Xterm Control Sequences

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Definitions

$\boxed{c}$	The literal character *c*.
C	A single (required) character.
P_s	A single (usually optional) numeric parameter, composed of one of more digits.
P_m	A multiple numeric parameter composed of any number of single numeric parameters, separated by $\boxed{;}$ character(s).
P_t	A text parameter composed of printable characters.

VT100 Mode

Most of these control sequences are standard VT102 control sequences, but there are some sequences here from later DEC VT terminals, too. VT102 features not supported are smooth scrolling, double size characters, blinking characters, and VT52 mode. There are additional control sequences to provide *xterm*-dependent functions, like the scrollbar or window size. Where the function is specified by DEC or ISO 6429, the code assigned to it is given in parentheses. The escape codes to designate and invoke character sets are specified by ISO 2022; see that document for a discussion of character sets.

$\boxed{\text{BEL}}$	Bell (Ctrl-G)
$\boxed{\text{BS}}$	Backspace (Ctrl-H)
$\boxed{\text{TAB}}$	Horizontal Tab (HT) (Ctrl-I)
$\boxed{\text{LF}}$	Line Feed or New Line (NL) (Ctrl-J)
$\boxed{\text{VT}}$	Vertical Tab (Ctrl-K) same as LF
$\boxed{\text{FF}}$	Form Feed or New Page (NP) (Ctrl-L) same as LF
$\boxed{\text{CR}}$	Carriage Return (Ctrl-M)
$\boxed{\text{SO}}$	Shift Out (Ctrl-N) → Switch to Alternate Character Set: invokes the G1 character set.
$\boxed{\text{SI}}$	Shift In (Ctrl-O) → Switch to Standard Character Set: invokes the G0 character set (the default).
$\boxed{\text{ESC}}\boxed{\#}\boxed{8}$	DEC Screen Alignment Test (DECALN)
$\boxed{\text{ESC}}\boxed{(}\,C$	Designate G0 Character Set (ISO 2022) $C = \boxed{0}$ → DEC Special Character and Line Drawing Set

	C = A → United Kingdom (UK)
	C = B → United States (USASCII)
ESC) C	Designate G1 Character Set (ISO 2022)
	C = 0 → DEC Special Character and Line Drawing Set
	C = A → United Kingdom (UK)
	C = B → United States (USASCII)
ESC * C	Designate G2 Character Set (ISO 2022)
	C = 0 → DEC Special Character and Line Drawing Set
	C = A → United Kingdom (UK)
	C = B → United States (USASCII)
ESC + C	Designate G3 Character Set (ISO 2022)
	C = 0 → DEC Special Character and Line Drawing Set
	C = A → United Kingdom (UK)
	C = B → United States (USASCII)
ESC 7	Save Cursor (DECSC)
ESC 8	Restore Cursor (DECRC)
ESC =	Application Keypad (DECPAM)
ESC >	Normal Keypad (DECPNM)
ESC D	Index (IND)
ESC E	Next Line (NEL)
ESC F	Cursor to lower left corner of screen (if enabled by the **hpLowerleftBugCompat** resource).
ESC H	Tab Set (HTS)
ESC M	Reverse Index (RI)
ESC N	Single Shift Select of G2 Character Set (SS2): affects next character only
ESC O	Single Shift Select of G3 Character Set (SS3): affects next character only
ESC P P_t ESC \	Device Control String (DCS)
	xterm implements no DCS functions; P_t is ignored. P_t need not be printable characters.
ESC Z	Return Terminal ID (DECID). Obsolete form of ESC [c (DA).
ESC [P_s @	Insert P_s (Blank) Character(s) (default = 1) (ICH)
ESC [P_s A	Cursor Up P_s Times (default = 1) (CUU)
ESC [P_s B	Cursor Down P_s Times (default = 1) (CUD)
ESC [P_s C	Cursor Forward P_s Times (default = 1) (CUF)
ESC [P_s D	Cursor Backward P_s Times (default = 1) (CUB)
ESC [P_s ; P_s H	Cursor Position [row;column] (default = [1,1]) (CUP)
ESC [P_s J	Erase in Display (ED)
	P_s = 0 → Clear Below (default)
	P_s = 1 → Clear Above
	P_s = 2 → Clear All
ESC [P_s K	Erase in Line (EL)
	P_s = 0 → Clear to Right (default)

	P_s = 1 → Clear to Left
	P_s = 2 → Clear All
ESC [P_s L	Insert P_s Line(s) (default = 1) (IL)
ESC [P_s M	Delete P_s Line(s) (default = 1) (DL)
ESC [P_s P	Delete P_s Character(s) (default = 1) (DCH)
ESC [P_s ; P_s ; P_s ; P_s ; P_s T	
	Initiate hilite mouse tracking. Parameters are [func;startx;starty;firstrow;lastrow]. See the section **Mouse Tracking**.
ESC [P_s c	Send Device Attributes (DA)
	P_s = 0 or omitted → request attributes from terminal
	→ ESC [? 1 ; 2 c (“I am a VT100 with Advanced Video Option.”)
ESC [P_s ; P_s f	Horizontal and Vertical Position [row;column] (default = [1,1]) (HVP)
ESC [P_s g	Tab Clear (TBC)
	P_s = 0 → Clear Current Column (default)
	P_s = 3 → Clear All
ESC [P_m h	Set Mode (SM)
	P_s = 4 → Insert Mode (IRM)
	P_s = 2 0 → Automatic Newline (LNM)
ESC [P_m l	Reset Mode (RM)
	P_s = 4 → Replace Mode (IRM)
	P_s = 2 0 → Normal Linefeed (LNM)
ESC [P_m m	Character Attributes (SGR)
	P_s = 0 → Normal (default)
	P_s = 1 → Bold
	P_s = 4 → Underscore
	P_s = 5 → Blink (appears as Bold)
	P_s = 7 → Inverse
ESC [P_s n	Device Status Report (DSR)
	P_s = 5 → Status Report ESC [0 n (“OK”)
	P_s = 6 → Report Cursor Position (CPR) [row;column] as ESC [*r* ; *c* R
ESC [P_s ; P_s r	Set Scrolling Region [top;bottom] (default = full size of window) (DECSTBM)
ESC [P_s x	Request Terminal Parameters (DECREQTPARM)
ESC [? P_m h	DEC Private Mode Set (DECSET)
	P_s = 1 → Application Cursor Keys (DECCKM)
	P_s = 2 → Designate USASCII for character sets G0-G3. (In the VT102, this selects VT52 mode (DECANM), which *xterm* doesn’t support.)
	P_s = 3 → 132 Column Mode (DECCOLM)
	P_s = 4 → Smooth (Slow) Scroll (DECSCLM)
	P_s = 5 → Reverse Video (DECSCNM)
	P_s = 6 → Origin Mode (DECOM)
	P_s = 7 → Wraparound Mode (DECAWM)

P_s = 8 → Auto-repeat Keys (DECARM)
P_s = 9 → Send Mouse X & Y on button press. See the section **Mouse Tracking**.
P_s = 3 8 → Enter Tektronix Mode (DECTEK)
P_s = 4 0 → Allow 80 ↔ 132 Mode
P_s = 4 1 → *more*(1) fix (see *curses* resource)
P_s = 4 4 → Turn On Margin Bell
P_s = 4 5 → Reverse-wraparound Mode
P_s = 4 6 → Start Logging (normally disabled by a compile-time option)
P_s = 4 7 → Use Alternate Screen Buffer (unless disabled by the **titeInhibit** resource)
P_s = 1 0 0 0 → Send Mouse X & Y on button press and release. See the section **Mouse Tracking**.
P_s = 1 0 0 1 → Use Hilite Mouse Tracking. See the section **Mouse Tracking**.

ESC [? P_m l — DEC Private Mode Reset (DECRST)
P_s = 1 → Normal Cursor Keys (DECCKM)
P_s = 3 → 80 Column Mode (DECCOLM)
P_s = 4 → Jump (Fast) Scroll (DECSCLM)
P_s = 5 → Normal Video (DECSCNM)
P_s = 6 → Normal Cursor Mode (DECOM)
P_s = 7 → No Wraparound Mode (DECAWM)
P_s = 8 → No Auto-repeat Keys (DECARM)
P_s = 9 → Don't Send Mouse X & Y on button press
P_s = 4 0 → Disallow 80 ↔ 132 Mode
P_s = 4 1 → No *more*(1) fix (see *curses* resource)
P_s = 4 4 → Turn Off Margin Bell
P_s = 4 5 → No Reverse-wraparound Mode
P_s = 4 6 → Stop Logging (normally disabled by a compile-time option)
P_s = 4 7 → Use Normal Screen Buffer
P_s = 1 0 0 0 → Don't Send Mouse X & Y on button press and release
P_s = 1 0 0 1 → Don't Use Hilite Mouse Tracking

ESC [? P_m r — Restore DEC Private Mode Values. The value of P_s previously saved is restored. P_s values are the same as for DECSET.

ESC [? P_m s — Save DEC Private Mode Values. P_s values are the same as for DECSET.

ESC] P_s ; P_t BEL — Set Text Parameters
P_s = 0 → Change Icon Name and Window Title to P_t
P_s = 1 → Change Icon Name to P_t
P_s = 2 → Change Window Title to P_t
P_s = 4 6 → Change Log File to P_t (normally disabled by a compile-time option)
P_s = 5 0 → Set Font to P_t

ESC ^ P_t ESC \ — Privacy Message (PM)
xterm implements no PM functions; P_t is ignored. P_t need not be printable characters.

ESC _ P_t ESC \ Application Program Command (APC)
xterm implements no APC functions; P_t is ignored. P_t need not be printable characters.

ESC c Full Reset (RIS)

ESC l Memory Lock (per HP terminals). Locks memory above the cursor.

ESC m Memory Unlock (per HP terminals)

ESC n Invoke the G2 Character Set (LS2)

ESC o Invoke the G3 Character Set (LS3)

ESC | Invoke the G3 Character Set as GR (LS3R). Has no visible effect in *xterm*.

ESC } Invoke the G2 Character Set as GR (LS2R). Has no visible effect in *xterm*.

ESC ~ Invoke the G1 Character Set as GR (LS1R). Has no visible effect in *xterm*.

Mouse Tracking

The VT widget can be set to send the mouse position and other information on button presses. These modes are typically used by editors and other full-screen applications that want to make use of the mouse.

There are three mutually exclusive modes, each enabled (or disabled) by a different parameter in the DECSET (or DECRST) escape sequence. Parameters for all mouse tracking escape sequences generated by *xterm* encode numeric parameters in a single character as *value*+040. For example, ! is 1. The screen coodinate system is 1-based.

X10 compatibility mode sends an escape sequence on button press encoding the location and the mouse button pressed. It is enabled by specifying parameter 9 to DECSET. On button press, *xterm* sends ESC [M $C_bC_xC_y$ (6 characters). C_b is button−1. C_x and C_y are the x and y coordinates of the mouse when the button was pressed.

Normal tracking mode sends an escape sequence on both button press and release. Modifier information is also sent. It is enabled by specifying parameter 1000 to DECSET. On button press or release, *xterm* sends ESC [M $C_bC_xC_y$. The low two bits of C_b encode button information: 0=MB1 pressed, 1=MB2 pressed, 2=MB3 pressed, 3=release. The upper bits encode what modifiers were down when the button was pressed and are added together. 4=Shift, 8=Meta, 16=Control. C_x and C_y are the x and y coordinates of the mouse event. The upper left corner is (1,1).

Mouse hilite tracking notifies a program of a button press, receives a range of lines from the program, highlights the region covered by the mouse within that range until button release, and then sends the program the release coordinates. It is enabled by specifying parameter 1001 to DECSET. Warning: use of this mode requires a cooperating program or it will hang *xterm.* On button press, the same information as for normal tracking is generated; *xterm* then waits for the program to send mouse tracking information. *All X events are ignored until the proper escape sequence is received from the pty:* ESC [P_s ; P_s ; P_s ; P_s ; P_s T . The parameters are *func, startx, starty, firstrow,* and *lastrow. func* is non-zero to initiate hilite tracking and zero to abort. *startx* and *starty* give the starting x and y location for the highlighted region. The ending location tracks the mouse, but will never be above row *firstrow* and will always be above row *lastrow.* (The top of the screen is row 1.) When the button is released, *xterm* reports the ending position one of two ways: if the start and end coordinates are valid text locations: ESC [t C_xC_y. If either coordinate is past the end of the line: ESC [T $C_xC_yC_xC_yC_xC_y$. The parameters are *startx, starty, endx, endy, mousex,* and *mousey. startx, starty, endx,* and *endy* give the starting and ending character positions of the region. *mousex* and *mousey* give the location of the mouse at button up, which may not be over a character.

Tektronix 4014 Mode

Most of these sequences are standard Tektronix 4014 control sequences. Graph mode supports the 12-bit addressing of the Tektronix 4014. The major features missing are the write-thru and defocused modes. This document does not describe the commands used in the various Tektronix plotting modes but does describe the commands to switch modes.

BEL Bell (Ctrl-G)

BS	Backspace (Ctrl-H)
TAB	Horizontal Tab (Ctrl-I)
LF	Line Feed or New Line (Ctrl-J)
VT	Cursor up (Ctrl-K)
FF	Form Feed or New Page (Ctrl-L)
CR	Carriage Return (Ctrl-M)
ESC ETX	Switch to VT100 Mode (ESC Ctrl-C)
ESC ENQ	Return Terminal Status (ESC Ctrl-E)
ESC FF	PAGE (Clear Screen) (ESC Ctrl-L)
ESC SO	Begin 4015 APL mode (ignored by *xterm*) (ESC Ctrl-N)
ESC SI	End 4015 APL mode (ignored by *xterm*) (ESC Ctrl-O)
ESC ETB	COPY (Save Tektronix Codes to file COPYyy-mm-dd.hh:mm:ss) (ESC Ctrl-W)
ESC CAN	Bypass Condition (ESC Ctrl-X)
ESC SUB	GIN mode (ESC Ctrl-Z)
ESC FS	Special Point Plot Mode (ESC Ctrl-\)
ESC 8	Select Large Character Set
ESC 9	Select #2 Character Set
ESC :	Select #3 Character Set
ESC ;	Select Small Character Set
ESC] P_s ; P_t BEL	Set Text Parameters of VT window
	P_s = 0 → Change Icon Name and Window Title to P_t
	P_s = 1 → Change Icon Name to P_t
	P_s = 2 → Change Window Title to P_t
	P_s = 4 6 → Change Log File to P_t (normally disabled by a compile-time option)
ESC `	Normal Z Axis and Normal (solid) Vectors
ESC a	Normal Z Axis and Dotted Line Vectors
ESC b	Normal Z Axis and Dot-Dashed Vectors
ESC c	Normal Z Axis and Short-Dashed Vectors
ESC d	Normal Z Axis and Long-Dashed Vectors
ESC h	Defocused Z Axis and Normal (solid) Vectors
ESC i	Defocused Z Axis and Dotted Line Vectors
ESC j	Defocused Z Axis and Dot-Dashed Vectors
ESC k	Defocused Z Axis and Short-Dashed Vectors
ESC l	Defocused Z Axis and Long-Dashed Vectors
ESC p	Write-Thru Mode and Normal (solid) Vectors
ESC q	Write-Thru Mode and Dotted Line Vectors
ESC r	Write-Thru Mode and Dot-Dashed Vectors
ESC s	Write-Thru Mode and Short-Dashed Vectors
ESC t	Write-Thru Mode and Long-Dashed Vectors
FS	Point Plot Mode (Ctrl-\)

$\boxed{\text{GS}}$	Graph Mode (Ctrl-])
$\boxed{\text{RS}}$	Incremental Plot Mode (Ctrl-^)
$\boxed{\text{US}}$	Alpha Mode (Ctrl-_)