NAME

getch, **wgetch**, **mvgetch**, **mvwgetch**, **ungetch**, **has_key** - get (or push back) characters from *curses* terminal keyboard

SYNOPSIS

#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 *c***);**

/ extension */*
int has_key(int *c***);**

DESCRIPTION

Reading Characters

wgetch gathers a key stroke from the terminal keyboard associated with a *curses* window *win*. **ncurses**(3X) describes the variants of this function.

When input is pending, **wgetch** returns an integer identifying the key stroke; for alphanumeric and punctuation keys, this value corresponds to the character encoding used by the terminal. Use of the control key as a modifier often results in a distinct code. The behavior of other keys depends on whether *win* is in keypad mode; see subsection "Keypad Mode" below.

If no input is pending, then if the no-delay flag is set in the window (see **nodelay**(3X)), the function returns **ERR**; otherwise, *curses* waits until the terminal has input. If **cbreak**(3X) has been called, this happens after one character is read. If **nocbreak**(3X) has been called, it occurs when the next newline is read. If **halfdelay**(3X) has been called, *curses* waits until a character is typed or the specified delay elapses.

If **echo**(3X) has been called, and the window is not a pad, *curses* writes the returned character *c* to the window (at the cursor position) per the following rules.

- If *c* matches the terminal’s erase character, the cursor moves leftward one position and the new position is erased as if **wmove**(3X) and then **wdelch**(3X) were called. When the window’s keypad mode is enabled (see below), **KEY_LEFT** and **KEY_BACKSPACE** are handled the same way.

- *curses* writes any other *c* to the window, as with **wechochar**(3X).

- If the window has been moved or modified since the last call to **wrefresh**(3X), *curses* calls **wrefresh**.

If *c* is a carriage return and **nl**(3X) has been called, **wgetch** returns the character code for line feed instead.

Keypad Mode

To *curses*, key strokes not from the alphabetic section of the keyboard (those corresponding to the ECMA-6 character set--see *ascii*(7)--optionally modified by either the control or shift keys) are treated as *function* keys. (In *curses*, the term "function key" includes but is not limited to keycaps engraved with "F1", "PF1", and so on.) If the window is in keypad mode, these produce a numeric code corresponding to the **KEY_** symbols listed in subsection "Predefined Key Codes" below; otherwise, they transmit a sequence of codes typically starting with the escape character, and which must be collected with multiple **wgetch** calls.

- The *curses.h* header file declares many *predefined function keys* whose names begin with **KEY_**; these object-like macros have values outside the range of eight-bit character codes.

- In *ncurses*, *user-defined function keys* are configured with **define_key**(3X); they have no names, but are also expected to have values outside the range of eight-bit codes.

A variable intended to hold a function key code must thus be of type *short* or larger.

Most terminals one encounters follow the ECMA-48 standard insofar as their function keys produce character sequences prefixed with the escape character ESC. This fact implies that *curses* cannot know whether the terminal has sent an ESC key stroke or the beginning of a function key's character sequence without waiting to see if, and how soon, further input arrives. When *curses* reads such an ambiguous character, it sets a timer. If the remainder of the sequence does not arrive within the designated time, **wgetch** returns the prefix character; otherwise, it returns the function key code corresponding to the unique sequence defined by the terminal. Consequently, a user of a *curses* application may experience a delay after pressing ESC while *curses* disambiguates the input; see section "EXTENSIONS" below. If the window is in "no time-out" mode, the timer does not expire; it is an infinite (or very large) value. See **notimeout**(3X). Because function key sequences usually begin with an escape character, the terminal may appear to hang in no time-out mode after the user has pressed ESC. Generally, further typing "awakens" *curses*.

Ungetting Characters

ungetch places *c* into the input queue to be returned by the next call to **wgetch**. A single input queue serves all windows.

Predefined Key Codes

The header file *curses.h* defines the following function key codes.

- Except for the special case of **KEY_RESIZE**, a window's keypad mode must be enabled for **wgetch** to read these codes from it.
- Not all of these are necessarily supported on any particular terminal.
- The naming convention may seem obscure, with some apparent misspellings (such as "RSUME" for "resume"); the names correspond to the *terminfo* capability names for the keys, and were standardized before the IBM PC/AT keyboard layout achieved a dominant position in industry.

Symbol	**Key name**
KEY_BREAK	Break key
KEY_DOWN	Arrow keys
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*)	Function key *n* where 0 <= *n* <= 63
KEY_DL	Delete line
KEY_IL	Insert line
KEY_DC	Delete character
KEY_IC	Insert character/Enter insert mode

KEY_EIC	Exit insert character mode
KEY_CLEAR	Clear screen
KEY_EOS	Clear to end of screen
KEY_EOL	Clear to end of line
KEY_SF	Scroll one line forward
KEY_SR	Scroll one line backward (reverse)
KEY_NPAGE	Next page/Page up
KEY_PPAGE	Previous page/Page down
KEY_STAB	Set tab
KEY_CTAB	Clear tab
KEY_CATAB	Clear all tabs
KEY_ENTER	Enter/Send
KEY_SRESET	Soft (partial) reset
KEY_RESET	(Hard) reset
KEY_PRINT	Print/Copy
KEY_LL	Home down/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
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_MOUSE	Mouse event occurred
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	Ref(erence) key
KEY_REFRESH	Refresh key
KEY_REPLACE	Replace key
KEY_RESIZE	Screen resized
KEY_RESTART	Restart key
KEY_RESUME	Resume key
KEY_SAVE	Save key
KEY_SELECT	Select key
KEY_SUSPEND	Suspend key
KEY_UNDO	Undo 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 character key
KEY_SDL	Shifted delete line 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 insert key
KEY_SLEFT	Shifted left arrow key
KEY_SMESSAGE	Shifted message key
KEY_SMOVE	Shifted move key
KEY_SNEXT	Shifted next object key
KEY_SOPTIONS	Shifted options key
KEY_SPREVIOUS	Shifted previous object key
KEY_SPRINT	Shifted print key
KEY_SREDO	Shifted redo key
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

Many keyboards feature a nine-key directional pad.

```
+-----+--------+-------+
| A1|   up|  A3 |
+-----+--------+-------+
|left|   B2|right |
+-----+--------+-------+
| C1|down|  C3 |
+-----+--------+-------+
```

Two of the symbols in the list above do *not* correspond to a physical key.

- **wgetch** returns **KEY_RESIZE**, even if the window's keypad mode is disabled, when *ncurses* handles a **SIGWINCH** signal; see **initscr**(3X) and **resizeterm**(3X).

- **wgetch** returns **KEY_MOUSE** to indicate that a mouse event is pending collection; see **curs_mouse**(3X). Receipt of this code requires a window's keypad mode to be enabled, because to interpret mouse input (as with with *xterm*(1)'s mouse prototocol), *ncurses* must read an escape sequence, as with a function key.

Testing Key Codes

In *ncurses*, **has_key** returns a Boolean value indicating whether the terminal type recognizes its parameter as a key code value. See also **define_key**(3X) and **key_defined**(3X).

RETURN VALUE

Except for **has_key**, these functions return **OK** on success and **ERR** on failure.

Functions taking a *WINDOW* pointer argument fail if the pointer is **NULL**.

Functions prefixed with "mv" first perform cursor movement and fail if the position (*y*, *x*) is outside the window boundaries.

wgetch also fails if

- its timeout expires without any data arriving, or

- execution was interrupted by a signal, in which case **errno** is set to **EINTR**.

ungetch fails if there is no more room in the input queue.

has_key returns **TRUE** or **FALSE**.

NOTES

curses discourages assignment of the ESC key to a discrete function by the programmer because the library requires a delay while it awaits the potential remainder of a terminal escape sequence.

Some key strokes are indistinguishable from control characters; for example, **KEY_ENTER** may be the same as **^M**, and **KEY_BACKSPACE** may be the same as **^H** or **^?**. Consult the terminal's *terminfo* entry to determine whether this is the case; see **infocmp**(1). Some *curses* implementations, including *ncurses*, honor the *terminfo* key definitions; others treat such control characters specially.

curses distinguishes the Enter keys in the alphabetic and numeric keypad sections of a keyboard because (most) terminals do. **KEY_ENTER** refers to the key on the numeric keypad and, like other function keys, and is reliably recognized only if the window's keypad mode is enabled.

- The *terminfo* **key_enter** (**kent**) capability describes the character (sequence) sent by the Enter key of a terminal's numeric (or similar) keypad.

- "Enter or send" is X/Open Curses's description of this key.

curses treats the Enter or Return key in the *alphabetic* section of the keyboard differently.

- It usually produces a control code for carriage return (**^M**) or line feed (**^J**).

- Depending on the terminal mode (raw, cbreak, or "cooked"), and whether **nl**(3X) or **nonl**(3X) has been called, **wgetch** may return either a carriage return or line feed upon an Enter or Return key stroke.

Use of **wgetch** with **echo**(3X) and neither **cbreak**(3X) nor **raw**(3X) is not well-defined.

Historically, the list of key code macros above was influenced by the function-key-rich keyboard of the AT&T 7300 (also known variously as the "3B1", "Safari 4", and "UNIX PC"), a 1985 machine. Today's computer keyboards are based that of the IBM PC/AT and tend to have fewer. A *curses* application can expect such a keyboard to transmit key codes **KEY_UP**, **KEY_DOWN**, **KEY_LEFT**, **KEY_RIGHT**, **KEY_HOME**, **KEY_END**, **KEY_PPAGE** (Page Up), **KEY_NPAGE** (Page Down), **KEY_IC** (Insert), **KEY_DC** (Delete), and **KEY_F(*n*)** for 1 <= *n* <= 12.

getch, **mvgetch**, and **mvwgetch** may be implemented as macros.

EXTENSIONS

In *ncurses*, when a window's "no time-out" mode is *not* set, the **ESCDELAY** variable configures the duration of the timer used to disambiguate a function key character sequence from a series of key strokes beginning with ESC typed by the user; see **curs_variables**(3X).

has_key was designed for **ncurses**(3X), and is not found in SVr4 *curses*, 4.4BSD *curses*, or any other previous curses implementation.

PORTABILITY

Applications employing *ncurses* extensions should condition their use on the visibility of the **NCURSES_VERSION** preprocessor macro.

X/Open Curses, Issue 4 describes **getch**, **wgetch**, **mvgetch**, **mvwgetch**, and **ungetch**. It specifies no error conditions for them.

wgetch reads only single-byte characters.

The echo behavior of these functions on input of **KEY_** or backspace characters was not specified in the SVr4 documentation. This description is adapted from X/Open Curses.

The behavior of **wgetch** in the presence of signal handlers is unspecified in the SVr4 documentation and X/Open Curses. In historical *curses* implementations, it varied depending on whether the operating system's dispatch of a signal to a handler interrupting a *read*(2) call in progress, and also (in some implementations) whether an input timeout or non-blocking mode has been set. Programmers concerned about portability should be prepared for either of two cases: (a) signal receipt does not interrupt **wgetch**; or (b) signal receipt interrupts **wgetch** and causes it to return **ERR** with **errno** set to **EINTR**.

KEY_MOUSE is mentioned in X/Open Curses, along with a few related *terminfo* capabilities, but no higher-level functions use the feature. The implementation in *ncurses* is an extension.

KEY_RESIZE and **has_key** are extensions first implemented for *ncurses*. By 2022, *PDCurses* and NetBSD *curses* had added them along with **KEY_MOUSE**.

SEE ALSO

curs_get_wch(3X) describes comparable functions of the *ncurses* library in its wide-character configuration (*ncursesw*).

curses(3X), **curs_addch**(3X), **curs_inopts**(3X), **curs_mouse**(3X), **curs_move**(3X), **curs_outopts**(3X), **curs_refresh**(3X), **curs_variables**(3X), **resizeterm**(3X), **ascii**(7)

ECMA-6 "7-bit coded Character Set" <https://ecma-international.org/publications-and-standards/standards/ecma-6/>

ECMA-48 "Control Functions for Coded Character Sets" <https://ecma-international.org/

publications-and-standards/standards/ecma-48/>