchar_t character strings from curses terminal keyboard

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

int getwstr(wchar_t *wstr);

int getnwstr(wchar_t *wstr, int n);

int wgetwstr(WINDOW *win, wchar_t *wstr);

int wgetnwstr(WINDOW *win, wchar_t *wstr, int n);

int mvgetwstr(int y, int x, wchar_t *wstr);

int mvgetnwstr(int y, int x, wchar_t *wstr, int n);

int mvwgetwstr(WINDOW *win, int y, int x, wchar_t *wstr);

int mvwgetnwstr(WINDOW *win, int y, int x, wchar_t *wstr, int n);
```

Description The effect of `getwstr()` is as though a series of calls to `getwch(3CURSES)` were made, until a newline and carriage return is received. The resulting value is placed in the area pointed to by the `wchar_t` pointer *wstr*. `getnwstr()` reads at most *n* `wchar_t` characters, thus preventing a possible overflow of the input buffer. The user's erase and kill characters are interpreted, as well as any special keys (such as function keys, HOME key, CLEAR key, etc.).

Return Value All routines return the integer `ERR` upon failure and an integer value other than `ERR` upon successful completion.

Attributes See `attributes(5)` for a description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `getwch(3CURSES)`, `attributes(5)`

Notes The header file <`curses.h`> automatically includes the header files <`stdio.h`>, <`unctrl.h`>, and <`widec.h`>.

Note that all routines except `wgetnwstr()` may be macros.

Name curs_getyx, getyx, getparyx, getbegyx, getmaxyx – get curses cursor and window coordinates

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

void getyx(WINDOW *win, int y, int x);

void getparyx(WINDOW *win, int y, int x);

void getbegyx(WINDOW *win, int y, int x);

void getmaxyx(WINDOW *win, int y, int x);
```

Description With the `getyx()` macro, the cursor position of the window is placed in the two integer variables *y* and *x*.

With the `getparyx()` macro, if *win* is a subwindow, the beginning coordinates of the subwindow relative to the parent window are placed into two integer variables, *y* and *x*. Otherwise, −1 is placed into *y* and *x*.

Like `getyx()` , the `getbegyx()` and `getmaxyx()` macros store the current beginning coordinates and size of the specified window.

Return Values The return values of these macros are undefined (that is, they should not be used as the right-hand side of assignment statements).

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)`

Notes The header `<curses.h>` automatically includes the headers `<stdio.h>` and `<unctrl.h>`.

Note that all of these interfaces are macros and that "&" is not necessary before the variables *y* and *x*.

Name curs_inch, inch, winch, mvinch, mvwinch – get a character and its attributes from a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

chtype inch(void);

chtype winch(WINDOW *win);

chtype mvinch(int y, int x);

chtype mvwinch(WINDOW *win, int y, int x);
```

Description With these routines, the character, of type `chtype`, at the current position in the named window is returned. If any attributes are set for that position, their values are OR-ed into the value returned. Constants defined in `<curses.h>` can be used with the logical AND (&) operator to extract the character or attributes alone.

Attributes The following bit-masks can be AND-ed with characters returned by `winch()`.

A_CHARTEXT	Bit-mask to extract character
A_ATTRIBUTES	Bit-mask to extract attributes
A_COLOR	Bit-mask to extract color-pair field information

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)`

Notes The header `<curses.h>` automatically includes the headers `<stdio.h>` and `<unctrl.h>`.

Note that all of these routines may be macros.

Name curs_inchstr, inchstr, inchnstr, winchstr, winchnstr, mvinchstr, mvinchnstr, mvwinchstr, mvwinchnstr – get a string of characters (and attributes) from a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int inchstr(chtype *chstr);

int inchnstr(chtype *chstr, int n);

int winchstr(WINDOW *win, chtype *chstr);

int winchnstr(WINDOW *win, chtype *chstr, int n);

int mvinchstr(int y, int x, chtype *chstr);

int mvinchnstr(int y, int x, chtype *chstr, int n);

int mvwinchstr(WINDOW *win, int y, int x, chtype *chstr);

int mvwinchnstr(WINDOW *win, int y, int x, chtype *chstr, int n);
```

Description With these routines, a string of type `chtype`, starting at the current cursor position in the named window and ending at the right margin of the window, is returned. The four functions with *n* as the last argument, return the string at most *n* characters long. Constants defined in <`curses.h`> can be used with the & (logical AND) operator to extract the character or the attribute alone from any position in the *chstr* (see `curs_inch(3CURSES)`).

Return Values All routines return the integer `ERR` upon failure and an integer value other than `ERR` upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_inch(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that all routines except `winchnstr()` may be macros.

Name curs_initscr, initscr, newterm, endwin, isendwin, set_term, delscreen – curses screen initialization and manipulation routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

WINDOW *initscr(void);

int endwin(void);

int isendwin(void);

SCREEN *newterm(char *type, FILE *outfd, FILE *infd);

SCREEN *set_term(SCREEN *new);

void delscreen(SCREEN * sp);
```

Description `initscr()` is almost always the first routine that should be called (the exceptions are `slk_init()`, `filter()`, `ripoffline()`, `use_env()` and, for multiple-terminal applications, `newterm()`.) This determines the terminal type and initializes all `curses` data structures. `initscr()` also causes the first call to `refresh()` to clear the screen. If errors occur, `initscr()` writes an appropriate error message to standard error and exits; otherwise, a pointer is returned to `stdscr()`. If the program needs an indication of error conditions, `newterm()` should be used instead of `initscr()`; `initscr()` should only be called once per application.

A program that outputs to more than one terminal should use the `newterm()` routine for each terminal instead of `initscr()`. A program that needs an indication of error conditions, so it can continue to run in a line-oriented mode if the terminal cannot support a screen-oriented program, would also use this routine. The routine `newterm()` should be called once for each terminal. It returns a variable of type `SCREEN *` which should be saved as a reference to that terminal. The arguments are the *type* of the terminal to be used in place of `$TERM`, a file pointer for output to the terminal, and another file pointer for input from the terminal (if *type* is `NULL`, `$TERM` will be used). The program must also call `endwin()` for each terminal being used before exiting from curses. If `newterm()` is called more than once for the same terminal, the first terminal referred to must be the last one for which `endwin()` is called.

A program should always call `endwin()` before exiting or escaping from `curses` mode temporarily. This routine restores tty modes, moves the cursor to the lower left-hand corner of the screen and resets the terminal into the proper non-visual mode. Calling `refresh()` or `doupdate()` after a temporary escape causes the program to resume visual mode.

The `isendwin()` routine returns `TRUE` if `endwin()` has been called without any subsequent calls to `wrefresh()`, and `FALSE` otherwise.

The `set_term()` routine is used to switch between different terminals. The screen reference `new` becomes the new current terminal. The previous terminal is returned by the routine. This is the only routine which manipulates `SCREEN` pointers; all other routines affect only the current terminal.

The `delscreen()` routine frees storage associated with the `SCREEN` data structure. The `endwin()` routine does not do this, so `delscreen()` should be called after `endwin()` if a particular `SCREEN` is no longer needed.

Return Values `endwin()` returns the integer `ERR` upon failure and `OK` upon successful completion.

Routines that return pointers always return `NULL` on error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_kernel(3CURSES)`, `curs_refresh(3CURSES)`, `curs_slk(3CURSES)`, `curs_util(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `initscr()` and `newterm()` may be macros.

Name curs_inopts, cbreak, nocbreak, echo, noecho, halfdelay, intrflush, keypad, meta, nodelay, notimeout, raw, noraw, noqiflush, qiflush, timeout, wtimeout, typeahead – curses terminal input option control routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int cbreak(void);

int nocbreak(void);

int echo(void);

int noecho(void);

int halfdelay(int tenths);

int intrflush(WINDOW *win, bool bf);

int keypad(WINDOW *win, bool bf);

int meta(WINDOW *win, bool bf);

int nodelay(WINDOW *win, bool bf);

int notimeout(WINDOW *win, bool bf);

int raw(void);

int noraw(void);

void noqiflush(void);

void qiflush(void);

void timeout(int delay);

void wtimeout(WINDOW *win, int delay);

int typeahead(int fildes);
```

Description The `cbreak()` and `nocbreak()` routines put the terminal into and out of `cbreak()` mode, respectively. In this mode, characters typed by the user are immediately available to the program, and erase/kill character-processing is not performed. When out of this mode, the tty driver buffers the typed characters until a newline or carriage return is typed. Interrupt and flow control characters are unaffected by this mode. Initially the terminal may or may not be in `cbreak()` mode, as the mode is inherited; therefore, a program should call `cbreak()` or `nocbreak()` explicitly. Most interactive programs using `curses` set the `cbreak()` mode.

Note that `cbreak()` overrides `raw()`. (See `curs_getch(3CURSES)` for a discussion of how these routines interact with `echo()` and `noecho()`.)

The `echo()` and `noecho()` routines control whether characters typed by the user are echoed by `getch()` as they are typed. Echoing by the tty driver is always disabled, but initially `getch()` is in echo mode, so characters typed are echoed. Authors of most interactive programs prefer to

do their own echoing in a controlled area of the screen, or not to echo at all, so they disable echoing by calling `noecho()`. (See `curs_getch(3CURSES)` for a discussion of how these routines interact with `cbreak()` and `nocbreak()`.)

The `halfdelay()` routine is used for half-delay mode, which is similar to `cbreak()` mode in that characters typed by the user are immediately available to the program. However, after blocking for *tenths* tenths of seconds, `ERR` is returned if nothing has been typed. The value of *tenths* must be a number between 1 and 255. Use `nocbreak()` to leave half-delay mode.

If the `intrflush()` option is enabled, (*bf* is `TRUE`), when an interrupt key is pressed on the keyboard (interrupt, break, quit) all output in the tty driver queue will be flushed, giving the effect of faster response to the interrupt, but causing `curses` to have the wrong idea of what is on the screen. Disabling (*bf* is `FALSE`), the option prevents the flush. The default for the option is inherited from the tty driver settings. The window argument is ignored.

The `keypad()` option enables the keypad of the user's terminal. If enabled (*bf* is `TRUE`), the user can press a function key (such as an arrow key) and `wgetch()` returns a single value representing the function key, as in `KEY_LEFT`. If disabled (*bf* is `FALSE`), `curses` does not treat function keys specially and the program has to interpret the escape sequences itself. If the keypad in the terminal can be turned on (made to transmit) and off (made to work locally), turning on this option causes the terminal keypad to be turned on when `wgetch()` is called. The default value for keypad is false.

Initially, whether the terminal returns 7 or 8 significant bits on input depends on the control mode of the tty driver (see `termio(7I)`). To force 8 bits to be returned, invoke `meta`(*win*, `TRUE`). To force 7 bits to be returned, invoke `meta`(*win*, `FALSE`). The window argument, *win*, is always ignored. If the terminfo capabilities `smm` (meta_on) and `rmm` (meta_off) are defined for the terminal, `smm` is sent to the terminal when `meta`(*win*, `TRUE`) is called and `rmm` is sent when `meta`(*win*, `FALSE`) is called.

The `nodelay()` option causes `getch()` to be a non-blocking call. If no input is ready, `getch()` returns `ERR`. If disabled (*bf* is `FALSE`), `getch()` waits until a key is pressed.

While interpreting an input escape sequence, `wgetch()` sets a timer while waiting for the next character. If `notimeout`(*win*, `TRUE`) is called, then `wgetch()` does not set a timer. The purpose of the timeout is to differentiate between sequences received from a function key and those typed by a user.

With the `raw()` and `noraw()` routines, the terminal is placed into or out of raw mode. Raw mode is similar to `cbreak()` mode, in that characters typed are immediately passed through to the user program. The differences are that in raw mode, the interrupt, quit, suspend, and flow control characters are all passed through uninterpreted, instead of generating a signal. The behavior of the BREAK key depends on other bits in the tty driver that are not set by `curses`.

When the `noqiflush()` routine is used, normal flush of input and output queues associated with the `INTR`, `QUIT` and `SUSP` characters will not be done (see `termio(7I)`). When `qiflush()` is called, the queues will be flushed when these control characters are read.

The `timeout()` and `wtimeout()` routines set blocking or non-blocking read for a given window. If *delay* is negative, blocking read is used (that is, waits indefinitely for input). If *delay* is zero, then non-blocking read is used (that is, read returns ERR if no input is waiting). If *delay* is positive, then read blocks for *delay* milliseconds, and returns ERR if there is still no input. Hence, these routines provide the same functionality as `nodelay()`, plus the additional capability of being able to block for only *delay* milliseconds (where *delay* is positive).

`curses` does "line-breakout optimization" by looking for typeahead periodically while updating the screen. If input is found, and it is coming from a tty, the current update is postponed until `refresh()` or `doupdate()` is called again. This allows faster response to commands typed in advance. Normally, the input FILE pointer passed to `newterm()`, or `stdin` in the case that `initscr()` was used, will be used to do this typeahead checking. The `typeahead()` routine specifies that the file descriptor *fildes* is to be used to check for typeahead instead. If *fildes* is –1, then no typeahead checking is done.

Return Values All routines that return an integer return ERR upon failure and an integer value other than ERR upon successful completion, unless otherwise noted in the preceding routine descriptions.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_getch(3CURSES)`, `curs_initscr(3CURSES)`, `curses(3CURSES)`, `attributes(5)`, `termio(7I)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `echo()`, `noecho()`, `halfdelay()`, `intrflush()`, `meta()`, `nodelay()`, `notimeout()`, `noqiflush()`, `qiflush()`, `timeout()`, and `wtimeout()` may be macros.

Name curs_insch, insch, winsch, mvinsch, mvwinsch – insert a character before the character under the cursor in a curses window

Synopsis

```
cc [ flag ... ] file... -lcurses [ library ... ]
#include <curses.h>

int insch(chtype ch);

int winsch(WINDOW *win, chtype ch);

int mvinsch(int y, int x, chtype ch);

int mvwinsch(WINDOW *win, int y, int x, chtype ch);
```

Description With these routines, the character *ch* is inserted before the character under the cursor. All characters to the right of the cursor are moved one space to the right, with the possibility of the rightmost character on the line being lost. The cursor position does not change (after moving to *y*, *x*, if specified). (This does not imply use of the hardware insert character feature.)

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Note that insch(), mvinsch(), and mvwinsch() may be macros.

Name curs_insstr, insstr, insnstr, winsstr, winsnstr, mvinsstr, mvinsnstr, mvwinsstr, mvwinsnstr – insert string before character under the cursor in a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int insstr(char *str);

int insnstr(char *str, int n);

int winsstr(WINDOW *win, char *str);

int winsnstr(WINDOW *win, char *str, int n);

int mvinsstr(int y, int x, char *str);

int mvinsnstr(int y, int x, char *str, int n);

int mvwinsstr(WINDOW *win, int y, int x, char *str);

int mvwinsnstr(WINDOW *win, int y, int x, char *str, int n);
```

Description With these routines, a character string (as many characters as will fit on the line) is inserted before the character under the cursor. All characters to the right of the cursor are moved to the right, with the possibility of the rightmost characters on the line being lost. The cursor position does not change (after moving to *y*, *x*, if specified). (This does not imply use of the hardware insert character feature.) The four routines with *n* as the last argument insert at most *n* characters. If *n*<=0, then the entire string is inserted.

If a character in *str* is a tab, newline, carriage return or backspace, the cursor is moved appropriately within the window. A newline also does a `clrtoeol()` before moving. Tabs are considered to be at every eighth column. If a character in *str* is another control character, it is drawn in the ^*X* notation. Calling `winch()` after adding a control character (and moving to it, if necessary) does not return the control character, but instead returns the representation of the control character.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_clear(3CURSES)`, `curs_inch(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that all but `winsnstr()` may be macros.

Name curs_instr, instr, innstr, winstr, winnstr, mvinstr, mvinnstr, mvwinstr, mvwinnstr – get a string of characters from a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int instr(char *str);

int innstr(char *str, int n);

int winstr(WINDOW *win, char *str);

int winnstr(WINDOW *win, char *str, int n);

int mvinstr(int y, int x, char *str);

int mvinnstr(int y, int x, char *str, int n);

int mvwinstr(WINDOW *win, int y, int x, char *str);

int mvwinnstr(WINDOW *win, int y, int x, char *str, int n);
```

Description These routines return a string of characters in *str*, starting at the current cursor position in the named window and ending at the right margin of the window. Attributes are stripped from the characters. The four functions with *n* as the last argument return the string at most *n* characters long.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Note that all routines except winnstr() may be macros.

Name curs_inswch, inswch, winswch, mvinswch, mvwinswch – insert a wchar_t character before the character under the cursor in a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

int inswch(chtype wch);

int winswch(WINDOW *win, chtype wch);

int mvinswch(int y, int x, chtype wch);

int mvwinswch(WINDOW *win, int y, int x, chtype wch);
```

Description These routines insert the character *wch*, holding a `wchar_t` character, before the character under the cursor. All characters to the right of the cursor are moved one space to the right, with the possibility of the rightmost character on the line being lost. The cursor position does not change (after moving to *y*, *x*, if specified). (This does not imply use of the hardware insert character feature.)

Return Value All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)`

Notes The header file <`curses.h`> automatically includes the header files <`stdio.h`>, <`unctrl.h`> and <`widec.h`>.

Note that `inswch()`, `mvinswch()`, and `mvwinswch()` may be macros.

None of these routines can use the color attribute in `chtype`.

Name curs_inswstr, inswstr, insnwstr, winswstr, winsnwstr, mvinswstr, mvinsnwstr, mvwinswstr, mvwinsnwstr – insert wchar_t string before character under the cursor in a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

int inswstr(wchar_t *wstr);

int insnwstr(wchar_t *wstr, int n);

int winswstr(WINDOW *win, wchar_t *wstr);

int winsnwstr(WINDOW *win, wchar_t *wstr, int n);

int mvinswstr(int y, int x, wchar_t *wstr);

int mvinsnwstr(int y, int x, wchar_t *wstr, int n);

int mvwinswstr(WINDOW *win, int y, int x, wchar_t *wstr);

int mvwinsnwstr(WINDOW *win, int y, int x, wchar_t *wstr, int n);
```

Description These routines insert a `wchar_t` character string (as many `wchar_t` characters as will fit on the line) before the character under the cursor. All characters to the right of the cursor are moved to the right, with the possibility of the rightmost characters on the line being lost. The cursor position does not change (after moving to *y*, *x*, if specified). (This does not imply use of the hardware insert character feature.) The four routines with *n* as the last argument insert at most *n* `wchar_t` characters. If *n*<=0, then the entire string is inserted.

If a character in *wstr* is a tab, newline, carriage return, or backspace, the cursor is moved appropriately within the window. A newline also does a `clrtoeol(3CURSES)` before moving. Tabs are considered to be at every eighth column. If a character in *wstr* is another control character, it is drawn in the ^*X* notation. Calling `winwch(3CURSES)` after adding a control character (and moving to it, if necessary) does not return the control character, but instead returns the representation of the control character.

Return Value All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `clrtoeol(3CURSES)`, `curses(3CURSES)`, `winwch(3CURSES)`, `attributes(5)`

Notes The header file <`curses.h`> automatically includes the header files <`stdio.h`>, <`unctrl.h`> and <`widec.h`>.

Note that all but `winsnwstr()` may be macros.

Name curs_inwch, inwch, winwch, mvinwch, mvwinwch – get a wchar_t character and its attributes from a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

chtype inwch(void);

chtype winwch(WINDOW *win);

chtype mvinwch(int y, int x);

chtype mvwinwch(WINDOW *win, int y, int x);
```

Description These routines return the `wchar_t` character, of type `chtype`, at the current position in the named window. If any attributes are set for that position, their values are OR-ed into the value returned. Constants defined in `<curses.h>` can be used with the logical AND (`&`) operator to extract the character or attributes alone.

Attributes The following bit-masks may be AND-ed with characters returned by `winwch()`.

```
A_WCHARTEXT          Bit-mask to extract character
A_WATTRIBUTES        Bit-mask to extract attributes
```

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)`

Notes The header file `<curses.h>` automatically includes the header files `<stdio.h>`, `<unctrl.h>` and `<widec.h>`.

Note that all of these routines may be macros.

None of these routines can use the color attribute in `chtype`.

Name curs_inwchstr, inwchstr, inwchnstr, winwchstr, winwchnstr, mvinwchstr, mvinwchnstr, mvwinwchstr, mvwinwchnstr – get a string of wchar_t characters (and attributes) from a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

int inwchstr(chtype *wchstr);

int inwchnstr(chtype *wchstr, int n);

int winwchstr(WINDOW *win, chtype *wchstr);

int winwchnstr(WINDOW *win, chtype *wchstr, int n);

int mvinwchstr(int y, int x, chtype *wchstr);

int mvinwchnstr(int y, int x, chtype *wchstr, int n);

int mvwinwchstr(WINDOW *win, int y, int x, chtype *wchstr);

int mvwinwchnstr(WINDOW *win, int y, int x, chtype *wchstr, int n);
```

Description These routines return a string of type `chtype`, holding `wchar_t` characters, starting at the current cursor position in the named window and ending at the right margin of the window. The four functions with *n* as the last argument, return the string at most *n* `wchar_t` characters long. Constants defined in `<curses.h>` can be used with the logical AND (&) operator to extract the `wchar_t` character or the attribute alone from any position in the *wchstr* (see `curs_inwch(3CURSES)`).

Return Value All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for a description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `curs_inwch(3CURSES)`, `attributes(5)`

Notes The header file `<curses.h>` automatically includes the header files `<stdio.h>`, `<unctrl.h>` and `<widec.h>`.

Note that all routines except `winwchnstr()` may be macros.

None of these routines can use the color attribute in `chtype`.

Name curs_inwstr, inwstr, innwstr, winwstr, winnwstr, mvinwstr, mvinnwstr, mvwinwstr, mvwinnwstr – get a string of wchar_t characters from a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses[library .. ]
#include <curses.h>

int inwstr(wchar_t *wstr);

int innwstr(wchar_t *wstr, int n);

int winwstr(WINDOW *win, wchar_t *wstr);

int winnwstr(WINDOW *win, wchar_t *wstr, int n);

int mvinwstr(int y, int x, wchar_t *wstr);

int mvinnwstr(int y, int x, wchar_t *wstr, int n);

int mvwinwstr(WINDOW *win, int y, int x, wchar_t *wstr);

int mvwinnwstr(WINDOW *win, int y, int x, wchar_t *wstr, int n);
```

Description These routines return the string of `wchar_t` characters in *wstr* starting at the current cursor position in the named window and ending at the right margin of the window. Attributes are stripped from the characters. The four functions with *n* as the last argument return the string at most *n* `wchar_t` characters long.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)`

Notes The header file <`curses.h`> automatically includes the header files <`stdio.h`>, <`unctrl.h`> and <`widec.h`>.

Note that all routines except `winnwstr()` may be macros.

Name curs_kernel, def_prog_mode, def_shell_mode, reset_prog_mode, reset_shell_mode, resetty, savetty, getsyx, setsyx, ripoffline, curs_set, napms – low-level curses routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int def_prog_mode(void);

int def_shell_mode(void);

int reset_prog_mode(void);

int reset_shell_mode(void);

int resetty(void);

int savetty(void);

int getsyx(int y, int x);

int setsyx(int y, int x);

int ripoffline(int line, int (*init)(WINDOW *, int));

int curs_set(int visibility);

int napms(int ms);
```

Description The following routines give low-level access to various `curses` functionality. Theses routines typically are used inside library routines.

The `def_prog_mode()` and `def_shell_mode()` routines save the current terminal modes as the "program" (in `curses`) or "shell" (not in `curses`) state for use by the `reset_prog_mode()` and `reset_shell_mode()` routines. This is done automatically by `initscr()`.

The `reset_prog_mode()` and `reset_shell_mode()` routines restore the terminal to "program" (in `curses`) or "shell" (out of `curses`) state. These are done automatically by `endwin()` and, after an `endwin()`, by `doupdate()`, so they normally are not called.

The `resetty()` and `savetty()` routines save and restore the state of the terminal modes. `savetty()` saves the current state in a buffer and `resetty()` restores the state to what it was at the last call to `savetty()`.

With the `getsyx()` routine, the current coordinates of the virtual screen cursor are returned in *y* and *x*. If `leaveok()` is currently `TRUE`, then −1,−1 is returned. If lines have been removed from the top of the screen, using `ripoffline()`, *y* and *x* include these lines; therefore, *y* and *x* should be used only as arguments for `setsyx()`.

With the `setsyx()` routine, the virtual screen cursor is set to *y*, *x*. If *y* and *x* are both −1, then `leaveok()` is set. The two routines `getsyx()` and `setsyx()` are designed to be used by a library routine, which manipulates `curses` windows but does not want to change the current

position of the program's cursor. The library routine would call `getsyx()` at the beginning, do its manipulation of its own windows, do a `wnoutrefresh()` on its windows, call `setsyx()`, and then call `doupdate()`.

The `ripoffline()` routine provides access to the same facility that `slk_init()` (see `curs_slk(3CURSES)`) uses to reduce the size of the screen. `ripoffline()` must be called before `initscr()` or `newterm()` is called. If `line` is positive, a line is removed from the top of `stdscr()`; if `line` is negative, a line is removed from the bottom. When this is done inside `initscr()`, the routine `init()` (supplied by the user) is called with two arguments: a window pointer to the one-line window that has been allocated and an integer with the number of columns in the window. Inside this initialization routine, the integer variables `LINES` and `COLS` (defined in `<curses.h>`) are not guaranteed to be accurate and `wrefresh()` or `doupdate()` must not be called. It is allowable to call `wnoutrefresh()` during the initialization routine.

`ripoffline()` can be called up to five times before calling `initscr()` or `newterm()`.

With the `curs_set()` routine, the cursor state is set to invisible, normal, or very visible for *visibility* equal to `0`, `1`, or `2` respectively. If the terminal supports the *visibility* requested, the previous *cursor* state is returned; otherwise, `ERR` is returned.

The `napms()` routine is used to sleep for *ms* milliseconds.

Return Values Except for `curs_set()`, these routines always return `OK`. `curs_set()` returns the previous cursor state, or `ERR` if the requested *visibility* is not supported.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_initscr(3CURSES)`, `curs_outopts(3CURSES)`, `curs_refresh(3CURSES)`, `curs_scr_dump(3CURSES)`, `curs_slk(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header `<curses.h>` automatically includes the headers `<stdio.h>` and `<unctrl.h>`.

Note that `getsyx()` is a macro, so an ampersand (&) is not necessary before the variables *y* and *x*.

Name curs_move, move, wmove – move curses window cursor

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int move(int y, int x);

int wmove(WINDOW *win, int y, int x);
```

Description With these routines, the cursor associated with the window is moved to line *y* and column *x*. This routine does not move the physical cursor of the terminal until `refresh()` is called. The position specified is relative to the upper left-hand corner of the window, which is (0,0).

Return Values These routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_refresh(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `move()` may be a macro.

Name curs_outopts, clearok, idlok, idcok, immedok, leaveok, setscrreg, wsetscrreg, scrollok, nl, nonl – curses terminal output option control routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int clearok(WINDOW *win, bool bf);

int idlok(WINDOW *win, bool bf);

void idcok(WINDOW *win, bool bf);

void immedok(WINDOW *win, bool bf);

int leaveok(WINDOW *win, bool bf);

int setscrreg(int top, int bot);

int wsetscrreg(WINDOW *win, int top, int bot);

int scrollok(WINDOW *win, bool bf);

int nl(void);

int nonl(void);
```

Description These routines set options that deal with output within `curses`. All options are initially `FALSE`, unless otherwise stated. It is not necessary to turn these options off before calling `endwin()`.

With the `clearok()` routine, if enabled (*bf* is `TRUE`), the next call to `wrefresh()` with this window will clear the screen completely and redraw the entire screen from scratch. This is useful when the contents of the screen are uncertain, or in some cases for a more pleasing visual effect. If the *win* argument to `clearok()` is the global variable `curscr()`, the next call to `wrefresh()` with any window causes the screen to be cleared and repainted from scratch.

With the `idlok()` routine, if enabled (*bf* is `TRUE`), `curses` considers using the hardware insert/delete line feature of terminals so equipped. If disabled (*bf* is `FALSE) , curses` very seldom uses this feature. (The insert/delete character feature is always considered.) This option should be enabled only if the application needs insert/delete line, for example, for a screen editor. It is disabled by default because insert/delete line tends to be visually annoying when used in applications where it isn't really needed. If insert/delete line cannot be used, `curses` redraws the changed portions of all lines.

With the `idcok()` routine, if enabled (*bf* is `TRUE`), `curses` considers using the hardware insert/delete character feature of terminals so equipped. This is enabled by default.

With the `immedok()` routine, if enabled (*bf* is `TRUE`), any change in the window image, such as the ones caused by `waddch()`, `wclrtobot()`, `wscrl()`, etc., automatically cause a call to `wrefresh()`. However, it may degrade the performance considerably, due to repeated calls to `wrefresh()`. It is disabled by default. Normally, the hardware cursor is left at the location of the window cursor being refreshed. The `leaveok()` option allows the cursor to be left

wherever the update happens to leave it. It is useful for applications where the cursor is not used, since it reduces the need for cursor motions. If possible, the cursor is made invisible when this option is enabled.

The `setscrreg()` and `wsetscrreg()` routines allow the application programmer to set a software scrolling region in a window. *top* and *bot* are the line numbers of the top and bottom margin of the scrolling region. (Line 0 is the top line of the window.) If this option and `scrollok()` are enabled, an attempt to move off the bottom margin line causes all lines in the scrolling region to scroll up one line. Only the text of the window is scrolled. (Note that this has nothing to do with the use of a physical scrolling region capability in the terminal, like that in the VT100. If `idlok()` is enabled and the terminal has either a scrolling region or insert/delete line capability, they will probably be used by the output routines.)

The `scrollok()` option controls what happens when the cursor of a window is moved off the edge of the window or scrolling region, either as a result of a newline action on the bottom line, or typing the last character of the last line. If disabled, (*bf* is `FALSE`), the cursor is left on the bottom line. If enabled, (*bf* is `TRUE`), `wrefresh()` is called on the window, and the physical terminal and window are scrolled up one line. (Note that in order to get the physical scrolling effect on the terminal, it is also necessary to call `idlok()`.)

The `nl()` and `nonl()` routines control whether newline is translated into carriage return and linefeed on output, and whether return is translated into newline on input. Initially, the translations do occur. By disabling these translations using `nonl()`, `curses` is able to make better use of the linefeed capability, resulting in faster cursor motion.

Return Values `setscrreg()` and `wsetscrreg()` return `OK` upon success and `ERR` upon failure. All other routines that return an integer always return `OK`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_addch(3CURSES)`, `curs_clear(3CURSES)`, `curs_initscr(3CURSES)`, `curs_refresh(3CURSES)`, `curs_scroll(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `clearok()`, `leaveok()`, `scrollok()`, `idcok()`, `nl()`, `nonl()`, and `setscrreg()` may be macros.

The `immedok()` routine is useful for windows that are used as terminal emulators.

Name curs_overlay, overlay, overwrite, copywin – overlap and manipulate overlapped curses windows

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int overlay(WINDOW *srcwin, WINDOW *dstwin);

int overwrite(WINDOW *srcwin, WINDOW *dstwin);

int copywin(WINDOW *srcwin, WINDOW *dstwin, int sminrow,
     int smincol, int dminrow, int dmincol,
     int dmaxrow, int dmaxcol, int overlay);
```

Description The `overlay()` and `overwrite()` routines overlay *srcwin* on top of *dstwin*. *scrwin* and *dstwin* are not required to be the same size; only text where the two windows overlap is copied. The difference is that `overlay()` is non-destructive (blanks are not copied) whereas `overwrite()` is destructive.

The `copywin()` routine provides a finer granularity of control over the `overlay()` and `overwrite()` routines. Like in the `prefresh()` routine, a rectangle is specified in the destination window, (*dminrow*, *dmincol*) and (*dmaxrow*, *dmaxcol*), and the upper-left-corner coordinates of the source window, (*sminrow*, *smincol*). If the argument *overlay* is `true`, then copying is non-destructive, as in `overlay()`.

Return Values Routines that return an integer return ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_pad(3CURSES)`, `curs_refresh(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `overlay()` and `overwrite` may be macros.

Name curs_pad, newpad, subpad, prefresh, pnoutrefresh, pechochar, pechowchar – create and display curses pads

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library .. ]
#include <curses.h>

WINDOW *newpad(int nlines, int ncols);

WINDOW *subpad(WINDOW *orig, int nlines, int ncols, int begin_y,
     int begin_x);

int prefresh(WINDOW *pad, int pminrow, int pmincol, int sminrow,
     int smincol, int smaxrow, int smaxcol);

int pnoutrefresh(WINDOW *pad, int pminrow, int pmincol, int sminrow,
     int smincol, int smaxrow, int smaxcol);

int pechochar(WINDOW *pad, chtype ch);

int pechowchar(WINDOW *pad, chtype wch);
```

Description The `newpad()` routine creates and returns a pointer to a new pad data structure with the given number of lines, *nlines*, and columns, *ncols*. A pad is like a window, except that it is not restricted by the screen size, and is not necessarily associated with a particular part of the screen. Pads can be used when a large window is needed, and only a part of the window will be on the screen at one time. Automatic refreshes of pads (for example, from scrolling or echoing of input) do not occur. It is not legal to call `wrefresh(3CURSES)` with a *pad* as an argument; the routines `prefresh()` or `pnoutrefresh()` should be called instead. Note that these routines require additional parameters to specify the part of the pad to be displayed and the location on the screen to be used for the display.

The `subpad()` routine creates and returns a pointer to a subwindow within a pad with the given number of lines, *nlines*, and columns, *ncols*. Unlike `subwin(3CURSES)`, which uses screen coordinates, the window is at position (*begin_x*, *begin_y*) on the pad. The window is made in the middle of the window *orig*, so that changes made to one window affect both windows. During the use of this routine, it will often be necessary to call `touchwin(3CURSES)` or `touchline(3CURSES)` on *orig* before calling `prefresh()`.

The `prefresh()` and `pnoutrefresh()` routines are analogous to `wrefresh(3CURSES)` and `wnoutrefresh(3CURSES)` except that they relate to pads instead of windows. The additional parameters are needed to indicate what part of the pad and screen are involved. *pminrow* and *pmincol* specify the upper left-hand corner of the rectangle to be displayed in the pad. *sminrow*, *smincol*, *smaxrow*, and *smaxcol* specify the edges of the rectangle to be displayed on the screen. The lower right-hand corner of the rectangle to be displayed in the pad is calculated from the screen coordinates, since the rectangles must be the same size. Both rectangles must be entirely contained within their respective structures. Negative values of *pminrow*, *pmincol*, *sminrow*, or *smincol* are treated as if they were zero.

The `pechochar()` routine is functionally equivalent to a call to `addch(3CURSES)` followed by a call to `refresh(3CURSES)`, a call to `waddch(3CURSES)` followed by a call to

wrefresh(3CURSES), or a call to waddch(3CURSES) followed by a call to prefresh(). The knowledge that only a single character is being output is taken into consideration and, for non-control characters, a considerable performance gain might be seen by using these routines instead of their equivalents. In the case of pechochar(), the last location of the pad on the screen is reused for the arguments to prefresh().

Return Values Routines that return an integer return ERR upon failure and an integer value other than ERR upon successful completion.

Routines that return pointers return NULL on error.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also addch(3CURSES), curses(3CURSES), refresh(3CURSES), subwin(3CURSES), touchline(3CURSES), touchwin(3CURSES), waddch(3CURSES), wnoutrefresh(3CURSES), wrefresh(3CURSES), attributes(5)

Notes The header file <curses.h> automatically includes the header files <stdio.h>, <unctrl.h> and <widec.h>.

Note that pechochar() may be a macro.

Name curs_printw, printw, wprintw, mvprintw, mvwprintw, vwprintw – print formatted output in curses windows

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int printw(char *fmt, /* arg */ ... );

int wprintw(WINDOW *win, char *fmt, /* arg */ ... );

int mvprintw(int y, int x, char *fmt, /* arg */ ... );

int mvwprintw(WINDOW *win, int y, int x, char *fmt, /* arg */... );

#include <varargs.h>

int vwprintw(WINDOW *win, char *fmt, /* varglist */ ... );
```

Description The `printw()`, `wprintw()`, `mvprintw()`, and `mvwprintw()` routines are analogous to `printf()` (see printf(3C)). In effect, the string that would be output by `printf()` is output instead as though `waddstr()` were used on the given window.

The `vwprintw()` routine is analogous to `vprintf()` (see vprintf(3C)) and performs a `wprintw()` using a variable argument list. The third argument is a `va_list`, a pointer to a list of arguments, as defined in `<varargs.h>`.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), printf(3C), vprintf(3C), attributes(5)

Notes The header `<curses.h>` automatically includes the headers `<stdio.h>` and `<unctrl.h>`.

Name curs_refresh, refresh, wrefresh, wnoutrefresh, doupdate, redrawwin, wredrawln – refresh curses windows and lines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int refresh(void);

int wrefresh(WINDOW *win);

int wnoutrefresh(WINDOW *win);

int doupdate(void);

int redrawwin(WINDOW *win);

int wredrawln(WINDOW *win, int beg_line, int num_lines);
```

Description The `refresh()` and `wrefresh()` routines (or `wnoutrefresh()` and `doupdate()`) must be called to get any output on the terminal, as other routines merely manipulate data structures. The routine `wrefresh()` copies the named window to the physical terminal screen, taking into account what is already there in order to do optimizations. The `refresh()` routine is the same, using `stdscr` as the default window. Unless `leaveok()` has been enabled, the physical cursor of the terminal is left at the location of the cursor for that window.

The `wnoutrefresh()` and `doupdate()` routines allow multiple updates with more efficiency than `wrefresh()` alone. In addition to all the window structures, `curses` keeps two data structures representing the terminal screen: a physical screen, describing what is actually on the screen, and a virtual screen, describing what the programmer wants to have on the screen.

The routine `wrefresh()` works by first calling `wnoutrefresh()`, which copies the named window to the virtual screen, and then calling `doupdate()`, which compares the virtual screen to the physical screen and does the actual update. If the programmer wishes to output several windows at once, a series of calls to `wrefresh()` results in alternating calls to `wnoutrefresh()` and `doupdate()`, causing several bursts of output to the screen. By first calling `wnoutrefresh()` for each window, it is then possible to call `doupdate()` once, resulting in only one burst of output, with fewer total characters transmitted and less CPU time used. If the *win* argument to `wrefresh()` is the global variable `curscr`, the screen is immediately cleared and repainted from scratch.

The `redrawwin()` routine indicates to `curses` that some screen lines are corrupted and should be thrown away before anything is written over them. These routines could be used for programs such as editors, which want a command to redraw some part of the screen or the entire screen. The routine `redrawln()` is preferred over `redrawwin()` where a noisy communication line exists and redrawing the entire window could be subject to even more communication noise. Just redrawing several lines offers the possibility that they would show up unblemished.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curs_outopts(3CURSES), curses(3CURSES), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Note that refresh() and redrawwin() may be macros.

Name curs_scanw, scanw, wscanw, mvscanw, mvwscanw, vwscanw – convert formatted input from a curses widow

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int scanw(char *fmt, /* arg */ ...);

int wscanw(WINDOW *win, char *fmt, /* arg */ ...);

int mvscanw(int y, int x, char *fmt, /* arg */ ...);

int mvwscanw(WINDOW *win, int y, int x, char *fmt, /* arg */...);

int vwscanw(WINDOW *win, char *fmt, va_list varglist);
```

Description The `scanw()`, `wscanw()`, and `mvscanw()` routines correspond to `scanf()` (see `scanf(3C)`). The effect of these routines is as though `wgetstr()` were called on the window, and the resulting line used as input for the scan. Fields which do not map to a variable in the `fmt` field are lost.

The `vwscanw()` routine is similar to `vwprintw()` in that it performs a `wscanw()` using a variable argument list. The third argument is a *va_list*, a pointer to a list of arguments, as defined in `<varargs.h>`.

Return Values `vwscanw()` returns ERR on failure and an integer equal to the number of fields scanned on success.

Applications may interrogate the return value from the `scanw`, `wscanw()`, `mvscanw()`, and `mvwscanw()` routines to determine the number of fields which were mapped in the call.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_getstr(3CURSES)`, `curs_printw(3CURSES)`, `curses(3CURSES)`, `scanf(3C)`, `attributes(5)`

Notes The header `<curses.h>` automatically includes the headers `<stdio.h>` and `<unctrl.h>`.

Name curs_scr_dump, scr_dump, scr_restore, scr_init, scr_set – read or write a curses screen from or to a file

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int scr_dump(char *filename);

int scr_restore(char *filename);

int scr_init(char *filename);

int scr_set(char *filename);
```

Description With the `scr_dump()` routine, the current contents of the virtual screen are written to the file *filename*.

With the `scr_restore()` routine, the virtual screen is set to the contents of *filename*, which must have been written using `scr_dump()`. The next call to `doupdate()` restores the screen to the way it looked in the dump file.

With the `scr_init()` routine, the contents of *filename* are read in and used to initialize the `curses` data structures about what the terminal currently has on its screen. If the data is determined to be valid, `curses` bases its next update of the screen on this information rather than clearing the screen and starting from scratch. `scr_init()` is used after `initscr()` or a `system`(3C) call to share the screen with another process which has done a `scr_dump()` after its `endwin()` call. The data is declared invalid if the time-stamp of the tty is old or the terminfo capabilities `rmcup()` and `nrrmc()` exist.

The `scr_set()` routine is a combination of `scr_restore()` and `scr_init()`. It tells the program that the information in *filename* is what is currently on the screen, and also what the program wants on the screen. This can be thought of as a screen inheritance function.

To read (write) a window from (to) a file, use the `getwin()` and `putwin()` routines (see `curs_util`(3CURSES)).

Return Values All routines return the integer `ERR` upon failure and `OK` upon success.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_initscr`(3CURSES), `curs_refresh`(3CURSES), `curs_util`(3CURSES), `curses`(3CURSES), `system`(3C), `attributes`(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Note that scr_init(), scr_set(), and scr_restore() may be macros.

Name curs_scroll, scroll, scrl, wscrl – scroll a curses window

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int scroll(WINDOW *win);

int scrl(int n);

int wscrl(WINDOW *win, int n);
```

Description With the `scroll()` routine, the window is scrolled up one line. This involves moving the lines in the window data structure. As an optimization, if the scrolling region of the window is the entire screen, the physical screen is scrolled at the same time.

With the `scrl()` and `wscrl()` routines, for positive *n* scroll the window up *n* lines (line *i*+*n* becomes *i*); otherwise scroll the window down *n* lines. This involves moving the lines in the window character image structure. The current cursor position is not changed.

For these functions to work, scrolling must be enabled via `scrollok()`.

Return Values All routines return the integer ERR upon failure and an integer value other than ERR upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_outopts(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Note that `scrl()` and `scroll()` may be macros.

Name curs_set – set visibility of cursor

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int curs_set(int visibility);
```

Description The `curs_set()` function sets the visibility of the cursor to invisible (0), normal (1), or very visible (2). The exact appearance of normal and very visible cursors is terminal dependent.

Parameters *visibility* Is a value of 0 (invisible), 1 (normal), or 2 (very visible).

Return Values If the terminal supports the mode specified by the *visibility* parameter, the `curs_set()` function returns the previous cursor state. Otherwise, it returns ERR.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name curs_slk, slk_init, slk_set, slk_refresh, slk_noutrefresh, slk_label, slk_clear, slk_restore, slk_touch, slk_attron, slk_attrset, slk_attroff – curses soft label routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int slk_init(int fmt);

int slk_set(int labnum, char *label, int fmt);

int slk_refresh(void);

int slk_noutrefresh(void);

char *slk_label(int labnum);

int slk_clear(void);

int slk_restore(void);

int slk_touch(void);

int slk_attron(chtype attrs);

int slk_attrset(chtype attrs);

int slk_attroff(chtype attrs);
```

Description `curses` manipulates the set of soft function-key labels that exist on many terminals. For those terminals that do not have soft labels, `curses` takes over the bottom line of `stdscr`, reducing the size of `stdscr` and the variable `LINES`. `curses` standardizes on eight labels of up to eight characters each.

To use soft labels, the `slk_init()` routine must be called before `initscr()` or `newterm()` is called. If `initscr()` eventually uses a line from `stdscr` to emulate the soft labels, then `fmt` determines how the labels are arranged on the screen. Setting `fmt` to `0` indicates a 3-2-3 arrangement of the labels; `1` indicates a 4-4 arrangement.

With the `slk_set()` routine, *labnum* is the label number, from `1` to `8`. *label* is the string to be put on the label, up to eight characters in length. A null string or a null pointer sets up a blank label. `fmt` is either `0`, `1`, or `2`, indicating whether the label is to be left-justified, centered, or right-justified, respectively, within the label.

The `slk_refresh()` and `slk_noutrefresh()` routines correspond to the `wrefresh()` and `wnoutrefresh()` routines.

With the `slk_label()` routine, the current label for label number *labnum* is returned with leading and trailing blanks stripped.

With the `slk_clear()` routine, the soft labels are cleared from the screen.

With the `slk_restore()` routine, the soft labels are restored to the screen after a `slk_clear()` is performed.

With the `slk_touch()` routine, all the soft labels are forced to be output the next time a `slk_noutrefresh()` is performed.

The `slk_attron()`, `slk_attrset()`, and `slk_attroff()` routines correspond to `attron()`, `attrset()`, and `attroff()`. They have an effect only if soft labels are simulated on the bottom line of the screen.

Return Values Routines that return an integer return `ERR` upon failure and an integer value other than `ERR` upon successful completion.

`slk_label()` returns `NULL` on error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_attr(3CURSES)`, `curs_initscr(3CURSES)`, `curs_refresh(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Most applications would use `slk_noutrefresh()` because a `wrefresh()` is likely to follow soon.

Name curs_termattrs, baudrate, erasechar, has_ic, has_il, killchar, longname, termattrs, termname – curses environment query routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int baudrate(void);

char erasechar(void);

int has_ic(void);

int has_il(void);

char killchar(void);

char *longname(void);

chtype termattrs(void);

char *termname(void);
```

Description The `baudrate()` routine returns the output speed of the terminal. The number returned is in bits per second, for example `9600`, and is an integer.

With the `erasechar()` routine, the user's current erase character is returned.

The `has_ic()` routine is true if the terminal has insert- and delete-character capabilities.

The `has_il()` routine is true if the terminal has insert- and delete-line capabilities, or can simulate them using scrolling regions. This might be used to determine if it would be appropriate to turn on physical scrolling using `scrollok()`.

With the `killchar()` routine, the user's current line kill character is returned.

The `longname()` routine returns a pointer to a static area containing a verbose description of the current terminal. The maximum length of a verbose description is 128 characters. It is defined only after the call to `initscr()` or `newterm()`. The area is overwritten by each call to `newterm()` and is not restored by `set_term()`, so the value should be saved between calls to `newterm()` if `longname()` is going to be used with multiple terminals.

If a given terminal doesn't support a video attribute that an application program is trying to use, `curses` may substitute a different video attribute for it. The `termattrs()` function returns a logical OR of all video attributes supported by the terminal. This information is useful when a `curses` program needs complete control over the appearance of the screen.

The `termname()` routine returns the value of the environment variable `TERM` (truncated to 14 characters).

Return Values `longname()` and `termname()` return `NULL` on error.

Routines that return an integer return `ERR` upon failure and an integer value other than `ERR` upon successful completion.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_initscr(3CURSES)`, `curs_outopts(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `termattrs()` may be a macro.

Name curs_termcap, tgetent, tgetflag, tgetnum, tgetstr, tgoto – curses interfaces (emulated) to the termcap library

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>
#include <term.h>

int tgetent(char *bp, char *name);

int tgetflag(char id[2]);

int tgetnum(char id[2]);

char *tgetstr(char id[2], char **area);

char *tgoto(char *cap, int col, int row);

int tputs(char *str, int affcnt, int (*putc)(void));
```

Description These routines are included as a conversion aid for programs that use the *termcap* library. Their parameters are the same and the routines are emulated using the *terminfo* database. These routines are supported at Level 2 and should not be used in new applications.

The `tgetent()` routine looks up the termcap entry for *name*. The emulation ignores the buffer pointer *bp*.

The `tgetflag()` routine gets the boolean entry for *id*.

The `tgetnum()` routine gets the numeric entry for *id*.

The `tgetstr()` routine returns the string entry for *id*. Use `tputs()` to output the returned string.

The `tgoto()` routine instantiates the parameters into the given capability. The output from this routine is to be passed to `tputs()`.

The `tputs()` routine is described on the `curs_terminfo(3CURSES)` manual page.

Return Values Routines that return an integer return `ERR` upon failure and an integer value other than `ERR` upon successful completion.

Routines that return pointers return `NULL` on error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curs_terminfo(3CURSES), curses(3CURSES), putc(3C), attributes(5)

Notes The header <curses.h> automatically includes the headers <stdio.h> and <unctrl.h>.

Name curs_terminfo, setupterm, setterm, set_curterm, del_curterm, restartterm, tparm, tputs, putp, vidputs, vidattr, mvcur, tigetflag, tigetnum, tigetstr – curses interfaces to terminfo database

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>
#include <term.h>

int setupterm(char *term, int fildes, int *errret);

int setterm(char *term);

int set_curterm(TERMINAL *nterm);

int del_curterm(TERMINAL *oterm);

int restartterm(char *term, int fildes, int *errret);

char *tparm(char *str, long int p1, long int p2, long int p3, long int p4,
     long int p5, long int p6, long int p7, long int p8, long int p9);

int tputs(char *str, int affcnt, int (*putc)(char));

int putp(char *str);

int vidputs(chtype attrs, int (*putc)(char));

int vidattr(chtype attrs);

int mvcur(int oldrow, int oldcol, int newrow, int newcol);

int tigetflag(char *capname);

int tigetnum(char *capname);

char *tigetstr(char *capname);
```

Description These low-level routines must be called by programs that have to deal directly with the *terminfo* database to handle certain terminal capabilities, such as programming function keys. For all other functionality, `curses` routines are more suitable and their use is recommended.

Initially, `setupterm()` should be called. Note that `setupterm()` is automatically called by `initscr()` and `newterm()`. This defines the set of terminal-dependent variables (listed in `terminfo(4)`). The *terminfo* variables `lines` and `columns` are initialized by `setupterm()` as follows: If `use_env(FALSE)` has been called, values for `lines` and `columns` specified in *terminfo* are used. Otherwise, if the environment variables `LINES` and `COLUMNS` exist, their values are used. If these environment variables do not exist and the program is running in a window, the current window size is used. Otherwise, if the environment variables do not exist, the values for `lines` and `columns` specified in the *terminfo* database are used.

The headers `<curses.h>` and `<term.h>` should be included (in this order) to get the definitions for these strings, numbers, and flags. Parameterized strings should be passed through `tparm()` to instantiate them. All *terminfo* strings (including the output of `tparm()`) should be printed with `tputs()` or `putp()`. Call the `reset_shell_mode()` routine to restore the tty modes before exiting (see `curs_kernel(3CURSES)`). Programs which use cursor

addressing should output `enter_ca_mode` upon startup and should output `exit_ca_mode` before exiting. Programs desiring shell escapes should call `reset_shell_mode` and output `exit_ca_mode` before the shell is called and should output `enter_ca_mode` and call `reset_prog_mode` after returning from the shell.

The `setupterm()` routine reads in the *terminfo* database, initializing the *terminfo* structures, but does not set up the output virtualization structures used by `curses`. The terminal type is the character string *term;* if *term* is null, the environment variable `TERM` is used. All output is to file descriptor *fildes* which is initialized for output. If *errret* is not null, then `setupterm()` returns `OK` or `ERR` and stores a status value in the integer pointed to by *errret*. A status of `1` in *errret* is normal, `0` means that the terminal could not be found, and `–1` means that the *terminfo* database could not be found. If *errret* is null, `setupterm()` prints an error message upon finding an error and exits. Thus, the simplest call is:

setupterm((char *)0, 1, (int *)0);,

which uses all the defaults and sends the output to `stdout`.

The `setterm()` routine is being replaced by `setupterm()`. The call:

`setupterm(`*term*, 1, (int *)0)

provides the same functionality as `setterm(`*term*). The `setterm()` routine is included here for compatibility and is supported at Level 2.

The `set_curterm()` routine sets the variable `cur_term` to *nterm*, and makes all of the *terminfo* boolean, numeric, and string variables use the values from *nterm*.

The `del_curterm()` routine frees the space pointed to by *oterm* and makes it available for further use. If *oterm* is the same as `cur_term`, references to any of the *terminfo* boolean, numeric, and string variables thereafter may refer to invalid memory locations until another `setupterm()` has been called.

The `restartterm()` routine is similar to `setupterm()` and `initscr()`, except that it is called after restoring memory to a previous state. It assumes that the windows and the input and output options are the same as when memory was saved, but the terminal type and baud rate may be different.

The `tparm()` routine instantiates the string *str* with parameters *pi*. A pointer is returned to the result of *str* with the parameters applied.

The `tputs()` routine applies padding information to the string *str* and outputs it. The *str* must be a terminfo string variable or the return value from `tparm()`, `tgetstr()`, or `tgoto()`. *affcnt* is the number of lines affected, or 1 if not applicable. *putc* is a `putchar()`-like routine to which the characters are passed, one at a time.

The `putp()` routine calls `tputs(`*str*, 1, putchar). Note that the output of `putpA()` always goes to `stdout`, not to the *fildes* specified in `setupterm()`.

The `vidputs()` routine displays the string on the terminal in the video attribute mode *attrs*, which is any combination of the attributes listed in `curses(3CURSES)`. The characters are passed to the `putchar()`-like routine `putc()` .

The `vidattr()` routine is like the `vidputs()` routine, except that it outputs through `putchar()`.

The `mvcur()` routine provides low-level cursor motion.

The `tigetflag()`, `tigetnum()` and `tigetstr()` routines return the value of the capability corresponding to the *terminfo capname* passed to them, such as `xenl`.

With the `tigetflag()` routine, the value −1 is returned if *capname* is not a boolean capability.

With the `tigetnum()` routine, the value −2 is returned if *capname* is not a numeric capability.

With the `tigetstr()` routine, the value `(char *)`−1 is returned if *capname* is not a string capability.

The *capname* for each capability is given in the table column entitled *capname* code in the capabilities section of `terminfo(4)`.

```
char *boolnames, *boolcodes, *boolfnames
char *numnames, *numcodes, *numfnames
char *strnames, *strcodes, *strfnames
```

These null-terminated arrays contain the *capnames*, the *termcap* codes, and the full C names, for each of the *terminfo* variables.

Return Values All routines return the integer `ERR` upon failure and an integer value other than `ERR` upon successful completion, unless otherwise noted in the preceding routine descriptions.

Routines that return pointers always return `NULL` on error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_initscr(3CURSES)`, `curs_kernel(3CURSES)`, `curs_termcap(3CURSES)`, `curses(3CURSES)`, `putc(3C)`, `terminfo(4)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

The `setupterm()` routine should be used in place of `setterm()`.

Note that `vidattr()` and `vidputs()` may be macros.

Name curs_touch, touchwin, touchline, untouchwin, wtouchln, is_linetouched, is_wintouched – curses refresh control routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

int touchwin(WINDOW *win);

int touchline(WINDOW *win, int start, int count);

int untouchwin(WINDOW *win);

int wtouchln(WINDOW *win, int y, int n, int changed);

int is_linetouched(WINDOW *win, int line);

int is_wintouched(WINDOW *win);
```

Description The `touchwin()` and `touchline()` routines throw away all optimization information about which parts of the window have been touched, by pretending that the entire window has been drawn on. This is sometimes necessary when using overlapping windows, since a change to one window affects the other window, but the records of which lines have been changed in the other window do not reflect the change. The routine `touchline()` only pretends that *count* lines have been changed, beginning with line *start*.

The `untouchwin()` routine marks all lines in the window as unchanged since the last call to `wrefresh()`.

The `wtouchln()` routine makes *n* lines in the window, starting at line *y*, look as if they have (*changed*=`1`) or have not (*changed*=`0`) been changed since the last call to `wrefresh()`.

The `is_linetouched()` and `is_wintouched()` routines return `TRUE` if the specified line/window was modified since the last call to `wrefresh()`; otherwise they return `FALSE`. In addition, `is_linetouched()` returns `ERR` if `line` is not valid for the given window.

Return Values All routines return the integer `ERR` upon failure and an integer value other than `ERR` upon successful completion, unless otherwise noted in the preceding routine descriptions.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_refresh(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that all routines except `wtouchln()` may be macros.

Name curs_util, unctrl, keyname, filter, use_env, putwin, getwin, delay_output, flushinp – curses miscellaneous utility routines

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

char *unctrl(chtype c);

char *keyname(int c);

int filter(void);

void use_env(char bool);

int putwin(WINDOW *win, FILE *filep);

WINDOW *getwin(FILE *filep);

int delay_output(int ms);

int flushinp(void);
```

Description The `unctrl()` macro expands to a character string which is a printable representation of the character *c*. Control characters are displayed in the ^*X* notation. Printing characters are displayed as is.

With the `keyname()` routine, a character string corresponding to the key *c* is returned.

The `filter()` routine, if used, is called before `initscr()` or `newterm()` are called. It makes `curses` think that there is a one-line screen. `curses` does not use any terminal capabilities that assume that they know on what line of the screen the cursor is positioned.

The `use_env()` routine, if used, is called before `initscr()` or `newterm()` are called. When called with `FALSE` as an argument, the values of `lines` and `columns` specified in the *terminfo* database will be used, even if environment variables `LINES` and `COLUMNS` (used by default) are set, or if `curses` is running in a window (in which case default behavior would be to use the window size if `LINES` and `COLUMNS` are not set).

With the `putwin()` routine, all data associated with window *win* is written into the file to which *filep* points. This information can be later retrieved using the `getwin()` function.

The `getwin()` routine reads window related data stored in the file by `putwin()`. The routine then creates and initializes a new window using that data. It returns a pointer to the new window.

The `delay_output()` routine inserts an *ms* millisecond pause in output. This routine should not be used extensively because padding characters are used rather than a CPU pause.

The `flushinp()` routine throws away any typeahead that has been typed by the user and has not yet been read by the program.

Return Values Except for `flushinp()`, routines that return an integer return `ERR` upon failure and an integer value other than `ERR` upon successful completion.

`flushinp()` always returns `OK`.

Routines that return pointers return `NULL` on error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_initscr(3CURSES)`, `curs_scr_dump(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

Note that `unctrl()` is a macro, which is defined in <`unctrl.h`>.

Name curs_window, newwin, delwin, mvwin, subwin, derwin, mvderwin, dupwin, wsyncup, syncok, wcursyncup, wsyncdown – create curses windows

Synopsis

```
cc [ flag ... ] file ... -lcurses [ library ... ]
#include <curses.h>

WINDOW *newwin(int nlines, int ncols, int begin_y, int begin_x);

int delwin(WINDOW *win);

int mvwin(WINDOW *win, int y, int x);

WINDOW *subwin(WINDOW *orig, int nlines, int ncols,
     int begin_y, int begin_x);

WINDOW *derwin(WINDOW *orig, int nlines, int ncols,
     int begin_y, int begin_x);

int mvderwin(WINDOW *win, int par_y, int par_x);

WINDOW *dupwin(WINDOW *win);

void wsyncup(WINDOW *win);

int syncok(WINDOW *win, bool bf);

void wcursyncup(WINDOW *win);

void wsyncdown(WINDOW *win);
```

Description The `newwin()` routine creates and returns a pointer to a new window with the given number of lines, *nlines*, and columns, *ncols*. The upper left-hand corner of the window is at line *begin_y*, column *begin_x*. If either *nlines* or *ncols* is zero, they default to `LINES` — *begin_y* and `COLS` — *begin_x*. A new full-screen window is created by calling `newwin(0,0,0,0)`.

The `delwin()` routine deletes the named window, freeing all memory associated with it. Subwindows must be deleted before the main window can be deleted.

The `mvwin()` routine moves the window so that the upper left-hand corner is at position (*x*, *y*). If the move would cause the window to be off the screen, it is an error and the window is not moved. Moving subwindows is allowed, but should be avoided.

The `subwin()` routine creates and returns a pointer to a new window with the given number of lines, *nlines*, and columns, *ncols*. The window is at position (*begin_y*, *begin_x*) on the screen. (This position is relative to the screen, and not to the window *orig*.) The window is made in the middle of the window *orig*, so that changes made to one window will affect both windows. The subwindow shares memory with the window *orig*. When using this routine, it is necessary to call `touchwin()` or `touchline()` on *orig* before calling `wrefresh()` on the subwindow.

The `derwin()` routine is the same as `subwin()`, except that *begin_y* and *begin_x* are relative to the origin of the window *orig* rather than the screen. There is no difference between the subwindows and the derived windows.

The `mvderwin()` routine moves a derived window (or subwindow) inside its parent window. The screen-relative parameters of the window are not changed. This routine is used to display different parts of the parent window at the same physical position on the screen.

The `dupwin()` routine creates an exact duplicate of the window *win*.

Each `curses` window maintains two data structures: the character image structure and the status structure. The character image structure is shared among all windows in the window hierarchy (that is, the window with all subwindows). The status structure, which contains information about individual line changes in the window, is private to each window. The routine `wrefresh()` uses the status data structure when performing screen updating. Since status structures are not shared, changes made to one window in the hierarchy may not be properly reflected on the screen.

The routine `wsyncup()` causes the changes in the status structure of a window to be reflected in the status structures of its ancestors. If `syncok()` is called with second argument `TRUE` then `wsyncup()` is called automatically whenever there is a change in the window.

The routine `wcursyncup()` updates the current cursor position of all the ancestors of the window to reflect the current cursor position of the window.

The routine `wsyncdown()` updates the status structure of the window to reflect the changes in the status structures of its ancestors. Applications seldom call this routine because it is called automatically by `wrefresh()`.

Return Values Routines that return an integer return the integer `ERR` upon failure and an integer value other than `ERR` upon successful completion.

`delwin()` returns the integer `ERR` upon failure and `OK` upon successful completion.

Routines that return pointers return `NULL` on error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_refresh(3CURSES)`, `curs_touch(3CURSES)`, `curses(3CURSES)`, `attributes(5)`

Notes The header <`curses.h`> automatically includes the headers <`stdio.h`> and <`unctrl.h`>.

If many small changes are made to the window, the `wsyncup()` option could degrade performance.

Note that `syncok()` may be a macro.

Name cur_term – current terminal information

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include -L /usr/xpg4/lib \
-R /usr/xpg4/lib -lcurses [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

extern TERMINAL *cur_term;
```

Description The external variable `cur_term` to identifies the record in the `terminfo` associated with the terminal currently in use.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `set_curterm(3XCURSES)`, `tigetflag(3XCURSES)`, `attributes(5)`, `standards(5)`

Name def_prog_mode, def_shell_mode, reset_prog_mode, reset_shell_mode – save/restore terminal modes

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int def_prog_mode(void);

int def_shell_mode(void);

int reset_prog_mode(void);

int reset_shell_mode(void);
```

Description The `def_prog_mode()` and `def_shell_mode()` functions save the current terminal modes as "program" (within X/Open Curses) or "shell" (outside X/Open Curses). The modes are saved automatically by `initscr(3XCURSES)`, `newterm(3XCURSES)`, and `setupterm(3XCURSES)`.

The `reset_prog_mode()` and `reset_shell_mode()` functions reset the current terminal modes to "program" (within X/Open Curses) or "shell" (outside X/Open Curses). The `endwin(3XCURSES)` function automatically calls the `reset_shell_mode()` function and the `doupdate(3XCURSES)` function calls the `reset_prog_mode()` function after calling `endwin()`.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `endwin(3XCURSES)`, `initscr(3XCURSES)`, `libcurses(3XCURSES)`, `newterm(3XCURSES)`, `setupterm(3XCURSES)`, `attributes(5)`, `standards(5)`

Name delay_output – delays output

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int delay_output(int ms);
```

Description The `delay_output()` function delays output for *ms* milliseconds by inserting pad characters in the output stream.

Parameters *ms* Is the number of milliseconds to delay the output.

Return Values On success, the `delay_output()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `napms(3XCURSES)`, `attributes(5)`, `standards(5)`

Name delch, mvdelch, mvwdelch, wdelch – remove a character

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int delch(void);

int mvdelch(int y, int x);

int mvwdelch(WINDOW *win, int y, int x);

int wdelch(WINDOW *win);
```

Description The `delch()` and `wdelch()` functions delete the character at the current cursor position from `stdscr` and *win*, respectively. All remaining characters after cursor through to the end of the line are shifted one character towards the start of the line. The last character on the line becomes a space; characters on other lines are not affected.

The `mvdelch()` and `mvwdelch()` functions delete the character at the position specified by the *x* and *y* parameters; the former deletes the character from `stdscr`; the latter from *win*.

Parameters

y Is the y (row) coordinate of the position of the character to be removed.

x Is the x (column) coordinate of the position of the character to be removed.

win Is a pointer to the window containing the character to be removed.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `bkgdset(3XCURSES)`, `insch(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name del_curterm, restartterm, set_curterm, setupterm – interfaces to the terminfo database

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <term.h>

int del_curterm(TERMINAL *oterm);

int restartterm(char *term, int fildes, int *errret);

TERMINAL *set_curterm(TERMINAL *nterm);

int setupterm(char *term, int fildes, int *errret);
```

Description Within X/Open Curses, the `setupterm()` function is automatically called by the initscr (3XC) and newterm (3XC) functions. This function can be also be used outside of X/Open Curses when a program has to deal directly with the `terminfo` database to handle certain terminal capabilities. The use of appropriate X/Open Curses functions is recommended in all other situations.

The `setupterm()` function loads terminal-dependent variables for the `terminfo` layer of X/Open Curses. The `setupterm()` function initializes the `terminfo` variables `lines` and `columns` such that if `use_env(FALSE)` has been called, the `terminfo` values assigned in the database are used regardless of the environmental variables `LINES` and `COLUMNS` or the program's window dimensions; when `use_env(TRUE)` has been called, which is the default, the environment variables `LINES` and `COLUMNS` are used, if they exist. If the environment variables do not exist and the program is running in a window, the current window size is used.

The *term* parameter of `setupterm()` specifies the terminal; if null, terminal type is taken from the `TERM` environment variable. All output is sent to *fildes* which is initialized for output. If *errret* is not null, `OK` or `ERR` is returned and a status value is stored in the integer pointed to by *errret*. The following status values may be returned:

Value	Description
`1`	Normal
`0`	Terminal could not be found
`-1`	`terminfo` database could not be found

If *errret* is null, an error message is printed, and the `setupterm()` function calls the `exit()` function with a non-zero parameter.

The `set_curterm()` function sets the `cur_term` variable to *nterm*. The values from *nterm* as well as other state information for the terminal are used by X/Open Curses functions such as

beep(3XCURSES), flash(3XCURSES), mvcur(3XCURSES), tigetflag(3XCURSES), tigetstr(3XCURSES), and tigetnum(3XCURSES).

The del_curterm() function frees the space pointed to by *oterm*. If *oterm* and the cur_term variable are the same, all Boolean, numeric, or string terminfo variables will refer to invalid memory locations until you call setupterm() and specify a new terminal type.

The restartterm() function assumes that a call to setupterm() has already been made (probably from initscr() or newterm()). It allows you to specify a new terminal type in *term* and updates the data returned by baudrate(3XCURSES) based on *fildes*. Other information created by the initscr(), newterm(), and setupterm() functions is preserved.

Parameters

oterm Is the terminal type for which to free space.

term Is the terminal type for which variables are set.

fildes Is a file descriptor initialized for output.

errret Is a pointer to an integer in which the status value is stored.

nterm Is the new terminal to become the current terminal.

Return Values

On success, the set_curterm() function returns the previous value of cur_term. Otherwise, it returns a null pointer.

On success, the other functions return OK. Otherwise, they return ERR.

Errors

None.

Attributes

See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also

baudrate(3XCURSES), beep(3XCURSES), initscr(3XCURSES), libcurses(3XCURSES), mvcur(3XCURSES), tigetflag(3XCURSES), use_env(3XCURSES), attributes(5), standards(5)

Name deleteln, wdeleteln – remove a line

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int deleteln(void);

int wdeleteln(WINDOW *win);
```

Description The `deleteln()` and `wdeleteln()` functions delete the line containing the cursor from `stdscr` and *win*, respectively. All lines below the one deleted are moved up one line. The last line of the window becomes blank. The position of the cursor is unchanged.

Parameters *win* Is a pointer to the window from which the line is removed.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `bkgdset(3XCURSES)`, `insdelln(3XCURSES)`, `insertln(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name delscreen – free space associated with the SCREEN data structure

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

void delscreen(SCREEN *sp);
```

Description The `delscreen()` function frees space associated with the `SCREEN` data structure. This function should be called after `endwin(3XCURSES)` if a `SCREEN` data structure is no longer needed.

Parameters *sp* Is a pointer to the screen structure for which to free space.

Return Values The `delscreen()` function does not return a value.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `endwin(3XCURSES)`, `initscr(3XCURSES)`, `libcurses(3XCURSES)`, `newterm(3XCURSES)`, `attributes(5)`, `standards(5)`

Name delwin – delete a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int delwin(WINDOW *win);
```

Description The `delwin()` function deletes the specified window, freeing up the memory associated with it.

Deleting a parent window without deleting its subwindows and then trying to manipulate the subwindows will have undefined results.

Parameters *win* Is a pointer to the window that is to be deleted.

Return Values On success, this functions returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `derwin`(3XCURSES), `dupwin`(3XCURSES), `libcurses`(3XCURSES), `attributes(5)`, `standards(5)`

Name derwin, newwin, subwin – create a new window or subwindow

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

WINDOW *derwin(WINDOW *orig, int nlines, int ncols,
     int begin_y, int begin_x);

WINDOW *newwin(int nlines, int ncols, int begin_y, int begin_x);

WINDOW *subwin(WINDOW *orig, int nlines, int ncols, int begin_y,
     int begin_x);
```

Description The `derwin()` function creates a subwindow within window *orig*, with the specified number of lines and columns, and upper left corner positioned at *begin_x*, *begin_y* relative to window *orig*. A pointer to the new window structure is returned.

The `newwin()` function creates a new window with the specified number of lines and columns and upper left corner positioned at *begin_x*, *begin_y*. A pointer to the new window structure is returned. A full-screen window can be created by calling `newwin(0,0,0,0)`.

If the number of lines specified is zero, `newwin()` uses a default value of `LINES` minus *begin_y*; if the number of columns specified is zero, `newwin()` uses the default value of `COLS` minus *begin_x*.

The `subwin()` function creates a subwindow within window *orig*, with the specified number of lines and columns, and upper left corner positioned at *begin_x*, *begin_y* (relative to the physical screen, *not* to window *orig*). A pointer to the new window structure is returned.

The original window and subwindow share character storage of the overlapping area (each window maintains its own pointers, cursor location, and other items). This means that characters and attributes are identical in overlapping areas regardless of which window characters are written to.

When using subwindows, it is often necessary to call `touchwin(3XCURSES)` before `wrefresh(3XCURSES)` to maintain proper screen contents.

Parameters

orig	Is a pointer to the parent window for the newly created subwindow.
nlines	Is the number of lines in the subwindow.
ncols	Is the number of columns in the subwindow.
begin_y	Is the y (row) coordinate of the upper left corner of the subwindow, relative to the parent window.

begin_x Is the x (column) coordinate of the upper left corner of the subwindow, relative to the parent window.

Return Values On success, these functions return a pointer to the newly-created window. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also doupdate(3XCURSES), is_linetouched(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name doupdate, refresh, wnoutrefresh, wrefresh – refresh windows and lines

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int doupdate(void);

int refresh(void);

int wnoutrefresh(WINDOW *win);

int wrefresh(WINDOW *win);
```

Description The `refresh()` and `wrefresh()` functions copy `stdscr` and *win*, respectively, to the terminal screen. These functions call the `wnoutrefresh()` function to copy the specified window to `curscr` and the `doupdate()` function to do the actual update. The physical cursor is mapped to the same position as the logical cursor of the last window to update `curscr` unless `leaveok(3XCURSES)` is enabled (in which case, the cursor is placed in a position that X/Open Curses finds convenient).

When outputting several windows at once, it is often more efficient to call the `wnoutrefresh()` and `doupdate()` functions directly. A call to `wnoutrefresh()` for each window, followed by only one call to `doupdate()` to update the screen, results in one burst of output, fewer characters sent, and less CPU time used.

If the *win* parameter to `wrefresh()` is the global variable `curscr`, the screen is immediately cleared and repainted from scratch.

For details on how the `wnoutrefresh()` function handles overlapping windows with broad glyphs, see the `Overlapping Windows` section of the `curses(3XCURSES)` reference manual page.

Parameters *win* Is a pointer to the window in which to refresh.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Standard	See standards(5).

See Also clearok(3XCURSES), curses(3XCURSES), libcurses(3XCURSES), prefresh(3XCURSES), redrawwin(3XCURSES), attributes(5), standards(5)

Name dupwin – duplicate a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

WINDOW *dupwin(WINDOW *win);
```

Description The `dupwin()` function creates a duplicate of window *win*. A pointer to the new window structure is returned.

Parameters *win* Is a pointer to the window that is to be duplicated.

Return Values On success, this function returns a pointer to new window structure; otherwise, it returns a null pointer.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `delwin(3XCURSES)`, `derwin(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name echo, noecho – enable/disable terminal echo

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int echo(void);

int noecho(void);
```

Description The `echo()` function enables Echo mode for the current screen. The `noecho()` function disables Echo mode for the current screen. Initially, curses software echo mode is enabled and hardware echo mode of the `tty` driver is disabled. The `echo()` and `noecho()` functions control software echo only. Hardware echo must remain disabled for the duration of the application, else the behavior is undefined.

Return Values Upon successful completion, these functions return `OK`. Otherwise, they return `ERR`.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `getch`(3XCURSES), `getstr`(3XCURSES), `initscr`(3XCURSES), `libcurses`(3XCURSES), `scanw`(3XCURSES), `attributes(5)`, `standards(5)`

Name echochar, wechochar – add a single-byte character and refresh window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int echochar(const chtype ch);

int wechochar(WINDOW *win, const chtype ch);
```

Description The `echochar()` function produces the same effect as calling `addch`(3XCURSES) and then `refresh`(3XCURSES). The `wechochar()` function produces the same effect as calling `waddch`(3XCURSES) and then `wrefresh`(3XCURSES).

Parameters

ch Is a pointer to the character to be written to the window.

win Is a pointer to the window in which the character is to be added.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `addch`(3XCURSES), `doupdate`(3XCURSES), `echo_wchar`(3XCURSES), `libcurses`(3XCURSES), `attributes`(5), `standards`(5)

Name echo_wchar, wecho_wchar – add a complex character and refresh window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int echo_wchar(const cchar_t *wch);

int wecho_wchar(WINDOW *win, const cchar_t *wch);
```

Description The `echo_wchar()` function produces the same effect as calling `add_wch`(3XCURSES) and then `refresh`(3XCURSES). The `wecho_wchar()` function produces the same effect as calling `wadd_wch`(3XCURSES) and then `wrefresh`(3XCURSES).

Parameters

wch Is a pointer to the complex character to be written to the window.

win Is a pointer to the window in which the character is to be added.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `add_wch`(3XCURSES), `doupdate`(3XCURSES), `echochar`(3XCURSES), `libcurses`(3XCURSES), `attributes`(5), `standards`(5)

Name endwin, isendwin – restore initial terminal environment

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int endwin(void);

bool isendwin(void);
```

Description The `endwin()` function restores the terminal after Curses activity by at least restoring the saved shell terminsl mode, flushing any output to the terminal, and moving the cursor to the first column of the last line of the screen. Refreshing a window resumes program mode. The application must call `endwin()` for each terminal being used before exiting. If `newterm(3XCURSES)` is called more than once for the same terminal, the first screen created must be the last one for which `endwin()` is called.

The `isendiwin()` function indicates whether or not a screen has been refreshed since the last call to `endwin()`.

Return Values Upon successful completion, the `endwin()` function returns `OK`. Otherwise, it returns `ERR`.

The `isendwin()` function returns `TRUE` if `endwin()` has been called without any subsequent refresh. Otherwise, it returns `FALSE`.

Errors Non errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `doupdate(3XCURSES)`, `libcurses(3XCURSES)`, `newterm(3XCURSES)`, `attributes(5)`, `standards(5)`

Name erasechar, erasewchar, killchar, killwchar – return current ERASE or KILL characters

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

char erasechar(void);

int erasewchar(wchar_t *ch);

char killchar(void);

int killwchar(wchar_t *ch);
```

Description The `erasechar()` function returns the current ERASE character from the tty driver. This character is used to delete the previous character during keyboard input. The returned value can be used when including deletion capability in interactive programs.

The `killchar()` function is similar to `erasechar()`. It returns the current KILL character.

The `erasewchar()` and `killwchar()` functions are similar to `erasechar()` and `killchar()` respectively, but store the ERASE or KILL character in the object pointed to by *ch*.

Parameters *ch* Is a pointer to a location where a character may be stored.

Return Values For `erasechar()` and `killchar()`, the terminal's current ERASE or KILL character is returned.

On success, the `erasewchar()` and `killwchar()` functions return `OK`. Otherwise, they return `ERR`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `getch(3XCURSES)`, `getstr(3XCURSES)`, `get_wch(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name filter – disable use of certain terminal capabilities

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

void filter(void);
```

Description The `filter()` function changes how X/Open Curses initializes terminal capabilities that assume the terminal has more than one line. After a call to `filter()`, the `initscr(3XCURSES)` or `newterm(3XCURSES)` functions also:

- Disable use of `clear`, `cud`, `cud1`, `cup`, `cuu1`, and `vpa`.
- Set `home` string to the value of `cr`.
- Set `lines` to 1.

Return Values The `filter()` function does not return a value.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `initscr(3XCURSES)`, `libcurses(3XCURSES)`, `newterm(3XCURSES)`, `attributes(5)`, `standards(5)`

Name flushinp – discard type-ahead characters

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int flushinp(void);
```

Description The `flushinp()` function discards (flushes) any characters in the input buffer associated with the current screen.

Return Values The `flushinp()` function always returns `OK`.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name form_cursor, pos_form_cursor – position forms window cursor

Synopsis

```
cc [ flag... ] file... -lform -lcurses [ library... ]
#include <form.h>

int pos_form_cursor(FORM *form);
```

Description `pos_form_cursor()` moves the form window cursor to the location required by the form driver to resume form processing. This may be needed after the application calls a `curses` library I/O routine.

Return Values `pos_form_cursor()` returns one of the following:

E_OK	Thefunction returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.
E_NOT_POSTED	The form is not posted.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_data, data_ahead, data_behind – tell if forms field has off-screen data ahead or behind

Synopsis

```
cc [ flag ... ] file ... -lform   -lcurses  [ library .. ]
#include <form.h>


int data_ahead(FORM *form);

int data_behind(FORM *form);
```

Description `data_ahead()` returns `TRUE` (1) if the current field has more off-screen data ahead; otherwise it returns `FALSE` (0).

`data_behind()` returns `TRUE` (1) if the current field has more off-screen data behind; otherwise it returns `FALSE` (0).

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_driver – command processor for the forms subsystem

Synopsis

```
cc [ flag... ] file... -lform -lcurses [ library... ]
#include <form.h>

int form_driver(FORM *form, int c);
```

Description The `form_driver()` function is the workhorse of the `forms` subsystem; it checks to determine whether the character *c* is a `forms` request or data. If it is a request, the form driver executes the request and reports the result. If it is data (a printable ASCII character), it enters the data into the current position in the current field. If it is not recognized, the form driver assumes it is an application-defined command and returns `E_UNKNOWN_COMMAND`. Application defined commands should be defined relative to `MAX_COMMAND`, the maximum value of a request listed below.

Form driver requests:

REQ_NEXT_PAGE	Move to the next page.
REQ_PREV_PAGE	Move to the previous page.
REQ_FIRST_PAGE	Move to the first page.
REQ_LAST_PAGE	Move to the last page.
REQ_NEXT_FIELD	Move to the next field.
REQ_PREV_FIELD	Move to the previous field.
REQ_FIRST_FIELD	Move to the first field.
REQ_LAST_FIELD	Move to the last field.
REQ_SNEXT_FIELD	Move to the sorted next field.
REQ_SPREV_FIELD	Move to the sorted prev field.
REQ_SFIRST_FIELD	Move to the sorted first field.
REQ_SLAST_FIELD	Move to the sorted last field.
REQ_LEFT_FIELD	Move left to field.
REQ_RIGHT_FIELD	Move right to field.
REQ_UP_FIELD	Move up to field.
REQ_DOWN_FIELD	Move down to field.
REQ_NEXT_CHAR	Move to the next character in the field.
REQ_PREV_CHAR	Move to the previous character in the field.
REQ_NEXT_LINE	Move to the next line in the field.

REQ_PREV_LINE	Move to the previous line in the field.
REQ_NEXT_WORD	Move to the next word in the field.
REQ_PREV_WORD	Move to the previous word in the field.
REQ_BEG_FIELD	Move to the first char in the field.
REQ_END_FIELD	Move after the last char in the field.
REQ_BEG_LINE	Move to the beginning of the line.
REQ_END_LINE	Move after the last char in the line.
REQ_LEFT_CHAR	Move left in the field.
REQ_RIGHT_CHAR	Move right in the field.
REQ_UP_CHAR	Move up in the field.
REQ_DOWN_CHAR	Move down in the field.
REQ_NEW_LINE	Insert/overlay a new line.
REQ_INS_CHAR	Insert the blank character at the cursor.
REQ_INS_LINE	Insert a blank line at the cursor.
REQ_DEL_CHAR	Delete the character at the cursor.
REQ_DEL_PREV	Delete the character before the cursor.
REQ_DEL_LINE	Delete the line at the cursor.
REQ_DEL_WORD	Delete the word at the cursor.
REQ_CLR_EOL	Clear to the end of the line.
REQ_CLR_EOF	Clear to the end of the field.
REQ_CLR_FIELD	Clear the entire field.
REQ_OVL_MODE	Enter overlay mode.
REQ_INS_MODE	Enter insert mode.
REQ_SCR_FLINE	Scroll the field forward a line.
REQ_SCR_BLINE	Scroll the field backward a line.
REQ_SCR_FPAGE	Scroll the field forward a page.
REQ_SCR_BPAGE	Scroll the field backward a page.
REQ_SCR_FHPAGE	Scroll the field forward half a page.
REQ_SCR_BHPAGE	Scroll the field backward half a page.

REQ_SCR_FCHAR	Horizontal scroll forward a character.
REQ_SCR_BCHAR	Horizontal scroll backward a character
REQ_SCR_HFLINE	Horizontal scroll forward a line.
REQ_SCR_HBLINE	Horizontal scroll backward a line.
REQ_SCR_HFHALF	Horizontal scroll forward half a line.
REQ_SCR_HBHALF	Horizontal scroll backward half a line.
REQ_VALIDATION	Validate field.
REQ_PREV_CHOICE	Display the previous field choice.
REQ_NEXT_CHOICE	Display the next field choice.

Return Values The `form_driver()` function returns one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.
E_NOT_POSTED	The form is not posted.
E_INVALID_FIELD	The field contents are invalid.
E_BAD_STATE	The routine was called from an initialization or termination function.
E_REQUEST_DENIED	The form driver request failed.
E_UNKNOWN_COMMAND	An unknown request was passed to the form driver.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header <`form.h`> automatically includes the headers <`eti.h`> and <`curses.h`>.

Name form_field, set_form_fields, form_fields, field_count, move_field – connect fields to forms

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_form_fields(FORM *form, FIELD **field);

FIELD **form_fields(FORM *form);

int field_count(FORM *form);

int move_field(FIELD *field, int frow, int fcol);
```

Description `set_form_fields()` changes the fields connected to *form* to *fields*. The original fields are disconnected.

`form_fields()` returns a pointer to the field pointer array connected to *form*.

`field_count()` returns the number of fields connected to *form*.

`move_field()` moves the disconnected *field* to the location *frow, fcol* in the `forms` subwindow.

Return Values `form_fields()` returns `NULL` on error.

`field_count()` returns `-1` on error.

`set_form_fields()` and `move_field()` return one of the following:

E_OK	The function returned successfully.
E_CONNECTED	The field is already connected to a form.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect
E_POSTED	The form is posted.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_field_attributes, set_field_fore, field_fore, set_field_back, field_back, set_field_pad, field_pad – format the general display attributes of forms

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_field_fore(FIELD *field, chtype attr);

chtype field_fore(FIELD *field);

int set_field_back(FIELD *field, chtype attr);

chtype field_back(FIELD *field);

int set_field_pad(FIELD *field, int pad);

int field_pad(FIELD *field);
```

Description `set_field_fore()` sets the foreground attribute of *field*. The foreground attribute is the low-level `curses` display attribute used to display the field contents. `field_fore()` returns the foreground attribute of *field*.

`set_field_back()` sets the background attribute of *field*. The background attribute is the low-level `curses` display attribute used to display the extent of the field. `field_back()` returns the background attribute of *field*.

`set_field_pad()` sets the pad character of *field* to *pad*. The pad character is the character used to fill within the field. `field_pad()` returns the pad character of *field*.

Return Values `field_fore()`, `field_back()`, and `field_pad()` return default values if *field* is `NULL`. If *field* is not `NULL` and is not a valid `FIELD` pointer, the return value from these routines is undefined.

`set_field_fore()`, `set_field_back()`, and `set_field_pad()` return one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_field_buffer, set_field_buffer, field_buffer, set_field_status, field_status, set_max_field – set and get forms field attributes

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_field_buffer(FIELD *field, int buf, char *value);

char *field_buffer(FIELD *field, int buf);

int set_field_status(FIELD *field, int status);

int field_status(FIELD *field);

int set_max_field(FIELD *field, int max);
```

Description `set_field_buffer()` sets buffer *buf* of *field* to *value*. Buffer 0 stores the displayed contents of the field. Buffers other than 0 are application specific and not used by the `forms` library routines. `field_buffer()` returns the value of *field* buffer *buf*.

Every field has an associated status flag that is set whenever the contents of field buffer 0 changes. `set_field_status()` sets the status flag of *field* to *status*. `field_status()` returns the status of *field*.

`set_max_field()` sets a maximum growth on a dynamic field, or if *max*=`0` turns off any maximum growth.

Return Values `field_buffer()` returns `NULL` on error.

`field_status()` returns `TRUE` or `FALSE`.

`set_field_buffer()`, `set_field_status()`, and `set_max_field()` return one of the following:

E_OK	Thefunction returned successfully.
E_SYSTEM_ERROR	System error
E_BAD_ARGUMENT	An argument is incorrect.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), forms(3CURSES), attributes(5)

Notes The header <form.h> automatically includes the headers <eti.h> and <curses.h>.

Name form_field_info, field_info, dynamic_field_info – get forms field characteristics

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int field_info(FIELD *field, int *rows, int *cols, int *frow, int *fcol,
     int *nrow, int *nbuf);

int dynamic_field_info(FIELD *field, int *drows, int *dcols, int *max);
```

Description `field_info()` returns the size, position, and other named field characteristics, as defined in the original call to `new_field()`, to the locations pointed to by the arguments *rows*, *cols*, *frow*, *fcol*, *nrow*, and *nbuf*.

`dynamic_field_info()` returns the actual size of the *field* in the pointer arguments *drows*, *dcols* and returns the maximum growth allowed for *field* in *max*. If no maximum growth limit is specified for *field*, *max* will contain 0. A field can be made dynamic by turning off the field option `O_STATIC`.

Return Values These routines return one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_field_just, set_field_just, field_just – format the general appearance of forms

Synopsis

```
cc [ flag... ] file... -lform -lcurses [ library... ]
#include <form.h>


int set_field_just(FIELD *field, int justification);

int field_just(FIELD *field);
```

Description The `set_field_just()` function sets the justification for *field*. Justification can be one of:

```
NO_JUSTIFICATION
JUSTIFY_RIGHT
JUSTIFY_LEFT
JUSTIFY_CENTER
```

The field justification is ignored if *field* is a dynamic field.

The `field_just()` function returns the type of justification assigned to *field*.

Return Values The `field_just()` function returns one of the following:

```
NO_JUSTIFICATION
JUSTIFY_RIGHT
JUSTIFY_LEFT
JUSTIFY_CENTER
```

The `set_field_just()` function returns one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header <form.h> automatically includes the headers <eti.h> and <curses.h>.

Name form_field_new, new_field, dup_field, link_field, free_field – create and destroy forms fields

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

FIELD *new_field(int r, int c, int frow, int fcol, int nrow, int ncol);

FIELD *dup_field(FIELD *field, int frow, int fcol);

FIELD *link_field(FIELD *field, int frow, int fcol);

int free_field(FIELD *field);
```

Description `new_field()` creates a new field with *r* rows and *c* columns, starting at *frow*, *fcol*, in the subwindow of a form. *nrow* is the number of off-screen rows and *nbuf* is the number of additional working buffers. This routine returns a pointer to the new field.

`dup_field()` duplicates *field* at the specified location. All field attributes are duplicated, including the current contents of the field buffers.

`link_field()` also duplicates *field* at the specified location. However, unlike `dup_field()`, the new field shares the field buffers with the original field. After creation, the attributes of the new field can be changed without affecting the original field.

`free_field()` frees the storage allocated for *field*.

Return Values Routines that return pointers return `NULL` on error. `free_field()` returns one of the following:

E_OK	Thefunction returned successfully.
E_CONNECTED	The field is already connected to a form.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_field_opts, set_field_opts, field_opts_on, field_opts_off, field_opts – forms field option routines

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_field_opts(FIELD *field, OPTIONS opts);

int set_field_opts(FIELD *field, OPTIONS opts);

int field_opts_on(FIELD *field, OPTIONS opts);

int field_opts_off(FIELD *field, OPTIONS opts);

OPTIONS field_opts(FIELD *field);
```

Description `set_field_opts()` turns on the named options of *field* and turns off all remaining options. Options are boolean values that can be OR-ed together.

`field_opts_on()` turns on the named options; no other options are changed.

`field_opts_off()` turns off the named options; no other options are changed.

`field_opts()` returns the options set for *field*.

O_VISIBLE	The field is displayed.
O_ACTIVE	The field is visited during processing.
O_PUBLIC	The field contents are displayed as data is entered.
O_EDIT	The field can be edited.
O_WRAP	Words not fitting on a line are wrapped to the next line.
O_BLANK	The whole field is cleared if a character is entered in the first position.
O_AUTOSKIP	Skip to the next field when the current field becomes full.
O_NULLOK	A blank field is considered valid.
O_STATIC	The field buffers are fixed in size.
O_PASSOK	Validate field only if modified by user.

Return Values `set_field_opts`, `field_opts_on` and `field_opts_off` return one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.
E_CURRENT	The field is the current field.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), forms(3CURSES), attributes(5)

Notes The header <form.h> automatically includes the headers <eti.h> and <curses.h>.

Name form_fieldtype, new_fieldtype, free_fieldtype, set_fieldtype_arg, set_fieldtype_choice, link_fieldtype – forms fieldtype routines

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

FIELDTYPE *new_fieldtype(int (* field_check)(FIELD *, char *),
     int (*char_check)(int, char *));

int free_fieldtype(FIELDTYPE *fieldtype);

int set_fieldtype_arg(FIELDTYPE *fieldtype, char *(* mak_arg)(va_list *),
     char *(* copy_arg)(char *), void (* free_arg)(char *));

int set_fieldtype_choice(FIELDTYPE *fieldtype, int (* next_choice)
     (FIELD *, char *), int (*prev_choice)(FIELD *, char *));

FIELDTYPE *link_fieldtype(FIELDTYPE *type1, FIELDTYPE *type2);
```

Description `new_fieldtype()` creates a new field type. The application programmer must write the function *field_check*, which validates the field value, and the function *char_check*, which validates each character. `free_fieldtype()` frees the space allocated for the field type.

By associating function pointers with a field type, `set_fieldtype_arg()` connects to the field type additional arguments necessary for a `set_field_type()` call. Function *mak_arg* allocates a structure for the field specific parameters to `set_field_type()` and returns a pointer to the saved data. Function *copy_arg* duplicates the structure created by *make_arg*. Function *free_arg* frees any storage allocated by *make_arg* or *copy_arg*.

The `form_driver()` requests `REQ_NEXT_CHOICE` and `REQ_PREV_CHOICE` let the user request the next or previous value of a field type comprising an ordered set of values. `set_fieldtype_choice()` allows the application programmer to implement these requests for the given field type. It associates with the given field type those application-defined functions that return pointers to the next or previous choice for the field.

`link_fieldtype()` returns a pointer to the field type built from the two given types. The constituent types may be any application-defined or pre-defined types.

Return Values Routines that return pointers always return `NULL` on error. Routines that return an integer return one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.
E_CONNECTED	Type is connected to one or more fields.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), forms(3CURSES), attributes(5)

Notes The header <form.h> automatically includes the headers <eti.h> and <curses.h>.

Name form_field_userptr, set_field_userptr, field_userptr – associate application data with forms

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_field_userptr(FIELD *field, char *ptr);

char *field_userptr(FIELD *field);
```

Description Every field has an associated user pointer that can be used to store pertinent data. `set_field_userptr()` sets the user pointer of *field*. `field_userptr()` returns the user pointer of *field*.

Return Values `field_userptr()` returns `NULL` on `error`. `set_field_userptr()` returns one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header <form.h> automatically includes the headers <eti.h> and <curses.h>.

Name form_field_validation, set_field_type, field_type, field_arg – forms field data type validation

Synopsis

```
cc [ flag... ] file... -lform -lcurses [ library... ]
#include <form.h>

int set_field_type(FIELD *field, FIELDTYPE *type...);

FIELDTYPE *field_type(FIELD *field);

char *field_arg(FIELD *field);
```

Description `set_field_type()` associates the specified field type with *field*. Certain field types take additional arguments. `TYPE_ALNUM`, for instance, requires one, the minimum width specification for the field. The other predefined field types are: `TYPE_ALPHA`, `TYPE_ENUM`, `TYPE_INTEGER`, `TYPE_NUMERIC`, and `TYPE_REGEXP`.

`field_type()` returns a pointer to the field type of *field*. `NULL` is returned if no field type is assigned.

`field_arg()` returns a pointer to the field arguments associated with the field type of *field*. `NULL` is returned if no field type is assigned.

Return Values `field_type()` and `field_arg()` return `NULL` on error.

`set_field_type()` returns one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_hook, set_form_init, form_init, set_form_term, form_term, set_field_init, field_init, set_field_term, field_term – assign application-specific routines for invocation by forms

Synopsis

```
cc [ flag... ] file... -lform -lcurses [ library... ]
#include <form.h>


int set_form_init(FORM *form, void (*func)(FORM*));

void (*form_init)(FORM *form);

int set_form_term(FORM *form, void (*func)(FORM*));

void (*form_term)(FORM *form);

int set_field_init(FORM *form, void (*func)(FORM*));

void (*field_init)(FORM *form);

int set_field_term(FORM *form, void (*func)(FORM*));

void (*field_term)(FORM *form);
```

Description These routines allow the programmer to assign application specific routines to be executed automatically at initialization and termination points in the `forms` application. The user need not specify any application-defined initialization or termination routines at all, but they may be helpful for displaying messages or page numbers and other chores.

`set_form_init()` assigns an application-defined initialization function to be called when the *form* is posted and just after a page change. `form_init()` returns a pointer to the initialization function, if any.

`set_form_term()` assigns an application-defined function to be called when the *form* is unposted and just before a page change. `form_term()` returns a pointer to the function, if any.

`set_field_init()` assigns an application-defined function to be called when the *form* is posted and just after the current field changes. `field_init()` returns a pointer to the function, if any.

`set_field_term()` assigns an application-defined function to be called when the *form* is unposted and just before the current field changes. `field_term()` returns a pointer to the function, if any.

Return Values Routines that return pointers always return `NULL` on error. Routines that return an integer return one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), forms(3CURSES), attributes(5)

Notes The header <form.h> automatically includes the headers <eti.h> and <curses.h>.

Name form_new, new_form, free_form – create and destroy forms

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

FORM *new_form(FIELD **fields);

int free_form(FORM *form);
```

Description `new_form()` creates a new form connected to the designated fields and returns a pointer to the form.

`free_form()` disconnects the *form* from its associated field pointer array and deallocates the space for the form.

Return Values `new_form()` always returns `NULL` on error. `free_form()` returns one of the following:

E_OK	The function returned successfully.
E_BAD_ARGUMENT	An argument is incorrect.
E_POSTED	The form is posted.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_new_page, set_new_page, new_page – forms pagination

Synopsis

```
cc [ flag... ] file... -lform -lcurses [ library... ]
#include <form.h>

int set_new_page(FIELD *field, int bool);

int new_page(FIELD *field);
```

Description `set_new_page()` marks *field* as the beginning of a new page on the form.

`new_page()` returns a boolean value indicating whether or not *field* begins a new page of the form.

Return Values `new_page` returns `TRUE` or `FALSE`.

`set_new_page()` returns one of the following:

E_OK	The function returned successfully.
E_CONNECTED	The field is already connected to a form.
E_SYSTEM_ERROR	System error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_opts, set_form_opts, form_opts_on, form_opts_off – forms option routines

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_form_opts(FORM *form, OPTIONS opts);

int form_opts_on(FORM *form, OPTIONS opts);

int form_opts_off(FORM *form, OPTIONS opts);

OPTIONS form_opts(FORM *form);
```

Description `set_form_opts()` turns on the named options for *form* and turns off all remaining options. Options are boolean values which can be OR-ed together.`form_opts_on()` turns on the named options; no other options are changed.`form_opts_off()` turns off the named options; no other options are changed.

`form_opts()` returns the options set for *form*.

O_NL_OVERLOAD Overload the `REQ_NEW_LINE` form driver request.

O_BS_OVERLOAD Overload the `REQ_DEL_PREV` form driver request.

Return Values `set_form_opts()`, `form_opts_on()`, and `form_opts_off()` return one of the following:

E_OK The function returned successfully.

E_SYSTEM_ERROR System error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_page, set_form_page, set_current_field, current_field, field_index – set forms current page and field

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_form_page(FORM *form, int page);

int form_page(FORM *form);

int set_current_field(FORM *form, FIELD *field);

FIELD *current_field(FORM*form);

int field_index(FIELD *field);
```

Description `set_form_page()` sets the page number of *form* to `page`. `form_page()` returns the current page number of *form*.

`set_current_field()` sets the current field of *form* to *field*. `current_field()` returns a pointer to the current field of *form*.

`field_index()` returns the index in the field pointer array of *field*.

Return Values `form_page()` returns `-1` on error.

`current_field()` returns `NULL` on error.

`field_index()` returns `-1` on error.

`set_form_page()` and `set_current_field()` return one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.
E_BAD_STATE	The routine was called from an initialization or termination function.
E_INVALID_FIELD	The field contents are invalid.
E_REQUEST_DENIED	The form driver request failed

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), forms(3CURSES), attributes(5)

Notes The header <form.h> automatically includes the headers <eti.h> and <curses.h>.

Name form_post, post_form, unpost_form – write or erase forms from associated subwindows

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int post_form(FORM *form);

int unpost_form(FORM *form);
```

Description `post_form()` writes *form* into its associated subwindow. The application programmer must use `curses` library routines to display the form on the physical screen or call `update_panels()` if the `panels` library is being used.

`unpost_form()` erases *form* from its associated subwindow.

Return Values These routines return one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.
E_POSTED	The form is posted.
E_NOT_POSTED	The form is not posted.
E_NO_ROOM	The form does not fit in the subwindow.
E_BAD_STATE	The routine was called from an initialization or termination function.
E_NOT_CONNECTED	The field is not connected to a form.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `panel_update(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name forms – character based forms package

Synopsis

```
#include <form.h>
```

Description The `form` library is built using the `curses` library, and any program using `forms` routines must call one of the `curses` initialization routines such as `initscr`. A program using these routines must be compiled with `-lform` and `-lcurses` on the `cc` command line.

The `forms` package gives the applications programmer a terminal-independent method of creating and customizing forms for user-interaction. The `forms` package includes: field routines, which are used to create and customize fields, link fields and assign field types; fieldtype routines, which are used to create new field types for validating fields; and form routines, which are used to create and customize forms, assign pre/post processing functions, and display and interact with forms.

Current Default Values for Field Attributes

The `forms` package establishes initial current default values for field attributes. During field initialization, each field attribute is assigned the current default value for that attribute. An application can change or retrieve a current default attribute value by calling the appropriate set or retrieve routine with a `NULL` field pointer. If an application changes a current default field attribute value, subsequent fields created using `new_field()` will have the new default attribute value. (The attributes of previously created fields are not changed if a current default attribute value is changed.)

Routine Name Index

The following table lists each `forms` routine and the name of the manual page on which it is described.

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field_buffer	form_field_buffer(3X)
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set_field_just	form_field_just(3X)
set_field_opts	form_field_opts(3X)
set_field_pad	form_field_attributes(3X)
set_field_status	form_field_buffer(3X)
set_field_term	form_hook(3X)
set_field_type	form_field_validation(3X)
set_field_userptr	form_field_userptr(3X)
set_fieldtype_arg	form_fieldtype(3X)
set_fieldtype_choice	form_fieldtype(3X)
set_form_fields	form_field(3X)
set_form_init	form_hook(3X)
set_form_opts	form_opts(3X)
set_form_page	form_page(3X)
set_form_sub	form_win(3X)
set_form_term	form_hook(3X)
set_form_userptr	form_userptr(3X)
set_form_win	form_win(3X)
set_max_field	form_field_buffer(3X)
set_new_page	form_new_page(3X)
unpost_form	form_post(3X)

Return Values Routines that return a pointer always return `NULL` on error. Routines that return an integer return one of the following:

`E_OK`	The function returned successfully.
`E_CONNECTED`	The field is already connected to a form.
`E_SYSTEM_ERROR`	System error.
`E_BAD_ARGUMENT`	An argument is incorrect.
`E_CURRENT`	The field is the current field.
`E_POSTED`	The form is posted.
`E_NOT_POSTED`	The form is not posted.
`E_INVALID_FIELD`	The field contents are invalid.
`E_NOT_CONNECTED`	The field is not connected to a form.
`E_NO_ROOM`	The form does not fit in the subwindow.
`E_BAD_STATE`	The routine was called from an initialization or termination function.
`E_REQUEST_DENIED`	The form driver request failed.
`E_UNKNOWN_COMMAND`	An unknown request was passed to the form driver.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_userptr, set_form_userptr – associate application data with forms

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_form_userptr(FORM *form, char *ptr);

char *form_userptr(FORM *form);
```

Description Every form has an associated user pointer that can be used to store pertinent data. `set_form_userptr()` sets the user pointer of *form*. `form_userptr()` returns the user pointer of *form*.

Return Values `form_userptr()` returns `NULL` on error. `set_form_userptr()` returns one of the following:

E_OK	The function returned successfully.
E_SYSTEM_ERROR	System error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name form_win, set_form_win, set_form_sub, form_sub, scale_form – forms window and subwindow association routines

Synopsis

```
cc [ flag... ] file... -lform  -lcurses  [ library... ]
#include <form.h>

int set_form_win(FORM *form, WINDOW *win);

WINDOW *form_win(FORM *form);

int set_form_sub(FORM *form, WINDOW *sub);

WINDOW *form_sub(FORM *form);

int scale_form(FORM *form, int *rows, int *cols);
```

Description `set_form_win()` sets the window of *form* to *win*. `form_win()` returns a pointer to the window associated with *form*.`set_form_sub()` sets the subwindow of *form* to *sub*. `form_sub()` returns a pointer to the subwindow associated with *form*.`scale_form()` returns the smallest window size necessary for the subwindow of *form*. *rows* and *cols* are pointers to the locations used to return the number of rows and columns for the form.

Return Values Routines that return pointers always return `NULL` on error. Routines that return an integer return one of the following:

E_OK	The function returnedsuccessfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An argument is incorrect.
E_NOT_CONNECTED	The field is not connected to a form.
E_POSTED	The form is posted.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `forms(3CURSES)`, `attributes(5)`

Notes The header `<form.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name getbegyx, getmaxyx, getparyx, getyx – get cursor or window coordinates

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

void getbegyx(WINDOW *win, int y, int x);

void getmaxyx(WINDOW *win, int y, int x);

void getparyx(WINDOW *win, int y, int x);

void getyx(WINDOW *win, int y, int x);
```

Description The `getyx()` macro stores the current cursor position of the specified window in *x* and *y*.

The `getparyx()` macro stores the *x* and *y* coordinates (relative to the parent window) of the specified window's origin (upper-left corner). If *win* does not point to a subwindow, *x* and *y* are set to −1.

The `getbegyx()` macro stores the *x* and *y* coordinates of the specified window's origin (upper-left corner).

The `getmaxyx()` macro stores the numbers of rows in the specified window in *y* and the number of columns in *x*.

Parameters

win Is a pointer to a window.

y stores the *y* coordinate for the cursor or origin. The `getmaxyx()` macro uses it to store the number of rows in the window.

x stores the *x* coordinate for the cursor or origin. The `getmaxyx()` macro uses it to store the number of columns in the window.

Return Values These macros do not return a value.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also libcurses(3XCURSES), attributes(5), standards(5)

Name getcchar – get a wide character string (with rendition) from a cchar_t

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int getcchar(const cchar_t *wcval, wchar_t *wch, attr_t *attrs,
     short *color_pair,void *opt);
```

Description If *wch* is not a null pointer, the `getcchar()` function splits the `cchar_t` object pointed to by *wcval* into a wide character string, attributes, and a color pair. It stores the attributes in the location pointed to by *attrs*, the color pair in the location pointed to by *color_pair*, and the wide character string in the location pointed to by *wch*.

If *wch* is a null pointer, the `getcchar()` function simply returns the number of wide characters in the `cchar_t` object pointed to by *wcval*. The objects pointed to by *attrs* and *color_pair* are not changed.

Parameters

wcval	Is a pointer to a `cchar_t` object.
wch	Is a pointer to an object where a wide character string can be stored.
attrs	Is a pointer to an object where attributes can be stored.
color_pair	Is a pointer to an object where a color pair can be stored.
opts	Is reserved for future use. Currently, this must be a null pointer.

Return Values When *wch* is a null pointer, the `getcchar()` function returns the number of wide characters in the string pointed to by *wcval* including the null terminator.

When *wch* is not a null pointer, the `getcchar()` function returns `OK` on success and `ERR` otherwise.

Errors None

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also attroff(3XCURSES), can_change_color(3XCURSES), libcurses(3XCURSES), setcchar(3XCURSES), attributes(5), standards(5)

Name getch, wgetch, mvgetch, mvwgetch – get a single-byte character from the terminal

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int getch(void);

int wgetch(WINDOW *win);

int mvgetch(int y, int x);

int mvwgetch(WINDOW *win, int y, int x);
```

Parameters

win Is a pointer to the window associated with the terminal from which the character is to be read.

y Is the y (row) coordinate for the position of the character to be read.

x Is the x (column) coordinate for the position of the character to be read.

Description These functions read a single-byte character from the terminal associated with the current or specified window. The results are unspecified if the input is not a single-byte character. If keypad(3XCURSES) is enabled, these functions respond to the pressing of a function key by returning the corresponding KEY_ value defined in <curses.h>

Processing of terminal input is subject to the general rules described on the keypad(3XCURSES) manual page.

If echoing is enabled, then the character is echoed as though it were provided as an input argument to addch(3XCURSES), except for the following characters:

<backspace> The input is interpreted as follows: unless the cursor already was in column 0, <backspace> moves the cursor one column toward the start of the current line and any characters after the <backspace> are added or inserted starting there. The character at the resulting cursor position it then deleted as though delch(3XCURSES) were called, except that if the cursor was originally in the first column of the line, the user is alerted as though beep(3XCURSES) were called.

Function keys The user is alerted as though beep() were called. Information concerning the function keys is not returned to the caller.

If the current or specified window is not a pad, and it has been moved modified since the last refresh operation, then it will be refreshed before another character is read.

Constant Values for Function Keys

The following is a list of tokens for function keys that are returned by the `getch()` set of functions if keypad handling is enabled (some terminals may not support all tokens).

Constant	Description
KEY_BREAK	Break key
KEY_DOWN	The down arrow key
KEY_UP	The up arrow key
KEY_LEFT	The left arrow key
KEY_RIGHT	The right arrow key
KEY_HOME	Home key
KEY_BACKSPACE	Backspace
KEY_F0	Function keys. Space for 64 keys is reserved.
KEY_F(*n*)	For 0 <= *n* <= 63
KEY_DL	Delete line
KEY_IL	Insert line
KEY_DC	Delete character
KEY_IC	Insert char or enter insert mode
KEY_EIC	Exit insert char mode
KEY_CLEAR	Clear screen
KEY_EOS	Clear to end of screen
KEY_EOL	Clear to end of line
KEY_SF	Scroll 1 line forward
KEY_SR	Scroll 1 line backwards
KEY_NPAGE	Next page
KEY_PPAGE	Previous page
KEY_STAB	Set tab
KEY_CTAB	Clear tab
KEY_CATAB	Clear all tabs
KEY_ENTER	Enter or send
KEY_SRESET	Soft (partial) reset

Constant	Description
KEY_RESET	Reset or hard reset
KEY_PRINT	Print or copy
KEY_LL	Home down or bottom (lower left)
KEY_A1	Upper left of keypad
KEY_A3	Upper right of keypad
KEY_B2	Center of keypad
KEY_C1	Lower left of keypad
KEY_C3	Lower right of keypad
KEY_BTAB	Back tab
KEY_BEG	Beginning key
KEY_CANCEL	Cancel key
KEY_CLOSE	Close key
KEY_COMMAND	Cmd (command) key
KEY_COPY	Copy key
KEY_CREATE	Create key
KEY_END	End key
KEY_EXIT	Exit key
KEY_FIND	Find key
KEY_HELP	Help key
KEY_MARK	Mark key
KEY_MESSAGE	Message key
KEY_MOVE	Move key
KEY_NEXT	Next object key
KEY_OPEN	Open key
KEY_OPTIONS	Options key
KEY_PREVIOUS	Previous object key
KEY_REDO	Redo key
KEY_REFERENCE	Reference key

Constant	Description
KEY_REFRESH	Refresh key
KEY_REPLACE	Replace key
KEY_RESTART	Restart key
KEY_RESUME	Resume key
KEY_SAVE	Save key
KEY_SBEG	Shifted beginning key
KEY_SCANCEL	Shifted cancel key
KEY_SCOMMAND	Shifted command key
KEY_SCOPY	Shifted copy key
KEY_SCREATE	Shifted create key
KEY_SDC	Shifted delete char key
KEY_SDL	Shifted delete line key
KEY_SELECT	Select key
KEY_SEND	Shifted end key
KEY_SEOL	Shifted clear line key
KEY_SEXIT	Shifted exit key
KEY_SFIND	Shifted find key
KEY_SHELP	Shifted help key
KEY_SHOME	Shifted home key
KEY_SIC	Shifted input key
KEY_SLEFT	Shifted left arrow key
KEY_SMESSAGES	Shifted messages key
KEY_SMOVE	Shifted move key
KEY_SNEXT	Shifted next key
KEY_SOPTIONS	Shifted options key
KEY_SPREVIOUS	Shifted previous key
KEY_SPRINT	Shifted print key
KEY_SREDO	Shifted redo key

Constant	Description
KEY_SREPLACE	Shifted replace key
KEY_SRIGHT	Shifted right arrow key
KEY_SRSUME	Shifted resume key
KEY_SSAVE	Shifted save key
KEY_SSUSPEND	Shifted suspend key
KEY_SUNDO	Shifted undo key
KEY_SUSPEND	Suspend key
KEY_UNDO	Undo key

Return Values Upon successful completion, these functions return the single-byte character, KEY_ value, or ERR. When in the nodelay mode and no data is available, ERR is returned.

Errors No errors are defined.

USAGE Applications should not define the escape key by itself as a single-character function.

When using these functions, nocbreak mode (cbreak(3XCURSES)) and echo mode (echo(3XCURSES)) should not be used at the same time. Depending on the state of the terminal when each character is typed, the application may produce undesirable results.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also cbreak(3XCURSES), echo(3XCURSES), halfdelay(3XCURSES), keypad(3XCURSES), libcurses(3XCURSES), nodelay(3XCURSES), notimeout(3XCURSES), raw(3XCURSES), timeout(3XCURSES), attributes(5), standards(5)

Name getnstr, getstr, mvgetnstr, mvgetstr, mvwgetnstr, mvwgetstr, wgetnstr, wgetstr – get a multibyte character string from terminal

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int getnstr(char *str, int n);

int getstr(char *str);

int mvgetnstr(int y, int x, char *str, int n);

int mvgetstr(int y, int x, char *str);

int mvwgetnstr(WINDOW *win, int y, int x, char *str, int n);

int mvwgetstr(WINDOW *win, int y, int x, char *str);

int wgetnstr(WINDOW *win, char *str, int n);

int wgetstr(WINDOW *win, char *str);
```

Description The `getstr()` and `wgetstr()` functions get a character string from the terminal associated with the window `stdscr` or window *win*, respectively. The `mvgetstr()` and `mvwgetstr()` functions move the cursor to the position specified in `stdscr` or *win*, respectively, then get a character string.

These functions call `wgetch(3XCURSES)` and place each received character in *str* until a newline is received, which is also placed in *str*. The erase and kill characters set by the user are processed.

The `getnstr()`, `mvgetnstr()`, `mvwgetnstr()` and `wgetnstr()` functions read at most *n* characters. These functions are used to prevent overflowing the input buffer.

The `getnstr()`, `wgetnstr()`, `mvgetnstr()`, and `mvwgetnstr()` functions only return complete multibyte characters. If the area pointed to by *str* is not large enough to hold at least one character, these functions fail.

Parameters

str Is a pointer to the area where the character string is to be placed.

n Is the maximum number of characters to read from input.

y Is the y (row) coordinate of starting position of character string to be read.

x Is the x (column) coordinate of starting position of character string to be read.

win Points to the window associated with the terminal from which the character is to be read.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also getch(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name getn_wstr, get_wstr, mvgetn_wstr, mvget_wstr, mvwgetn_wstr, mvwget_wstr, wgetn_wstr, wget_wstr – get a wide character string from terminal

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int getn_wstr(wint_t *wstr, int n);

int get_wstr(wint_t *wstr);

int mvgetn_wstr(int y, int x, wint_t *wstr, int n);

int mvget_wstr(int y, int x, wint_t *wstr);

int mvwgetn_wstr(WINDOW *win, int y, int x, wint_t *wstr, int n);

int mvwget_wstr(WINDOW *win, int y, int x, wint_t *wstr);

int wgetn_wstr(WINDOW *win, wint_t *wstr, int n);

int wget_wstr(WINDOW *win, wint_t *wstr);
```

Description The `get_wstr()` and `wget_wstr()` functions get a wide character string from the terminal associated with the window `stdscr` or window *win*, respectively. The `mvget_str()` and `mvwget_wstr()` functions move the cursor to the position specified in `stdscr` or *win*, respectively, then get a wide character string.

These functions call `wget_wch(3XCURSES)` and place each received character in *wstr* until a newline character, end-of-line character, or end-of-file character is received, which is also placed in *wstr*. The erase and kill characters set by the user are processed.

The `getn_wstr()`, `mvgetn_wstr()`, `mvwgetn_wstr()` and `wgetn_wstr()` functions read at most *n* characters. These functions are used to prevent overflowing the input buffer.

Parameters

wstr	Is a pointer to the area where the character string is to be placed.
n	Is the maximum number of characters to read from input.
y	Is the y (row) coordinate of starting position of character string to be read.
x	Is the x (column) coordinate of starting position of character string to be read.
win	points to the window associated with the terminal from which the character is to be read.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also get_wch(3XCURSES), getnstr(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name get_wch, wget_wch, mvget_wch, mvwget_wch – get a wide character from terminal

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int get_wch(wint_t *ch);

int wget_wch(WINDOW *win, wint_t *ch);

int mvget_wch(int y, int x, wint_t *ch);

int mvwget_wch(WINDOW *win, int y, int x, wint_t *ch);
```

Description The `get_wch()` and `wget_wch()` functions get a wide character from the terminal associated with the window `stdscr` or window *win*, respectively. The `mvget_wch()` and `mvwget_wch()` functions move the cursor to the position specified in `stdscr` or *win*, respectively, then get a character.

If the window is not a pad and has been changed since the last call to `refresh`(3XCURSES), `get_wch()` calls `refresh()` to update the window before the next character is read.

The setting of certain functions affects the behavior of the `get_wch()` set of functions. For example, if `cbreak`(3XCURSES) is set, characters typed by the user are immediately processed. If `halfdelay`(3XCURSES) is set, `get_wch()` waits until a character is typed or returns `ERR` if no character is typed within the specified timeout period. This timeout can also be specified for individual windows with the *delay* parameter of `timeout`(3XCURSES) A negative value waits for input; a value of `0` returns `ERR` if no input is ready; a positive value blocks until input arrives or the time specified expires (in which case `ERR` is returned). If `nodelay`(3XCURSES) is set, `ERR` is returned if no input is waiting; if not set, `get_wch()` waits until input arrives. Each character will be echoed to the window unless `noecho`(3XCURSES) has been set.

If keypad handling is enabled (`keypad`(3XCURSES) is `TRUE`), the token for the function key (a `KEY_` value) is stored in the object pointed to by *ch* and `KEY_CODE_YES` is returned. If a character is received that could be the beginning of a function key (for example, ESC), an inter-byte timer is set. If the remainder of the sequence is not received before the time expires, the character is passed through; otherwise, the value of the function key is returned. If `notimeout()` is set, the inter-byte timer is not used.

The ESC key is typically a prefix key used with function keys and should not be used as a single character.

See the `getch`(3XCURSES) manual page for a list of tokens for function keys that are returned by the `get_wch()` set of functions if keypad handling is enabled (Some terminals may not support all tokens).

Parameters

ch Is a pointer to a wide integer where the returned wide character or KEY_ value can be stored.

win Is a pointer to the window associated with the terminal from which the character is to be read.

y Is the y (row) coordinate for the position of the character to be read.

x Is the x (column) coordinate for the position of the character to be read.

Return Values

When these functions successfully report the pressing of a function key, they return KEY_CODE_YES. When they successfully report a wide character, they return OK. Otherwise, they return ERR.

Errors

None.

Attributes

See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also

cbreak(3XCURSES), echo(3XCURSES), halfdelay(3XCURSES), keypad(3XCURSES), libcurses(3XCURSES), nodelay(3XCURSES), notimeout(3XCURSES), raw(3XCURSES), timeout(3XCURSES), attributes(5), standards(5)

Name getwin, putwin – read a window from, and write a window to, a file

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

WINDOW *getwin(FILE *filep);

int putwin(WINDOW *win, FILE *filep);
```

Description The `getwin()` function reads window-related data (written earlier by `putwin()`) from the `stdio` stream pointed to by *filep*. It then creates and initializes a new window using that data.

The `putwin()` function writes all the data associated with the window pointed to by *win* to the `stdio` stream pointed to by *filep*. The `getwin()` function can later retrieve this data.

Parameters

filep Is a pointer to a `stdio` stream.

win Is a pointer to a window.

Return Values On success, the `getwin()` function returns a pointer to the new window created. Otherwise, it returns a null pointer.

On success, the `putwin()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `scr_dump(3XCURSES)`, `attributes(5)`, `standards(5)`

Name halfdelay – enable/disable half-delay mode

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int halfdelay(int tenths);
```

Description The `halfdelay()` function is similar to `cbreak(3XCURSES)` in that when set, characters typed by the user are immediately processed by the program. The difference is that `ERR` is returned if no input is received after *tenths* tenths seconds.

The `nocbreak(3XCURSES)` function should be used to leave half-delay mode.

Parameters *tenths* Is the number of tenths of seconds for which to block input (1 to 255).

Return Values On success, the `halfdelay()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `cbreak(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name has_ic, has_il – determine insert/delete character/line capability

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

bool has_ic(void);

bool has_il(void);
```

Description The `has_ic()` function determines whether or not the terminal has insert/delete character capability.

The `has_il()` function determines whether or not the terminal has insert/delete line capability.

Return Values The `has_ic()` function returns `TRUE` if the terminal has insert/delete character capability and `FALSE` otherwise.

The `has_il()` function returns `TRUE` if the terminal has insert/delete line capability and `FALSE` otherwise.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name hline, mvhline, mvvline, mvwhline, mvwvline, vline, whline, wvline – use single-byte characters (and renditions) to draw lines

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int hline(chtype ch, int n);

int mvhline(int y, int x, chtype ch, int n);

int mvvline(int y, int x, chtype ch, int n);

int mvwhline(WINDOW *win, int y, int x, chtype ch, int n);

int mvwvline(WINDOW *win, int y, int x, chtype ch, int n);

int vline(chtype ch, int n);

int whline(WINDOW *win, chtype ch, int n);

int wvline(WINDOW *win, chtype ch, int n);
```

Description The `hline()`, `vline()`, `whline()`, `wvline()` functions draw a horizontal or vertical line, in either the window `stdscr` or *win* starting at the current cursor position. The line is drawn using the character *ch* and is a maximum of *n* positions long, or as many as will fit into the window. If *ch* is 0 (zero), the default horizontal or vertical character is used.

The `mvhline()`, `mvvline()`, `mvwhline()`, `mvwvline()` functions are similar to the previous group of functions but the line begins at cursor position specified by *x* and *y*.

The functions with names ending with `hline()` draw horizontal lines proceeding towards the last column of the same line. The functions with names ending with `vline()` draw vertical lines proceeding towards the last column of the same line.

These functions do not change the position of the cursor.

Parameters

ch Is the character used to draw the line.

n Is the maximum number of characters in the line.

y Is the y (row) coordinate for the start of the line.

x Is the x (column) coordinate for the start of the line.

win Is a pointer to a window.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also border(3XCURSES), border_set(3XCURSES), hline_set(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name hline_set, mvhline_set, mvvline_set, mvwhline_set, mvwvline_set, vline_set, whline_set, wvline_set – use complex characters (and renditions) to draw lines

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int hline_set(const cchar_t *ch, int n);

int mvhline_set(int y, int x, const cchar_t *wch, int n);

int mvvline_set(int y, int x, const cchar_t *wch, int n);

int mvwhline_set(WINDOW *win, int y, int x, const cchar_t *wch, int n);

int mvwvline_set(WINDOW *win, int y, int x, const cchar_t *wch, int n);

int vline_set(const cchar_t *wch, int n);

int whline_set(WINDOW *win, const cchar_t *wch, int n);

int wvline_set(WINDOW *win, const cchar_t *wch, int n);
```

Description The `hline_set()`, `vline_set()`, `whline_set()`, `wvline_set()` functions draw a line, in either the window `stdscr` or *win* starting at the current cursor position. The line is drawn using the character *wch* and is a maximum of *n* positions long, or as many as will fit into the window. If *wch* is a null pointer, the default horizontal or vertical character is used.

The `mvhline_set()`, `mvvline_set()`, `mvwhline_set()`, `mvwvline_set()` functions are similar to the previous group of functions but the line begins at cursor position specified by *x* and *y*.

The functions with names ending with `hline_set()` draw horizontal lines proceeding towards the last column of the same line. The functions with names ending with `vline_set()` draw vertical lines proceeding towards the last column of the same line.

These functions do not change the position of the cursor.

Parameters

wch Is the complex character used to draw the line.

n Is the maximum number of characters in the line.

y Is the y (row) coordinate for the start of the line.

x Is the x (column) coordinate for the start of the line.

win Is a pointer to a window.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also border(3XCURSES), border_set(3XCURSES), hline(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name idcok – enable/disable hardware insert-character and delete-character features

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

void idcok(WINDOW *win, bool bf);
```

Description The `idcok()` function enables or disables the use of hardware insert-character and delete-character features in *win*. If *bf* is set to `TRUE`, the use of these features in *win* is enabled (if the terminal is equipped). If *bf* is set to `FALSE`, their use in *win* is disabled.

Parameters

win Is a pointer to a window.

bf Is a Boolean expression.

Return Values The `idcok()` function does not return a value.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `clearok(3XCURSES)`, `doupdate(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name immedok – call refresh on changes to window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int immedok(WINDOW *win, bool bf);
```

Description If *bf* is `TRUE`, `immedok()` calls `refresh(3XCURSES)` if any change to the window image is made (for example, through functions such as `addch(3XCURSES)`, `clrtobot(3XCURSES)`, and `scrl(3XCURSES)`). Repeated calls to `refresh()` may affect performance negatively. The `immedok ()` function is disabled by default.

Parameters

win Is a pointer to the window that is to be refreshed.

bf Is a Boolean expression.

Return Values The `immedok()` function does not return a value.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `addch(3XCURSES)`, `clearok(3XCURSES)`, `clrtobot(3XCURSES)`, `doupdate(3XCURSES)`, `libcurses(3XCURSES)`, `scrl(3XCURSES)`, `attributes(5)`, `standards(5)`

Name inch, mvinch, mvwinch, winch – return a single-byte character (with rendition)

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

chtype inch(void);

chtype mvinch(int y, int x);

chtype mvwinch(WINDOW *win, int y, int x);

chtype winch(WINDOW *win);
```

Description The `inch()` and `winch()` functions return the `chtype` character located at the current cursor position of the `stdscr` window and window *win*, respectively. The `mvinch()` and `mvwinch()` functions return the `chtype` character located at the position indicated by the *x* (column) and *y* (row) parameters (the former in the `stdscr` window; the latter in window *win*).

The complete character/attribute pair will be returned. The character or attributes can be extracted by performing a bitwise AND on the returned value, using the constants `A_CHARTEXT`, `A_ATTRIBUTES`, and `A_COLOR`.

Parameters

y Is the y (row) coordinate of the position of the character to be returned.

x Is the x (column) coordinate of the position of the character to be returned.

win Is a pointer to the window that contains the character to be returned.

Return Values On success, these functions return the specified character and rendition. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `addch(3XCURSES)`, `attroff(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name inchnstr, inchstr, mvinchnstr, mvinchstr, mvwinchnstr, mvwinchstr, winchnstr, winchstr – retrieve a single-byte character string (with rendition)

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int inchnstr(chtype *chstr, int n);

int inchstr(chtype *chstr);

int mvinchnstr(int y, int x, chtype *chstr, int n);

int mvinchstr(int y, int x, chtype *chstr);

int mvwinchnstr(WINDOW *win, int y, int x, chtype *chstr, int n);

int mvwinchstr(WINDOW *win, int y, int x, chtype *chstr);

int winchnstr(WINDOW *win, chtype *chstr, int n);

int winchstr(WINDOW *win, chtype *chstr);
```

Description The `inchstr()` and `winchstr()` functions retrieve the character string (with rendition) starting at the current cursor position of the `stdscr` window and window *win*, respectively, and ending at the right margin. The `mvinchstr()` and `mvwinchstr()` functions retrieve the character string located at the position indicated by the *x* (column) and *y* (row) parameters (the former in the `stdscr` window; the latter in window *win*).

The `inchnstr()`, `winchnstr()`, `mvinchnstr()`, and `mvwinchnstr()` functions retrieve at most *n* characters from the window `stdscr` and *win*, respectively. The former two functions retrieve the string, starting at the current cursor position; the latter two commands retrieve the string, starting at the position specified by the *x* and *y* parameters.

All these functions store the retrieved character string in the object pointed to by *chstr*.

The complete character/attribute pair is retrieved. The character or attributes can be extracted by performing a bitwise AND on the retrieved value, using the constants `A_CHARTEXT`, `A_ATTRIBUTES`, and `A_COLOR`. The character string can also be retrieved without attributes by using `instr`(3XCURSES) set of functions.

Parameters

chstr Is a pointer to an object that can hold the retrieved character string.

n Is the number of characters not to exceed when retrieving *chstr*.

y Is the y (row) coordinate of the starting position of the string to be retrieved.

x Is the x (column) coordinate of the starting position of the string to be retrieved.

win Is a pointer to the window in which the string is to be retrieved.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also inch(3XCURSES), innstr(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name initscr, newterm – screen initialization functions

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

WINDOW *initscr(void);

SCREEN *newterm(char *type, FILE *outfp, FILE *infp);
```

Parameters

`type` Is a string defining the terminal type to be used in place of `TERM`.

outfp Is a pointer to a file to be used for output to the terminal.

infp Is the pointer to a file to be used for input to the terminal.

Description The `initscr()` function initializes X/Open Curses data structures, determines the terminal type, and ensures the first call to `refresh(3XCURSES)` clears the screen.

The `newterm()` function opens a new terminal with each call. It should be used instead of `initscr()` when the program interacts with more than one terminal. It returns a variable of type `SCREEN`, which should be used for later reference to that terminal. Before program termination, `endwin()` should be called for each terminal.

The only functions that you can call before calling `initscr()` or `newterm()` are `filter(3XCURSES)`, `ripoffline(3XCURSES)`, `slk_init(3XCURSES)`, and `use_env(3XCURSES)`.

Return Values On success, the `initscr()` function returns a pointer to `stdscr`; otherwise, `initscr()` does not return.

On success, the `newterm()` function returns a pointer to the specified terminal; otherwise, a null pointer is returned.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also del_curterm(3XCURSES), delscreen(3XCURSES), doupdate(3XCURSES), endwin(3XCURSES), filter(3XCURSES), libcurses(3XCURSES), slk_attroff(3XCURSES), use_env(3XCURSES), attributes(5), standards(5)

Name innstr, instr, mvinnstr, mvinstr, mvwinnstr, mvwinstr, winnstr, winstr – retrieve a multibyte character string (without rendition)

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

:#include <curses.h>

int innstr(char *str, int n);

int instr(char *str);

int mvinnstr(int y, int x, char *str, int n);

int mvinstr(int y, int x, char *str);

int mvwinnstr(WINDOW *win, int y, int x, char *str, int n);

int mvwinstr(WINDOW *win, int y, int x, char *str);

int winstr(WINDOW *win, char *str);

int winnstr(WINDOW *win, char *str, int n);
```

Parameters

str Is a pointer to an object that can hold the retrieved multibyte character string.

n Is the number of characters not to exceed when retrieving *str*.

y Is the y (row) coordinate of the starting position of the string to be retrieved.

x Is the x (column) coordinate of the starting position of the string to be retrieved.

win Is a pointer to the window in which the string is to be retrieved.

Description The `instr()` and `winstr()` functions retrieve a multibyte character string (without attributes) starting at the current cursor position of the `stdscr` window and window *win*, respectively, and ending at the right margin. The `mvinstr()` and `mvwinstr()` functions retrieve a multibyte character string located at the position indicated by the *x* (column) and *y* (row) parameters (the former in the `stdscr` window; the latter in window *win*).

The `innstr()`, `winnstr()`, `mvinnstr()`, and `mvwinnstr()` functions retrieve at most *n* characters from the window `stdscr` and *win*, respectively. The former two functions retrieve the string starting at the current cursor position; the latter two commands return the string, starting at the position specified by the *x* and *y* parameters.

All these functions store the retrieved string in the object pointed to by *str*. They only store complete multibyte characters. If the area pointed to by *str* is not large enough to hold at least one character, these functions fail.

Only the character portion of the character/rendition pair is returned. To return the complete character/rendition pair, use `winchstr()`.

Errors

OK	Successful completion.
ERR	An error occurred.

Usage All functions except `winnstr()` may be macros.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `inch(3XCURSES)`, `inchstr(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name innwstr, inwstr, mvinnwstr, mvinwstr, mvwinnwstr, mvwinwstr, winnwstr, winwstr – retrieve a wide character string (without rendition)

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int innwstr(wchar_t *wstr, int n);

int inwstr(wchar_t *wstr);

int mvinnwstr(int y, int x, wchar_t *wstr, int n);

int mvinwstr(int y, int x, wchar_t *wstr);

int mvwinnwstr(WINDOW*win, int y, int x, wchar_t *wstr, int n);

int mvwinwstr(WINDOW*win, int y, int x, wchar_t *wstr);

int winwstr(WINDOW*win, wchar_t *wstr);

int winnwstr(WINDOW*win, wchar_t *wstr, int n);
```

Parameters

wstr Is a pointer to an object that can hold the retrieved multibyte character string.

n Is the number of characters not to exceed when retrieving *wstr*.

y Is the y (row) coordinate of the starting position of the string to be retrieved.

x Is the x (column) coordinate of the starting position of the string to be retrieved.

win Is a pointer to the window in which the string is to be retrieved.

Description The `inwstr()` and `winwstr()` functions retrieve a wide character string (without attributes) starting at the current cursor position of the `stdscr` window and window *win*, respectively, and ending at the right margin. The `mvinwstr()` and `mvwinwstr()` functions retrieve a wide character string located at the position indicated by the *x* (column) and *y* (row) parameters (the former in the `stdscr` window; the latter in window *win*).

The `innwstr()`, `winnwstr()`, `mvinnwstr()`, and `mvwinnwstr()` functions retrieve at most *n* characters from the window `stdscr` and *win*, respectively. The former two functions retrieve the string starting at the current cursor position; the latter two commands return the string, starting at the position specified by the *x* and *y* parameters.

All these functions store the retrieved string in the object pointed to by *wstr*. They only store complete wide characters. If the area pointed to by *wstr* is not large enough to hold at least one character, these functions fail.

Only the character portion of the character/rendition pair is returned. To return the complete character/rendition pair, use `win_wchstr(3XCURSES)`.

Return Values On success, the `inwstr()`, `mvinwstr()`, `mvwinwstr()`, and `winwstr()` functions return OK. Otherwise, they return ERR.

On success, the `innwstr()`, `mvinnwstr()`, `mvwinnwstr()`, and `winnwstr()` functions return the number of characters read into the string. Otherwise, they return ERR.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `in_wch(3XCURSES)`, `in_wchnstr(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name insch, winsch, mvinsch, mvwinsch – insert a character

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int insch(chtype ch);

int mvinsch(int y, int x, chtype ch);

int mvwinsch(WINDOW *win, int y, int x, chtype ch);

int winsch(WINDOW *win, chtype ch);
```

Parameters

ch Is the character to be inserted.

y Is the y (row) coordinate of the position of the character.

x Is the x (column) coordinate of the position of the character.

win Is a pointer to the window in which the character is to be inserted.

Description These functions insert the character and rendition from *ch* into the current or specified window at the current or specified position.

These functions do not perform wrapping and do not advance the cursor position. These functions perform special-character processing, with the exception that if a newline is inserted into the last line of a window and scrolling is not enabled, the behavior is unspecified.

Return Values Upon successful completion, these functions return OK. Otherwise, they return ERR.

Errors No errors are defined.

Usage These functions are only guaranteed to operate reliably on character sets in which each character fits into a single byte, whose attributes can be expressed using only constants with the A_ prefix.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also ins_wch(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name insdelln, winsdelln – insert/delete lines to/from the window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int insdelln(int n);

int winsdelln(WINDOW *win, int n);
```

Parameters

n Is the number of lines to insert or delete (positive *n* inserts; negative *n* deletes).

win Is a pointer to the window in which to insert or delete a line.

Description The `insdelln()` and `winsdelln()` functions insert or delete blank lines in `stdscr` or *win*, respectively. When *n* is positive, *n* lines are added before the current line and the bottom *n* lines are lost; when *n* is negative, *n* lines are deleted starting with the current line, the remaining lines are moved up, and the bottom *n* lines are cleared. The position of the cursor does not change.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `deleteln(3XCURSES)`, `insertln(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name insertln, winsertln – insert a line in a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int insertln(void);

int winsertln(WINDOW *win);
```

Parameters *win* Is a pointer to the window in which to insert the line.

Description The `insertln()` and `winsertln()` functions insert a blank line before the current line in `stdscr` or *win*, respectively. The new line becomes the current line. The current line and all lines after it in the window are moved down one line. The bottom line in the window is discarded.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `bkgdset(3XCURSES)`, `deleteln(3XCURSES)`, `insdelln(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name insnstr, insstr, mvinsnstr, mvinsstr, mvwinsnstr, mvwinsstr, winsnstr, winsstr – insert a multibyte character string

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int insnstr(const char *str, int n);

int insstr(const char *str);

int mvinsnstr(int y, int x, const char *str, int n);

int mvinsstr(int y, int x, const char *str);

int mvwinsnstr(WINDOW *win, int y, int x, const char *str, int n);

int mvwinsstr(WINDOW *win, int y, int x, const char *str);

int winsnstr(WINDOW *win, const char *str, int n);

int winsstr(WINDOW *win, const char *str);
```

Parameters

str Is a pointer to the string to be inserted.

n Is the number of characters not to exceed when inserting *str*. If *n* is less than 1, the entire string is inserted.

y Is the y (row) coordinate of the starting position of the string.

x Is the x (column) coordinate of the starting position of the string.

win Is a pointer to the window in which the string is to be inserted.

Description The `insstr()` function inserts *str* at the current cursor position of the `stdscr` window. The `winsstr()` function performs the identical action, but in window *win*. The `mvinsstr()` and `mvwinsstr()` functions insert the character string at the starting position indicated by the *x* (column) and *y* (row) parameters (the former to the `stdscr` window; the latter to window *win*).

The `insnstr()`, `winsnstr()`, `mvinsnstr()`, and `mvwinsnstr()` functions insert *n* characters to the window or as many as will fit on the line. If *n* is less than 1, the entire string is inserted or as much of it as fits on the line. The former two functions place the string at the current cursor position; the latter two commands use the position specified by the *x* and *y* parameters.

All characters to the right of inserted characters are moved to the right. Characters that don't fit on the current line are discarded. The cursor is left at the point of insertion.

If a character in *str* is a newline, carriage return, backspace, or tab, the cursor is moved appropriately. The cursor is moved to the next tab stop for each tab character (by default, tabs

are eight characters apart). If the character is a control character other than those previously mentioned, the character is inserted using ^*x* notation, where *x* is a printable character. clrtoeol(3XCURSES) is automatically done before a newline.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also addchstr(3XCURSES), addstr(3XCURSES), clrtoeol(3XCURSES), ins_nwstr(3XCURSES), insch(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name ins_nwstr, ins_wstr, mvins_nwstr, mvins_wstr, mvwins_nwstr, mvwins_wstr, wins_nwstr, wins_wstr – insert a wide character string

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int ins_nwstr(const wchar_t *wstr, int n);

int ins_wstr(const wchar_t *wstr);

int mvins_nwstr(int y, int x, const wchar_t *wstr, int n);

int mvins_wstr(int y, int x, const wchar_t *wstr);

int mvwins_nwstr(WINDOW *win, int y, int x, const wchar_t *wstr, int n);

int mvwins_wstr(WINDOW *win, int y, int x, const wchar_t *wstr);

int wins_nwstr(WINDOW *win, const wchar_t *wstr, int n);

int wins_wstr(WINDOW *win, const wchar_t *wstr);
```

Parameters

wstr Is a pointer to the string to be inserted.

n Is the number of characters not to exceed when inserting *wstr*. If *n* is less than 1, the entire string is inserted.

y Is the y (row) coordinate of the starting position of the string.

x Is the x (column) coordinate of the starting position of the string.

win Is a pointer to the window in which the string is to be inserted.

Description The `ins_wstr()` function inserts *wstr* at the current cursor position of the `stdscr` window. The `wins_wstr()` function performs the identical action, but in window *win*. The `mvins_wstr()` and `mvwins_wstr()` functions insert *wstr* string at the starting position indicated by the *x* (column) and *y* (row) parameters (the former in the `stdscr` window; the latter in window *win*).

The `ins_nwstr()`, `wins_nwstr()`, `mvins_nwstr()`, and `mvwins_nwstr()` functions insert *n* characters to the window or as many as will fit on the line. If *n* is less than 1, the entire string is inserted or as much of it as fits on the line. The former two functions place the string at the current cursor position; the latter two commands use the position specified by the *x* and *y* parameters.

All characters to the right of inserted characters are moved to the right. Characters that don't fit on the current line are discarded. The cursor is left at the point of insertion.

If a character in *wstr* is a newline, carriage return, backspace, or tab, the cursor is moved appropriately. The cursor is moved to the next tab stop for each tab character (by default, tabs are eight characters apart). If the character is a control character other than those previously mentioned, the character is inserted using ^*x* notation, where *x* is a printable character. `clrtoeol(3XCURSES)` is automatically done before a newline.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `add_wchnstr(3XCURSES)`, `addnwstr(3XCURSES)`, `clrtoeol(3XCURSES)`, `ins_wch(3XCURSES)`, `insnstr(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name ins_wch, wins_wch, mvins_wch, mvwins_wch – insert a complex character

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int ins_wch(const cchar_t *wch);

int mvins_wch(int y, int x, const cchar_t *wch);

int mvwins_wch(WINDOW *win, int y, int x, const cchar_t *wch);

int wins_wch(WINDOW *win, const cchar_t *wch);
```

Parameters

wch Is the complex character to be inserted.

y Is the y (row) coordinate of the position of the character.

x Is the x (column) coordinate of the position of the character.

win Is a pointer to the window in which the character is to be inserted.

Description The `ins_wch()` function inserts the complex character *wch* at the current cursor position of the `stdscr` window. The `wins_wch()` function performs the identical action but in window *win*. The `mvins_wch()` and `mvwins_wch()` functions insert the character at the position indicated by the *x* (column) and *y* (row) parameters (the former in the `stdscr` window; the latter in window *win*). The cursor position does not change.

All characters to the right of the inserted character are moved right one character. The last character on the line is deleted.

Insertions and deletions occur at the character level. The cursor is adjusted to the first column of the character prior to the operation.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also add_wch(3XCURSES), ins_nwstr(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name intrflush – enable or disable flush on interrupt

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int intrflush(WINDOW *win, bool bf);
```

Parameters

win Is ignored.

bf Is a Boolean expression.

Description The `intrflush()` function specifies whether pressing an interrupt key (interrupt, suspend, or quit) will flush the input buffer associated with the current screen. If the value of *bf* is `TRUE`, then flushing of the output buffer associated with the current screen will occur when an interrupt key (interrupt, suspend, or quit) is pressed.If the value of *bf* is `FALSE`, then no flushing of the buffer will occur when an interrupt key is pressed. The default for the option is inherited from the display driver settings. The *win* argument is ignored.

Return Values Upon successful completion, `intrflush()` returns `OK`. Otherwise, it returns `ERR`.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `flushinp(3XCURSES)`, `libcurses(3XCURSES)`, `qiflush(3XCURSES)`, `attributes(5)`, `standards(5)`

Name in_wch, mvin_wch, mvwin_wch, win_wch – retrieve a complex character (with rendition)

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int in_wch(cchar_t *wcval);

int mvin_wch(int y, int x, cchar_t *wcval);

int mvwin_wch(WINDOW *win, inty, cchar_t *wcval);

int win_wch(WINDOW *win, cchar_t *wcval);
```

Description The `in_wch()` and `win_wch()` functions retrieve the complex character and its rendition located at the current cursor position of the `stdscr` window and window *win*, respectively. The `mvin_wch()` and `mvwin_wch()` functions retrieve the complex character and its rendition located at the position indicated by the *x* (column) and *y* (row) parameters (the former in the `stdscr` window; the latter in window *win*).

All these functions store the retrieved character and its rendition in the object pointed to by *wcval*.

Parameters

wcval Is a pointer to an object that can store a complex character and its rendition.

y Is the y (row) coordinate of the position of the character to be returned.

x Is the x (column) coordinate of the position of the character to be returned.

win Is a pointer to the window that contains the character to be returned.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `add_wch(3XCURSES)`, `inch(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name in_wchnstr, in_wchstr, mvin_wchnstr, mvin_wchstr, mvwin_wchnstr, mvwin_wchstr, win_wchnstr, win_wchstr – retrieve complex character string (with rendition)

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int in_wchnstr(cchar_t *wchstr, int n);

int in_wchstr(cchar_t *wchstr);

int mvin_wchnstr(int y, int x, cchar_t *wchstr, int n);

int mvin_wchstr(int y, int x, cchar_t *wchstr);

int mvwin_wchnstr(WINDOW *win, int y, int x, cchar_t *wchstr, int n);

int mvwin_wchstr(WINDOW *win, int y, int x, cchar_t *wchstr);

int win_wchnstr(WINDOW *win, cchar_t *wchstr, int n);

int win_wchstr(WINDOW *win, cchar_t *wchstr);
```

Description The `in_wchstr()` and `win_wchstr()` functions retrieve a complex character string (with rendition) starting at the current cursor position of the `stdscr` window and window *win*, respectively, and ending at the right margin. The `mvin_wchstr()` and `mvwin_wchstr()` functions retrieve a complex character string located at the position indicated by the *x* (column) and *y* (row) parameters (the former in the `stdscr` window; the latter in window *win*).

The `in_wchnstr()`, `win_wchnstr()`, `mvin_wchnstr()`, and `mvwin_wchnstr()` functions retrieve at most *n* characters from the window `stdscr` and *win*, respectively. The former two functions retrieve the string, starting at the current cursor position; the latter two commands retrieve the string, starting at the position specified by the *x* and *y* parameters.

The retrieved character string (with renditions) is stored in the object pointed to by *wcval*.

Parameters

wchstr	Is a pointer to an object where the retrieved complex character string can be stored.
n	Is the number of characters not to exceed when retrieving *wchstr*.
y	Is the y (row) coordinate of the starting position of the string to be retrieved.
x	Is the x (column) coordinate of the starting position of the string to be retrieved.
win	Is a pointer to the window in which the string is to be retrieved.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also in_wch(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name is_linetouched, is_wintouched, touchline, touchwin, untouchwin, wtouchln – control window refresh

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

bool is_linetouched(WINDOW *win, int line);

bool is_wintouched(WINDOW *win);

int touchline(WINDOW *win, int start, int count);

int touchwin(WINDOW *win);

int untouchwin(WINDOW *win);

int wtouchln(WINDOW *win, int y, int n, int changed);
```

Parameters

win	Is a pointer to the window in which the refresh is to be controlled or monitored.
`line`	Is the line to be checked for change since refresh.
start	Is the starting line number of the portion of the window to make appear changed.
count	Is the number of lines in the window to mark as changed.
y	Is the starting line number of the portion of the window to make appear changed or not changed.
n	Is the number of lines in the window to mark as changed.
changed	Is a flag indicating whether to make lines look changed (0) or not changed (1).

Description The `touchwin()` function marks the entire window as dirty. This makes it appear to X/Open Curses as if the whole window has been changed, thus causing the entire window to be rewritten with the next call to `refresh`(3XCURSES). This is sometimes necessary when using overlapping windows; the change to one window will not be reflected in the other and, hence will not be recorded.

The `touchline()` function marks as dirty a portion of the window starting at line *start* and continuing for *count* lines instead of the entire window. Consequently, that portion of the window is updated with the next call to `refresh()`.

The `untouchwin()` function marks all lines in the window as unchanged since the last refresh, ensuring that it is not updated.

The `wtouchln()` function marks *n* lines starting at line *y* as either changed (*changed*=1) or unchanged (*changed*=0) since the last refresh.

To find out which lines or windows have been changed since the last refresh, use the `is_linetouched()` and `is_wintouched()` functions, respectively. These return `TRUE` if the specified line or window have been changed since the last call to `refresh()` or `FALSE` if no changes have been made.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `doupdate(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name keyname, key_name – return character string used as key name

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

char *keyname(int c);

char *key_name(wchar_t wc);
```

Parameters

c Is an 8 bit-character or a key code.

wc Is a wide character key name.

Description The `keyname()` function returns a string pointer to the key name. Make a duplicate copy of the returned string if you plan to modify it.

The `key_name()` function is similar except that it accepts a wide character key name.

The following table shows the format of the key name based on the input.

Input	Format of Key Name
Visible character	The same character
Control character	^*X*
Meta-character (`keyname()` only)	M-*X*
Key value defined in `<curses.h>` (`keyname()` only)	KEY_*name*
None of the above	UNKNOWN KEY

In the preceding table, *X* can be either a visible character with the high bit cleared or a control character.

Return Values On success, these functions return a pointer to the string used as the key's name. Otherwise, they return a null pointer.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe
Standard	See standards(5).

See Also libcurses(3XCURSES), meta(3XCURSES), attributes(5), standards(5)

Name keypad – enable/disable keypad handling

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int keypad(WINDOW *win, bool bf);
```

Parameters

win Is a pointer to the window in which to enable/disable keypad handling.

bf Is a Boolean expression.

Description The `keypad()` function controls keypad translation. If *bf* is `TRUE`, keypad translation is enabled. If *bf* is `FALSE`, keypad translation is disabled. The initial state is `FALSE`.

This function affects the behavior of any function that provides keyboard input.

If the terminal in use requires a command to enable it to transmit distinctive codes when a function key is pressed, then after keypad translation is first enabled, the implementation transmits this command to the terminal before an affected input function tries to read any characters from that terminal.

The Curses input model provides the following ways to obtain input from the keyboard:

Keypad processing The application can enable or disable keypad translation by calling `keypad()`. When translation is enabled, Curses attempts to translate a sequence of terminal input that represents the pressing of a function into a single key code. When translation is disabled, Curses passes terminal input to the application without such translation, and any interpretation of the input as representing the pressing of a keypad key must be done by the application.

The complete set of key codes for keypad keys that Curses can process is specified by the constants defined in <`curses.h`> whose names begin with "`KEY_`". Each terminal type described in the `terminfo` database may support some or all of these key codes. The `terminfo` database specifies the sequence of input characters from the terminal type that correspond to each key code.

The Curses inplementation cannot translate keypad keys on terminals where pressing the keys does not transmit a unique sequence.

When translation is enabled and a character that could be the beginning of a function key (such as escape) is received, Curses notes the time and begins accumulating characters. If Curses receives additional characters that represent the processing of a keypad key within an unspecified interval from the time the character was received, then Curses converts this input to a key code for presentation to the application. If such characters are not received during this

interval, translation of this input does not occur and the individual characters are presented to the application separately. (Because Curses waits for this interval to accumulate a key code, many terminals experience a delay between the time a user presses the escape key and the time the escape key is returned to the application.)

In addition, No Timeout Mode provides that in any case where Curses has received part of a function key sequence, it waits indefinitely for the complete key sequence. The "unspecified interval" in the previous paragraph becomes infinite in No Timeout Mode. No Timeout Mode allows the use of function keys over slow communication lines. No Timeout Mode lets the user type the individual characters of a function key sequence, but also delays application response when the user types a character (not a function key) that begins a function key sequence. For this reason, in No Timeout Mode many terminals will appear to hang between the time a user presses the escape key and the time another key is pressed. No Timeout Mode is switchable by calling `notimeout(3XCURSES)`.

If any special characters (<backspace>, <carriage return>, <newline>, <tab>) are defined or redefined to be characters that are members of a function key sequence, then Curses will be unable to recognize and translate those function keys.

Several of the modes discussed below are described in terms of availability of input. If keypad translation is enabled, then input is not available once Curses has begun receiving a keypad sequence until the sequence is completely received or the interval has elapsed.

Input Mode

The following four mutually-specific Curses modes let the application control the effect of flow-control characters, the interrupt character, the erase character, and the kill character:

Input Mode	Effect
Cooked Mode	This achieves normal line-at-a-time processing with all special characters handled outside the application. This achieves the same effect as canonical-mode input processing. The state of the `ISIG` and `IXON` flags are not changed upon entering this mode by calling `nocbreak(3XCURSES)`, and are set upon entering this mode by calling `noraw(3XCURSES)`. Erase and kill characters are supported from any supported locale, no matter the width of the character.
`cbreak` Mode	Characters typed by the user are immediately available to the application and Curses does not perform special processing on either the erase character or the kill character. An application can set `cbreak` mode to do its own line editing but to let the abort character be used to abort the task. This mode achieves the same effect as non-canonical-mode, Case B input processing (with MIN set to 1 and ICRNL cleared.) The state of the `ISIG` and `IXON` flags are not changed upon entering this mode.

Input Mode	Effect
Half-Delay Mode	The effect is the same as `cbreak`, except that input functions wait until a character is available or an interval defined by the application elapses, whichever comes first. This mode achieves the same effect as non-canonical-mode, Case C input processing (with TIME set to the value specified by the application.) The state of the `ISIG` and `IXON` flags are not changed upon entering this mode.
Raw Mode	Raw mode gives the application maximum control over terminal input. The application sees each character as it is typed. This achieves the same effect as non-canonical mode, Case D input processing. The `ISIG` and `IXON` flags are cleared upon entering this mode.

The terminal interface settings are reported when the process calls `initscr(3XCURSES)` or `newterm(3XCURSES)` to initialize Curses and restores these settings when `endwin(3XCURSES)` is called. The initial input mode for Curses operations is especially unless Enhanced Curses compliance, in which the initial mode is `cbreak` mode, is supported.

The behavior of the `BREAK` key depends on other bits in the display driver that are not set by Curses.

Delay Mode

Two mutually-exclusive delay modes specify how quickly certain Curses functions return to the application when there is no terminal input waiting when the function is called:

No Delay — The function fails.

Delay — The application waits until text is passed through to the application. If `cbreak` or Raw Mode is set, this is after one character. Otherwise, this is after the first <newline> character, end-of-line character, or end-of-file character.

The effect of No Delay Mode on function key processing is unspecified.

Echo processing

Echo mode determines whether Curses echoes typed characters to the screen. The effect of Echo mode is analogous to the effect of the `ECHO` flag in the local mode field of the `termios` structure associated with the terminal device connected to the window. However, Curses always clears the `ECHO` flag when invoked, to inhibit the operating system from performing echoing. The method of echoing characters is not identical to the operating system's method of echoing characters, because Curses performs additional processing of terminal input.

If in Echo mode, Curses performs 's's own echoing. Any visible input character is stored in the current or specified window by the input function that the application called, at that window's cursor position, as though `addch(3XCURSES)` were called, with all consequent effects such as cursor movement and wrapping.

If not in Echo mode, any echoing of input must be performed by the application. Applications often perform their own echoing in a controlled area of the screen, or do not echo at all, so they disable Echo mode.

It may not be possible to turn off echo processing for synchronous and networked asynchronous terminals because echo processing is done directly by the terminals. Applications running on such terminals should be aware that any characters typed will appear on the screen at wherever the cursor is positioned.

Return Values Upon successful completion, the `keypad()` function returns `OK`. Otherwise, it returns `ERR`.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `addch(3XCURSES)`, `endwin(3XCURSES)`, `getch(3XCURSES)`, `initscr(3XCURSES)`, `libcurses(3XCURSES)`, `newterm(3XCURSES)`, `nocbreak(3XCURSES)`, `noraw(3XCURSES)`, `attributes(5)`, `standards(5)`

Name libcurses – X/Open Curses library

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include -L /usr/xpg4/lib \
-R /usr/xpg4/lib -lcurses [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>
```

Description Functions in this library provide a terminal-independent method of updating character screens with reasonable optimization, conforming to X/Open Curses, Issue 4, Version 2.

Interfaces The shared object `libcurses.so.2` provides the public interfaces defined below. See `Intro(3)` for additional information on shared object interfaces.

COLORS	COLOR_PAIR
COLOR_PAIRS	COLS
LINES	PAIR_NUMBER
add_wch	add_wchnstr
add_wchstr	addch
addchnstr	addchstr
addnstr	addnwstr
addstr	addwstr
attr_get	attr_off
attr_on	attr_set
attroff	attron
attrset	baudrate
beep	bkgd
bkgdset	bkgrnd
bkgrndset	border
border_set	box
box_set	can_change_color
cbreak	chgat
clear	clearok
clrtobot	clrtoeol

color_content

color_set

copywin

cur_term

curs_set

curscr

def_prog_mode

def_shell_mode

del_curterm

delay_output

delch

deleteln

delscreen

delwin

derwin

doupdate

dupwin

echo

echo_wchar

echochar

endwin

erase

erasechar

erasewchar

filter

flash

flushinp

get_wch

get_wstr

getbkgd

getbkgrnd

getcchar

getch

getn_wstr

getnstr

getstr

getwin

halfdelay

has_colors

has_ic

has_il

hline

hline_set

idcok

idlok

immedok

in_wch

in_wchnstr

in_wchstr

inch

inchnstr

inchstr

init_color

init_pair

initscr

innstr

innwstr

ins_nwstr

ins_wch

ins_wstr

insch

insdelln

insertln

insnstr

insstr

instr

intrflush

inwstr

is_linetouched

is_wintouched

isendwin

key_name

keyname

keypad

killchar

killwchar

leaveok

longname

meta

move

mvadd_wch

mvadd_wchnstr

mvadd_wchstr

mvaddch

mvaddchnstr

mvaddchstr

mvaddnstr

mvaddnwstr

mvaddstr

mvaddwstr

mvchgat

mvcur

mvdelch

mvderwin

mvget_wch

mvget_wstr

mvgetch

mvgetn_wstr

mvgetnstr

mvgetstr

mvhline

mvhline_set

mvin_wch

mvin_wchnstr

mvin_wchstr

mvinch

mvinchnstr

mvinchstr

mvinnstr

mvinnwstr

mvins_nwstr

mvins_wch

mvins_wstr

mvinsch

mvinsnstr

mvinsstr

mvinstr

mvinwstr

mvprintw

mvscanw

mvvline

mvvline_set

mvwadd_wch

mvwadd_wchnstr

mvwadd_wchstr

mvwaddch

mvwaddchnstr

mvwaddchstr

mvwaddnstr

mvwaddnwstr

mvwaddstr

mvwaddwstr

mvwchgat

mvwdelch

mvwget_wch

mvwget_wstr

mvwgetch

mvwgetn_wstr

mvwgetnstr

mvwgetstr

mvwhline

mvwhline_set

mvwin

mvwin_wch

mvwin_wchnstr

mvwin_wchstr

mvwinch

mvwinchnstr

mvwinchstr

mvwinnstr

mvwinnwstr

mvwins_nwstr

mvwins_wch

mvwins_wstr

mvwinsch

mvwinsnstr

mvwinsstr

mvwinstr

mvwinwstr

mvwprintw

mvwscanw

mvwvline

mvwvline_set

napms

newpad

newterm

newwin

nl

nocbreak

nodelay

noecho

nonl

noqiflush

noraw

notimeout

overlay

overwrite

pair_content

pecho_wchar

pechochar

pnoutrefresh

prefresh

printw

putp

putwin

qiflush

raw

redrawwin

refresh

reset_prog_mode

reset_shell_mode

resetty

restartterm

ripoffline

savetty

scanw

scr_dump

scr_init

scr_restore

scr_set

scrl

scroll

scrollok

set_curterm

set_term

setcchar

setscrreg

setupterm

slk_attr_off

slk_attr_on

slk_attr_set

slk_attroff

slk_attron

slk_attrset

slk_clear

slk_color

slk_init

slk_label

slk_noutrefresh

slk_refresh

slk_restore

slk_set

slk_touch

slk_wset

standend

standout

start_color

stdscr

subpad

subwin

syncok

term_attrs

termattrs

termname

tgetent

tgetflag

tgetnum

tgetstr

tgoto

tigetflag

tigetnum

tigetstr

timeout

touchline

touchwin

tparm

tputs

typeahead

unctrl

unget_wch

ungetch

untouchwin

use_env

vid_attr

vid_puts

vidattr

vidputs

vline

vline_set

vw_printw

vw_scanw

vwprintw

vwscanw

wadd_wch

wadd_wchnstr

wadd_wchstr

waddch

waddchnstr

waddchstr

waddnstr

waddnwstr

waddstr

waddwstr

wattr_get

wattr_off

wattr_on

wattr_set

wattroff

wattron

wattrset

wbkgd

wbkgdset

wbkgrnd

wbkgrndset

wborder

wborder_set

wchgat

wclear

wclrtobot

wclrtoeol

wcolor_set		wcursyncup	
wdelch		wdeleteln	
wecho_wchar		wechochar	
werase		wget_wch	
wget_wstr		wgetbkgrnd	
wgetch		wgetn_wstr	
wgetnstr		wgetstr	
whline		whline_set	
win_wch		win_wchnstr	
win_wchstr		winch	
winchnstr		winchstr	
winnstr		winnwstr	
wins_nwstr		wins_wch	
wins_wstr		winsch	
winsdelln		winsertln	
winsnstr		winsstr	
winstr		winwstr	
wmove		wnoutrefresh	
wprintw		wredrawln	
wrefresh		wscanw	
wscrl		wsetscrreg	
wstandend		wstandout	
wsyncdown		wsyncup	
wtimeout		wtouchln	
wunctrl		wvline	
wvline_set			

Files

`/usr/xpg4/lib/libcurses.so.1`	shared object for backward compatibility
`/usr/xpg4/lib/libcurses.so.2`	shared object
`/usr/xpg4/lib/64/libcurses.so.1`	64-bit shared object for backward compatibility

`/usr/xpg4/lib/64/libcurses.so.2` 64-bit shared object

Notes The `libcurses.so.1` listed above is an earlier shared object that provides the previous version of the X/Open Curses library (Issue 4). There is no binary compatiblity between `libcurses.so.1` and `libcurses.so.2`. This file is provided for backwards compatiblity and will be removed in a future Solaris release. There is no plan to fix any of its defects.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	system/library
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `Intro(3)`, `curses(3XCURSES)`, `libcurses(3LIB)`, `attributes(5)`, `standards(5)`

Name LINES – number of lines on terminal screen

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include -L /usr/xpg4/lib \
-R /usr/xpg4/lib -lcurses [ library... ]

c89 [ flag... ] file... -lcurses [ library ... ]

#include <curses.h>

extern int LINES;
```

Description The external variable `LINES` indicates the number of lines on the terminal screen.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `initscr(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name longname – return full terminal type name

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

const char *longname(void);
```

Description The `longname()` function returns a pointer to a static area containing a verbose description (128 characters or fewer) of the terminal. The area is defined after calls to `initscr`(3XCURSES), `newterm`(3XCURSES), or `setupterm`(3XCURSES). The value should be saved if `longname()` is going to be used with multiple terminals since it will be overwritten with a new value after each call to `newterm()` or `setupterm()`.

Return Values On success, the `longname()` function returns a pointer to a verbose description of the terminal. Otherwise, it returns a null pointer.

Errors None.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `initscr`(3XCURSES), `libcurses`(3XCURSES), `newterm`(3XCURSES), `setupterm`(3XCURSES), `attributes`(5), `standards`(5)

Name menu_attributes, set_menu_fore, menu_fore, set_menu_back, menu_back, set_menu_grey, menu_grey, set_menu_pad, menu_pad – control menus display attributes

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_menu_fore(MENU *menu, chtype attr);

chtype menu_fore(MENU *menu);

int set_menu_back(MENU *menu, chtype attr);

chtype menu_back(MENU *menu);

int set_menu_grey(MENU*menu, chtype attr);

chtype menu_grey(MENU *menu);

int set_menu_pad(MENU *menu, int pad);

int menu_pad(MENU *menu);
```

Description `set_menu_fore()` sets the foreground attribute of *menu* — the display attribute for the current item (if selectable) on single-valued menus and for selected items on multi-valued menus. This display attribute is a `curses` library visual attribute. `menu_fore()` returns the foreground attribute of *menu*.

`set_menu_back()` sets the background attribute of `menu` — the display attribute for unselected, yet selectable, items. This display attribute is a `curses` library visual attribute.

`set_menu_grey()` sets the grey attribute of *menu* — the display attribute for nonselectable items in multi-valued menus. This display attribute is a `curses` library visual attribute. `menu_grey()` returns the grey attribute of *menu*.

The pad character is the character that fills the space between the name and description of an item. `set_menu_pad()` sets the pad character for *menu* to *pad*. `menu_pad()` returns the pad character of *menu*.

Return Values These routines return one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), menus(3CURSES), attributes(5)

Notes The header <menu.h> automatically includes the headers <eti.h> and <curses.h>.

Name menu_cursor, pos_menu_cursor – correctly position a menus cursor

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>


int pos_menu_cursor(MENU *menu);
```

Description `pos_menu_cursor()` moves the cursor in the window of *menu* to the correct position to resume menu processing. This is needed after the application calls a `curses` library I/O routine.

Return Values This routine returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_NOT_POSTED	The menu has not been posted.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `panel_update(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_driver – command processor for the menus subsystem

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int menu_driver(MENU *menu, int c);
```

Description `menu_driver()` is the workhorse of the `menus` subsystem. It checks to determine whether the character *c* is a menu request or data. If *c* is a request, the menu driver executes the request and reports the result. If *c* is data (a printable ASCII character), it enters the data into the pattern buffer and tries to find a matching item. If no match is found, the menu driver deletes the character from the pattern buffer and returns `E_NO_MATCH`. If the character is not recognized, the menu driver assumes it is an application-defined command and returns `E_UNKNOWN_COMMAND`.

Menu driver requests:

REQ_LEFT_ITEM	Move left to an item.
REQ_RIGHT_ITEM	Move right to an item
REQ_UP_ITEM	Move up to an item.
REQ_DOWN_ITEM	Move down to an item.
REQ_SCR_ULINE	Scroll up a line.
REQ_SCR_DLINE	Scroll down a line.
REQ_SCR_DPAGE	Scroll up a page.
REQ_SCR_UPAGE	Scroll down a page.
REQ_FIRST_ITEM	Move to the first item.
REQ_LAST_ITEM	Move to the last item.
REQ_NEXT_ITEM	Move to the next item.
REQ_PREV_ITEM	Move to the previous item.
REQ_TOGGLE_ITEM	Select/de-select an item.
REQ_CLEAR_PATTERN	Clear the menu pattern buffer.
REQ_BACK_PATTERN	Delete the previous character from pattern buffer.
REQ_NEXT_MATCH	Move the next matching item.
REQ_PREV_MATCH	Move to the previous matching item.

Return Values `menu_driver()` returns one of the following:

E_OK	The routine returned successfully.

E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_BAD_STATE	The routine was called from an initialization or termination function.
E_NOT_POSTED	The menu has not been posted.
E_UNKNOWN_COMMAND	An unknown request was passed to the menu driver.
E_NO_MATCH	The character failed to match.
E_NOT_SELECTABLE	The item cannot be selected.
E_REQUEST_DENIED	The menu driver could not process the request.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), menus(3CURSES), attributes(5)

Notes Application-defined commands should be defined relative to (greater than) MAX_COMMAND, the maximum value of a request listed above.

The header <menu.h> automatically includes the headers <eti.h> and <curses.h>.

Name menu_format, set_menu_format – set and get maximum numbers of rows and columns in menus

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_menu_format(MENU *menu, int rows, int cols);

void menu_format(MENU *menu, int *rows, int *cols);
```

Description `set_menu_format()` sets the maximum number of rows and columns of items that may be displayed at one time on a menu. If the menu contains more items than can be displayed at once, the menu will be scrollable.

`menu_format()` returns the maximum number of rows and columns that may be displayed at one time on *menu*. *rows* and *cols* are pointers to the variables used to return these values.

Return Values `set_menu_format()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_POSTED	The menu is already posted.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_hook, set_item_init, item_init, set_item_term, item_term, set_menu_init, menu_init, set_menu_term, menu_term – assign application-specific routines for automatic invocation by menus

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_item_init(MENU *menu, void (*func)(MENU *));

int set_item_term(MENU *menu, void (*func)(MENU *));

void item_term(MENU *menu);

int set_menu_init(MENU *menu, void (*func)(MENU *));

void menu_init(MENU *menu);

int set_menu_term(MENU *menu, void (*func)(MENU *));

void menu_term(MENU *menu);
```

Description `set_item_init()` assigns the application-defined function to be called when the *menu* is posted and just after the current item changes. `item_init()` returns a pointer to the item initialization routine, if any, called when the *menu* is posted and just after the current item changes.

`set_item_term()` assigns an application-defined function to be called when the *menu* is unposted and just before the current item changes. `item_term()` returns a pointer to the termination function, if any, called when the *menu* is unposted and just before the current item changes.

`set_menu_init()` assigns an application-defined function to be called when the *menu* is posted and just after the top row changes on a posted menu. `menu_init()` returns a pointer to the menu initialization routine, if any, called when the *menu* is posted and just after the top row changes on a posted menu.

`set_menu_term()` assigns an application-defined function to be called when the *menu* is unposted and just before the top row changes on a posted menu. `menu_term()` returns a pointer to the menu termination routine, if any, called when the *menu* is unposted and just before the top row changes on a posted menu.

Return Values Routines that return pointers always return NULL on error. Routines that return an integer return one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), menus(3CURSES), attributes(5)

Notes The header <menu.h> automatically includes the headers <eti.h> and <curses.h>.

Name menu_item_current, set_current_item, current_item, set_top_row, top_row, item_index – set and get current menus items

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_current_item(MENU *menu, ITEM *item);

ITEM *current_item(MENU *menu);

int set_top_row(MENU *menu, int row);

int top_row(MENU *menu);

int item_index(ITEM *item);
```

Description The current item of a menu is the item where the cursor is currently positioned. `set_current_item()` sets the current item of *menu* to *item*. `current_item()` returns a pointer to the the current item in *menu*.

`set_top_row()` sets the top row of *menu* to *row*. The left-most item on the new top row becomes the current item. `top_row()` returns the number of the menu row currently displayed at the top of *menu*.

`item_index()` returns the index to the *item* in the item pointer array. The value of this index ranges from `0` through *N*`-1`, where *N* is the total number of items connected to the menu.

Return Values `current_item()` returns NULL on error.

`top_row()` and `index_item()` return −1 on error.

`set_current_item()` and `set_top_row()` return one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_BAD_STATE	The routine was called from an initialization or termination function.
E_NOT_CONNECTED	No items are connected to the menu.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), menus(3CURSES), attributes(5)

Notes The header <menu.h> automatically includes the headers <eti.h> and <curses.h>.

Name menu_item_name, item_name, item_description – get menus item name and description

Synopsis

```
cc [ flag ... ] file ... -lmenu  -lcurses  [ library .. ]
#include <menu.h>

char *item_name(ITEM *item);

char *item_description(ITEM *item);
```

Description `item_name()` returns a pointer to the name of *item*.

`item_description()` returns a pointer to the description of *item*.

Return Values These routines return NULL on error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `menu_new(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_item_new, new_item, free_item – create and destroy menus items

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

ITEM *new_item(char *name, char *desc);

int free_item(ITEM *item);
```

Description `new_item()` creates a new item from *name* and *description*, and returns a pointer to the new item.

`free_item()` frees the storage allocated for *item*. Once an item is freed, the user can no longer connect it to a menu.

Return Values `new_item()` returns NULL on error.

`free_item()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_CONNECTED	One or more items are already connected to another menu.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_item_opts, set_item_opts, item_opts_on, item_opts_off, item_opts – menus item option routines

Synopsis

```
cc [ flag... ] file... -lmenu -lcurses [ library... ]
#include <menu.h>

int set_item_opts(ITEM *item, OPTIONS opts);

int item_opts_on(ITEM *item, OPTIONS opts);

int item_opts_off(ITEM *item, OPTIONS opts);

OPTIONS item_opts(ITEM *item);
```

Description `set_item_opts()` turns on the named options for *item* and turns off all other options. Options are boolean values that can be OR-ed together.

`item_opts_on()` turns on the named options for *item*; no other option is changed.

`item_opts_off()` turns off the named options for *item*; no other option is changed.

`item_opts()` returns the current options of *item*.

`O_SELECTABLE` The item can be selected during menu processing.

Return Values Except for `item_opts()`, these routines return one of the following:

E_OK The routine returned successfully.

E_SYSTEM_ERROR System error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_items, set_menu_items, item_count – connect and disconnect items to and from menus

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_menu_items(MENU *menu, ITEM **items);

ITEM **menu_items(MENU *menu);

int item_count(MENU *menu);
```

Description `set_menu_items()` changes the item pointer array connected to *menu* to the item pointer array *items*.`menu_items()` returns a pointer to the item pointer array connected to *menu*.`item_count()` returns the number of items in *menu*.

Return Values `menu_items()` returns NULL on error.

`item_count()` returns -1 on error.

`set_menu_items()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_POSTED	The menu is already posted.
E_CONNECTED	One or more items are already connected to another menu.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_item_userptr, set_item_userptr, item_userptr – associate application data with menus items

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_item_userptr(ITEM *item, char *userptr);

char *item_userptr(ITEM *item);
```

Description Every item has an associated user pointer that can be used to store relevant information. `set_item_userptr()` sets the user pointer of *item*. `item_userptr()` returns the user pointer of *item*.

Return Values `item_userptr()` returns NULL on error. `set_item_userptr()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_item_value, set_item_value, item_value – set and get menus item values

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_item_value(ITEM *item, int bool);

int item_value(ITEM *item);
```

Description Unlike single-valued menus, multi-valued menus enable the end-user to select one or more items from a menu. `set_item_value()` sets the selected value of the *item* — `TRUE` (selected) or `FALSE` (not selected). `set_item_value()` may be used only with multi-valued menus. To make a menu multi-valued, use `set_menu_opts` or `menu_opts_off()` to turn off the option `O_ONEVALUE`. (See `menu_opts(3CURSES)`).

`item_value()` returns the select value of *item*, either `TRUE` (selected) or `FALSE` (unselected).

Return Values `set_item_value()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_REQUEST_DENIED	The menu driver could not process the request.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `menu_opts(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_item_visible, item_visible – tell if menus item is visible

Synopsis

```
cc [ flag ... ] file ... -lmenu   -lcurses  [ library .. ]
#include <menu.h>


int item_visible(ITEM *item);
```

Description A menu item is visible if it currently appears in the subwindow of a posted menu. `item_visible()` returns `TRUE` if *item* is visible, otherwise it returns `FALSE`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `menu_new(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_mark, set_menu_mark – menus mark string routines

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_menu_mark(MENU *menu, char *mark);

char *menu_mark(MENU *menu);
```

Description `menus` displays mark strings to distinguish selected items in a menu (or the current item in a single-valued menu). `set_menu_mark()` sets the mark string of *menu* to *mark*. `menu_mark()` returns a pointer to the mark string of *menu*.

Return Values `menu_mark()` returns NULL on error. `set_menu_mark()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_new, new_menu, free_menu – create and destroy menus

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

MENU *new_menu(ITEM **items);

int free_menu(MENU *menu);
```

Description `new_menu()` creates a new menu connected to the item pointer array *items* and returns a pointer to the new menu.

`free_menu()` disconnects *menu* from its associated item pointer array and frees the storage allocated for the menu.

Return Values `new_menu()` returns NULL on error.

`free_menu()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_POSTED	The menu is already posted.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header <menu.h> automatically includes the headers <eti.h> and <curses.h>.

Name menu_opts, set_menu_opts, menu_opts_on, menu_opts_off – menus option routines

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

OPTIONS menu_opts(MENU *menu);

int set_menu_opts(MENU *menu, OPTIONS opts);

int menu_opts_on(MENU *menu, OPTIONS opts);

int menu_opts_off(MENU *menu, OPTIONS opts);
```

Description

Menu Options `set_menu_opts()` turns on the named options for *menu* and turns off all other options. Options are boolean values that can be OR-ed together.

`menu_opts_on()` turns on the named options for *menu*; no other option is changed.

`menu_opts_off()` turns off the named options for *menu*; no other option is changed.

`menu_opts()` returns the current options of *menu*.

The following values can be OR'd together to create *opts*.

`O_ONEVALUE`	Only one item can be selected from the menu.
`O_SHOWDESC`	Display the description of the items.
`O_ROWMAJOR`	Display the menu in row major order.
`O_IGNORECASE`	Ignore the case when pattern matching.
`O_SHOWMATCH`	Place the cursor within the item name when pattern matching.
`O_NONCYCLIC`	Make certain menu driver requests non-cyclic.

Return Values Except for `menu_opts()`, these routines return one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_POSTED	The menu is already posted.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), menus(3CURSES), attributes(5)

Notes The header <menu.h> automatically includes the headers <eti.h> and <curses.h>.

Name menu_pattern, set_menu_pattern – set and get menus pattern match buffer

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

char *menu_pattern(MENU *menu);

int set_menu_pattern(MENU *menu, char *pat);
```

Description Every menu has a pattern buffer to match entered data with menu items. `set_menu_pattern()` sets the pattern buffer to *pat* and tries to find the first item that matches the pattern. If it does, the matching item becomes the current item. If not, the current item does not change. `menu_pattern()` returns the string in the pattern buffer of *menu*.

Return Values `menu_pattern()` returns `NULL` on error. `set_menu_pattern()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_NO_MATCH	The character failed to match.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_post, post_menu, unpost_menu – write or erase menus from associated subwindows

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int post_menu(MENU *menu);

int unpost_menu(MENU *menu);
```

Description `post_menu()` writes *menu* to the subwindow. The application programmer must use `curses` library routines to display the menu on the physical screen or call `update_panels()` if the `panels` library is being used.

`unpost_menu()` erases *menu* from its associated subwindow.

Return Values These routines return one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_POSTED	The menu is already posted.
E_BAD_STATE	The routine was called from an initialization or termination function.
E_NO_ROOM	The menu does not fit within its subwindow.
E_NOT_POSTED	The menu has not been posted.
E_NOT_CONNECTED	No items are connected to the menu.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menus – character based menus package

Synopsis

```
#include <menu.h>
```

Description The `menu` library is built using the `curses` library, and any program using menus routines must call one of the `curses` initialization routines, such as `initscr`. A program using these routines must be compiled with `-lmenu` and `-lcurses` on the `cc` command line.

The menus package gives the applications programmer a terminal-independent method of creating and customizing menus for user interaction. The menus package includes: item routines, which are used to create and customize menu items; and menu routines, which are used to create and customize menus, assign pre- and post-processing routines, and display and interact with menus.

Current Default Values for Item Attributes

The menus package establishes initial current default values for item attributes. During item initialization, each item attribute is assigned the current default value for that attribute. An application can change or retrieve a current default attribute value by calling the appropriate set or retrieve routine with a `NULL` item pointer. If an application changes a current default item attribute value, subsequent items created using `new_item()` will have the new default attribute value. The attributes of previously created items are not changed if a current default attribute value is changed.

Routine Name Index

The following table lists each menus routine and the name of the manual page on which it is described.

Menus Routine Name	Manual Page Name
current_item	menu_item_current(3X)
free_item	menu_item_new(3X)
free_menu	menu_new(3X)
item_count	menu_items(3X)
item_description	menu_item_name(3X)
item_index	menu_item_current(3X)
item_init	menu_hook(3X)
item_name	menu_item_name(3X)
item_opts	menu_item_opts(3X)
item_opts_off	menu_item_opts(3X)
item_opts_on	menu_item_opts(3X)
item_term	menu_hook(3X)
item_userptr	menu_item_userptr(3X)

Menus Routine Name	Manual Page Name
item_value	menu_item_value(3X)
item_visible	menu_item_visible(3X)
menu_back	menu_attributes(3X)
menu_driver	menu_driver(3X)
menu_fore	menu_attributes(3X)
menu_format	menu_format(3X)
menu_grey	menu_attributes(3X)
menu_init	menu_hook(3X)
menu_items	menu_items(3X)
menu_mark	menu_mark(3X)
menu_opts	menu_opts(3X)
menu_opts_off	menu_opts(3X)
menu_opts_on	menu_opts(3X)
menu_pad	menu_attributes(3X)
menu_pattern	menu_pattern(3X)
menu_sub	menu_win(3X)
menu_term	menu_hook(3X)
menu_userptr	menu_userptr(3X)
menu_win	menu_win(3X)
new_item	menu_item_new(3X)
new_menu	menu_new(3X)
pos_menu_cursor	menu_cursor(3X)
post_menu	menu_post(3X)
scale_menu	menu_win(3X)
set_current_item	menu_item_current(3X)
set_item_init	menu_hook(3X)
set_item_opts	menu_item_opts(3X)
set_item_term	menu_hook(3X)

Menus Routine Name	Manual Page Name
set_item_userptr	menu_item_userptr(3X)
set_item_value	menu_item_value(3X)
set_menu_back	menu_attributes(3X)
set_menu_fore	menu_attributes(3X)
set_menu_format	menu_format(3X)
set_menu_grey	menu_attributes(3X)
set_menu_init	menu_hook(3X)
set_menu_items	menu_items(3X)
set_menu_mark	menu_mark(3X)
set_menu_opts	menu_opts(3X)
set_menu_pad	menu_attributes(3X)
set_menu_pattern	menu_pattern(3X)
set_menu_sub	menu_win(3X)
set_menu_term	menu_hook(3X)
set_menu_userptr	menu_userptr(3X)
set_menu_win	menu_win(3X)
set_top_row	menu_item_current(3X)
top_row	menu_item_current(3X)
unpost_menu	menu_post(3X)

Return Values Routines that return pointers always return NULL on error. Routines that return an integer return one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_POSTED	The menu is already posted.
E_CONNECTED	One or more items are already connected to another menu.
E_BAD_STATE	The routine was called from an initialization or termination function.
E_NO_ROOM	The menu does not fit within its subwindow.

E_NOT_POSTED	The menu has not been posted.
E_UNKNOWN_COMMAND	An unknown request was passed to the menu driver.
E_NO_MATCH	The character failed to match.
E_NOT_SELECTABLE	The item cannot be selected.
E_NOT_CONNECTED	No items are connected to the menu.
E_REQUEST_DENIED	The menu driver could not process the request.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also curses(3CURSES), attributes(5)

Notes The header <menu.h> automatically includes the headers <eti.h> and <curses.h>.

Name menu_userptr, set_menu_userptr – associate application data with menus

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

char *menu_userptr(MENU *menu);

int set_menu_userptr(MENU *menu, char *userptr);
```

Description Every menu has an associated user pointer that can be used to store relevant information. `set_menu_userptr()` sets the user pointer of *menu*. `menu_userptr()` returns the user pointer of *menu*.

Return Values `menu_userptr()` returns `NULL` on error.

`set_menu_userptr()` returns one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name menu_win, set_menu_win, set_menu_sub, menu_sub, scale_menu – menus window and subwindow association routines

Synopsis

```
cc [ flag... ] file... -lmenu  -lcurses  [ library... ]
#include <menu.h>

int set_menu_win(MENU *menu, WINDOW *win);

WINDOW *menu_win(MENU *menu);

int set_menu_sub(MENU *menu, WINDOW *sub);

WINDOW *menu_sub(MENU *menu);

int scale_window(MENU *menu, int *rows, int *cols);
```

Description `set_menu_win()` sets the window of *menu* to *win*. `menu_win()` returns a pointer to the window of *menu*.`set_menu_sub()` sets the subwindow of *menu* to *sub*. `menu_sub()` returns a pointer to the subwindow of *menu*.`scale_window()` returns the minimum window size necessary for the subwindow of *menu*. *rows* and *cols* are pointers to the locations used to return the values.

Return Values Routines that return pointers always return `NULL` on error. Routines that return an integer return one of the following:

E_OK	The routine returned successfully.
E_SYSTEM_ERROR	System error.
E_BAD_ARGUMENT	An incorrect argument was passed to the routine.
E_POSTED	The menu is already posted.
E_NOT_CONNECTED	No items are connected to the menu.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `menus(3CURSES)`, `attributes(5)`

Notes The header `<menu.h>` automatically includes the headers `<eti.h>` and `<curses.h>`.

Name meta – enable/disable meta keys

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int meta(WINDOW *win, bool bf);
```

Parameters

win Is an ignored parameter.

bf Is a Boolean expression.

Description Whether a terminal returns 7 or 8 significant bits initially depends on the control mode of the terminal driver. The `meta()` function forces the number of bits to be returned by `getch(3XCURSES)` to be 7 (if *bf* is `FALSE`) or 8 (if *bf* is `TRUE`).

If the program handling the data can only pass 7-bit characters or strips the 8th bit, 8 bits cannot be handled.

If the `terminfo` capabilities `smm` (meta_on) and `rmm` (meta_off) are defined for the terminal, `smm` is sent to the terminal when `meta(`*win*`, TRUE)` is called, and `rmm` is sent when `meta(`*win*`, FALSE)` is called.

This function is useful when extending the non-text command set in applications where the META key is used.

Return Values On success, the `meta()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `getch(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name move, wmove – move cursor in window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int move(int y, int x);

int wmove(WINDOW *win, int y, int x);
```

Parameters

y Is the y (row) coordinate of the position of the cursor in the window.

x Is the x (column) coordinate of the position of the cursor in the window.

win Is a pointer to the window in which the cursor is to be written.

Description The `move()` function moves the logical cursor (for `stdscr`) to the position specified by *y* (row) and *x* (column), where the upper left corner of the window is row 0, column 0. The `wmove()` function performs the same action, but moves the cursor in the window specified by *win*. The physical cursor will not move until after a call to `refresh`(3XCURSES) or `doupdate`(3XCURSES).

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `doupdate`(3XCURSES), `libcurses`(3XCURSES), `attributes`(5), `standards`(5)

Name mvcur – move the cursor

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int mvcur(int oldrow, int oldcol, int newrow, int newcol);
```

Parameters

oldrow Is the row from which cursor is to be moved.

oldcol Is the column from which cursor is to be moved.

newrow Is the row to which cursor is to be moved.

newcol Is the column to which cursor is to be moved.

Description The `mvcur()` function is a low-level function used only outside of X/Open Curses when the program has to deal directly with the `terminfo` database to handle certain terminal capabilities. The use of appropriate X/Open Curses functions is recommended in all other situations, so that X/Open Curses can track the cursor.

The `mvcur()` function moves the cursor from the location specified by *oldrow* and *oldcol* to the location specified by *newrow* and *newcol*. A program using this function must keep track of the current cursor position.

Return Values On success, the `mvcur()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name mvderwin – map area of parent window to subwindow

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int mvderwin(WINDOW *win, int par_y, int par_x);
```

Parameters

win Is a pointer to the window to be mapped.

par_y Is the y (row) coordinate of the placement of the upper left corner of window relative to the parent window.

par_x Is the x (column) coordinate of the placement of the upper left corner of the window relative to the parent window.

Description The `mvderwin()` function defines a mapped area of *win*'s parent window that is the same size as *win* and has its upper left corner at position *par_y*, *par_x* of the parent window.

Whenever *win* is refreshed, its contents are updated to match those of the mapped area and any reference to characters in *win* is treated as a reference to corresponding characters in the mapped area.

Return Values On success, the `mvderwin()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `delwin(3XCURSES)`, `derwin(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name mvprintw, mvwprintw, printw, wprintw – print formatted output window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int mvprintw(int y, int x, char *fmt, ...);

int mvwprintw(WINDOW *win, int y, int x, char *fmt, ...);

int printw(char *fmt, ...);

int wprintw(WINDOW *win, char *fmt, ...);
```

Parameters

y Is the y (row) coordinate position of the string's placement in the window.

x Is the x (column) coordinate position of the string's placement in the window.

fmt Is a `printf()` format string.

win Is a pointer to the window in which the string is to be written.

Description The `mvprintw()`, `mvwprintw()`, `printw()`, and `wprintw()` functions are analogous to `printf(3C)`. The effect of these functions is as though `sprintf()` were used to format the string, and then `waddstr(3XCURSES)` were used to add that multi-byte string to the current or specified window at the current or specified cursor position.

Return Values Upon successful completion, these functions return `OK`. Otherwise, they return `ERR`.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `addnstr(3XCURSES)`, `libcurses(3XCURSES)`, `printf(3C)`, `attributes(5)`, `standards(5)`

Name mvscanw, mvwscanw, scanw, wscanw – convert formatted input from a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int mvscanw(int y, int x, char *fmt, ...);

int mvwscanw(WINDOW *win, int y, int x, char *fmt, ...);

int scanw(char *fmt, ...);

int wscanw(WINDOW *win, char *fmt, ...);
```

Parameters

y Is the y (row) coordinate of the position of the character to be read.

x Is the x (column) coordinate of the position of the character to be read.

fmt Is a `scanf()` format string.

win Is a pointer to the window in which the character is to be read.

Description These functions are similar to `scanf(3C)`. Their effect is as though `mvwgetstr(3XCURSES)` were called to get a multi-byte character string from the current or specified window at the current or specified cursor position, and then `sscanf()` were used to interpret and convert that string.

Return Values Upon successful completion, these functions return `OK`. Otherwise, they return `ERR`.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `getnstr(3XCURSES)`, `libcurses(3XCURSES)`, `printw(3XCURSES)`, `scanf(3C)`, `wcstombs(3C)`, `attributes(5)`, `standards(5)`

Name mvwin – move window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int mvwin(WINDOW *win, int y, int x);
```

Parameters

win Is a pointer to the window to move.

y Is the y (row) coordinate of the upper left corner of the window.

x Is the x (column) coordinate of the upper left corner of the window.

Description The `mvwin()` function moves the specified window (or subwindow), placing its upper left corner at the positions specified by *x* and *y*. The entire window must fit within the physical boundaries of the screen or an error results. In the case of a subwindow, the window must remain within the boundaries of the parent window.

Return Values On success, the `mvwin()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `derwin(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name napms – sleep process for a specified length of time

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int napms(int ms);
```

Parameters *ms* Is the number of milliseconds to sleep.

Description The `napms()` function sleeps for at least *ms* milliseconds.

Return Values The `napms()` function always returns `OK`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `delay_output(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name newpad, pnoutrefresh, prefresh, subpad – create or refresh a pad or subpad

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

WINDOW *newpad(int nlines, int ncols);

int pnoutrefresh(WINDOW *pad, int pminrow, int pmincol, int sminrow,
     int smincol,int smaxrow, int smaxcol);

int prefresh(WINDOW *pad, int pminrow, int pmincol, int sminrow,
     int smincol,int smaxrow, int smaxcol);

WINDOW *subpad(WINDOW *orig, int nlines, int ncols);
```

Parameters

nlines	Is the number of lines in the pad to be created.
ncols	Is the number of columns in the pad to be created.
pad	Is a pointer to the pad to refresh.
pminrow	Is the row coordinate of the upper left corner of the pad rectangle to be copied
pmincol	Is the column coordinate of the upper left corner of the pad rectangle to be copied.
sminrow	Is the row coordinate of the upper left corner of the rectangle on the physical screen where pad is to be positioned.
smincol	Is the column coordinate of the upper left corner of the rectangle on the physical screen where pad is to be positioned.
smaxrow	Is the row coordinate of the lower right corner of the rectangle on the physical screen where the pad is to be positioned.
smaxcol	Is the column coordinate of the lower right corner of the rectangle on the physical screen where the pad is to be positioned.
orig	Is a pointer to the parent pad within which a sub-pad is created.

Description The `newpad()` function creates a new pad with the specified number of lines and columns. A pointer to the new pad structure is returned. A pad differs from a window in that it is not restricted to the size of the physical screen. It is useful when only part of a large window will be displayed at any one time.

Automatic refreshes by scrolling or echoing of input do not take place when pads are used. Pads have their own refresh commands, `prefresh()` and `pnoutrefresh()`.

The `prefresh()` function copies the specified portion of the logical pad to the terminal screen. The parameters *pmincol* and *pminrow* specify the upper left corner of the rectangular area of the pad to be displayed. The lower right coordinate of the rectangular area of the pad that is to be displayed is calculated from the screen parameters (*sminrow*, *smincol*, *smaxrow*, *smaxcol*).

This function calls the `pnoutrefresh()` function to copy the specified portion of *pad* to the terminal screen and the `doupdate`(3XCURSES) function to do the actual update. The logical cursor is copied to the same location in the physical window unless `leaveok`(3XCURSES) is enabled (in which case, the cursor is placed in a position that the program finds convenient).

When outputting several pads at once, it is often more efficient to call the `pnoutrefresh()` and `doupdate()` functions directly. A call to `pnoutrefresh()` for each pad first, followed by only one call to `doupdate()` to update the screen, results in one burst of output, fewer characters sent, and less CPU time used.

The `subpad()` function creates a sub-pad within the pad *orig* with the specified number of lines and columns. A pointer to the new pad structure is returned. The sub-pad is positioned in the middle of *orig*. Any changes made to one pad affect the other. `touchwin`(3XCURSES) or `touchline`(3XCURSES) will likely have to be called on pad *orig* to correctly update the window.

Return Values

On success, the `newpad()` and `subpad()` functions returns a pointer to the new pad data structure. Otherwise, they return a null pointer.

On success, the `pnoutrefresh()` and `prefresh()` functions return `OK`. Otherwise, they return `ERR`.

Attributes

See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also

`clearok`(3XCURSES), `doupdate`(3XCURSES), `is_linetouched`(3XCURSES), `libcurses`(3XCURSES), `pechochar`(3XCURSES), `attributes`(5), `standards`(5)

Name nl, nonl – enable/disable newline control

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int nl(void);

int nonl(void);
```

Description The `nl()` function enables the handling of newlines. The `nl()` function converts newline into carriage return and line feed on output and converts carriage return into newline on input. `nonl()` disables the handling of newlines.

The handling of newlines is initially enabled. Disabling the handling of newlines results in faster cursor motion since X/Open Curses can use the line-feed capability more efficiently.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name nodelay – set blocking or non-blocking read

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int nodelay(WINDOW *win, bool bf);
```

Parameters

win Is a pointer to the window in which to enable non-blocking.

bf Is a Boolean expression.

Description If enabled, (*bf* is TRUE), the `nodelay()` function causes `getch(3XCURSES)` to return ERR if no input is ready. When disabled, `getch()` blocks until a key is pressed.

Return Values On success, the `nodelay()` function returns OK. Otherwise, it returns ERR.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `getch(3XCURSES)`, `halfdelay(3XCURSES)`, `libcurses(3XCURSES)`, `notimeout(3XCURSES)`, `attributes(5)`, `standards(5)`

Name noqiflush, qiflush – control flush of input and output on interrupt

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

void noqiflush(void);

void qiflush(void);
```

Description The `qiflush()` function enables the flushing of input and output queues when an interrupt, quit, or suspend character is sent to the terminal. The `noqiflush()` function disables this flushing.

Return Values These functions do not return a value.

Errors None

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `flushinp(3XCURSES)`, `intrflush(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name notimeout, timeout, wtimeout – set timed blocking or non-blocking read

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int notimeout(WINDOW *win, bool bf);

void timeout(int delay);

void wtimeout(WINDOW win, int delay);
```

Parameters

win Is a pointer to the window in which to set the timed blocking.

bf Is a Boolean expression.

delay Is the number of milliseconds to block or wait for input.

Description If *bool* is TRUE, the `notimeout()` function disables a timer used by `getch(3XCURSES)` when handling multibyte function key sequences.

When *bool* is FALSE and keypad handling is enabled, a timer is set by `getch()` to handle bytes received that could be the beginning of a function key (for example, ESC). If the remainder of the sequence is not received before the time expires, the first byte is returned; otherwise, the value of the function key is returned. Subsequent calls to the `getch()` function will return the other bytes received for the incomplete key sequence.

The `timeout()` and `wtimeout()` functions set the length of time `getch()` waits for input for windows `stdscr` and *win*, respectively. These functions are similar to `nodelay(3XCURSES)` except the time to block or wait for input can be specified.

A negative *delay* causes the program to wait indefinitely for input; a *delay* of `0` returns ERR if no input is ready; and a positive *delay* blocks until input arrives or the time specified expires, (in which case, ERR is returned).

Return Values On success, the `notimeout()` function returns OK. Otherwise, it returns ERR.

The `timeout()` and `wtimeout()` functions do not return a value.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe
Standard	See standards(5).

See Also getch(3XCURSES), halfdelay(3XCURSES), libcurses(3XCURSES), nodelay(3XCURSES), attributes(5), standards(5)

Name overlay, overwrite – copy overlapped windows

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int overlay(const WINDOW *srcwin, WINDOW *dstwin);

int overwrite(const WINDOW *srcwin, WINDOW *dstwin);
```

Parameters

srcwin Is a pointer to the source window to be copied.

dstwin Is a pointer to the destination window to be overlayed or overwritten.

Description The `overwrite()` and `overlay()` functions overlay *srcwin* on top of *destwin*. The *srcwin* and *dstwin* arguments do not have to be the same size; only text where the two windows overlap is copied.

The `overwrite()` function copies characters as though a sequence of `win_wch(3XCURSES)` and `wadd_wch(3XCURSES)` were performed with the destination window's attributes and background attributes cleared.

The `overlay()` function does the same thing, except that, whenever a character to be copied is the background character of the source window, `overlay()` does not copy the character but merely moves the destination cursor the width of the source background character.

If any portion of the overlaying window border is not the first column of a multi-column character, then all the column positions will be replaced with the background character and rendition before the overlay is done. If the default background character is a multi-column character when this occurs, then these functions fail.

Return Values Upon successful completion, these functions return `OK`. Otherwise, they return `ERR`.

Errors No errors are defined.

Examples **EXAMPLE 1** Implement a pop-up dialog

The following example demonstrates the use of `overwrite()` to implement a pop-up dialog box.

```
#include <curses.h>
/*
 *   Pop-up a window on top of curscr.  If row and/or col
 *   are -1 then that dimension will be centered within
 *   curscr.  Return 0 for success or -1 if malloc( ) failed.
 *   Pass back the working window and the saved window for the
 *   pop-up.  The saved window should not be modified.
```

EXAMPLE 1 Implement a pop-up dialog *(Continued)*

```
 */
int
popup(work, save, nrows, ncols, row, col)
WINDOW **work, **save;
int nrows, ncols, row, col;
{
     int mr, mc;
     getmaxyx(curscr, mr, mc);
     /* Windows are limited to the size of curscr. */
     if (mr < nrows)
          nrows = mr;
     if (mc < ncols)
          ncols = mc;
     /* Center dimensions. */
     if (row == -1)
          row = (mr-nrows)/2;
     if (col == -1)
          col = (mc-ncols)/2;
     /* The window must fit entirely in curscr. */
     if (mr < row+nrows)
          row = 0;
     if (mc < col+ncols)
          col = 0;
     *work = newwin(nrows, ncols, row, col);
     if (*work == NULL)
          return (-1);
     if ((*save = dupwin(*work)) == NULL) {
          delwin(*work);
          return (-1);
     }
     overwrite(curscr, *save);
     return (0);
}
/*
 * Restore the region covered by a pop-up window.
 * Delete the working window and the saved window.
 * This function is the complement to popup( ).  Return
 * 0 for success or -1 for an error.
 */
int
popdown(work, save)
WINDOW *work, *save;
{
     (void) wnoutrefresh(save);
     (void) delwin(save);
```

EXAMPLE 1 Implement a pop-up dialog *(Continued)*

```
     (void) delwin(work);
     return (0);
}
/*
 * Compute the size of a dialog box that would fit around
 * the string.
 */
void
dialsize(str, nrows, ncols)
char *str;
int *nrows, *ncols;
{
     int rows, cols, col;
     for (rows = 1, cols = col = 0; *str != '\0'; ++str) {
          if (*str == '\n') {
               if (cols < col)
                   cols = col;
               col = 0;
               ++rows;
          } else {
               ++col;
          }
      }
      if (cols < col)
           cols = col;
      *nrows = rows;
      *ncols = cols;
}
/*
 * Write a string into a dialog box.
 */
void
dialfill(w, s)
WINDOW *w;
char *s;
{
     int row;
     (void) wmove(w, 1, 1);
     for (row = 1; *s != '\0'; ++s) {
          (void) waddch(w, *((unsigned char*) s));
          if (*s == '\n')
               wmove(w, ++row, 1);
     }
     box(w, 0, 0);
}
```

EXAMPLE 1 Implement a pop-up dialog *(Continued)*

```
void
dialog(str)
char *str;
{
     WINDOW *work, *save;
     int nrows, ncols, row, col;
     /* Figure out size of window. */
     dialsize(str, &nrows, &ncols);
     /* Create a centered working window with extra */
     /* room for a border. */
     (void) popup(&work, &save, nrows+2, ncols+2, -1, -1);
     /* Write text into the working window. */
     dialfill(work, str);
     /* Pause.  Remember that wgetch( ) will do a wrefresh( ) */
     /* for us. */
     (void) wgetch(work);
     /* Restore curscr and free windows. */
     (void) popdown(work, save);
     /* Redraw curscr to remove window from physical screen. */
     (void) doupdate( );
}
```

Attributes

See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also

copywin(3XCURSES), libcurses(3XCURSES), wadd_wch(3XCURSES), win_wch(3XCURSES), attributes(5), standards(5)

Name panel_above, panel_below – panels deck traversal primitives

Synopsis

```
cc [ flag ... ] file ... -lpanel  -lcurses  [ library .. ]
#include <panel.h>

PANEL *panel_above(PANEL *panel);

PANEL *panel_below(PANEL *panel);
```

Description `panel_above()` returns a pointer to the panel just above *panel*, or NULL if *panel* is the top panel. `panel_below()` returns a pointer to the panel just below *panel*, or NULL if *panel* is the bottom panel.

If NULL is passed for *panel*, `panel_above()` returns a pointer to the bottom panel in the deck, and `panel_below()` returns a pointer to the top panel in the deck.

Return Values NULL is returned if an error occurs.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes These routines allow traversal of the deck of currently visible panels.

The header `<panel.h>` automatically includes the header `<curses.h>`.

Name panel_move, move_panel – move a panels window on the virtual screen

Synopsis

```
cc [ flag ... ] file ... -lpanel  -lcurses  [ library .. ]
#include <panel.h>


int move_panel(PANEL *panel, int starty, int startx);
```

Description `move_panel()` moves the `curses` window associated with *panel* so that its upper left-hand corner is at *starty*, *startx*. See usage note, below.

Return Values `OK` is returned if the routine completes successfully, otherwise `ERR` is returned.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `panel_update(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes For `panels` windows, use `move_panel()` instead of the `mvwin()` `curses` routine. Otherwise, `update_panels()` will not properly update the virtual screen.

The header `<panel.h>` automatically includes the header `<curses.h>`.

Name panel_new, new_panel, del_panel – create and destroy panels

Synopsis

```
cc [ flag ... ] file ... -lpanel  -lcurses  [ library .. ]
#include <panel.h>

PANEL *new_panel(WINDOW *win);

int del_panel(PANEL *panel);
```

Description `new_panel()` creates a new panel associated with *win* and returns the panel pointer. The new panel is placed on top of the panel deck.

`del_panel()` destroys *panel*, but not its associated window.

Return Values `new_panel()` returns `NULL` if an error occurs.

`del_win()` returns `OK` if successful, `ERR` otherwise.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `panel_update(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes The header `<panel.h>` automatically includes the header `<curses.h>`.

Name panels – character based panels package

Synopsis

```
#include <panel.h>
```

Description The `panel` library is built using the `curses` library, and any program using `panels` routines must call one of the `curses` initialization routines such as `initscr`. A program using these routines must be compiled with `-lpanel` and `-lcurses` on the `cc` command line.

The `panels` package gives the applications programmer a way to have depth relationships between `curses` windows; a `curses` window is associated with every panel. The `panels` routines allow `curses` windows to overlap without making visible the overlapped portions of underlying windows. The initial `curses` window, `stdscr`, lies beneath all panels. The set of currently visible panels is the *deck* of panels.

The `panels` package allows the applications programmer to create panels, fetch and set their associated windows, shuffle panels in the deck, and manipulate panels in other ways.

Routine Name Index The following table lists each `panels` routine and the name of the manual page on which it is described.

panels Routine Name	Manual Page Name
bottom_panel	`panel_top`(3CURSES)
del_panel	`panel_new`(3CURSES)
hide_panel	`panel_show`(3CURSES)
move_panel	`panel_move`(3CURSES)
new_panel	`panel_new`(3CURSES)
panel_above	`panel_above`(3CURSES)
panel_below	`panel_above`(3CURSES)
panel_hidden	`panel_show`(3CURSES)
panel_userptr	`panel_userptr`(3CURSES)
panel_window	`panel_window`(3CURSES)
replace_panel	`panel_window`(3CURSES)
set_panel_userptr	`panel_userptr`(3CURSES)
show_panel	`panel_show`(3CURSES)
top_panel	`panel_top`(3CURSES)
update_panels	`panel_update`(3CURSES)

Return Values Each `panels` routine that returns a pointer to an object returns NULL if an error occurs. Each panel routine that returns an integer, returns `OK` if it executes successfully and `ERR` if it does not.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `attributes(5)` and 3X pages whose names begin "panel_" for detailed routine descriptions.

Notes The header `<panel.h>` automatically includes the header `<curses.h>`.

Name panel_show, show_panel, hide_panel, panel_hidden – panels deck manipulation routines

Synopsis

```
cc [ flag ... ] file ... -lpanel  -lcurses  [ library .. ]
#include <panel.h>


int show_panel(PANEL *panel);

int hide_panel(PANEL *panel);

int panel_hidden(PANEL *panel);
```

Description `show_panel()` makes *panel*, previously hidden, visible and places it on top of the deck of panels.

`hide_panel()` removes *panel* from the panel deck and, thus, hides it from view. The internal data structure of the panel is retained.

`panel_hidden()` returns `TRUE (1)` or `FALSE (0)` indicating whether or not *panel* is in the deck of panels.

Return Values `show_panel()` and `hide_panel()` return the integer `OK` upon successful completion or `ERR` upon error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `panel_update(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes The header `<panel.h>` automatically includes the header `<curses.h>`.

Name panel_top, top_panel, bottom_panel – panels deck manipulation routines

Synopsis

```
cc [ flag ... ] file ... -lpanel  -lcurses  [ library .. ]
#include <panel.h>

int top_panel(PANEL *panel);

int bottom_panel(PANEL *panel);
```

Description `top_panel()` pulls *panel* to the top of the desk of panels. It leaves the size, location, and contents of its associated window unchanged.

`bottom_panel()` puts *panel* at the bottom of the deck of panels. It leaves the size, location, and contents of its associated window unchanged.

Return Values All of these routines return the integer `OK` upon successful completion or `ERR` upon error.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `panel_update(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes The header `<panel.h>` automatically includes the header `<curses.h>`.

Name panel_update, update_panels – panels virtual screen refresh routine

Synopsis

```
cc [ flag ... ] file ... -lpanel  -lcurses  [ library .. ]
#include <panel.h>


void update_panels(void);
```

Description `update_panels()` refreshes the virtual screen to reflect the depth relationships between the panels in the deck. The user must use the curses library call `doupdate()` (see `curs_refresh`(3CURSES)) to refresh the physical screen.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curs_refresh`(3CURSES), `curses`(3CURSES), `panels`(3CURSES), `attributes`(5)

Notes The header <`panel.h`> automatically includes the header <`curses.h`>.

Name panel_userptr, set_panel_userptr – associate application data with a panels panel

Synopsis

```
cc [ flag ... ] file ... -lpanel  -lcurses  [ library .. ]
#include <panel.h>


int set_panel_userptr(PANEL *panel, char *ptr);

char * panel_userptr(PANEL *panel);
```

Description Each panel has a user pointer available for maintaining relevant information.

`set_panel_userptr()` sets the user pointer of *panel* to *ptr*.

`panel_userptr()` returns the user pointer of *panel*.

Return Values `set_panel_userptr` returns `OK` if successful, `ERR` otherwise.

`panel_userptr` returns `NULL` if there is no user pointer assigned to *panel*.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes The header `<panel.h>` automatically includes the header `<curses.h>`.

Name panel_window, replace_panel – get or set the current window of a panels panel

Synopsis

```
cc [ flag ... ] file ... -lpanel   -lcurses  [ library .. ]
#include <panel.h>

WINDOW *panel_window(PANEL *panel);

int replace_panel(PANEL *panel, WINDOW *win);
```

Description `panel_window()` returns a pointer to the window of *panel*.

`replace_panel()` replaces the current window of *panel* with *win*.

Return Values `panel_window()` returns `NULL` on failure.

`replace_panel()` returns `OK` on successful completion, `ERR` otherwise.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `curses(3CURSES)`, `panels(3CURSES)`, `attributes(5)`

Notes The header `<panel.h>` automatically includes the header `<curses.h>`.

Name pechochar, pecho_wchar – add character and refresh window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int pechochar(WINDOW *pad, chtype ch);

int pecho_wchar(WINDOW *pad, const chtype *wch);
```

Parameters

pad Is a pointer to the pad in which the character is to be added.

ch Is a pointer to the character to be written to the pad.

wch Is a pointer to the complex character to be written to the pad.

Description The `pechochar()` function is equivalent to calling `waddch`(3XCURSES) followed by a call to `prefresh`(3XCURSES). The `pecho_wchar()` function is equivalent to calling `wadd_wch`(3XCURSES) followed by a call to `prefresh()`. `prefresh()` reuses the last position of the pad on the screen for its parameters.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `add_wch`(3XCURSES), `addch`(3XCURSES), `libcurses`(3XCURSES), `newpad`(3XCURSES), `attributes`(5), `standards`(5)

Name plot, arc, box, circle, closepl, closevt, cont, erase, label, line, linemod, move, openpl, openvt, point, space – graphics interface

Synopsis

```
cc [ flag ... ] file ... -lplot [ library... ]
#include <plot.h>

void arc(short x0, short y0, short x1, short y1, short x2,
     short y2);

void box(short x0, short y0, short x1, short y1);

void circle(short x, short y, short r);

void closepl();

void closevt();

void cont(short x, short y);

void erase();

void label(char *s);

void line(short x0, short y0, short x1, short y1);

void linemod(char *s);

void move(short x, short y);

void openpl();

void openvt();

void point(short x, short y);

void space(short x0, short y0, short x1, short y1);
```

Description These functions generate graphics output for a set of output devices. The format of the output is dependent upon which link editor option is used when the program is compiled and linked (see `Link Editor`).

The term `current point` refers to the current setting for the *x* and *y* coordinates.

The `arc()` function specifies a circular arc. The coordinates (*x0*, *y0*) specify the center of the arc. The coordinates (*x1*, *y1*) specify the starting point of the arc. The coordinates (*x2*, *y2*) specify the end point of the circular arc.

The `box()` function specifies a rectangle with coordinates (*x0*, *y0*), (*x0*, *y1*), (*x1*, *y0*), and (*x1*, *y1*). The current point is set to (*x1*, *y1*).

The `circle()` function specifies a circle with a center at the coordinates (*x*, *y*) and a radius of *r*.

The `closevt()` and `closepl()` functions flush the output.

The `cont()` function specifies a line beginning at the current point and ending at the coordinates (*x*, *y*). The current point is set to (*x*, *y*).

The `erase()` function starts another frame of output.

The `label()` function places the null terminated string *s* so that the first character falls on the current point. The string is then terminated by a NEWLINE character.

The `line()` function draws a line starting at the coordinates (*x0*, *y0*) and ending at the coordinates (*x1*, *y1*). The current point is set to (*x1*, *y1*).

The `linemod()` function specifies the style for drawing future lines. *s* may contain one of the following: `dotted`, `solid`, `longdashed`, `shortdashed`, or `dotdashed`.

The `move()` function sets the current point to the coordinates (*x*, *y*).

The `openpl()` or `openvt()` function must be called to open the device before any other `plot` functions are called.

The `point()` function plots the point given by the coordinates (*x*, *y*). The current point is set to (*x*, *y*).

The `space()` function specifies the size of the plotting area. The plot will be reduced or enlarged as necessary to fit the area specified. The coordinates (*x0*, *y0*) specify the lower left hand corner of the plotting area. The coordinates (*x1*, *y1*) specify the upper right hand corner of the plotting area.

Link Editor

Various flavors of these functions exist for different output devices. They are obtained by using the following `ld(1)` options:

`-lplot`	device-independent graphics stream on standard output in the format described in `plot(4B)`
`-l300`	GSI 300 terminal
`-l300s`	GSI 300S terminal
`-l4014`	Tektronix 4014 terminal
`-l450`	GSI 450 terminal
`-lvt0`	

Files

`/usr/lib/libplot.so.1`	shared object
`/usr/lib/64/libplot.so.1`	64-bit shared object
`/usr/lib/lib300.so.1`	shared object
`/usr/lib/64/lib300.so.1`	64-bit shared object
`/usr/lib/lib300s.so.1`	shared object

`/usr/lib/64/lib300s.so.1`	64-bit shared object
`/usr/lib/lib4014.so.1`	shared object
`/usr/lib/64/lib4014.so.1`	64-bit shared object
`/usr/lib/lib450.so.1`	shared object
`/usr/lib/64/lib450.so.1`	64-bit shared object
`/usr/lib/libvt0.so.1`	shared object
`/usr/lib/64/libvt0.so.1`	64-bit shared object

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Unsafe

See Also `ld(1)`, `libplot(3LIB)`, `plot(4B)`, `attributes(5)`

Name putp, tputs – apply padding information and output string

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int putp(const char *str);

int tputs(const char *str, int affcnt, int (*putfunc) (int));
```

Parameters

str Is a pointer to a `terminfo` variable or return value from `tgetstr`(3XCURSES), `tgoto`(3XCURSES), `tigetstr`(3XCURSES), or `tparm`(3XCURSES).

affcnt Is the number of lines affected, or 1 if not relevant.

putfunc Is the output function.

Description The `putp()` and `tputs()` functions are low-level functions used to deal directly with the `terminfo` database. The use of appropriate X/Open Curses functions is recommended for most situations.

The `tputs()` function adds padding information and then outputs *str*. *str* must be a `terminfo` string variable or the result value from `tgetstr()`, `tgoto()`, `tigetstr()`, or `tparm()`. The `tputs()` function replaces the padding specification (if one exists) with enough characters to produce the specified delay. Characters are output one at a time to *putfunc*, a user-specified function similar to `putchar`(3C).

The `putp()` function calls `tputs()` as follows:

`tputs(`*str*, 1, putchar)

Return Values On success, these functions return `OK`.

Errors None.

Usage The output of `putp()` goes to `stdout`, not to the file descriptor, *fildes*, specified in `setupterm`(3XCURSES).

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Standard	See standards(5).

See Also libcurses(3XCURSES), putchar(3C), setupterm(3XCURSES), tgetent(3XCURSES), tigetflag(3XCURSES), terminfo(4), attributes(5), standards(5)

Name redrawwin, wredrawln – redraw screen or portion of screen

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int redrawwin(WINDOW *win);

int wredrawln(WINDOW *win, int beg_line, int num_lines);
```

Parameters

win Is a pointer to the window in which to redraw.

beg_line Is the first line to redraw.

num_lines Is the number of lines to redraw.

Description The `redrawwin()` and `wredrawln()` functions force portions of a window to be redrawn to the terminal when the next refresh operation is performed.

The `redrawwin()` function forces the entire window *win* to be redrawn, while the `wredrawln()` function forces only *num_lines* lines starting with *beg_line* to be redrawn. Normally, refresh operations use optimization methods to reduce the actual amount of the screen to redraw based on the current screen contents. These functions tell the refresh operations not to attempt any optimization when redrawing the indicated areas.

These functions are useful when the data that exists on the screen is believed to be corrupt and for applications such as screen editors that redraw portions of the screen.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `doupdate(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name resetty, savetty – restore/save terminal modes

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int resetty(void);

int savetty(void);
```

Description The `savetty()` and `resetty()` functions save and restore the terminal state, respectively. The `savetty()` function saves the current state in a buffer; the `resetty()` function restores the state to that stored in the buffer at the time of the last `savetty()` call.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name ripoffline – reserve screen line for dedicated purpose

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int ripoffline(int line, int (*init)(WINDOW *win, int width));
```

Parameters

line determines whether the screen line being reserved comes from the top of `stdscr` (`line` is positive) or the bottom (`line` is negative).

init Is a pointer to a function that initializes the one-line window.

win Is a pointer to one-line window created by this function.

width Is the number of columns in the window pointed to by the *win* parameter.

Description The `ripoffline()` function reserves a screen line as a one line window.

To use this function, it must be called before you call `initscr`(3XCURSES) or `newterm`(3XCURSES). When `initscr()` or `newterm()` is called, so is the function pointed to by `init`. The function pointed to by `init` takes two arguments: a pointer to the one-line window and the number of columns in that window. This function cannot use the `LINES` or `COLS` variables and cannot call `wrefresh`(3XCURSES) or `doupdate`(3XCURSES), but may call `wnoutrefresh`(3XCURSES).

Return Values The `rioffline()` function always returns `OK`.

Errors None.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `doupdate`(3XCURSES), `initscr`(3XCURSES), `libcurses`(3XCURSES), `slk_attroff`(3XCURSES), `attributes`(5), `standards`(5)

Name scr_dump, scr_init, scr_restore, scr_set – write screen contents to/from a file

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int scr_dump(const char *filename);

int scr_init(const char *filename);

int scr_restore(const char *filename);

int scr_set(const char *filename);
```

Parameters *filename* Is a pointer to the file in which screen contents are written.

Description These function perform input/output functions on a screen basis.

The `scr_dump()` function writes the contents of the virtual screen, `curscr`, to *filename*.

The `scr_restore()` function reads the contents of *filename* from `curscr` (which must have been written with `scr_dump()`). The next refresh operation restores the screen to the way it looks in *filename*.

The `scr_init()` function reads the contents of *filename* and uses those contents to initialize the X/Open Curses data structures to what is actually on screen. The next refresh operation bases its updates on this data, unless the terminal has been written to since *filename* was saved or the `terminfo` capabilities `rmcup` and `nrrmc` are defined for the current terminal.

The `scr_set()` function combines `scr_restore()` and `scr_init()`. It informs the program that the contents of the file *filename* are what is currently on the screen and that the program wants those contents on the screen.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also delscreen(3XCURSES), doupdate(3XCURSES), endwin(3XCURSES), getwin(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name scrl, scroll, wscrl – scroll a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int scrl(int n);

int scroll(WINDOW *win);

int wscrl(WINDOW *win, int n);
```

Parameters

n number and direction of lines to scroll

win pointer to the window in which to scroll

Description The `scroll()` function scrolls the window *win* up one line. The current cursor position is not changed.

The `scrl()` and `wscrl()` functions scroll the window `stdscr` or *win* up or down *n* lines, where *n* is a positive (scroll up) or negative (scroll down) integer.

The `scrollok(3XCURSES)` function must be enabled for these functions to work.

Return Values On success, these functions return `OK`. Otherwise, they return `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `clearok(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name setcchar – set a cchar_t type character from a wide character and rendition

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int setcchar(cchar_t *wcval, const wchar_t *wch, const attr_t attrs,
     short color_pair, const void *opts);
```

Parameters

wcval	Is a pointer to a location where a `cchar_t` character (and its rendition) can be stored.
wch	Is a pointer to a wide character.
attrs	Is the set of attributes to apply to *wch* in creating *wcval*.
color_pair	Is the color pair to apply to *wch* in creating *wcval*.
opts	Is reserved for future use. Currently, this must be a null pointer.

Description The `setcchar()` function takes the wide character pointed to by *wch*, combines it with the attributes indicated by *attrs* and the color pair indicated by *color_pair* and stores the result in the object pointed to by *wcval*.

Return Values On success, the `setcchar()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `attroff(3XCURSES)`, `can_change_color(3XCURSES)`, `getcchar(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name set_term – switch between terminals

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

SCREEN *set_term(SCREEN *new);
```

Parameters *new* Is the new terminal to which the `set_term()` function will switch.

Description The `set_term()` function switches to the terminal specified by *new* and returns a screen reference to the previous terminal. Calls to subsequent X/Open Curses functions affect the new terminal.

Return Values On success, the `set_term()` function returns a pointer to the previous screen. Otherwise, it returns a null pointer.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name slk_attroff, slk_attr_off, slk_attron, slk_attr_on, slk_attrset, slk_attr_set, slk_clear, slk_color, slk_init, slk_label, slk_noutrefresh, slk_refresh, slk_restore, slk_set, slk_touch, slk_wset – soft label functions

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int slk_attroff(const chtype attrs);

int slk_attr_off(const attr_t attrs, void *opts);

int slk_attron(const chtype attrs);

int slk_attr_on(const attr_t attrs, void *opts);

int slk_attrset(const chtype attrs);

int slk_attr_set(const attr_t attrs, short color_pair_number, void *opts);

int slk_clear(void);

int slk_color(short color_pair_number);

int slk_init(int fmt);

char *slk_label(int labnum);

int slk_noutrefresh(void);

int slk_refresh(void);

int slk_restore(void);

int slk_set(int labnum, const char *label, int justify);

int slk_touch(void);

int slk_wset(int labnum, const wchar_t *label, int justify);
```

Parameters

attrs	are the window attributes to be added or removed.
opts	Is reserved for future use. Currently, this must be a null pointer.
color_pair_number	Is a color pair.
fmt	Is the format of how the labels are arranged on the screen.
labnum	Is the number of the soft label.
label	Is the name to be given to a soft label.
justify	Is a number indicating how to justify the label name.

Description The Curses interface manipulates the set of soft function-key labels that exist on many terminals. For those terminals that do not have soft labels, Curses takes over the bottom line of *stdscr*, reducing the size of *stdscr* and the value of the `LINES` external variable. There can be up to eight labels of up to eight display columns each.

To use soft labels, `slk_init()` must be called before calling `initscr`(3XCURSES), `newterm`(3XCURSES), or `ripoffline`(3XCURSES). If `initscr()` eventually uses a line from *stdscr* to emulate the soft labels, then *fmt* determines how the labels are arranged on the screen. Setting *fmt* to 0 indicates a 3-2-3 arrangement of the labels; 1 indicates a 4-4 arrangement. Other values for *fmt* are unspecified.

The `slk_init()` function has the effect of calling `ripoffline()` to reserve one screen line to accommodate the requested format.

The `slk_set()` and `slk_wset()` functions specify the text of soft label number *labnum*, within the range from 1 to and including 8. The *label* argument is the string to be put the lable. With `slk_set()` and `slk_wset()`, the width of the label is limited to eight columns positions. A null string or a null pointer specifies a blank label. The *justify* argument can have the following values to indicate how to justify *label* within the space reserved for it:

0 Align the start of *label* with the start of the space

1 Center *label* within the space

2 Align the end of *label* with the end of the space

The `slk_refresh()` and `slk_noutrefresh()` functions correspond to the `wrefresh`(3XCURSES) and `wnoutrefresh`(3XCURSES) functions.

The `slk_label()` function obtains soft label number *labnum*.

The `slk_clear()` function immediately clears the soft labels from the screen.

The `slk_restore()` function immediately restores the soft labels to the screen after a call to `slk_clear()`.

The `slk_touch()` function forces all the soft labels to be output the next time `slk_refresh()` or `slk_noutrefresh()` is called.

The `slk_attron()`, `slk_attrset()`, and `slk_attroff()` functions correspond to the `attron`(3XCURSES), `attrset`(3XCURSES), and `attroff`(3XCURSES) functions. They have an effect only if soft labels are stimulated on the bottom line of the screen.

The `slk_attr_on()`, `slk_attr_off()`, `slk_attr_set()` and `slk_color()` functions correspond to the `attr_on`(3XCURSES), `attr_off`(3XCURSES), `attr_set`(3XCURSES), and `color_set`(3XCURSES) functions. As a result, they support color and the attribute constants with the `WA_` prefix.

The *opts* argument is reserved for definition in a future release. Currently, the *opts* argument is a null pointer.

Return Values Upon successful completion, the `slk_label()` function returns the requested label with leading and trailing blanks stripped. Otherwise, it returns a null pointer.

Upon successful completion, the other functions return `OK`. Otherwise, they return `ERR`.

Errors No errors are defined.

Usage When using multi-byte character sets, applications should check the width of the string by calling `mbstowcs(3C)` and then `wcswidth(3C)` before calling `slk_set()`. When using wide characters, applications should check the width of the string by calling `wcswidth()` before calling `slk_set()`.

Since the number of columns that a wide string will occupy is codeset-specific, call `wcwidth(3C)` and `wcswidth(3C)` to check the number of column positions in the string before calling `slk_wset()`.

Most applications would use `slk_noutrefresh()` because a `wrefresh()` is likely to follow soon.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `attr_get(3XCURSES)`, `attroff(3XCURSES)`, `delscreen(3XCURSES)`, `libcurses(3XCURSES)`, `mbstowcs(3C)`, `ripoffline(3XCURSES)`, `wcswidth(3C)`, `wcwidth(3C)`, `attributes(5)`, `standards(5)`

Name standend, standout, wstandend, wstandout – set/clear window attributes

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int standend(void);

int standout(void);

int wstandend(WINDOW *win);

int wstandout(WINDOW *win);
```

Parameters *win* Is a pointer to the window in which attribute changes are to be made.

Description The `standend()` and `wstandend()` functions turn off all attributes associated with `stdscr` and *win* respectively.

The `standout()` and `wstandout()` functions turn on the `A_STANDOUT` attribute of `stdscr` and *win* respectively.

Return Values These functions always return 1.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `attr_get(3XCURSES)`, `attroff(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name stdscr – default window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include -L /usr/xpg4/lib \
-R /usr/xpg4/lib -lcurses [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

extern WINDOW *stdscr;
```

Description The external variable `stdscr` specifies the default window used by functions that to not specify a window using an argument of type `WINDOW *`. Other windows may be created using `newwin()`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `derwin(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name syncok, wcursyncup, wsyncdown, wsyncup – synchronize window with its parents or children

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int syncok(WINDOW *win, bool bf);

void wcursyncup(WINDOW *win);

void wsyncdown(WINDOW *win);

void wsyncup(WINDOW *win);
```

Parameters

win Is a pointer to a window.

bf Is a Boolean expression.

Description The `syncok()` function uses the value of *bf* to determine whether or not the window *win*'s ancestors are implicitly touched whenever there is a change to *win*. If *bf* is `TRUE`, this touching occurs. If *bf* is `FALSE`, it does not occur. The initial value for *bf* is `FALSE`.

The `wcursyncup()` function moves the cursor in *win*'s ancestors to match its position in *win*.

The `wsyncdown()` function touches *win* if any of its ancestors have been touched.

The `wsyncup()` function touches all ancestors of *win*.

Return Values On success, the `syncok()` function returns `OK`. Otherwise, it returns `ERR`.

The other functions do not return a value.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `derwin(3XCURSES)`, `doupdate(3XCURSES)`, `is_linetouched(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name termattrs, term_attrs – get supported terminal video attributes

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

chtype termattrs(void);

attr_t term_attrs(void);
```

Description The `termattrs()` function extracts the video attributes of the current terminal which is supported by the `chtype` data type.

The `term_attrs()` function extracts information for the video attributes of the current terminal which is supported for a `cchar_t`.

Return Values The `termattrs()` function returns a logical OR of `A_` values of all video attributes supported by the terminal.

The `term_attrs()` function returns a logical OR of `WA_` values of all video attributes supported by the terminal.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `attr_get(3XCURSES)`, `attroff(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name termname – return the value of the environmental variable TERM

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

char *termname(void);
```

Description The `termname()` function returns a pointer to the value of the environmental variable `TERM` (truncated to 14 characters).

Return Values The `termname()` returns a pointer to the terminal's name.

Errors None.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `del_curterm(3XCURSES)`, `libcurses(3XCURSES)`, `attributes(5)`, `standards(5)`

Name tgetent, tgetflag, tgetnum, tgetstr, tgoto – emulate the termcap database

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <term.h>

int tgetent(char *bp, const char *name);

int tgetflag(char id[2]);

int tgetnum(char id[2]);

char *tgetstr(char id[2], char **area);

char *tgoto(char *cap, int col, int row);
```

Parameters

bp Is a pointer to a buffer. This parameter is ignored.

name Is the `termcap` entry to look up.

cap Is the pointer to a `termcap` capability.

area Is a pointer to the area where `tgetstr()` stores the decoded string.

col Is the column placement of the new cursor.

row Is the row placement of the new cursor.

Description The `tgetent()` function looks up the `termcap` entry for *name*. The emulation ignores the buffer pointer *bp*.

The `tgetflag()` function gets the Boolean entry for *id*.

The `tgetnum()` function gets the numeric entry for *id*.

The `tgetstr()` function gets the string entry for *id*. If *area* is not a null pointer and does not point to a null pointer, `tgetstr()` copies the string entry into the buffer pointed to by **area* and advances the variable pointed to by *area* to the first byte after the copy of the string entry.

The `tgoto()` function instantiates the parameters *col* and *row* into the capability *cap* and returns a pointer to the resulting string.

All of the information available in the `terminfo` database need not be available through these functions.

Return Values Upon successful completion, those functions that return integers return `OK`. Otherwise, they return `ERR`.

Those functions that return pointers return a null pointer when an error occurs.

Errors No errors are defined.

Usage These functions are included as a conversion aid for programs that use the `termcap` library. Their arguments are the same and the functions are emulated using the `terminfo` database.

These functions are only guaranteed to operate reliably on character sets in which each character fits into a single byte, whose attributes can be expressed using only constants with the `A_` prefix.

Any terminal capabilities from the `terminfo` database that cannot be retrieved using these functions can be retrieved using the functions described on the `tigetflag(3XCURSES)` manual page.

Portable applications must use `tputs(3XCURSES)` to output the strings returned by `tgetstr()` and `tgoto()`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `putp(3XCURSES)`, `setupterm(3XCURSES)`, `tigetflag(3XCURSES)`, `attributes(5)`, `standards(5)`

Name tigetflag, tigetnum, tigetstr, tparm – return the value of a terminfo capability

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <term.h>

int tigetflag(char *capname);

int tigetnum(char *capname);

char *tigetstr(char *capname);

char *tparm(char *cap, long p1, long p2, long p3, long p4, long p5,
     long p6, long p7,long p8, long p9);
```

Parameters

capname Is the name of the `terminfo` capability for which the value is required.

cap Is a pointer to a string capability.

p1...p9 Are the parameters to be instantiated.

Description The `tigetflag()`, `tigetnum()`, and `tigetstr()` functions return values for `terminfo` capabilities passed to them.

The following null-terminated arrays contain the *capnames*, the `termcap` codes and full C names for each of the `terminfo` variables.

```
char *boolnames, *boolcodes, *boolfnames
char *numnames, *numcodes, *numfnames
char *strnames, *strcodes, *strfnames
```

The `tparm()` function instantiates a parameterized string using nine arguments. The string is suitable for output processing by `tputs()`.

Return Values On success, the `tigetflg()`, `tigetnum()`, and `tigetstr()` functions return the specified `terminfo` capability.

`tigetflag()` returns –1 if *capname* is not a Boolean capability.

`tigetnum()` returns –2 if *capname* is not a numeric capability.

`tigetstr()` returns `(char *)`–1 if *capname* is not a string capability.

On success, the `tparm()` function returns *cap* in a static buffer with the parameterization resolved. Otherwise, it returns a null pointer.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also libcurses(3XCURSES), tgetent(3XCURSES), terminfo(4), attributes(5), standards(5)

Name typeahead – check for type-ahead characters

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int typeahead(int fd);
```

Parameters *fd* Is the file descriptor that is used to check for type-ahead characters.

Description The `typeahead()` function specifies the file descriptor (*fd*) to use to check for type-ahead characters (characters typed by the user but not yet processed by X/Open Curses).

X/Open Curses checks for type-ahead characters periodically while updating the screen. If characters are found, the current update is postponed until the next `refresh`(3XCURSES) or `doupdate`(3XCURSES). This speeds up response to commands that have been typed ahead. Normally, the input file pointer passed to `newterm`(3XCURSES), or `stdin` in the case of `initscr`(3XCURSES), is used for type-ahead checking.

If *fd* is -1, no type-ahead checking is done.

Return Values On success, the `typeahead()` function returns `OK`. Otherwise, it returns `ERR`.

Errors None.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `doupdate`(3XCURSES), `getch`(3XCURSES), `initscr`(3XCURSES), `libcurses`(3XCURSES), `attributes`(5), `standards`(5)

Name unctrl – generate printable representation of a character

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <unctrl.h>

char *unctrl(chtype c);
```

Parameters *c* Is a character.

Description The `unctrl()` function generates a character string that is a printable representation of *c*. If *c* is a control character,it is converted to the ^*X* notation. If *c* contains rendition information, the effect is undefined.

Return Values Upon successful completion, the `unctrl()` function returns the generated string. Otherwise, it returns a null pointer.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `addch`(3XCURSES), `addstr`(3XCURSES), `libcurses`(3XCURSES), `wunctrl`(3XCURSES), `attributes(5)`, `standards(5)`

Name ungetch, unget_wch – push character back onto the input queue

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int ungetch(int ch);

int unget_wch(const wchar_t wch);
```

Parameters

ch Is the single byte character to be put back in the input queue for the next call to getch(3XCURSES).

wch Is the wide character to be put back in the input queue for the next call to get_wch(3XCURSES).

Description The ungetch() function pushes *ch* back onto the input queue until the next call to getch().

The unget_wch() function is similar to ungetch() except that *ch* can be of type wchar_t.

Return Values On success, these functions return OK. Otherwise, they return ERR.

Errors None.

Attributes See attributes(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See standards(5).

See Also get_wch(3XCURSES), getch(3XCURSES), libcurses(3XCURSES), attributes(5), standards(5)

Name use_env – specify source of screen size information

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

void use_env(bool boolval);
```

Parameters *boolval* Is a Boolean expression.

Description The `use_env()` function specifies the technique by which the implementation determines the size of the screen. If *boolval* is `FALSE`, the implementation uses the values of *lines* and *columns* specified in the `terminfo` database. If *boolval* is `TRUE`, the implementation uses the `LINES` and `COLUMNS` environmental variables. The initial value is `TRUE`.

Any call to `use_env()` must precede calls to `initscr`(3XCURSES), `newterm`(3XCURSES), or `setupterm`(3XCURSES).

Return Values The `use_env()` function does not return a value.

Errors No errors are defined.

Attributes See `attributes`(5) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards`(5).

See Also `del_curterm`(3XCURSES), `initscr`(3XCURSES), `libcurses`(3XCURSES), `attributes`(5), `standards`(5)

Name vidattr, vid_attr, vidputs, vid_puts – output attributes to the terminal

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

int vidattr(chtype attr);

int vid_attr(attr_t attr, short color_pair_number, void *opt);

int vidputs(chtype attr, int (*putfunc) (int));

int vid_puts(attr_t attr, short color_pair_number, void *opt,
     int (*putfunc) (int));
```

Parameters

attr	Is the rendition of the foreground window.
color_pair_number	Is a color pair.
opt	Is reserved for future use. Currently, this must be a null pointer.
putfunc	Is a user-supplied output function.

Description These functions output commands to the terminal that change the terminal's attributes.

If the `terminfo` database indicates that the terminal in use can display characters in the rendition specified by *attr*, then `vidattr()` outputs one or more commands to request that the terminal display subsequent characters in that rendition. The function outputs by calling `putchar(3C)`. The `vidattr()` function neither relies on your updates the model which Curses maintains of the prior rendition mode.

The `vidputs()` function computes the terminal output string that `vidattr()` does, based on *attr*, but `vidputs()` outputs by calling the user-supplied function *putfunc*. The `vid_attr()` and `vid_puts()` functions correspond to `vidattr()` and `vidputs()` respectively, but take a set of arguments, one of type `attr_t` for the attributes, one of type `short` for the color pair number, and a `void` *, and thus support the attribute constants with the `WA_` prefix.

The *opts* argument is reserved for definition in a future release. Currently, it is implemented as a null pointer.

The user-supplied function *putfunc* (which can be specified as an argument to either `vidputs()` or `vid_puts()`) is either `putchar()` or some other function with the same prototype. Both the `vidputs()` and `vid_puts()` functions ignore the return value of *putfunc*.

Return Values Upon successful completion, these functions return `OK`. Otherwise, they return `ERR`.

Errors No errors are defined.

USAGE After use of any of these functions, the model Curses maintains of the state of the terminal might not match the actual state of the terminal. The application should touch and refresh the window before resuming conventional use of Curses.

Of these functions requires that the application contain so much information about a particular class of terminal that it defeats the purpose of using Curses.

On some terminals, a command to change rendition conceptually occupies space in the screen buffer (with or without width). Thus, a command to set the terminal to a new rendition would change the rendition of some characters already displayed.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `doupdate(3XCURSES)`, `is_linetouched(3XCURSES)`, `libcurses(3XCURSES)`, `putchar(3C)`, `tigetflag(3XCURSES)`, `attributes(5)`, `standards(5)`

Name vw_printw – print formatted output in window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <stdarg.h>
#include <curses.h>

int vw_printw(WINDOW *win, char *fmt, va_list varglist);
```

Parameters

fmt Is a `printf()` format string.

varglist Is a pointer to a list of parameters.

win Is a pointer to the window in which the string is to be written.

Description The `vw_printw()` function achieves the same effect as `wprintw(3XCURSES)` using a variable argument list. The third argument is a `va_list`, as defined in `<stdarg.h>`.

Return Values Upon successful completion, `vw_printw()` returns `OK`. Otherwise, it returns `ERR`.

Errors No errors are defined.

Usage The `vw_printw()` function is preferred over `vwprintw(3XCURSES)`. The use of the `vwprintw()` and `vw_printw()` in the same file will not work, due to the requirements to include `<varargs.h>` and `<stdarg.h>`, which both contain definitions of `va_list`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `mvprintw(3XCURSES)`, `printf(3C)`, `attributes(5)`, `standards(5)`

Name vwprintw – print formatted output in window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <varargs.h>
#include <curses.h>

int vwprintw(WINDOW *win, char *fmt, va_list varglist);
```

Parameters

fmt Is a `printf()` format string.

varglist Is a pointer to a list of parameters.

win Is a pointer to the window in which the string is to be written.

Description The `vwprintw()` function achieves the same effect as `wprintw(3XCURSES)` using a variable argument list. The third argument is a `va_list`, as defined in <`varargs.h`>.

Return Values Upon successful completion, `vwprintw()` returns `OK`. Otherwise, it returns `ERR`.

Errors No errors are defined.

Usage The `vwprintw()` function is deprecated; the `vw_printw(3XCURSES)` function is preferred. The use of the `vwprintw()` and `vw_printw()` in the same file will not work, due to the requirements to include <`varargs.h`> and <`stdarg.h`>, which both contain definitions of `va_list`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `mvprintw(3XCURSES)`, `printf(3C)`, `vw_printw(3XCURSES)`, `attributes(5)`, `standards(5)`

Name vw_scanw – convert formatted input from a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <stdarg.h>
#include <curses.h>

int vw_scanw(WINDOW *win, char *fmt, va_list varglist);
```

Parameters

fmt Is a `scanf()` format string.

varglist Is a pointer to a list of parameters.

win Is a pointer to the window in which the character is to be read.

Description The `vw_scanw()` function achieves the same effect as `wscanw(3XCURSES)` using a variable argument list. The third argument is a `va_list`, as defined in `<stdarg.h>`.

Return Values Upon successful completion, `vw_scanw()` returns `OK`. Otherwise, it returns `ERR`.

Errors No errors are defined.

Usage The `vw_scanw()` function is preferred over `vwscanw(3XCURSES)`. The use of the `vwscanw()` and `vw_scanw()` in the same file will not work, due to the requirements to include `<varargs.h>` and `<stdarg.h>`, which both contain definitions of `va_list`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `mvscanw(3XCURSES)`, `scanf(3C)`, `attributes(5)`, `standards(5)`

Name vwscanw – convert formatted input from a window

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <varargs.h>
#include <curses.h>

int vwscanw(WINDOW *win, char *fmt, va_list varglist);
```

Parameters

fmt Is a `scanf()` format string.

varglist Is a pointer to a list of parameters.

win Is a pointer to the window in which the character is to be read.

Description The `vwscanw()` function achieves the same effect as `wscanw(3XCURSES)` using a variable argument list. The third argument is a `va_list`, as defined in <`varargs.h`>.

Return Values Upon successful completion, `vwscanw()` returns `OK`. Otherwise, it returns `ERR`.

Errors No errors are defined.

Usage The `vwscanw()` function is deprecated; the `vw_scanw(3XCURSES)` function is preferred. The use of the `vwscanw()` and `vw_scanw()` in the same file will not work, due to the requirements to include <`varargs.h`> and <`stdarg.h`>, which both contain definitions of `va_list`.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `libcurses(3XCURSES)`, `mvscanw(3XCURSES)`, `scanf(3C)`, `vw_scanw(3XCURSES)`, `attributes(5)`, `standards(5)`

Name wunctrl – generate printable representation of a wide character

Synopsis

```
cc [ flag... ] file... -I /usr/xpg4/include  -L  /usr/xpg4/lib \
 -R  /usr/xpg4/lib  -lcurses  [ library... ]

c89 [ flag... ] file... -lcurses [ library... ]

#include <curses.h>

wchar_t *wunctrl(cchar_t *wc);
```

Parameters *wc* Is a pointer to the wide character.

Description The `wunctrl()` function converts the a wide character string that is a printable representation of the wide character *wc*.

This function also performs the following processing on the input argument:

- Control characters are converted to the ^*X* notation
- Any rendition information is removed.

Return Values Upon successful completion, the `wunctrl()` function returns the generated string. Otherwise, it returns a null pointer.

Errors No errors are defined.

Attributes See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Unsafe
Standard	See `standards(5)`.

See Also `keyname(3XCURSES)`, `libcurses(3XCURSES)`, `unctrl(3XCURSES)`, `attributes(5)`, `standards(5)`