
<https://invisible-island.net/xterm/xterm.log>

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It began as a list of the changes that I made for xterm, using the notes that I added when submitting a patch. You should note that other changes were made as well, by other people, to fix bugs and correct ifdef's for portability. Until mid-2006, most of these were summarized in the XFree86 [CHANGELOG](#)).

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Patch #407 - 2026/02/16

- add private modes 1020 to 1023 for reporting whether xterm uses UTF-8, whether CJK-width is set, whether Emoji-width is set, and whether private-width is set.
- add resource `privateWidth` to control whether PUA (private use area) codes are neutral width or single-width.
- improve fix for Debian [#738794](#), to show boxes for codes which are neither combining characters or valid Unicode characters (Debian [#1123877](#)).

- improve switching to/from UTF-8 mode by saving, restoring and resetting the G0-G3 array (Debian [#1124802](#)).
- use ST consistently in terminfo rather than legacy BEL
- minor updates to configure script and terminfo
- add option `--enable-resize-adjust` for saving and repainting parts of the window which are lost when the user resizes the window (integrated patch by Kirill A Korinsky).

Patch #406 - 2025/12/21

- add configure option `--enable-resize-adjust`, to provide support for cursor-adjustment and repainting of saved data when resizing the window (patch by Kirill A Korinsky).
- add option `-emoji_width` and resource `emojiWidth` to allow enabling/disabling VS15/VS16 feature introduced in [patch #404](#) (Debian [#1123509](#)). Also, work around display issues by changing the filler character for VS16.

Patch #405 - 2025/12/14

- correct sign-extension in drawing changes made in [patch #404](#) (Debian [#1122519](#))
- further improvements to limit-checking for mouse button and motion events (report by James Holderness).
- correct index expression when handling overflow of title stack.

Patch #404 - 2025/11/30

- add numeric keypad codes to XTGETTCAP.
- implement parsing and cursor positioning for Unicode variation selectors 15 and 16.
- improve limit-checking for mouse button and motion events (report by James Holderness).
- fix a bug in printer code in xterm [#403](#) (report by Felix Brockmeier).
- change `wcwidth` for private-use codes, to make them consistently neutral width, i.e., single/double width according to whether they are used for CJK.
- improve test-driver for `wcwidth`, adding options to test the predefined ranges listed in UnicodeData, as well as suppressing output where it only shows that the system's `wcwidth` lacks a definition for codes.
- add some of the OpenBSD local-patches, including an `ifdef`-improvement for `DEF_DISALLOWED_WINDOW` (patch by Matthieu Herrb).
- modify configure script macros to widen pattern for `$host_os` from “linux*gnu” to “linux*gnu*” to cover targets such as `i686-pc-linux-gnut64` (GenToo [#963725](#)).

Patch #403 - 2025/10/19

- modify a special case which gives the expected width of Latin-1 characters to account for the `allowC1Printable` resource (Debian [#1110771](#)).
- modify `run-tic.in` to use `ncurses tic's -o` option in preference to the `TERMINFO` environment variable.
- adjust limits for built-in line-drawing characters (Debian [#1109472](#)).
- add note in manpage regarding environment variables which xterm removes (report by Ben Collver).
- modify resources `eightBitSelectTypes` and `utf8SelectTypes` to match names ignoring case.
- improve manpage description of comma-separated resource values (prompted by discussion with István Kopft).
- change default value for `disallowedWindowOps` resource (prompted by discussion with István Kopft).

- fix a mismatched pointer in free in error-handling of a table lookup of resource initialization (report/patch by István Kopft).
- update tables in `wcwidth.c` based on Unicode 17.0.0
- update `config.guess`, `config.sub`

Patch #402 - 2025/09/08

- revise a correction for HLS to RGB from [patch #385](#) to avoid losing precision (report/patch by István Kopft).
- extend special case for line-drawing characters in glyphs 1-31 to work with TrueType fonts (report/testcase by Jens Schweikhardt).
- modify `wcwidth.c` to treat Emoji codes as double-width.
- add configure option `--with-xterm-kbs` as in `ncurses`, to provide for platform-based default value for the erase key definition in `terminfo`.
- modify `DA1` to report extension code 17 with VT320.
- simplify `CursorBack` and related cursor-movement functions.
- change names of experimental `ifdef`'s such as `xmc-glitch` to begin with "EXP_", and consistently use fallbacks in `ptyx.h`
- expanded section of manpage dealing with select/paste.
- amend [patch #392](#) changes for accepting an 8-bit ST to make this an experimental feature limited to the SOS table when in UTF-8 mode.
- update `precompose.c` based on Unicode 16.0
- add a null-pointer check in `ScrNWriteText` (Debian [#1110769](#)).

Patch #401 - 2025/07/02

- adjust reported window-position by the shell window's border with in XTWINOPS 13, for better match with the position set via XTWINOPS 3, fixing a mismatch seen with `esctest`.
- improve `ifdef`'ing of infrequently-configured features.
- add `vttests/query-allowed.pl`, to illustrate OSC 60, 61, and 62.
- add OSC 62, to provide a list of features which can be specified to be disabled/enabled via resource settings or menus.
- restore a check needed for Debian [#1084794](#), which was lost in the changes for [patch #400](#) (report by Sean C Farley).
- correct spelling for "allowWindowOps" in OSC 61. The original spelling "allowWinOps" is still accepted.

Patch #400 - 2025/06/15

- improve configure check for X libraries to reduce duplicates.
- amend fix for (Debian [#1084794](#) to ensure that non-linedrawing characters are drawn with Xft (report by Robert Ross).
- simplify/consolidate copyright notices where those were redundant.
- update/improve cleanup of environment variables.

Patch #399 - 2025/05/18

- add configure check for `inline`, for c89 support.
- further improve integration between UTF-8 and `allowC1Printable` (report by Matthieu Herrb).
- modify one of the missing-character checks to prefer Xft's check over the check for missing line-drawing characters (Debian [#1084794](#)).

- align terminfo building blocks in terminfo to correspond to recent refactoring/trimming in ncurses.
- revise a limit-check in selection to fix a regression in [patch #398](#) (Debian [#1105738](#)).
- modify configure check for Xft to work around recent change to fontconfig's pkg-config file (Gentoo [#953864](#)).

Patch #398 - 2025/04/11

- modify DECFRA and DECRQCRA to handle NRCS and ISO character set mappings.
- ensure that the cursor GC is updated when switching between normal and italic fonts (report/testcase by Peter Fabinski).
- reduce overflow in scaling of ReGIS coordinates (report/testcase by Robert L Masterson).
- improve permissions-check for valid shell program.
- extend *modifyOtherKeys* and *formatOtherKeys* to the various categories of special keys, i.e., cursor-keys, function-keys, keypad-keys, modifier-keys and (other) special-keys.
 - review/extend `convmap.pl` to handle all of the X11 keysym definitions in `keysym2ucs`.
 - keysyms which do not correspond to Unicode character codes are mapped to Unicode private use areas in the BMP and plane 15.
 - add/extend control sequences for the new format- and modify-resources.
- fix copy/paste error in configure script for default value of `--enable-block-select` (report by Vincent Lefèvre).
- revise `keysym2ucs.c`, to provide mapping to/from the Unicode private use area for non-character keysyms. Also remove redundant items from `keysym.map`.
- improve `modifyOtherKeys`, by providing the UCS value for keys which have no single-byte representation (Debian [#1093056](#)).
- add two extensions to `modifyOtherKeys`:
 - setting `modifyOtherKeys` to 3 makes all keyboard input send escape sequences, using parameter 1 where no modifiers are given.
 - a subparameter can be added to the `XTMODKEYS` control sequence, telling xterm to factor-out the corresponding modifier mask from available parameters in the `modifyOtherKeys` feature.
- add items `ColumnMode` and `StatusLine` to `disallowWindowOps`, for `DECCOLM`, `DECANM` and `DECSASD`, `DECSSTD` respectively (report by Sami Farin).
- fix several minor issues reported by Coverity.
- add `ColorEvents` resource to provide a way for applications to send a client message which can modify the default foreground and background colors (adapted from patch by Claes Nästén).
- add special case for displaying an error for `CAN` (cancel) when emulating VT100 (prompted by discussion with Thomas Wolff).
- correct the size of a `CellData` buffer in `xtermReportSGR` seen in `ASAN2` (report by Sami Farin).

Patch #397 - 2025/01/05

- add resource `printRawChars` to allow bypassing check in [patch #389](#) which omits Unicode non-characters from printing (request by Adam Saponara).
- add visible-effect for `SUB`, per DEC 070 page 5-132.
- correct a limit-check in private mode 1045.
- add optional feature for block-selection, bound to meta-button-one (patch by Adam Saponara).
- if started as a VT52, identify the terminal as a real VT52 rather than VT52 emulated by VT100.
- amend change to VT52 cursor-addressing per DEC 070 (mintty [#1299](#)).
- correct `ctlseqs.ms` suffix for `XTTITLEPOS`

Patch #396 - 2024/12/02

- fix stricter warnings provided by upcoming gcc 15, as well as NetBSD lint.
- modify title-stack test script, adding logging and command-replay options. Improved the script with new controls:
 - add XTTITLEPOS query to get position in title-stack.
 - add DECRQSS for XTSMTITLE.
- correct cursor-addressing limit for VT52 mode (report by Serguei Fichel).
- amend change in [patch #395](#) for 7-bit parsing to allow UTF-8 titles (report by Dmytro Bagril).
- portability fixes for configure script, from ncurses
- update config.guess, config.sub

Patch #395 - 2024/10/24

- add DECRQSS response for DECSTGLT, i.e., ANSI SGR color.
- add Russian and SCS NRCS character set mappings.
- remove obsolete code for OS390 and VMS.
- minor fixes to work with vttest 20240929's 7-bit parsing test.
- improve DECRPM responses for unsupported modes; those which are valid for a given DEC terminal are reported as permanently reset rather than unknown.
- add JIS-Roman and JIS-Katakana character sets, for VT382.
- fix typo in `ctlseqs.ms` note about function key vs DSR (report by Michael Thomas Greer).
- formatting fixes for `ctlseqs.ms` (report by Mark Manning).
- update tables in `wcwidth.c` based on Unicode 16.0.0

Patch #394 - 2024/09/02

- add `-nomap` option (request by Tavis Ormandy).
- improve checks for rectangle operations, per DEC 070.
- improve check for missing characters in bitmap fonts, for a case where the font is marked complete but its range does not include non-Latin1 codes (prompted by discussion with Craig Leres).
- correct upper-limit in check for missing characters, from [patch #393](#) changes (report/patch by Matthew Martin).
- fix for `-report-fonts` option when the font's first character position is nonzero (prompted by discussion with Craig Leres).
- add null-pointer check for a Heisenbug (Debian [#1078255](#)).

Patch #393 - 2024/07/11

- add a check for ANSI SC/RC, to ignore CSI parameters.
- improve check for missing characters for bitmap-fonts by using the normal font for reference in the case where the current font, e.g., the wide-font was derived from the normal font and lacks per-character metrics (report by Rajeev V. Pillai).
- fix regression in error-recovery for SGR parameters from [patch #357](#) (report by James Holderness).
- remove some duplicates in `xtermcfg.h` (report by Matthew Green).
- change default for `--enable-imake` configure option.
- fixes for `wcwidth`:
 - return 0 for format effectors, like a zero-width printing character rather than -1 like a control character (report by Rajeev V. Pillai).
 - correct `doublewidth` to account for reserved codepoints which are listed in the `EastAsianWidth` file.
 - add a special case for surrogate pairs, which might be checked in testing the `wcwidth` function.
- amend sixel bounds-check added in [patch #371](#) to not wrap out-of-bounds data.

- eliminate `maxStringParse` limit for SIXEL.
- improve logic which ignores APC, PM and SOS controls to also not accumulate their data temporarily in a buffer.
- exclude `TERM_INGRESS` from cleanup of environment variables (patch by Iain Riley).
- fix some documentation typos (report by Thomas Wolff).

Patch #392 - 2024/05/22

- improve input decoding for non-Latin1 character sets by preserving the sense of GL/GR.
- add resource `preferLatin1` to simplify UPSS configuration (Gentoo [#932154](#)).
- build-fix for `--disable-boxchars`; [patch #390](#) reuses that feature's code to draw the part of the DEC Technical character set which has no Unicode equivalent.
- modify `#include` of `pty.h` to work with musl (report by Khem Raj).
- improve definitions used in `clock_gettime` logic in `graphics_sixel.c`, as well as updating comments (patch by Ben Wong).
- amend `allowC1Printable` changes from [patch #391](#), restoring a special case which caused C1 characters to be ignored (report/testcase by Dmytro Bagrii).

Patch #391 - 2024/05/12

- improve integration between UTF-8 and `allowC1Printable`.
- alter SIXEL HLS computation to make blue 0 degrees (patch by Ben Wong).
- disable SIXEL aspect-ratio, pending a rewrite (patch by Ben Wong).
- add resource `incrementalGraphics` (prompted by patch by Ben Wong).
- reorganize `graphics_sixel.c` as a step toward eliminating graphics buffer-size (integrated patch by Ben Wong).
- use `__linux__` consistently rather than the older `linux`.
- build-fix for musl (report by Jonáš Vidra, adapted patch by Khem Raj):
 - modify `ifdef` for `USE_OPENPTY`, changing test for `__GLIBC__` to `__linux__`
 - change `ifdef`'s for `_POSIX_SOURCE` to `_POSIX_VERSION`
 - modify `ifdef` for `setsid` to use a configure-script check for that function's existence and move the old check to imake fallbacks.
- minor consistency fixes for `manpage`.
- fix regression in [patch #390](#): non-UTF8 text pasted as a `XA_UTF8_STRING` was not decoded (report by Petri Kaukasoina).

Patch #390 - 2024/02/19

- improve typography of control-sequences page (patches by Branden Robinson).
- amend UPSS change from [patch #389](#), fixing a regression in VT100/VT220 character sets.
- modify ANSI conformance per ECMA-43 and DEC 070:
 - set ANSI conformance level to 3 for DEC levels 2 and up.
 - disable locking shifts in level 1, e.g., VT100.
 - disable single-shifts from G2/G3 in level 1.
 - use UPSS for G2/G3 in levels 2 and up.
- modify invisible-character attribute to permit `DECRQCRA` to report a consistent checksum (report/testcase by Thomas Wolff).
- align terminfo building blocks in terminfo to correspond to recent refactoring/trimming in ncurses.
- set flag in `regex` call for `onNClicks` to handle “^” anchor (patch by Matthew Martin).
- add line-drawing data for the characters in [DEC Technical](#) which have no Unicode equivalents.

- remove a special case in `encode_scs` which made xterm report Latin-1 when encoding is set to UTF-8, where ASCII is the selected character set. This fixes a regression in `vttest` for the `DECRSPS` cursor test.
- correct values for `Ps` of `DECAUPSS` in `ctlseqs.ms` (report by James Holderness).
- simplify/correct expression for checking Unicode non-characters (report by Thomas Wolff).
- correct loop for trimming environment variables (report/patch by Casper Dik).
- fixes for manpage formatting (Debian [#1041809](#)).
- update `config.guess`, `config.sub`

Patch #389 - 2024/01/01

- interchange variables in subparameter parsing, fixing a bug where subparameters after the first parameter could be misidentified (patch by Adam Saponara).
- correct popping of icon/window titles in a case where only one was pushed from [patch #385](#) changes.
- add `XTQMODKEYS` response in `DECRQSS`, as alternative for vim.
- correct `DECCIR` encoded information on character set size, handle a VT525 quirk, and add `DECST8C` (Windows Terminal [#14984](#)).
- improve `DECRQCRA` (prompted by discussion with James Holderness, Windows Terminal [#14974](#)).
- add part of VT525 color controls:
 - `DECAC`, to update default foreground/background, respond to `DECRQSS`
 - `DECATC`, to respond with `DECRQSS`
- prevent Unicode non-characters from being printed (prompted by patch by Grady Martin).
- modify `send_SGR()` to avoid modifying colors 16 to 255 in printed output (patch by Grady Martin).
- minor cleanup of miscellaneous error-codes with `ERROR_MISC`.
- remove legacy `CSI 53` for locator status, corrected in [patch #294](#).
- modify `DECRQUPSS` and `DECAUPSS` feature to support VT5xx character sets (report by Thomas Wolff).
- improve configure script:
 - reduce configure-check compiler warnings (prompted by Florian Weimer, Redhat [#2251945](#))
 - improve usage messages in configure script to make it clearer when an option value is optional.
- improve EWMH handling (report/analysis by Edward Rosten)
 - reset `_NET_WM_STATE_HIDDEN` flag from `_NET_WM_STATE` before mapping the window to deiconify.
 - cache X properties to reduce latency (adapted from patch by Edward Rosten).

Patch #388 - 2023/10/22

- improve `disallowPasteControls` by adding a category for the special characters known to `stty` (prompted by discussion with David Leadbeater).
- amend support of `DECAUPSS`, undoing change to initialization of G2/G3 so that pasting of GR characters works properly (report/analysis by Petri Kaukasoina).
- update `config.guess`, `config.sub`

Patch #387 - 2023/10/15

- add `DECRQUPSS` and `DECAUPSS`.
- add `DECRQDE` (report by Jake Hamby).
- correct indexing expression in title-stack, from [patch #385](#) changes (report by Brian Lindholm).

Patch #386 - 2023/10/09

- improve references in `ctlseqs.ms` (prompted by discussion with Kirill Chibisov).

- make the maximum amount of memory used for buffering DCS and OSC strings configurable with `maxStringParse` resource (report by Daniel Franke).
- improve performance of ReGIS when initializing the largest fontsize (report by Ben Wong).
- fix regression in SIXEL colors, in [patch #385](#) (report/patch by Jonny Langley).
- fix typo in `--with-wtmp` (report/patch by Sven Joachim)

Patch #385 - 2023/10/01

- fixes for ReGIS (report by Ben Wong).
 - correct conversion from HLS to RGB
 - improve font-caching performance.
- update tables in `wcwidth.c` based on Unicode 15.1.0
- improve `fastScroll` resource:
 - suppress screen-refreshes for carriage-returns
 - add `-j f` option to simplify use of this resource.
 - add a control sequence for enabling/disabling the resource.
 - enable this feature by default
- extend title-stack feature to allow an additional parameter to directly access the stack, like the `XTPUSHCOLORS` and `XTPOPCOLORS` feature.
- correct size and position of box shown for double-cell character which happens to be missing from the bitmap font (report by Peter Fabinski).
- improved configure script:
 - add pattern for `uClibc-ng` to `CF_XOPEN_SOURCE` (report/patch by Waldemar Brodkorb).
 - add configure options `--with-utmp-path` and `--with-wtmp-path` to override configure script's check for `utmp/wtmp` pathnames which are shown in the manual (Debian [#1042767](#)).
 - `CF_XOPEN_SOURCE` provides for defining `_DEFAULT_SOURCE` for MinGW32 and MinGW64.
 - sed expression used to report gcc version now works with MinGW
- ensure that line-attributes are reset after drawing missing character (report by Christian Weisgerber).
- update `config.guess`, `config.sub`

Patch #384 - 2023/07/10

- exclude ASCII space from `showMissingGlyphs`, since a few bitmap fonts lack this (report by "SanRemo", Emanuel Haupt).
- correct a step in rendering double-width characters with bitmap-fonts (report by Peter Fabinski, Debian [#1039986](#)).
- fixes for ReGIS-related problems (report by Ben Wong):
 - mimic an undocumented hardware VT340 feature which handles color initialization with incomplete parameters.
 - handle whitespace between operator/operands for color values.
 - reset ReGIS-context when resetting graphics in RIS.

Patch #383 - 2023/06/27

- expand description of full- and soft-reset in the manual.
- fixes for full- and soft-reset:
 - clear alternate screen on full reset.
 - disable menu-entry for active icon; it merely shows whether the feature is enabled.
 - use `appcursorDefault` and `app keypadDefault` resources for reset of `DECCKM` and `DECKPAM`.

- save initial resource values for `sixelScrolling` and `privateColorRegisters`, using those in full reset.
- update checkbox for *Enable Blinking Cursor* (report by Rajeev V. Pillai).
- add reply for DECSACE with DECRQSS.
- modify status-line feature to exit without erasing for DECSTR.
- add private mode 1045 which imitates the original xterm cursor-back reverse wrapping mode 45 (see [patch #380](#)).
- improve checks for non-Unicode values, e.g., in DECRQCRA.
- re-checkout from RCS archive to fix stale identifiers (report by Sven Joachim).

Patch #382 - 2023/05/30

- amend change to `CursorBack` in [patch #380](#), allowing the result to be on the hidden right-half of double-cell characters (report by Rajeev V. Pillai).
- amend `xtermDrawString`, fixing regression with `--disable-wide-chars` configuration from [patch #380](#).
- corrected pathname for `run-tic.sh`, for full install in an out-of-tree build (report by Rajeev V. Pillai).

Patch #381 - 2023/05/28

- fix a regression in wide bitmap fonts versus check for missing glyphs (report by Rajeev V. Pillai).

Patch #380 - 2023/05/09

- simplify the change for `sixelScrolling` from [patch #374](#) (report by Per Bothner).
- add `xterm+focus` and `report+da2`, update `report+version` building blocks in `terminfo`, from `post-ncurses 6.4`
- drop the `-title` option from `uxterm` and `koi8rxterm`, because that interferes with deriving the default title from the `-e` option (Debian [#1031837](#)). Compensate for this by using the `-class` option to derive a default title.
- improve description of `readline 2003` mode in `ctlseqs.ms` (report by Thomas Wolff).
- other improvements to status-line feature (report by Thomas Wolff):
 - clear status line on `DECCOLM`
 - ignore `DECSASD` if no previous `DECSSDT`
 - allow `DECSSDT 1` immediately after `DECSSDT 2`, i.e., without switching back to host mode.
- adjust `RequestResize` to avoid shrinking screen when using `DECCOLM` while the status-line is active (report/patch by Thomas Wolff).
- disallow wrapping before the beginning of the screen, to the end of the screen, for cursor-back sequences (Redhat [#2182357](#)).
- modify `makefile` to install the 16x16 xpm files (report by Harald Dunkel).
- update test-package to reflect resolution of Debian [#906901](#).
- change default of `showMissingGlyphs` to `True`.
- improve handling of double-sized characters when those happen to be missing from the bitmap font and/or are fullwidth.
- pointer/overflow fixes (reported by David Leadbeater):
 - improve limit-checks for control-sequence numeric parameters in `SIXEL` graphics.
 - add null-pointer checks in `WriteNow` macro to handle a case where `SS2` or `SS3` might be in effect while processing a combining character.
 - disallow `ReGIS` reporting for character-set names containing characters other than alphanumeric or underscore.

- implement TrueType fallback font for double-sized characters, including Unicode fullwidth. Also add `limitFontHeight` to provide for configuring the distinction between slightly-oversized glyphs and double-sized glyphs.
- configure script improvements:
 - check for `nfsc_t`
- fix a typo in the underline cursor thickness derivation (patch by Jan Engelhardt).

Patch #379 - 2023/02/15

- improve text-cursor (patch by Jan Engelhardt):
 - allow selecting `CURSOR_BAR` mode from command-line/Xresources.
 - draw cursor using filled rectangle instead of rectangle outline to permit thicker underlines/bars.
 - scale up cursor relative to font size.
- improve readline modes (Fedora [#2166860](#)):
 - document readline modes
 - change the feature to configure by default
 - replace hard-coded SS3 for cursor movement with current mode
 - replace hard-coded erase/lnext characters with current values
- improve status-line (report by Thomas Wolff):
 - RIS turns off status-line
 - Right-margin (`DECLRMM` and `DECSLRM`) limits the length of text written/updated in the status-line.
 - Most controls which affect the whole screen are ignored while updating the status-line.
- modify configure check for `tgetent` to allow for some special cases of ncurses configuration (report by Satadru Pramani).
- reduce timeout, improve warning message if resize is run on a terminal which is not VT100-compatible.
- reduce compiler warnings in configure script.

Patch #378 - 2023/01/09

- improve descriptions of `XTQMODKEYS` and `XTQALLOWED` features in `ctlseqs.ms` (reports by Bram Moolenaar, Thomas Wolff).
- add `bracketed+paste` and `report+version` building blocks to `terminfo`, from ncurses 6.4
- improve check for unsupported formatting characters, e.g., zero-width space, to properly ignore them (report by Thomas Wolff).
- improve/document error-checking for some of the controls which return responses: `DECRQSS`, `XTGETXRES`, `XTSETTCAP`, `XTGETTCAP` (prompted by discussion with David Leadbeater).
- improve limit-checks for fallback font cache (report by Dimitrije Erdeljan).
- improve check for too-wide glyph in fallback font by allowing xterm to continue searching for a suitable font rather than just failing on the first. Also add `limitFontWidth` to allow changing the amount by which a glyph must extend outside the font's bounding box to disallow it.

Patch #377 - 2022/11/25

- add control sequences for reporting the current state of the modified keys options (`XTQMODKEYS`) and allowed/disallowed operations (`XTQALLOWED`), (prompted by discussion with Bram Moolenaar).
- amend `modifyOtherKeys` case 2 to distinguish the escape character with modifiers, e.g., shift-escape, from a plain escape character (suggested by Bram Moolenaar).
- improve parsing and error-recovery in the case where a list of X11 bitmap fonts is given in the `-fn` and related options.
- change default for `xftTrackMemUsage` to false, because libXft does not handle certain fonts.

Patch #376 - 2022/11/16

- modify configure script to always check for gcc attributes,
- update `install-sh`.
- fix parsing of `result -u` in `vttests/halves.pl`.
- add a note in `ctlseqs.ms` about compatibility of TBC.
- fix a copy/paste error in manual (patch by Grady Martin).
- add null-pointer checks in `x_strcasecmp` and `x_strncasecmp`, to help with error-recovery for a missing font (Debian [#1022942](#)).

Patch #375 - 2022/10/23

- improve error-recovery when setting a bitmap font for the VT100 window, e.g., in case `OSC 50` failed, restoring the most recent valid font so that a subsequent `OSC 50` reports this correctly (report by David Leadbeater).
- exclude `MC_XDG_OPEN` from environment variables trimmed on startup (report by Gabor Hauzer).
- check for null pointer in `isSelect()` (report by Column Paget).

Patch #374 - 2022/10/10

- eliminate use of `grep` aliases from `vttests` scripts.
- amend discussion of DECSDM versus *Sixel Scrolling* in `ctlseqs.ms` (reports by Hayaki Saito, Ben Wong).
- change default for `sixelScrolling` resource to better match VT330/VT340 DECSDM setting (patch by Ben Wong).
- fix some gcc and coverity warnings.
- improve memory usage for `OSC 52` (report by David Leadbeater).
- fix regression in [xterm-373](#) change adding resources `xftTrackMemUsage` to `xftMaxGlyphMemory`, which did not first cache the server's resource-settings (report/testcase by Gabor Hauzer, as well as Debian [#1021243](#)).
- fix regression in [xterm-373](#) change for status-line vs alternate screen (report by Rajeev V. Pillai).
- configure script improvements:
 - modify `CF_XOPEN_SOURCE` to handle more special cases of Linux (reports by Adam Sampson, Sven Joachim).
 - modify checks for `egrep/fgrep` aliases to work around warning messages from GNU `grep 3.8`

Patch #373 - 2022/09/25

- improve rendering of TrueType fonts:
 - add resource `xftTrackMemUsage` to enable/disable a new feature of Xft which improves performance.
 - add resources `xftMaxGlyphMemory` and `xftMaxUnrefFonts` to customize memory-usage of Xft and `fontconfig`.
 - provide for display of colored fonts in `libXft 2.3.5`
 - allow for an extra TrueType font to be specified using the `-fa` option, as an override to the `fontconfig` scheme of fallback fonts (request by Nickolas Raymond Kaczynski).
 - improve caching of TrueType missing-glyph tests.
 - allow no more than 255 fonts to be scanned for a fontset.
 - eliminate a table-lookup in `findXftGlyph`
- improvements status-line feature:

- save/restore wraparound flag when updating the status-line (report by Rajeev V. Pillai).
- avoid clearing the status-line when switching between normal and alternate screens (report by Valtteri Vuorikoski).
- remove adjustment from `update_winsize` leftover from initial work (report by Valtteri Vuorikoski).
- modify `wcwidth` tables to separate Unicode *Cf* category as *formatting* control-characters, to better match the guideline for [unsupported characters](#) (report by Tim Chase).
- add configure option `--disable-exec-selection`.
- use `mkstemp` where `mkdtemp` is unavailable, when initializing colored cursor.
- adapt fixes from OpenBSD `xenocara`:
 - improve `ifdef`'s for a few optional features.
 - correct `#ifdef` to `#if` in a few uses of `OPT_PRINT_ON_EXIT`.
- set `StartupWMClass` in “.desktop” files, e.g., to help `cinnamon-session` notice that `xterm` sets `WM_CLASS` and use its icon (patch by Richard de Boer).
- disable pixel computation when `rgb` width is greater than 8, to work with depth 30 (patch by Denis Kaganovich).
- improve color-computation for SGR 2 faint/dim (patch by Boian Bonev). Add resource `faintIsRelative` to specify if the modified computation should be used (prompted by discussion with Matthieu Herrb).
- correct comparison-length for environment variable cleanup (patch by Brendan O' Dea).
- correct `DSL` capability for `dec+sl` block in `terminfo` (report by Rajeev V. Pillai).
- improve output formatting by `vttests/utf8.pl`
- repair test/demo scripts still using "vxt-" prefix, some cleanup with `shellcheck`.
- enable page-number for `DECXCPR` response in `VT330`.
- amend change for combining characters in [patch #371](#) to limit it to the currently-defined codes (report by Thomas Wolff).
- add directory-template parameter to `mktemp` in shell-scripts to improve portability to older systems (patch by Ryan Schmidt).
- mention webpage [XTerm – bracketed-paste](#) in `ctlseqs.ms`
- update manual-page descriptions for `allowPasteControls` and `disallowedPasteControls` ([patch #363](#)).
- further extended list of environment variables to purge on startup (suggested by Thomas Wolff).
- update `config.guess`, `config.sub`

Patch #372 - 2022/03/09

- amend allocation/freeing of scrollbar lines, eliminating an adjustment for status-line added in [patch #371](#) (report/testcase by Rajeev V. Pillai).

Patch #371 - 2022/02/24

- drop double-buffer default from test-packages, since that interferes with status-line.
- add `faceSize7` to table in `charproc.c`, overlooked in [patch #360](#) (patch by Vladimir A. Pavlov).
- use `XDrawString` rather than `XDrawString16` for text when the latter is not needed.
- improve performance for initializing/reusing graphic objects in the `SIXEL` feature.
- improve error-checking for `resize`.
- fix errata in manual page (Debian [#988221](#)).
- extended list of environment variables to purge on startup, i.e., in case a user starts `xterm` from another terminal emulator.
- add comment in `CURSOR.c` to explain why `autowrap` (`DECAWM`) does not apply to data saved/restored with `save/restore` cursor-operations (report by Thomas Wolff).

- add special case in generating the combining-character table in `wcwidth.c`, for Hangul Jamo Extended-B (report by Luis Javier Merino).
- simplify/improve portability of `trap` commands in shell-scripts.
- update configure options
 - disable-rectangles,
 - disable-tcap-fkeys and
 - disable-tcap-query
 to account for changed default settings.
- rather than ignore empty parameter for setting title, use that to reset it to “xterm” for scripting.
- check for out-of-bounds condition while drawing sixels, and quit that operation (report by Nick Black).
- add fallback definition for `PROJECTROOT` so that a suitable default location for `luit` will be compiled-in on build-servers.
- implement DEC status-line controls `DECSASD/DECSSDT`:
 - decode controls, set state
 - implement `DECRQSS` responses
 - implement indicator-style status-line
 - add configure option `--enable-status-line`
 - add resource `indicatorFormat`
 - implement host-writable status-line, able to handle video-attributes and simple left/right cursor movement. This disallows all of the DEC/xterm private modes such as switching to/from the alternate screen.
 - move the status-line if the window is resized.
 - *Note*: the associated screen-resizing does not work for the special case of TrueType fonts with double-buffering (see note in [patch #349](#)).
- modify configure-script fixup for `-Werror` options to exclude fixup for `-Werror=format`, e.g., `-Werror=format-security`.
- amend change from [patch #370](#); DEC 070's pseudo-code for `DECCOLM` incorrectly suggests that it enables `DECLRMM` as a side-effect.
- fix some memory leaks seen using `esctest` and `asan2` (patch by Luis Javier Merino).

Patch #370 - 2021/11/13

- add `-a`, `-c` and `-d` options to `query-status.pl` to improve test for `DECRQSS`.
- expanded discussion of maximum graphics geometry in `ctlseqs.ms` (suggested by Bon Wong).
- corrected parameter symbol for `DECCARA` and `DECRARA` in `ctlseqs.ms` to indicate that multiple parameters may be used (report by Thomas Wolff).
- add several test/demo scripts.
- improve `DECCOLM`, `DECLRMM` and `DECALN` referring to pseudo-code in DEC 070.
- amend a change in [patch #348](#) which caused left/right margin mode to be reset when resizing the terminal window (report by Valentine Barshak).
- fix a misnamed macro-parameter (patch by Rajeev V. Pillai).
- fix spacing of `wideFont` when its width is not exactly twice as wide as the normal font (report by Rajeev V. Pillai).
- suppress loading of italic font in a few places when `colorITmode` is enabled (report/analysis by Rajeev V. Pillai).
- modify `XTSMGRAPHICS` to return failure status if the terminal is not configured to support the corresponding `ReGIS` or `SIXEL` feature (report by Nick Black, [notcurses #2252](#), [notcurses #2257](#)).
- modify `DECERA` and `DECERA` to erase corresponding area in `SIXEL` graphics (patch by Nick Black, [notcurses #1740](#), [vt340test #16](#)). Also modify `DECSERA`.
- equate visuals for `TrueColor` and `DirectColor` (patch by Denis Kaganovich).
- correct computation for pixel value of `rgb` when using depth 16 (report by Denis Kaganovich).

- correct wrapping of VT100-style double-sized characters when configured for Unicode wide-characters (report by Luis Javier Merino).
- updated default value for `sixelScrolling` resource to match expected behavior versus DECSDM change in [patch #369](#) (report by Grant Taylor).

Patch #369 - 2021/09/21

- modify `run-tic.sh` to work around bug in development version of ncurses which was packaged in FreeBSD ports.
- remove `ifdef`'s for `OPT_COLOR_RES` and `OPT_COLOR_RES2`.
- improve performance over slow connections (report by Harald Dunkel).
- update cursor if restoring mode for DECTCEM.
- modify `CharWidth` macro to ensure that the shortcut for Latin-1 is only applied when UTF-8 is not enabled, to fix a bug in handling soft-hyphen from [patch #334](#) changes (patch by Martijn van Duren).
- improve terminfo:
 - fill-in function-keys in terminfo which are not Sun/HP keyboards using `xterm+nopcfkeys` building-block.
 - add `kbg` to `xterm+keypad` to accommodate termcap applications
 - add `smglp` and `smgrp` to `vt420+lrmm`, to provide useful data for the "tabs" `+m` option
- support shift-tab in Sun, HP and SCO keyboards.
- document some legacy features in `ctlseqs.ms` (prompted by discussion with Jimmy Aguilar Mena "Ergus").
- add "trim" option to `cdXtraScroll` and `tiXtraScroll`.
- remove support for non-fifo save-lines configuration.
- extend `cdXtraScroll` to check if the cursor is at the upper-left of the scrolling region when the erasure is for the remainder of the screen versus the whole screen (prompted by discussion with Jörg Breitbart).
- add workaround for broken `pcre2` package in Debian 10.
- change screen-refresh call used for `DECCARA` and `DECRARA` to ensure that trailing blanks which are part of the rectangle are repainted (report/analysis by Dennis Filder).
- when resetting the terminal, ensure that the cursor shape also is reset, e.g., if `DECSCUSR` has been used to modify the cursor shape for an `xterm` which was started with the underlined cursor option (report/analysis by Luis Javier Merino).
- prevent `DECSCUSR` from blinking the cursor if the `cursorBlink` resource is "never" (report by Vladimir D Seleznev).
- invert the sense of `DECSDM`, to correspond with VT382 manuals (lsix [#41](#)).
- update tables in `wcwidth.c` based on Unicode 14.0.0

Patch #368 - 2021/06/07

- add `DefaultOff` option to `RenderFont` resource, as part of the session-management feature.
- add auto-scroll-lock feature (patch by Stelios Bounanos).
- update the window-size information returned via `TIOCGWINSZ` when rows/columns are unchanged but the font-size changes (report by Nick Black).
- improve session-management feature by saving/restoring the font settings.
- update `config.guess`, `config.sub`

Patch #367 - 2021/03/26

- add `OSC 22` to allow programs to select different pointer cursor at runtime.
- change configuration for `no-return` functions to use `_Noreturn` when it is available, because `clang -analyze` does not properly handle the `gcc noreturn` attribute.

- add `cursorTheme` resource to provide a way to enable or disable the cursor theme feature.
- modified `CopyWait` event retries to use shorter sleeps, to improve responsiveness ([tmux #2556](#)).
- improve quoting/escaping in demo-scripts per shellcheck.
- add `resizeByPixel` resource, to permit disabling window manager resizing-hints (patch by Tim Oehl).
- corrected `printOptsImmediate` handling of alternate-screen (report by Abhijit Dasgupta).
- update sample terminfo to more closely match ncurses.
- add/improve limit-checks for Xlib calls (report by Roman Fiedler).
- fix a typo in the help-message (report by Tomas Korbar).

Patch #366 - 2021/02/10

- correct a compiler-warning fix in [patch #352](#) which allowed sign-extension of coordinate values (report by "CismonX").
- correct upper-limit for selection buffer, accounting for combining characters (report/testcase by Tavis Ormandy).
- with `alwaysHighlight` true, xterm does not properly track focus. The `screen->select` FOCUS flag remains always on, which prevents `bellIsUrgent` from working, as the urgent `WM_HINT` flag is only set in `setXUrgency()` when the window is not focused. Fix this by updating `screen->select` in `unselectwindow()` regardless of the value of `always_highlight` (patch by Jiri Bohac).
- improve fix for interaction between SRM and ENQ (report by Grant Taylor).
- build-fix for `--with-Xaw3dxf`, needed when `--with-toolbar` is omitted (report by Jimmy Olgeni, Emanuel Haupt).

Patch #365 - 2021/02/03

- amend fix for “word” selection in [patch #364](#) to limit that to the `insert-selectable` action, which reads data from the screen. This restores the interactive behavior where double-clicking on a “word” would make subsequent selection extensions by words as well as suppressing some boundary-checks (report by David Wolfskill, FreeBSD [#253225](#)).

Patch #364 - 2021/02/02

- add `-fc` option.
- correct/improve limit-checks for SRM versus ENQ from [patch #344](#) (report by Tom Szilagyi).
- enable `XftFont` resource in `Xaw3dxf` configuration (patch by Tavis Ormandy).
- improve quoting/escaping in build-scripts per shellcheck.
- add `libpcre2-posix` to the packages tested for `--with-pcre2` option, needed with Fedora (report by Tomas Korbar).
- correct a typo in manual page, and note that `KeepClipboard` may not be compiled-in (report/patch by Sean C Farley).
- corrected boundary-checks for “word” selection used in `onNClicks` resources (report by Tavis Ormandy).
- update to `autoconf-2.52-20210101`, to improve shellcheck warnings.
- improve configure check for desktop categories.

Patch #363 - 2020/12/26

- disable groff hyphenation in generated html when using `man2html`.
- change SCS “&4” Cyrillic to non-NRCS, per VT520 manual.

- amend fix for SCS in [patch #198](#) to remove DEL rather than converting it to a space (report by Thomas Wolff).
- modify state transitions for selecting character sets to eliminate an ambiguity between the “A” used in VT220 versus VT320.
- improve error recovery when selecting characters by resetting to US ASCII when no suitable encoding is found, e.g., attempting to use an NRCS sequence when NRCS is not enabled.
- turn off hyphenation in “.txt” conversion, prompted by groff changes.
- add VT5xx ISO Latin-2 (prompted by discussion with Thomas Wolff).
- amend change from [patch #361](#) to event-handling in CopyWait to handle active-icon as a special case (Debian [#975687](#)).
- add call to loadColorTable to get the visual information needed to decode BE RGBA32 color format (patch by Leandro Lupori).
- modify the resource-parsing for disallowedPasteControls and similar lists of names/numbers to recognize “~;” (tilde) for cancelling a given name/number.
- add ENQ, EOT and NUL to default for disallowedPasteControls.
- change default for disallowedPasteControls to omit the tab character (suggested by Harald Dunkel).
- fix swapped height/width in regisScreenSize and maxGraphicSize resources using "auto" value, from [patch #314](#) (report by Anton Lavrentiev)
- revise [patch #362](#) change for shift-modifier versus mouse protocol and select/paste by adding resource shiftEscape, which can be enabled via a control sequence (prompted by discussion with Matthijs van Duin).
- simplify/improve ifdef in trace code for using a separate set of files for each run of xterm.
- add options -r and -t to vttests/query-color.pl to show the 6-digit RGB code and actual colors.
- add nel to xterm-basic terminfo.
- alter vttests/modify-keys.pl to omit HTML reference links to the modified-keys table where no keycode was available.

Patch #362 - 2020/11/11

- cleanup of calls to free, removing checks for null (Walter Harms).
- improved mouse-button reporting (prompted by discussion with Stephane Chazelas)
 - narrow the scope of the change for shift-key in [patch #361](#) to make it apply only when the modifyOtherKeys resource is set to 2 (i.e., “program mode”). Also, when checking the shift-key, ignore modifiers other than shift, control and “meta”
 - use the alt/meta modifier information obtained in VTInitModifiers to replace a hard-coded *mod1* used to detect “Meta” for mouse-button responses.
- reduce SIGWINCH's sent to the client by filtering out duplicates.
- improve display when scaleHeight is greater than 1:
 - the text-cursor is vertically-centered on the current line, rather than only extending below the current line (report by Manu Chaturvedi).
 - the built-in line-drawing characters extend to the scaled cell-height.
- fill-in special case for motion-events to match the changes for shift-key in pointer-button events from [patch #361](#).

Patch #361 - 2020/10/14

- treat the return value of strerror as readonly (patch by Philipp Klaus Krause).
- modify event-handling in CopyWait to work around hanging while writing large amounts of text to an active icon and at the same time iconifying/deiconifying (report by Dave Kemper).

- initialize double-buffer for active-icon window.
- improve manual page description of scrollbar resources (report by Brian Lindholm).
- correct ifdef for menu entry for active-icon, when initializing it with toolbar configuration.
- add preprocessor option to makefile to set internal definition of pixmap's directory to match the install-configuration (FreeBSD [#250036](#)).
- cleanup of calls to `free`, removing checks for null (Walter Harms).
- add fallback actions `pointer-button` and `pointer-motion` which handle events for the mouse control-sequences protocol if the *select*-related translations are omitted with `*omitTranslation:select` (prompted by discussion with "Ergus").
- amend rule for using shift-key to override mouse-protocol for select/paste to limit that feature to mouse-buttons which are actually bound to select/paste actions (prompted by discussion with "Ergus").
- corrected mapping in special case for repainting wrap-marks when viewing the scrollbar area.
- use separate GCs for `showWrapMarks` feature, to work around cursor coloring change in [patch #345](#) (report by Paulo Silva de Alíbaro).

Patch #360 - 2020/09/20

- mention `decGraphicsID` in `ctlseqs.ms` (suggested by Thomas Wolff).
- modify pixel-coordinate mouse response to use as origin the VT100-window rather than the underlying widget, which includes the scrollbar (report by Thomas Wolff).
- add configure option `--disable-print-graphics` (Ross Combs).
- add `test_ptydata` to "make check" rule.
- minor fixes for `ctlseqs.ms` (report by Jean-Marc Bourguet).
- minor fixes for manpage style (report/patch by "a1346054").
- correct cleanup from switch between italics/normal font in the show/hide cursor functions (report/testcase by Peter Fabinski).
- integrated patch by Ross Combs:
 - internal renaming of `GraphicsID` symbols, for readability.
 - adjust logic for VT125, treating it as a ReGIS terminal.
- update configure macros, for compiler-warning fixes.
- integrated patch by Ross Combs:
 - add control sequence modes for graphics printing.
 - improve conversion to bitmaps for TrueType fonts in ReGIS
 - add `font7` resource, for an "enormous" bitmap font.
 - do not reset graphics in a soft-reset.
 - add `pointerFont` resource, and `-pf` command-line option.
- improve typography of manual page (patch by Branden Robinson).
- amend [patch #359](#) change to `df-install.in` to ignore a command-line assignment to `DESTDIR` if followed by an explicit `--dir` (report by Sven Joachim).

Patch #359 - 2020/08/17

- add special case in `WriteText` to allow colors 8-15 to override `colorBDMODE` (patch by Ingo Brückl).
- add `utf8Weblike` resource, to provide an alternate scheme for handling ill-formed UTF-8 sequences (adapted from patch by Dan Gohman).
- improve computation for the number of lines needed to scroll-up a SIXEL graphic (report/patch by Ben Wong).
- correct manpage description for default value of `disallowWindowOps` from changes in [xterm #331](#) (patch by Ben Wong).
- correct a loop starting-point in `refresh_graphics` from optimization in [patch #358](#) changes (report by Ben Wong).

- add a new mouse mode 1016, which uses the same format as mode 1006, but sends the mouse's position in pixels (suggested by Igor van den Hoven).
- fix an issue from [patch #338](#) changes where only the first selection buffer specified in the request would be updated using OSC 52 (patch by Michael Gulick).
- modify makefile/scripts to allow DESTDIR to prefix the target directory for desktop-file-install (report by Fred Heitkamp).
- enable SIXEL feature by default.
- update config.guess, config.sub

Patch #358 - 2020/07/12

- correct logic for decodeTerminalID changes in [patch #357](#) (report by "Chartreuse").
- modify makefile to use `plink.sh` when linking test-programs, to fix build when using pcre (report by H Merijn Brand)
- build-fix for test_ptydata program (patch by H Merijn Brand)

Patch #357 - 2020/07/05

- several minor optimizations for the ReGIS and SIXEL features, improving performance by 10%.
- add resource `decGraphicsID` to allow displaying graphics when the emulation level would ordinarily disallow this (prompted by discussion with Thomas Wolff).
- add control sequences for fast switching of color palettes: `XTPUSHCOLORS`, `XTPOPCOLORS`, `XTREPORTCOLORS`
- amend change for soft-hyphen from [patch #328](#) to avoid stripping replacement-characters which would be shown with malformed or overlong UTF-8 input.
- corrected an error-handling case in `decodeUtf8`, matching a similar fix in [patch #268](#) (report/patch by Dan Gohman).
- add a test-driver for `ptydata.c`
- minor cleanup of macros (adapted from patch by Walter Harms).
- fix some errata in `ctlseqs.ms` (report by Thomas Wolff).
- allow immediate repaint-on-palette-changed if double-buffering is enabled.
- deprecate codes 10/11 in `sgr push controls`, changing those to 30/31, to avoid confusion with `sgr 10-19`.
- modify `SGR` parameter handling to stop if an unrecognized parameter is encountered, to guard against malformed or nonstandard sequences (report by Bram Moolenaar).
- modify `DECERA` color for consistency with other erasures/clearing (report by Thomas Wolff).
- `ECH` should not be masked by `DECSCA` (report by Thomas Wolff).
- extend `DECFRA` and `REP` to accept any "graphic" character rather than just Latin1, etc. (report by Thomas Wolff).
- add `-C` option to `256colors2.pl` and `88colors2.pl`, to demonstrate mixed semicolon/colon separators which are implied by ECMA-48.
- update sample `terminfo` to reflect the documentation improvements.
- update description of 88/256/direct color in `ctlseqs.ms` to point out that using semicolons is a deprecated legacy feature, and standard terminal applications should use colons (prompted by discussion with Bram Moolenaar).
- modify `configure-check` for `tgetent` to conditionally include `termcap.h`, enabling configuration using `clang`'s `pedantic-errors` option (report by Dennis Clarke). See [Other Compatibility](#) in `ncurses' curs_termcap(3X)`.
- remove some unnecessary pointer checks (patch by Walter Harms).
- accept terminal-id and add DA response for VT131, VT132.

Patch #356 - 2020/05/02

- revise fix for Debian [#954730](#), which interfered with wheel mouse events (report by Gabriele Balducci).

Patch #355 - 2020/05/01

- revise fix for Debian [#954730](#), which interfered with wheel mouse events (report by Henri Menke).
- fix typos in documentation (reports by Stephen Hurd, Stefan Assmann).
- add mapping for `deCTerminalID` for “100” overlooked in [patch #354](#).
- update tables in `wcwidth.c` based on Unicode 13.0.0
- build-fix for “make check” when building out-of-tree (report by Sven Joachim).

Patch #354 - 2020/04/26

- work around performance problems of `XDrawImageString` and `XDrawImageString16` functions (Debian [#954845](#)).
- add a control sequence which reports xterm's version (patch by Nicholas Marriott, mintty [#881](#)).
- temporarily set numeric locale category to "C" when parsing resources, so that `scaleHeight` and `faceSize` settings do not depend on locale (Debian [#820803](#)).
- improve `DA/DA2` response by ensuring that the `deCTerminalID` maps to one of the known identifiers, as well as providing `DA2` response for VT241 and VT382.
- terminfo improvements:
 - add (my) comments from ncurses which explain the keypad layouts.
 - add `vt52+keypad` from ncurses
 - use improved `xm` example for `xterm+x11mouse`, `xterm+sm+1006` from ncurses 6.2 `terminfo.src`
- two fixes for left/right wheel mouse event reporting (Debian [#954730](#)):
 - filter identical button-events
 - correct order of button-range versus protocol type (see [patch #345](#))
- change “make check” makefile-rule to use test-drivers for charclass and `wcwidth` data.
- quiet “did not find a usable xxx TrueType font” warnings by making `fontWarnings` apply to these messages (report by Jim Rees).
- improve reinitialization of parameter list (report/testcase by James Holderness).
- temporarily set numeric locale category to "C" when formatting SVG or XHTML screendumps, to make the radix separator used in RGB values consistent (adapted from patch by George Kouryachy).
- add resource `forceXftHeight` to control whether workaround from Debian [#880407](#) is used.
- apply updated ascent/descent in workaround from Debian [#880407](#) to fix a 1-pixel gap in built-in vertical lines (report/testcase by Stefan Assmann).
- improve round-off of scaling for built-in line-drawing (prompted by discussion with Stefan Assmann).
- adjust fonts in `svg-icon` files to accommodate reduced functionality of new pango (report/analysis by YOKOTA Hiroshi).
- improve configure check for X Toolkit library.
- correct Y-coordinate transformation in `ClearCurBackground`, overlooked in changes for [patch #334](#) (report/analysis by Chuck Silvers).
- remove `--vendor` option from test-packages' install of desktop files; the feature is badly broken in `gnome-shell`.
- modify `uxterm` to make it possible to select nonstandard locale `C.UTF-8`, e.g, if the user's locale is set to “C” (Debian [#940626](#)).
- re-save/tweak “.svg” icon-files to work around breakage in toolset since the files were created in [patch #283](#).

Patch #353 - 2020/02/01

- amend change in [patch #352](#) for button-events to fix a case where some followup events were not processed soon enough (report/patch by Jimmy Aguilar Mena).
- handle *MappingNotify* X event, to improve recovery when switching keyboard configurations using *xkbcomp* (prompted by discussion with Frank Mosch, Debian [#661295](#)). There is more work needed here, possibly in the X libraries.
- improve discussion of mouse-mode in *ctlseqs.ms* (suggested by Igor van den Hoven).
- further improve checks for Xft *max-advance-width* to take into account fonts which use two cells for ambiguous width characters. Also improve the time used for these checks (reports by Yuri Pankov, Frank Mosch).
- fix a few spelling errors reported by codespell (report by Jens Schleusener).
- modify *run-tic.sh* to prefer development version of *ncurses* since changes to terminfo file in [patch #345](#) rely upon bug-fixes in *ncurses* (prompted by discussion with Will Senn).

Patch #352 - 2020/01/16

- adjust fontsize data to handle a minor inconsistency from recent Xft versions (Debian [#880407](#), adapted from patch by Vincent Lefèvre).
- add a table to the manual page description of *forceBoxChars* to alert the reader to the special characters aside from “line-drawing” which are drawn directly when this resource is set (Debian [#931305](#)).
- improve *checkXft* logic which attempts to detect fonts whose *max-advance-width* is inconsistent with the actual glyph widths. For some fonts, it is necessary to check additional characters (report/analysis by Jan Engelhardt).
- improve configure-checks for X headers and libraries on recent MacOS, which has moved those files under */usr/X11*.
- improve portability of iconify/deiconify feature by taking into account some window managers which manipulate the *EWMH _NET_WM_STATE* property, adding/removing *_NET_WM_STATE_HIDDEN* rather than actually *minimizing* the window (prompted by discussion with Jörg Breitbart).
- improve workaround from [patch #287](#) for the *- iconic* option when configured with toolbar by postponing the extra request for minimizing the window to the end of menu-initialization.
- modify *xevents* special-case for mouse-events to include button-events so that the meta key by itself can generate button-events (report/analysis by Mattias Engdegård).
- amend SGR-stack change from [patch #348](#) to not associate bold attribute with background color (report by Nicholas Marriott).
- fix copy/paste error in manual page (patch by Larry Hynes).
- add definitions in *xterm_io.h* so that GNU/Hurd will use *posix_openpty* (patch by Samuel Thibault).
- build-fix in debug-tracing, for *esctest*.
- updated autoconf macros
- update *config.guess*

Patch #351 - 2019/11/17

- correct logic in *property_to_string* for deciding when to fallback from UTF-8 decoding to ISO-8859-1 decoding, broken in [xterm #350](#) (FreeBSD [#241961](#)).
- add *-report-icons* to help-message.
- improved autoconf macros:
 - *CF_ADD_LIBS*: the change to filter out duplicates caused this to append rather than prepend. revise to fix that.
 - *CF_GCC_VERSION* and *CF_GCC_WARNINGS*: move checks to distinguish *icc/clang* from *gcc* from the macro which handles the *--enable-warnings* option, to make this work without-warnings for the inline-checks.
- update *config.guess*, *config.sub*

- correct status in XTGETXRES replies when the resource was not found.
- fix some gcc, cppcheck, clang and coverity warnings.
- guard call to RequestResize from the struct-notify event handler to prevent recursion in the Xft+buffered workaround in some cases when doing manual resizing rather than resizing via escape sequences (reports by Stefan Assmann, Mike Thornburg).
- amend the workaround for Xft+buffered blanking by moving the switch to bitmap-fonts to account for differences in font metrics between bitmap- and TrueType-fonts (report by Stefan Assmann).
- improve the note on the xterm - rep terminfo entry (prompted by discussion with Sven Joachim).

Patch #350 - 2019/11/02

- modify html/svg dump to not ignore zero'd/blank cells.
- align terminfo file with ncurses, e.g., add xterm+osc104 block.
- improve discussion of modifyOtherKeys in manual page and in ctlseqs.ms.
- add vttests/modify-keys.pl script to illustrate the modifyOtherKeys resource (prompted by discussion with Bram Moolenaar).
- various improvements to ctlseqs.ms, as part of autogenerating links for the website.
- update manual page default for saveLines resource default value (Branden Robinson, Debian [#913815](#)).
- add command-line option -report-xres to show the values of the VT100 widget X resources when initialization is complete.
- add a control sequence which, like tcap-query, allows an application to inspect most X resource settings of the VT100 widget.
- adjust some optional features to enable them in the imake configuration as they would be by default via the configure script.
- add null-pointer checks to improve error recovery when bitmap fonts are missing or corrupt (report by Jonne Ransijn).
- correct the condition for deleting the EWMH window-title property, i.e., if UTF-8 titles are disabled, rather than if an update to the EWMH property found no change (report by Sven Joachim).
- build-fix for the case when configure --enable-trace is used without --enable-warnings (report by Sven Joachim).
- fix a few minor bugs found with Coverity.
- add a check in property_to_string to avoid translating UTF8_STRING or COMPOUND_TEXT into Latin-1 when UTF-8 encoding is active, e.g., when pushing onto the title-stack while switching to the alternate screen.
- build-fix for the --disable-doublechars configure option (report by Brian Lindholm).

Patch #349 - 2019/09/22

- add graphic context to support bold+italics (patch by Quinn Strahl).
- document window properties in the manual page.
- improve title-string feature:
 - if any of allowC1Printable, utf8Title or titleModes hint that an application might send a title-string encoded in UTF-8, check if that is the case, and if it is recodable into ISO-8859-1, use that for the ICCCM-style title.
 - check if the title given by a control sequence happens to be already encoded in UTF-8, to avoid double-encoding (FreeBSD [#240393](#)).
 - Make sameName resource work for the EWMH titles.
 - Modify menu-state of utf8Title to be consistent with the utf8 source, i.e., setting the EWMH properties automatically when UTF-8 is active.
- reorganize text-drawing to make it possible to investigate using Xft to implement VT100-style double-sized characters. While doing this, made a workaround for apparent Xft bug which loses its drawable state

- when switching from 132 to 80 columns.
- improve font-warning messages by showing which are *derived* rather than directly from resource settings (suggested by Tomas Korbar). Also filter repeated font-warning messages, to accommodate broken X configurations.
- fix an inconsistency between failure to load derived wide font versus failure to load derived wide-bold font (Redhat [#1679790](#)). That relies upon the “:unscaled” property which is broken in some distributions (however, recent Debian and the BSDs such as MacOS work).
- updated autoconf-252 to check X11R7 include/lib directories found on some older configurations.
- set a graphic-context for border when double-buffering is active; to prevent the border color from changing when switching to reverse-video.
- build-fix for `--disable-ziconbeep`, which conflicted with the new double-buffer configuration (report by Brian Lindholm).
- fix loop-limit for lookup of `fullscreen` resource broken in [xterm #347](#) (report by Scott Bertilson).

Patch #348 - 2019/07/22

- update window-manager hints when exiting Tek4014 mode (Debian [#932569](#), patch by Jonathan Irwin).
- fix a misformatted printf in `report-sgr.pl`.
- add configure check for termios types, to improve compiler-warnings.
- ensure that when resetting margins, to also reset DECLRMM. This affects DECCOLM, DECALN (although DEC STD 070 mentions only top/bottom margins), and DECSTR.
- corrected order of reset/move when setting DECCOLM, and make it more consistent by always resetting margins, rather than only when the mode is changed (report by James Holderness).
- compile-in double-buffer support by default, changing the configure option to set the default resource value for `buffered` to true or false.
- take in account the reverse-video state when computing the filler-color used when clearing the screen in double-buffering configuration.
- correct logic for filtering scrollbar-updates when `buffered` resource is compiled-in but not enabled (report by Paul Lampert).
- improve state saved/restored for cursor-save and SGR stack features.
- improve description of 1006 and 1005 mouse modes, to avoid implying that they use character-parameters (report by Bryan Christ).
- explain in `ctlseqs.ms` that some of the numeric keypad keys were xterm extensions rather than VT100/VT220 terminal features (prompted by discussion with Thomas Wolff).
- explain in `ctlseqs.ms` how the DEC windowing extension is supported by xterm.
- add 28 rectangular editing to the primary response (suggested by Thomas Wolff).
- fix a typo, improve wording in `ctlseqs.ms` (Thomas Wolff).
- fix internal column-parameter when SL or SR is used with left/right margins (patch by Thomas Wolff).
- fix off-by-one in VT52 graphics character mapping (patch by Thomas Wolff).
- use `_X_UNUSED`, etc., when available as a fallback for `GCC_UNUSED`, etc., to reduce compiler warnings when building with *imake*.
- update `config.sub`

Patch #347 - 2019/06/30

- fix a few minor bugs found with Coverity.
- improve double-buffering for scrollbars combined with scrolled text; add `bufferedFPS` resource to control the maximum rate of screen updates (report by Mike Thornburg).
- improve fixes for DECCRA handling of double-width characters (patch by Martin Hostettler).
- improve discussion of ECMA-48's typographical error for SD in `ctlseqs.ms` (prompted by report by Martin Hostettler).
- correct off-by-one in parameter limit-check for DECCRA (report by Martin Hostettler).

- modify `saveCellData` to handle case where double-width character is partially copied; that should be blanked (report/testcase by Thomas Wolff).
- add resource `buffered` to allow enabling/disabling double-buffered mode.
- two fixes for the double-buffer configuration, prompted by MacPorts' switch to double-buffering (patch by Mike Thornburg, MacPorts [#58313](#)):
 - ensure that the `needSwap` flag is set after drawing TrueType text
 - corrected the `drawable-parameter` used for the bar-cursor
- modify `ScrnRefresh` to ignore a case where the left/right halves of a double-width character have been set to different video attributes. The attribute to use is in the left-half (report/testcase by Thomas Wolff).
- correct a limit-check for `DECCRA` in case the target lies off-screen (report/testcase by Thomas Wolff).
- documentation errata (report by Thomas Wolff).
- reset flags including `wraparound` and `reverse-wrap` when switching to VT52 mode, while noting that DEC's standard documentation leaves that behavior *undefined* (report by Thomas Wolff).
- ensure that italic font is turned off on hard/soft resets (report by Martin Hostettler).
- improve responsiveness to X events while processing HTML or SVG dumps (report by Martin Hostettler).
- replace logic in `wcwidth.c` for detecting double-width characters with binary-search table generated using updated `uniset` (report by Robert Ross).
- add test-driver for `wcwidth.c` to simplify comparison with system's `wcwidth`.
- ensure that window-manager name comparisons work when `active-icon` is enabled, since `CSI13t` uses the window-manager name (report by Glenn Golden, Arch [#62818](#)).
- trim a stray “experimental” in one of the comments about the `tcap-query` feature, which has been a supported feature since 2008 (see [patch #238](#)).

Patch #346 - 2019/05/27

- update description of the “default” setting for the `renderFont` resource to match the behavior in [patch #261](#) (Debian [#862042](#)).
- account for `internalBorder` in `useBorderClipping` (report by Robert Ross).
- update table of unknown-width characters in `wcwidth.c` based on Unicode 12.1.0 (prompted by discussion with Robert Ross).
- improve description of `DECSCL` versus `S7C1T` and `S8C1T` in `ctlseqs.ms`.
- improve consistency between `CSI3t` and `CSI13t`, accounting for differences between some window managers' handling of EMWH extents (report by Bram Moolenaar).
- fix a sign-extension when reporting offscreen window position (report by Bram Moolenaar).

Patch #345 - 2019/05/14

- updated FreeBSD test-package from recent `/usr/ports` scripts.
- workaround in `run-tic.sh` for HP-UX, whose `mktemp` prints the name of a temporary directory without creating it.
- add left/right margin capabilities to `terminfo`, since the default terminal emulation is VT420 (suggested by Thomas Wolff).
- modify treatment of `reverseVideo` for dynamic colors to make text foreground/background consistent with the cursor color (prompted by discussion with Ben Wong, Ixix [#20](#)).
- modify button-handling to make SGR button-release distinct from button-press for button-codes starting with 8 (patch by Mikulas Patocka).
- add aliases for the `sgf push/pop` controls to work around language limitations of C# (request by Dan Thompson).
- correct a typo in `setDirectFG`, which could cause setting of indexed-color after a direct-color to be ignored.
- add resource `useBorderClipping` as an alternative to `useClipping` (request by Robert Ross).

- improve logic for displaying xterm's built-in line-drawing characters vs missing glyphs, e.g., for U+2409 to U+240D (patch by Robert Ross).
- add `vttests/sgrPushPop2.pl` to illustrate how selective pushes work, as well as to demonstrate push/pop of the various color types supported by xterm.
- fix a special case in `XTPOPSGR` where direct-colors were not checked as a dependency of indexed-colors, contrary to documentation.
- reduce buffer-flushes for `OSC 4` and `OSC 5` color-queries, as well as in the queries for dynamic colors. **Note:** this change makes the reply for `OSC 5` use the "5" in the response; formerly it was mapped to "4" after adding the maximum number of colors.
- modify `vttests/query-color.pl` to demonstrate multiple queries in one request.
- update tables of combining and unknown-width characters in `wcwidth.c` based on Unicode 12.0.0.
- modify response for `OSC 5` to be consistent with documentation.
- add `vttests/query-dynamic.pl`
- modify `vttests/query-color.pl` to accept bold, underline, etc., keywords to decide whether to use `OSC 5` rather than `OSC 4`.
- modify cursor coloring to avoid a case where the cursor matched the foreground color while the text was displayed in reverse-video (report by Nuno Silva).
- fix an inconsistency in X10 mouse responses from [patch #342](#) changes; the legacy protocol supports only buttons 1-3.
- reduce the number of buffer-flushes for `tcap-query` batches.
- modify `tcapquery.pl` to demonstrate batch queries with `-q` option.
- increase response-buffer size, and make it configurable as `limitResponse` (prompted by discussion with Stephen P Wall).
- modified configure script:
 - check/workaround for non-POSIX manipulation of predefined symbols
 - check for updated X Toolkit, which uses `const`.
- update `config.guess`, `config.sub`
- provide for secondary-selection, overlooked in [patch #338](#) (report by Emile LeBlanc).
- documentation errata (patch by Larry Hynes).
- improve pointer-checks in `Tekproc.c`
- revise solution for Debian [#919475](#), to allow for struct-notify events occurring as a side-effect of toggling to/from full-screen mode.
- window's border-size was incorrectly added to position when maximizing window (report by Gary Langshaw).

Patch #344 - 2019/02/12

- add ASCII escape to default for `disallowedPasteControls` (prompted by discussion with Martin Hostettler).
- fix typo in `ctlseqs.ms` (Robert Ross).
- implement DEC Cyrillic NRCS (based on screenshots of `vttest` provided by Markus Schmidt).
- correct control returning sixel geometry maximum versus actual size (patch by Ben Wong).
- improve manual page for `resize` to clarify that `resize` does not execute the shell commands which it generates for setting environment variables.
- improve memory-management for parser, to handle response strings that might occur with `ENQ` or when `SRM` mode is active (patch by Martin Hostettler).
- change `Comment` text in `uxterm's` desktop file to work around a limitation of GNOME's GIO application ([issue #940](#)). The [documentation](#) reads:

Searches desktop files for ones that match `search_string`.

The return value is an array of *strvs*. Each *strv* contains a list of applications that matched `search_string` with an equal score. The outer list is sorted by score so that the first *strv* contains the best-matching applications, and so on. The algorithm for determining matches is undefined and may change at any time.

- a check of `ZIconBeep` resource was removed in double-buffer fix in [patch #334](#). That is used to decide whether to handle struct-notify events. When `xterm` does handle the events, it may negotiate a new window-size with the window manager. In that case, the `limitResize` resource setting limited the new window-size to the screen-size. Amended that by eliminating the limit for this special case when double-buffer is configured, and restoring the check for `ZIconBeep` when double-buffer is not configured (Debian [#919475](#)).
- disallow recursion which could happen if a user configures the `answerbackString` resource with the ENQ code and experiments with that code when SRM is enabled (report by by Martin Hostettler).
- add remaining credits in `COPYING` file.
- modify `run-tic.sh` to check if it is using an older version of `ncurses` which does not support large terminal descriptions, and if so, remove a non-essential feature to keep within the 4096-byte legacy limit.

Patch #343 - 2019/01/13

- modify `run-tic.sh` to prefer `ncurses6` over `ncurses5`, when available.
- add `COPYING` file, and dummy "check" makefile rule for testing Arch packages.
- add/update package scripts for FreeBSD and NetBSD, for testing.
- update tables of combining and ambiguous-width characters in `wcwidth.c` based on Unicode 11.0.0.
- modify `xterm-new` sample terminfo entry to correspond to `ncurses 6.1`, using the SGR 1006 mouse protocol.
- improve manual page discussion of selection ownership versus highlighting (prompted by discussion with Martin Hostettler).
- restore/repair `keepClipboard` feature which was broken by changes in [patch #338](#) (report by Martin Hostettler).
- improve documentation for `deleteISDEL` resource.
- modify `DECRCQM` response for private mode 1037 to account for cases where the resource `deleteISDEL` is initially neither true nor false, but dependent upon the keyboard type (report/analysis by Martin Hostettler).
- clear pointers for `pattern/fontset` after destroying their data when switching `facename` with an escape sequence (report by Robert Ross).
- modify logic for TrueType fallback fonts to match the sort-order used by `fc-match` (report by Robert Ross).
- add resource setting `limitFontsets` which can be used to limit or disable the new TrueType fontset feature (request by Robert Ross).

Patch #342 - 2019/01/03

- limit mouse-button events to 11 buttons in the original protocol, and 15 in the extended mouse-protocol (patch by Martin Hostettler).
- correct calculation for buttons past 11 in `mouse-codes` sample script (patch by Martin Hostettler).
- disable a supplementary check added in [patch #341](#) which interferes with using `fontconfig` to select different-sized bitmap fonts (Arch [#61237](#)).

Patch #341 - 2018/12/24

- add options to `mouse-codes` script to demonstrate that the encoding used for mouse events limits button numbers to 11.

- allow mouse button numbers up to 11 using an offset of 128 for button numbers 8-11 rather than the offset of 64 used for wheel-mouse, etc., buttons 4-7 in [patch #338](#) (adapted from patch by Martin Hostettler).
- correct off-by-one right-margin checks for double-width character adjustments in DECERA/DECFRA (patch by Martin Hostettler).
- allocated size of selection buffer was not reset when freeing the buffer in [patch #338](#) (report/analysis by Stefan Assmann).
- modify the initial pattern passed to fontconfig to disallow color bitmap fonts.
- improve error recovery for a case where fontconfig ignores the requested pattern due to override in the user's font configuration (report/testcase by Stefan Assmann).

Patch #340 - 2018/12/16

- suppress a spurious warning about fontsets when initializing menus for the toolbar configuration.
- fix some strict compiler warnings.
- improve checks for TrueType font, to help with the case of color bitmap fonts, which fontconfig misrepresents (Arch Linux [#58706](#)).

Patch #339 - 2018/12/12

- modify CF_GNU_SOURCE macro to treat *newlib* as similar to *glibc*, fixing a problem with the configure checks for pseudoterminals in Cygwin overlooked in [patch #334](#) updates for configure-macros.

Patch #338 - 2018/12/09

- ignore \$TERMINFO in the configure script if it is set to a non-directory value.
- updated configure macros:
 - CF_WITH_PCRE2, modified to work with Debian's (mis-numbered) pcre3 package.
 - CF_CC_ENV_FLAGS, report preprocessor options in CFLAGS
 - CF_LD_RPATH_OPT, suppress check if `--disable-rpath` option was given.
 - CF_XOPEN_SOURCE, add case for midnightbsd
- update config.guess, config.sub
- add a check to ensure that the filename parameter passed to `XpmReadFileToPixmap` is actually a file, since that function does not check (report by Ben Nott).
- amend solution for Debian [#758633](#) to ensure that replies for bracketed paste are not sent while processing a selection for `exec - formatted` (Debian [#913237](#)).
- improve adjustments/clearing for double-width characters in DECERA, DECFRA, DECSERA.
- improve adjustments/clearing for double-width characters when doing vertical scrolling within left/right margins (patch by Martin Hostettler).
- modify `wcwidth` to encode a few spacing combining marks as regular combining characters.
- change compiled-in default for `saveLines` to match the resource-file changed in [patch #192](#) (Debian [#913815](#)).
- change default `faceSize` to 8.0, to simplify switching back/forth between bitmap fonts and TrueType. This was originally (mis)set to 14.0 in [patch #148](#).
- add fallback support in Xft configuration for missing glyphs (prompted by discussion with Mike Burns).
- fix a problem with using direct-colors for the background color when clearing/scrolling (report by Nicholas Marriott).
- add a "sources" rule for the makefile's generated source.
- add a short explanation in `ctlseqs.ms` discussing the differences in error-recovery for malformed sequences versus unimplemented features, and amend one case for consistency (prompted by discussion with Martin Hostettler).

- adjusted `ifdef's` so that the `paste64` configure option does not automatically enable the `readline-mouse` configure option.
- revert the change which prevented concurrent ownership of different selection targets, and instead modify selection storage so that different concurrent requests for different selection targets will be stored/retrieved independently (Debian [#901249](#)).
- remove a check which prevented returning button-codes past the documented 4/5 for wheel mouse, and add a script `mouse - codes` which makes a report showing the various mouse codes for different button/modifier combinations (discussion with Přemysl Janouch).
- improve display and checksum for DEC Special Graphics by mapping 0x5f to 0.
- add a null-pointer check for table-ending in the extended-boolean resource-handling (report by Felix von Leitner).
- remove stray `]`'s from `INSTALL`-file (Larry Hynes).

Patch #337 - 2018/09/21

- regenerated configure script (report by Sven Joachim).
- revise/improve fix for scrolling in margins (report/analysis by Martin Hostettler):
- amend change to default-translations "select" subset to ensure that specific key-press actions are listed before generic key-press actions (reports by H Merijn Brand, Sven Joachim).

Patch #336 - 2018/09/19

- ensure that only one of `PRIMARY` and `CLIPBOARD` is owned by `xterm` at a given time (Debian [#901249](#)).
- documentation fixes (report by Lars Krueger):
 - document `SL` and `SR`.
 - document `DECRPTUI`, change number of digits to match `VT420`.
- revise `omitTranslation` resource, e.g., splitting "default" into several more useful categories.
- modify mask-logic to permit *control*- and *meta*- modifiers to be used in mouse protocol.
- several fixes for parsing/state (report/testcases by Martin Hostettler):
 - remove an old/unimplemented entry for `xterm-title` from state table.
 - save/restore wrap-flag when scrolling, to fix an inconsistency between jump-scrolling and normal-scrolling.
 - improve a special case of wrapping where the cursor starts beyond the right-margin, and wraps at the terminal's last-column before the settable-margins can take effect.
 - if origin mode is set, adjust a restored cursor column relative to the left margin.
 - when scrolling a line within left/right margins, correct order of the fixups needed when a double-width character crosses the margin boundary.
- review/fix a few cases where the parsing state was not reset after completing a control sequence (prompted by report by Martin Hostettler).
- disallow `XTCHECKSUM` if the corresponding window-ops "SetChecksum" is unset.
- add `print-vt-chars.pl` script to illustrate the NRCS and codepages supported by `xterm`.
- add `other-sgr.sh` script to demonstrate the non-VT100 video attributes implemented in [patch #305](#), and added a summary of their introduction in ECMA-48 to the control sequences document.
- add `tabs` and `-tabs` keywords to `TTYModes` resource to simplify workaround for terminal drivers which are not aware of UTF-8 (FreeBSD [#229682](#)).
- add VT5xx NRCS 7-bit Turkish and DEC Turkish.
- add VT5xx NRCS 7-bit Hebrew and DEC Hebrew.
- add VT5xx NRCS 7-bit Greek and DEC Greek.
- correct a few post-VT220 codepages to make them display without setting the NRCS state.
- extend `vt100Graphics` resource to include other character-sets such as the VT500 codepages in UTF-8 mode.

- add some VT5xx codepages to help with the discussion of 96-character sets: *ISO Greek Supplemental*, *ISO Hebrew Supplemental*, *ISO Latin-5 Supplemental*, and *ISO Latin-Cyrillic*.
- improve description of the VT300-controls for designating character sets, and fix a typo which indicated that some were used for 94-character sets (prompted by discussion with Lars Krueger).
- add private control XTCHECKSUM for modifying checksumExtension.
- factor out xterm's DECRQCRA checksum extensions as a resource setting checksumExtension.
- revise calculation of checksum for DECRQCRA to match DEC's terminals (using screenshots of vttest provided by Markus Schmidt).
- restore a fix for memory-checksum setup of DECCKSR from [patch #315](#) incorrectly reverted in [patch #334](#) as part of fix for DECRQCRA.

Patch #335 - 2018/08/14

- add colorInnerBorder resource to make a change from [patch #334](#) configurable (reports by H Merijn Brand, Gabriele Balducci).

Patch #334 - 2018/08/12

- modify Imakefile to reflect the fact that NetBSD no longer has a working termcap emulation.
- add resource-setting validShells which can be used to augment the system's /etc/shell (prompted by discussion with Paul Lampert).
- stifle some useless warnings from lintian in test-packages.
- add the ncurses extension “RGB” to the responses for the termcap-query feature.
- improved getopts-handling in sample scripts.
- fix some warnings from gcc8 and clang --analyze.
- update note about incorrect documentation for DECRQSS to include VT525 (report by Markus Schmidt).
- correct check for default-values in rectangular parsing; a zero counts as a missing or default parameter (report/testcase by Markus Schmidt).
- correct some ranges in the ambiguous[] table in wwidth (adapted from patch by KUGA Tsutomu).
- fix a special case with faint video attribute incorrectly combined with default color.
- add private control XTREPORTSGR for reporting video-attributes and color on a rectangle, and script report - sgr . pl to demonstrate it.
- modify some of the markup in ctlseqs.ms to work around groff's reassignment of ASCII punctuation characters as documented in *groff_char(7)*.
- treat ECMA-48 SGR 6 the same as SGR 5.
- add private controls XTPUSHSGR and XTPOPSGR for saving/restoring the current video-attributes on a stack (adapted from patch by Dan Thompson).
- modify DECRPM response for logging enable to indicate its state even when enabling/disabling it is not allowed.
- implement DECSNLS
- implement DECRSPS
- improve fill-color for double-buffer configuration, which was sharing a graphic context with the cursor.
- fix a couple of cases where double-sized VT100 characters were not clipped, seen in Joe Smith's [VT100 torture test](#).
- color the inner border using the same borderColor as the outer border, rather than filling with the VT100's default background.
- change encoding of “THANKS” to UTF-8.
- modify handling of DECELR to recognize MotionNotify events again, amending a check for allowMouseOps which limited that to button-events in [patch #328](#) (Olaf Rogalsky).
- fix some screen-painting problems with left/right margins when using insert-line or delete-line (report/testcase by Martin Hostettler). also fix similar case with index/reverse-index.

- several minor performance improvements using macros, e.g., inline checks for character width.
- add `DECSCPP` and `DECSLPP` to `DECRQSS`.
- implement `DECSCPP`.
- implement `DECCIR` and `DECTABSR` presentation reports.
- modify checksum computation for `DECRQCRA` to treat uninitialized cells as blanks rather than nulls.
- drop custom-entity from `HTML-dump`, use UTF-8 for ` `; (Debian [#902381](#)).
- modify display of non-BMP characters when using bitmap fonts to show a null/empty box rather than the replacement character which was used in cleanup changes for [patch #233](#) (report by Christian Weisgerber).
- when setting up clipping rectangle for `Xft`, allow for the case where `xterm` is only displaying a combining character, where the base was already written (report by Joshua Crowgey).
- allow reset `Xft`'s state if switching font-sizes when double-buffering is used.
- fix repainting, e.g., on resize, when double-buffering is used with `Xft` (patch by Daniel Colascione).
- correct some interchanged pairs of symbols in `unicode/keysym.map` (Brad Town).
- improve configure macros `CF_GCC_WARNINGS`, `CF_GNU_SOURCE`, `CF_POSIX_C_SOURCE`, `CF_TRY_XOPEN_SOURCE`, `CF_XOPEN_SOURCE`, `CF_X_ATHENA_CPPFLAGS`.
- modify `logfile` resource to interpret “-” as the standard output (adapted patch by Colum Paget).
- improve documentation of `Tek4014` menu options; fix a case where the `Tek4014` window was not displayed before switching modes.
- re-correct parameter for `pid` used for `DECCKSR`, `DECRQCSR` (see [xterm #315](#)).
- hard/soft reset now resets the cursor-blinking state that may have been set via escape sequences; the cursor-blinking menu-entry feature is unmodified (report by Matthieu Herrb).
- update `config.guess`, `config.sub`

Patch #333 - 2018/05/03

- ensure that `i18n` is enabled if `input-method` is enabled.
- modify logic for pre-edit to update spot-location while the cursor is invisible (Kakoune [#1940](#)).
- change default icon to newer one, "mini.xterm".
- install a complete set of icons, to simplify post-install customization.
- add resource `disallowedPasteControls` to extend filtering of control characters from pastes.
- add `print-on-error` action-hook, and document action-hooks for `dump-html`, `dump-svg`.
- provide action-hook for `print-immediate`, which was available only as a menu-item (report by Rastislav Barlik).
- continue to improve notes in `ctlseqs.ms` which mention where various controls originated.
- add case to accept ECMA-48's bogus `SD`, but document the issue in `ctlseqs.ms`.
- add control sequence for loading XPM-icon file, using the analogous control sequence from `shelltool/dtterm`.
- add `-report-icons` option, to report on XPM-icon and title-bar updates.
- correct a discrepancy between locator-reports for `VT220` vs `VT330`.
- add window-ops control sequences to complement existing ones for reporting window-position and text-area size with reports for text-area position and window-size.
- display `vt52` graphics mode characters.
- correct case-statement for window-ops 10, overlooked since some window managers equate vertical-maximize and horizontal-maximize window hints with full-screen maximize.

Patch #332 - 2018/04/15

- add a `GetChecksum` item to `disallowedWindowOps`
- improve notes in `ctlseqs.ms` which mention where various controls originated.
- add control sequences for querying the X display size and the character size, both in pixels to help eliminate some of the constants in `esctest`.
- fixes prompted by review of George Nachman's `esctest` script:

- add a null-pointer check and a limit-check in `xtermCheckRect`.
- correct limit-check for right-margin when processing autowrapping if xterm is not built for wide-characters.
- repair logic in RIS to reset 132-column mode when an escape sequence is used to enable 80/132-column switching.
- correct array-limit for EWMH working state.
- further improve limit-checks versus assert's (see [patch #315](#)).
- correct order of check-margins and move-to-left margin for DL and IL.
- modify reverse-wrap to pay attention to top/bottom margins as it has done for left/right margins since [patch #279](#).
- modify behavior of DECFI and DECBI to not index the screen at the left/right edge of the display unless those happen to be the left/right margins.
- add case for VT320 DSR response for keyboard status.
- improve check for valid shell path using `getusershell` and `endusershell` if available, in case `/etc/shells` does not exist (suggested by Rainer Orth).
- modified configure checks for groff and man2html, to use the latter by default, but allowing mandoc as a partial replacement for former.
- revisited the inconsistent copyright notices mentioned in [patch #165](#), and eliminate the issue as mentioned in this [copyright discussion](#).
- fix typo in this change-log (report by Sven Joachim)
- update `config.guess`, `config.sub`

Patch #331 - 2017/12/30

- add workaround for improper grayscale adjustments made in FreeType library, exposed by changes to rounding in 2.8.1, which shows up as a gap in line-drawing characters (Debian [#880407](#)).
- improve a special case where a non-Unicode font's line-drawing characters were not used, when specifying it via the `utf8Fonts` resource, e.g.,

```
-fs 15 \
-xrm '*VT100.font:12x24' \
-xrm '*VT100.boldFont:12x24' \
-xrm '*VT100.utf8Fonts.font: 12x24' \
-xrm '*VT100.utf8Fonts.boldFont: 12x24' \
```

- replace constant 10msec delay for next X event with new resource `nextEventDelay`, and reduce that to 1msec to accommodate faster machines than used when `-hold` was implemented in [1999](#) (Debian [#877628](#)).
- add `scroll-to` action, which simplifies binding a key to scroll to the beginning or end of the saved-lines (Debian [#880120](#)).
- add building blocks for alternate screen and/or title-stack features in the `terminfo` file.
- improve calculations for cell-data size.
- change configure script to enable XHTML/SVG screen dumps by default.
- change configure script to enable 256-colors by default.
- update `config.guess`, `config.sub`
- change configure script option for `--with-man2html` to use improved script by default.
- add case for private mode 1044 in DECRQM, to report the `keepClipboard` resource setting and corresponding menu entry.
- fix an inconsistency between private mode 12 (the AT&T 610 cursor blink) and DECSCUSR: the former relied on having the `cursorBlink` resource set initially to enable the escape sequence, while the latter does not.
- add private modes 13 and 14, as well as resource `cursorBlinkXOR` to allow better control over the cursor-blinking state (discussion with Bram Moolenaar).

- modify the html and svg screen dumps to support direct color
- modify media copy (screen-printing) to support the same SGR codes as DECRQSS, including 88/256 indexed color as well as direct color.
- improve options-parsing for query-status.pl script.
- modify parsing of SGR direct-color control making *color space identifier* optional. The corresponding DECRQSS reply always returns an empty (default) field for the identifier.
- add wide-attributes to DECRQSS reply for SGR.
- add private mode 1046 to help with scripting applications.
- correct expression used for readline-flags in DECRQM; to test the current flag rather than information *stacked* within the same variable.
- correct typo in `ctlseqs.ms` reference to ISO-8613-6 (patch by Mike Frysinger).
- fix lintian warning for test-package.
- fix typo in DECRQSS for SGR 48, which printed the foreground value for colors past 15. Also use colon delimiter for codes 38/48 in response (report by Paul LeoNerd Evans).
- improve workaround for Debian [#542434](#) by using the font's maximum width when no ISO-8859-1 glyphs are provided (Debian [#879936](#)).
- work around a special case of *Xft*'s mismanagement of its cached data by adding a check before the `-report-fonts` option to ensure that it does not use an `XftPattern` which may have been freed during a call to `XftFontOpenPattern`.
- improve manual page description of `regex` option for `onXClicks` resources (report by Lukas Mai).
- add `directColor` resource.
- additional manpage macro cleanup (Branden Robinson, Debian [#880551](#)).
- add optional support for direct-colors (adapted from patch by anonymous “Nibby Nebbulous”).
- improve legacy/NRC character set mapping (patch by Thomas Wolff), e.g.,
 - enable alternate NRC set designators for French and French Canadian, ‘9’ and ‘f’ respectively, as documented in `ctlseqs`. (‘9’ is documented for VT510, ‘f’ is a Kermit feature).
 - correct the Unicode value in the *DEC Technical* table to show capital delta.
 - referring to

<http://vt100.net/docs/vt220-rm/table2-3b.html>

<http://vt100.net/docs/vt320-uu/appendixe.html>

add entries for the *DEC Supplemental Graphics* table to display 0x28/0xa8 as ◻ and 0x5d/0xdd as Ÿ.

- referring to

<http://www.vt100.net/charsets/technical.html>

alter the Unicode values used for 0x2b through 0x2c to use *curly braces* to work with the “middle” parts displayed with 0x2f and 0x30.

- modify the VT220 “Supplemental” table, giving a hint that it was probably meant to be “Supplemental Graphics” and is the same as VT320's table.
- quiet a few font-warnings when a derived fontname cannot be opened, overlooked in refactoring of font resources in [patch #328](#) (initially reported on [Cygwin mailing list](#), with [followup](#)).
- correct error response for DECRQSS broken in cleanup of Coverity reports in [patch #288](#) (reports by Bram Moolenaar and IWAMOTO Kouichi).
- improve DECRPM responses by returning *mode not recognized* for modes which may not be settable due to the selected `deTerminalID` resource (report by IWAMOTO Kouichi).
- correct logic for `print-immediate` action, and enable corresponding menu entry (patch by Lauri Tirkkonen).
- add configure option `--with-pcre2` (patch by David Michael).
- fix a misspelled subsection title in `ctlseqs.ms` and add a note regarding blink which was rendered as bold in X11R6. Blinking text was implemented in [Patch #60](#).

- fix typos in `xterm.man` (patches by Sven Joachim, Larry Hynes).
- fix typography in `xterm.man` (patch by Bjarni Ingi Gislason, Debian [#869248](#)).
- fix typo in `INSTALL` (Larry Hynes).
- add `xterm-direct` terminal description based on changes introduced in [patch #277](#), and relying upon ncurses **RGB** extension.
- modify `xterm-new` terminal description to use ECMA-48 REP, reflecting its use in xterm since [patch #32](#) (1996).
- clarify comment in `ctlseqs.ms` regarding blink: it has been part of xterm since [patch #60](#) (1998).
- update ftp URLs in documentation.

Patch #330 - 2017/06/20

- updates for ReGIS (Ross Combs):
 - remove redundant text command error check which broke `T(B)` and `T(E)`.
 - retain the loading alphabet number across multiple `"L"` commands.
 - add `S(T)` delay handler.
 - fix some color handling error messages.
 - add stubbed-out macrograph handling.
 - use `fragment_remaining()` and `fragment_consumed()` instead of manually checking position / length in various places.
 - rename some local variables in string / extent / option parsing
 - wrap some long lines.
 - move macrograph command handling out of the top-level.
- add a summary of the italic fonts loaded to `-report-fonts` option.
- modify the font-lookup for italics to allow for `"-i-"` if no match is found with slant `"-o-"` (prompted by patch by Ben Wong).
- change default values for `mkSamplePass` and `mkSampleSize` to reflect generally-improved locale support in various operating systems (FreeBSD [#219800](#)).
- modify `wcwidth.c` to return -1 for non-Unicode values, and adjust a couple of blocks to better match assumptions about ambiguous-width characters in other implementations. Also modify `wcwidth.c` to support configurable soft-hyphen, so there is no drawback to using this version rather than a system `wcwidth`.
- amend change made in [patch #328](#) for cursor-visibility to handle case where an application is updating the reverse-video state (FreeBSD [#219800](#)).
- update tables of combining and ambiguous-width characters in `wcwidth.c` based on Unicode 10.0.0.
- build-fix for `--enable-sixel-graphics` without `--enable-regis-graphics` (reports by Sven Joachim, FreeBSD [#219945](#)).

Patch #329 - 2017/06/12

- add control sequences for reading the Sixel and ReGIS graphics sizes (suggested by Ben Wong).
- add a workaround for `wcwidth` returning -1 for characters which should have been printable (FreeBSD [#219800](#)).
- fix a bug in font initialization from [patch #328](#) (FreeBSD [#219800](#)).
- fix a special case in `HideCursor` which assigned a bold font to the slot used for normal font in changes for italics in [patch #307](#) (Debian [#858304](#)).
- updates for ReGIS (Ross Combs):
 - Strings specified with no command are used as "comments". Print these in the log when tracing.
 - Catch attempts to use "alternate display" mode (AKA "blink") from the GIGI, but do not implement it.
 - The `T(M)` command should only multiply the height by 10, not 20.

- Make the S(E) command reset more state than just the screen contents.
- Remove two rotation variables which were only being printed.
- Numerous minor fixes and comment updates in the R command.
- Unknown R command option names trigger an empty response.
- Fix the output position after printing rotated text (it was missing the the sign before).
- Fix the position change with pixelvectors and rotated text (the rotation transform was not being applied).
- Update the *TODO* list and remove a verification *FIXME* (slanted text positioning is correct as is).
- Emulate the approximately 1.4x enlargement for text which isn't rotated at right angles.
- Only update the color planes specified in the plane mask (the W command's F option).
- fix a bug introduced by the changes to font information in [patch #328](#). When processing the "checkfont" option of the locale resource, the program referred to the *request* data, to an array which was only allocated in the *new/result* widget (report by H Merijn Brand).
- fix a missing assignment initialization to make the utf8 resource control whether escape sequences to enable/disable UTF-8 mode are allowed.

Patch #328 - 2017/06/01

- revise parser for charClass resource, making these improvements:
 - accept octal and hexadecimal values
 - allow embedded whitespace
 - allow the class after colon to be optional, e.g., to clear class settings for a range of characters.
- add command-line option `-report-charclass`.
- fix most lintian warnings about test-package
- add `eraseSavedLines` resource.
- document `DECSED 3` in `ctlseqs.ms` (report by Ben Longmans).
- improve integration between configure-events and updates for reported screensize, in particular when switching between vt100 and tek4014 modes.
- modify selection-highlighting of reverse-video text to keep that distinct, e.g., by reversing the selection foreground and background colors as one would expect. This fixes a "useless" case in the description of `highlightColorMode`.
- improve fix for Debian [#759734](#), addressing a case where non-colored cursor would be invisible against reverse-video (see [patch #311](#)).
- updates for ReGIS (Ross Combs):
 - the "H" option of the "T" command should multiply by 10, not 20.
 - display unknown glyphs as a solid block.
 - given a succession of text-direction options, use the last.
 - fix the direction of ReGIS slanted text so that negative values produce oblique output .
 - fix the ReGIS text direction option to only rotate characters when no following size option is used.
- update terminfo to better match corresponding entries in ncurses, e.g., u8 pattern to match the VT220, VT420, etc., primary responses, as well as adding `smxx` and `rmxx`.
- fixes from Jörg Sommer:
 - corrected a trace-message regarding maximum graphics-size; it used the similar ReGIS maximum size which might not be configured.
 - in `do_select_regex`, clear selection if there is no match. If the regex does not match anything around the cursor, the selection returned must be empty, otherwise the whole line is treated as a match. This way the command defined by `exec-selectable` will not be executed if there is no match.
 - modify `limit` in `do_select_regex` to include the character at the cursor in the match, making it easier to type something and then hit the key to trigger `exec-selectable`.
 - If `exec-selectable` or `insert-selection` is triggered by a mouse button click, the position of the mouse pointer should be used. This makes it easier to address any position on the

window and it makes it possible to use the mouse, e.g., for applications such as mutt where you cannot move the cursor.

- modify DECRC to save/restore xterm's last-column flag used to control wrapping behavior rather than manipulating DECAWM (report/analysis by Mattias Engdegård).
- add configure option `--enable-terminfo-env` to use the value set by `--with-own-terminfo` for the `$TERMINFO` environment variable. That variable was set automatically for HPUX, but would be useful in other systems, e.g., for Solaris (request by Jeff Wieland).
- fix a race condition when setting up a signal handler to timeout if opening `/dev/tty` hangs (patch by Tobias Stoeckmann).
- review/cleanup resources which were not in the manual page (report by Maxwell Anselm):
 - add manual page description as needed.
 - drop resource name for `menuBar`, as unnecessary.
 - modify fallback numeric value for `regisScreenSize` resource to match that for `maxGraphicSize`.
- updated configure macros `CF_ADD_CFLAGS`, `CF_CC_ENV_FLAGS`, `CF_GNU_SOURCE`, `CF_MATH_LIB`, and `CF_XOPEN_SOURCE` from other program-changes.
- update `config.guess`, `config.sub`
- change “maximum screensize” assumed by `resize` to 9999x9999, to accommodate people using the *Unreadable* font.
- drop `Utility` from default value of `--with-desktop-category` (Debian [#780176](#)).
- widen the configure script pattern used for finding related “.desktop” files, including “Terminal”
- several minor improvements to font utility functions:
 - provide for later modification to implement font-sets by parsing the font resources as comma-separated lists.
 - parse `-fn` and `-fa` similarly, using “x:” and “xft:” prefixes for font name/family strings to distinguish between XLFD and Xft font specifications.
 - use loops to iterate over font classes
 - use getters/setters for font data to allow for on-demand lookups.
 - make the debugging trace for missing glyph less verbose since that interferes with the `-report-fonts` option.
 - refactor `xtermLoadFont` to make it clearer how some fonts are derived from others, e.g., bold, wide.
 - make the triggering and suppressing of font-warnings more consistent by storing the last state in the widget.
 - reduce font-warnings by checking for repeated warnings.
- add `vttests/query-status.pl`
- add `vttests/closest-rgb`
- add special case for displaying soft-hyphen if it happens to fall at the right margin, and omitting similar case such as the BIDI markers, where a zero-width character is neither a control character nor a combining character (Debian [#844325](#)).
- modify logic for `OSC 52`, *manipulate selection data*, to update the selection-time to include the latest X events. This fixes some cases where the selection was invalid, e.g., after an event due to focus-follows-mouse (report/testcase by Stephane Chauveau).
- revise macro `CastMallocN` as new macro `TextAlloc` to make explicit use of `sizeof(char)` (prompted by patch by Cade Foster).
- add “*Mouse Ops*” menu entry and related resources to allow runtime disabling/enabling of the mouse protocol escape sequences (discussion with Bob Proulx).
- improve discussion of mouse actions versus protocol in the manual (discussion with Bob Proulx).
- improve discussion of environment variables in the manual, pointing out where some features (such as `termcap` and the System5 `COLUMNS` and `LINES` variables) are used rarely, mainly to support legacy applications.
- add examples of `translations` resource for select/paste, and for font-size changes to the manual.
- minor reordering of some entries in `ctlseqs.ms` for consistency (report by Arran Ubels).

- add `-s` option to `256colors2.pl` and `88colors2.pl`, to demonstrate modifying the “system” colors 0–15.
- omit `XFT_SPACING` property from call to `XftPatternBuild`, to work around a bug in `fontconfig` for handling Google Go fonts, whose names sort in an order not expected by `fontconfig`, causing the request for a monospaced font to return *italics*, e.g.,

```
$ fc-match 'Go Mono:spacing=monospace'
Go-Mono-Italic.ttf: "Go Mono" "Italic"
(report by Giacomo Boffi on Stackoverflow).
```

- modify `minstall.in` to improve a workaround added to the manual page in [patch #182](#) to avoid having the C preprocessor used in the imake configuration strip out the comments in the character classes section (reports by Ted Unangst, Anthony J Bentley).

Patch #327 - 2016/10/07

- add a check in the function which handles end-of-line wrapping to ensure that C1 controls are allocated one column when `allowC1Printable` is set (Debian [#738794](#)).
- use consistent error-checking after `strtol` calls, fixes a case where a query with OSC 6 did not ensure there was a valid color number (report by Alex Smith).
- add `-baudrate` option, for testing ncurses.
- always generate the `CASE_xxx` symbols in `VTparse.h` and `Tekparse.h`, as part of a change to improve debug-logging. This makes the build always depend upon `awk`.
- modify `allowC1Printable` to disallow codes 160-254 as being equivalent to codes 32-126 when parsing escape sequences (Debian [#839220](#)).
- amend fix from [patch #326](#) for TrueType fonts to exclude the hidden character used for double-width cells (report by Grady Martin).
- fix a typo in `ctlseqs.ms`

Patch #326 - 2016/09/25

- updated `appdata` file (report by Richard Hughes).
- improve discussion of the different terminal emulations provided by `xterm` in the manual page.
- add examples of setting the icon title with/without the window title in the manual (Debian [#833984](#)).
- correct a limit-check when using a numeric value for extended Booleans e.g., `*fullscreen:3` rather than a name such as `*fullscreen:never`.
- add action `allow-bold-fonts`
- improved formatting fixes for manual page, using `script` to find mismatches in spelling of resources, actions and menu entries.
- improve documentation of logging resources.
- fix a special case of flickering cursor by adding `GraphicsExpose` to the list of event types that should not trigger making the mouse cursor visible (patch by Joe Peterson).
- correct initialization of line-drawing in VT52-mode, overlooked in changes for [patch #297](#) (report/patch by Ben Wiley Sittler).
- minor clarification of form-feed versus line-feed in `ctlseqs.ms` (suggested by David Kemper).
- amend fix for Debian [#738794](#) to restore a check for missing characters which are *not* combining characters. Also fill in a corresponding special case for TrueType fonts (Debian [#827905](#)).

Patch #325 - 2016/06/05

- improve manual page discussion of function keys (discussion with Ross Combs).
- further improve fix for Debian [#545220](#) in [patch #248](#), to avoid conflict with combining characters (Debian [#738794](#)).
- improve `-hold` option to avoid 100% CPU usage with NetBSD after closing the shell, which makes subsequent checks for X input events fail (prompted by patch by Pierre Pronchery).
- review `#ifdef` statements, listed those which do not have a configure option in `xtermcfg.hin`.
- fixed one case where the menu sensitivity for *Print-All Immediately* and *Print-All on Error* was not properly `ifdef'd`.
- modify terminfo entries for 16-, 88- and 256-color to reset palette with `rs1` capability.
- accept legacy value of `-kt` as synonym for the `oldXtermFKeys` resource, and extend the full-reset logic to use the keyboard type set via `-kt`.
- modify `ioctl` calls for `I_PUSH` to first check if the module has been added, using `I_FIND`. This is needed for newer Solaris libraries with `c11` support (adapted from patch by Alan Coopersmith).
- add check in `getXtermCombining` to ensure that combining characters were allocated (report by Tor Andersson).
- add configure option `--without-xinerama` to allow suppressing the extension (Gentoo [#580936](#)).
- update `keysym2ucs.c` based on Unicode 9.0
- fixed most `cppcheck --enable=all` warnings, including for style (prompted by report by David Binderman). There was one bug-fix:
 - RGB least-squares computation in `allocateClosestRGB` used only one ordinate
- add `cppcheck` to lint-like programs in configure script and makefile.
- fix some const correctness issues and point out an array lifetime issue (Ross Combs).
- updates for SIXEL and ReGIS (Ross Combs):
 - Sixel drawing should still happen after an error if some commands have been processed
 - Tiny steps toward reporting ReGIS input

Patch #324 - 2016/03/10

- updated configure macro `CF_LD_RPATH_OPT` from ncurses changes.
- provide alternate fix for Juha Nurmela's report by turning on POSIX signals if `_POSIX_C_SOURCE` is at least one. This is done to improve the behavior if a direct child process receives a `STOP` signal.
- revert change to `CF_POSIX_C_SOURCE` from [patch #323](#) (reports by Ashish Shukla, Christian Weisgerber).

Patch #323 - 2016/03/07

- updated `appdata` and `desktop` files to add keywords (report by Richard Hughes).
- modify configure macro `CF_POSIX_C_SOURCE` to accommodate some systems, e.g., FreeBSD, which have separated their implementation specific preprocessor symbols from the POSIX ones, requiring both to be defined (report by Juha Nurmela).
- change the directory to the current working dir of the child process in `exec-formatted` and `exec-selectable` actions (patch by Alexander Pohoyda).
- correct typo in `xterm.man` (patch by Larry Hynes).
- correct typo in `ctlseqs.ms` (report by Shriramana Sharma).
- add feature to support XHTML and SVG screen dumps (patch by Jens Schweikhardt).
- correct response to `DECRQSS` when terminal id is less than 400 (patch by Iwamoto Kouichi).

Patch #322 - 2016/01/02

- fix regression due to incorrect fix for compiler warning when allocating storage for `/etc/shells` (reports by Ashish Shukla, Debian [#809646](#)).

Patch #321 - 2015/12/31

- add resource `keepClipboard`, escape sequence and action `keep-clipboard`.
- add optional feature to capture text copied to clipboard at the time of copying rather than at the time the clipboard contents are requested for pasting (patch by Milan Mehner).
- improve a special case where the `-e` option was used to pass a single-quoted command via `luit`, by wrapping it in a `"sh -c"` (report by Keith Hedger).
- minor fix for type-cleanliness when allocating storage for `/etc/shells` (Tobias Stoeckmann).
- fix a typo in manual page (Dan Church).
- fix minor file-descriptor leak; after calling `openpty`, the slave's file descriptor is not needed (report by Juha Nurmela).
- editorial change to `ctlseqs.ms` (report by David Gomboc).
- minor updates for autoconf macros.
- update `config.guess`, `config.sub`

Patch #320 - 2015/08/28

- correct documentation for `%t` format (report by Martin Tournoij).
- add `%R` for consistency to `exec-formatted()` and `insert-formatted()` actions.
- add `%r` format to `exec-formatted()` and `insert-formatted()` actions (patch by Martin Tournoij).
- Amend fix for Debian [#794201](#) (report forwarded from Christian Jachmann by Emanuel Haupt, Debian [#797008](#)).

Patch #319 - 2015/08/19

- add a section to `ctlseqs.ms` discussing control sequences and ECMA-48, to explain why C1 controls do not occur in the decoded characters from UTF-8 byte streams (prompted by discussion with Poul-Henning Kamp).
- modify check for `cursor-theme` from [patch #301](#) to also check if the resource `Xcursor.theme` is set to a nonempty value before fallback to xterm's own dummy theme (request by Robert Kloefkorn).
- explain in `ctlseqs.ms` that some keys which normally send SS3-prefixes are changed to CSI-prefixes if key-modifiers are passed as parameters (report by George Nachman).
- correct double-free of font information when multiple problems are found, particularly for the wide fonts loaded via the `-wC` option (report/testcase by Nelson Beebe).
- make configure option `--enable-builtin-xpms` actually work (report by William Bulley).
- correct combination of `-ls` and `-e` options for utempter configuration (Debian [#794201](#)).
- NetBSD build-fix for `OPT_RENDERFONT` versus `OPT_SHIFT_FONTS` (patch by Matthew Green, forwarded by Thomas Klausner).
- fix a few minor bugs found with Coverity.
- update pixelvector handling (Ross Combs):
 - split pixel-based and coord-based functions with common parts factored out to a "raw" function
 - add a "step" variant which loads a single PV digit
- make the graphic dirty upon resize or clear, fixing some missing refreshes (patch by Ross Combs)
- fixes scrolling to use user coordinates and move in the correct direction (patch by Ross Combs)
- several fixes/improvements for ReGIS whitespace and page-handling (patch by Ross Combs).

Patch #318 - 2015/04/12

- rename new(er) configure option `--enable-initial-erase` to `--enable-pty-erase`, since that conflicted with an existing option (report by Jens Schweikhardt).
- fix cut/paste error in `--with-builtin-xpms` configure option (reports by Jens Schweikhardt, Ross Combs).
- fix minor formatting issue in xterm manual (report by Jens Schweikhardt).
- eliminate unnecessary "#(vi" markers in autoconf macros by using "(" to begin case-statement cases (suggested by Jens Schweikhardt).
- minor fixes to improve `CONST` usage (Ross Combs).

Patch #317 - 2015/03/27

- adapt example for `exec`-formatted from [Lukáš Zapletal's](#) webpage to manual (Debian [#780008](#)).
- add a short usage section to the xterm manual, including notes on setting the window title (Debian [#742477](#)).
- revise a change made to `ICH` in [patch #314](#) to address limit-checks (reports/testcases by Zoltán Kéri and Joe Peterson, also reported by Christian Weisgerber).

Patch #316 - 2015/03/07

- revert change to make `DCH` honor top/bottom scrolling margins. For the record, both the VT420 and VT520 reference manuals incorrectly state that *"DCH has no effect outside the scrolling margins."*
- fix regression in `DCH` introduced in adjustment for limit-check in [patch #315](#) (report/testcase by Zoltán Kéri, also reported by Christian Weisgerber).
- correct default value for configure option `--enable-initial-erase`; it should be "False", but in [patch #315](#) it was "Maybe", which differed from default set in [patch #192](#).

Patch #315 - 2015/03/02

- change default for `--enable-narrowproto` for Cygwin to "no" to better match contemporary configurations (report by Jens Schweikhardt, prompted by [discussion](#)).
- provide `OSC 106` as an alternative to `OSC 6`, avoiding conflict with one of Terminal.app's undocumented escape sequences (report by Egmont Koblinger).
- fix an off-by-one in comparison when autowrap and left/right margins are combined (report by George Nachman).
- modify `DECBI` and `DECFI` to work outside the left/right margins, since the vague VT520 reference manual could support that interpretation (suggested by George Nachman).
- correct response for `DECSCUSR` in `DECRQSS` (report/analysis by George Nachman).
- add `DECSLRM` to list for `DECRQSS` in `ctlseqs.ms` (report by George Nachman).
- improve limit-checks versus `assert's` in the debugging version (reports by George Nachman).
- correct a problem with multiple writes to the right-margin when autowrap is turned off (report by George Nachman, also reported in [Gnome #744819](#) by Ulf Magnusson).
- modify `DCH` to honor top/bottom and left/right margins (report by George Nachman).
- correct off-by-one in comparison so that `DL` honors left/right margins (report by George Nachman).
- correct logic of `DECSCL`, which always set 8-bit controls as a side-effect (report by George Nachman).
- correct loop limit for `DECSED 1`, when `DECSCA` is enabled (report by George Nachman).
- fix a entry in `csi_table` for "\$", needed for `CSI [$ z` (report by George Nachman).
- remove restriction from [patch #279](#) changes on `DECIC` and `DECDC` to left-right mode (report by George Nachman).
- correct `PID` value returned in response to `DECRQCRA` (report/analysis by George Nachman).
- fix an `ifdef'ing` problem, where `--disable-dec-locator` would turn off logic needed for `DECIC` and `DECDC` (report by George Nachman).

- correct order of parameters in report for `CSI 1 9 t`, which gives the screensize in characters (report by George Nachman).
- add null pointer checks for a case in DECCRA where part of the target rectangle lies outside the screen limits (report by George Nachman).
- remove extra "6" for selective erase from DA1 response (report by George Nachman).
- support Xinerama screen specification in geometry parsing (patch by Nicolas George).
- add configure option `--enable-initial-erase` to set `ptyInitialErase` consistently with `manpage`, as well as adding a table in `manpage` to clarify the relationship between the resources related to the backarrow key (Debian [#775952](#)).
- add configure `--enable-builtin-xpms` to simplify compiling-in the icons introduced in [patch #284](#) (prompted by discussion with William Bulley).
- fix/improve autoconf macros:
 - `CF_WITH_APP_DEFAULTS`, add paths for OSX
 - `CF_WITH_MAN2HTML`, configure option `--with-man2html` provides "man2html" as alternative to groff's man/html conversion
- fix some minor issues in `manpage` (Jens Schweikhardt).

Patch #314 - 2014/12/28

- fix a minor bug in the termcap-specific version of `resize` when the lines or columns values are at the very end of an incomplete termcap string (prompted by coverity report).
- improve `paste64` feature (report by Olaf Rogalsky)
 - fix "p;" command in `paste64.pl` example.
 - modify `_OwnSelection` to allow the `paste64` control to cause primary/clipboard selections to be disowned and cleared.
 - omit an extra "=" used in padding, to make the base64 response a multiple of four characters.
 - modify `_ConvertSelectionHelper` to not stop converting on embedded nulls in the primary or clipboard selection. That makes the behavior consistent with cut-buffers. Nulls are not passed on to the application because they are used for separators in the X library calls that convert `XTextProperty` values.
- add configure option `--with-man2html` to allow an alternative to groff's man/html conversion.
- review and modify resource-settings which can be set via control sequences, etc:
 - add `OSC 6`, to enable/disable colors set via `OSC 5`, without changing the color assignments (prompted by patch by Ingo Brückl).
 - add command-line option `-itc` for italics.
 - add `colorIT` and `colorITMode` for italics, like `colorBD`, etc.
 - guard `allowPasteControls` against modification by `editres`.
- change `passedPty` from fixed-length to allocated to ensure that it is long enough to hold the `-S` option value (report by Ben Longbons).
- improve ReGIS graphics initialization (Ross Combs):
 - add a new string resource to set the default ReGIS font.
 - fix a caching problem where the font name wasn't taken into consideration when looking up cached metrics.
 - enables use of fractional values in coordinates (which in turn allows setting the coordinates to something like `[0,1][1,0]`)
 - doubles the minimum ReGIS graphic to 200x200
 - set the default ReGIS image size to "auto"
 - fix some swapped width/height parameters in TRACE messages
 - add support for scaling and mirrored coordinate systems to the screen address command
 - sets a minimum ReGIS graphics size of 100x100 -- smaller address ranges will be scaled up
 - reset the image if either the width or height is zero (which should happen together or not at all, but switching the logic gets rid of some parentheses)
 - adds support for alternate screen coordinates (just offsets, not inverted coordinates or scaling)

- keeps the graphics state across ReGIS calls unless P1 or P3 entry codes are used
- changes loops to continue after parsing whitespace to allow trailing whitespace
- fixes some incorrect character casts

Patch #313 - 2014/11/28

- add `regisScreenSize` resource setting to allow custom screensizes for ReGIS graphics (prompted by discussion with Scott Froebe).
- fix some minor issues in manpage (Jens Schweikhardt).
- improve ReGIS font-handling (Ross Combs):
 - remove "random junk" generation for unknown characters
 - add xterm extension to load user glyphs for alphabet 0
 - add xterm extension to specify loading an alphabet from a font by name
 - fix bug with use of empty alphabet slots which caused slot 0 to be clobbered
 - update/clarify ReGIS-related comments
 - add DECprint extension for printing/clearing the screen (only clearing is performed)
- improve ReGIS colorspec conversion (Ross Combs):
 - avoid some floating point math for colorspace conversion
 - move two copies of colorspec parsing to a single function
 - change colorspec parsing to handle components being out of order or with spaces and commas between them
 - add support for an extension where RGB components can be given instead of HLS
- improve use of `const`, e.g., for the `LineData` pointers (patch by Ross Combs).
- clip of graphics that overlap the scrollback buffer and alt screen (patch by Ross Combs).
- amend change to focus-change events in [patch #287](#) to limit it to suppressing the reset of the urgency-hint, because some useful `FOCUSOut` events were lost (report by Joe Peterson).
- modify `dpkg` build-script to configure `xterm-dev` as an `x-terminal-emulator` alternative.
- extend the `--with-xterm-symlink` feature to make symbolic links for the other programs and scripts.
- minor fix to `vttests/resize.pl` to avoid undefined variable when receiving broken/missing response, e.g., from `mrxvt`.
- change the way that ReGIS graphics are refreshed (patch by Ross Combs):
 - it pre-composes any overlapping graphics to avoid unnecessary and flickering draws
 - it adds a three-dimensional lookup table for RGB -> pixel values and uses this across all graphics
 - it draws in line segments when there is a run of the same color
 - in cases where there are no transparent parts, it uses an `XImage` to draw
 - it hooks into the double-buffering support if it is enabled (though this doesn't seem to get rid of all flicker).

This has the effect of reducing flicker and speeding up redraws.

Patch #312 - 2014/09/28

- undo change to `do_select_regex()` in [patch #311](#) (reports by H Merijn Brand, Sven-Haegar Koch, Debian [#762978](#)).

Patch #311 - 2014/09/18

- mention `xclip` in manpage as an alternative workaround for copying clipboard data, noting that `selectToClipboard` (see [patch #209](#)) is the recommended approach (Debian [#639094](#)).
- correct comparison in `do_select_regex()` of working position against starting column.

- correct initialization for regular-expression feature of `exec-selectable` and `insert-selectable` actions (Debian [#758633](#)).
- modify logic for `exec-formatted` and `insert-formatted` actions to ensure that the formatting occurs just after the selection is received (Debian [#758633](#)).
- account for state of reverse-video in special case of cursor coloring (Debian [#759734](#)).
- fix a sign-extension problem in ReGIS support, as well as correcting a case where ignored-characters were not really ignored (patch by Ross Combs).
- Enable the "Escape Sequence" menu entry when an OSC 50 is received. Also disable it if the escape sequence specifies no font (Debian [#760208](#)).
- improve fix for the `fontSel` menu entry from [patch #304](#): because the recovery used the "current font", it would fail if one first selected a valid font, then an invalid font (Debian [#760207](#)).
- correct an off-by-one in limit-check for `ScrNLimitChar` function (report by Egmont Koblinger).

Patch #310 - 2014/07/25

- update package/freebsd files based on xterm [#309](#) port.
- adapt changes from Minux3.2 which ported [xterm #197](#), to allow building on that platform both using `imake` as well as using the configure script.
- update `precompose.c` based on Unicode 7.0
- build-fix for `--with-Xaw3dxf` option (report by Emanuel Haupt).

Patch #309 - 2014/07/13

- modify configure script to work around debris left by XQuartz upgrades.
- modify test-package scripts to enable ReGIS graphics.
- improvements/additions to ReGIS graphics, e.g., drawing text (Ross Combs).
- add `--with-Xaw3dxf`, to link with Xaw 3d xft library (Stephen P Wall).
- amend reset for cursor-shape to take into account `cursorUnderline` resource (report by Christian Weisgerber).
- update `config.guess`, `config.sub`

Patch #308 - 2014/06/19

- corrected font used for clipping double-width bitmap fonts from [patch #307](#) changes to work around mis-scaled fonts (Debian [#752947](#)).
- improve wording of a warning message.

Patch #307 - 2014/06/17

- fill background for top/bottom parts of double-width/double-height characters, to cover occasional gaps due to bitmap font-scaling (report by Egmont Koblinger).
- amend resets for keyboard-type, pointer-mode and title-modes from [xterm #305](#) changes to account for resource settings (Debian [#751351](#)).
- modify `printAttributes` feature to include new SGR codes.
- modify cursor show/hide logic to work with italic fonts.
- do clipping and filling for a case with bitmap-fonts and italics when the font server returns only a "close" match (report/testcase by Egmont Koblinger).
- adjust loop comparison for underlining to display underlines on 5x8 font as in [patch #304](#) (Debian [#750733](#)).
- amend fix for Freedesktop [#15979](#) (Debian [#750733](#)).
- amend `xterm.appdata.xml`, making it validate with current schema.

Patch #306 - 2014/06/03

- fixes for display-errors in new SGR codes (report by Egmont Koblinger).

Patch #305 - 2014/06/02

- add `xterm.appdata.xml` (request by Richard Hughes). By the way, none of the *released* validators yet handle `<licence>` tags (or `<metadata_license>`, etc).
- fix memory leaks in bitmap font-name caching.
- other changes to hard-reset behavior:
 - reset keyboard-type on hard-reset.
 - reset pointer-mode (`pointerMode`) on hard-reset
 - reset title-modes (`titleModes`) on hard-reset
 - reset cursor-shape on hard or soft-reset
 - reset LEDs on hard-reset.
 - reset DECSACE on hard-reset.
- reset bracketed-paste mode on hard-reset (suggested by Egmont Koblinger).
- modify UTF-8 decoder to account for `allowC1Printable` resource.
- revise `getXftColor` to ensure that its sequence number will not overflow in long-running sessions.
- minor fix to selection to prevent hidden character from being returned in selection data (report by Egmont Koblinger).
- add `-Sh` to help-message.
- amend check for incomplete fonts to always decide that a character is missing if the font lacks per-character metrics (prompted by Freedesktop [#15979](#)).
- minor reorganization to implement “filler” SGR features. There are no established applications which rely upon these; some people find them amusing.
 - separate bits used to manage drawing state from attribute-bits.
 - implement SGR codes 2, 3, 9, 21 and their corresponding resets.
 - add configure option `--disable-wide-attrs` to disable the feature.
- additional changes for ReGIS support (Ross Combs):
 - fix some arc drawing bugs and add support for pattern shading.

Patch #304 - 2014/05/03

- add debugging check for parsing table entries, fixed a few inconsistencies.
- handle `utmp/utmpx` strings consistently with new function that null-pads unused locations.
- build-fix for `imake` configuration with FreeBSD 9 and later, to account for replacing `utmp` with `utmpx`.
- improve handling of the `fontsel` (font-selection) menu item:
 - initialize the menu entry differently if the toolbar configuration is used, i.e., enabling it without attempting to use the current selection as a font name. Because of the way in which the toolbar is setup, this attempt usually failed, and would result in a warning.
 - if the menu action fails, e.g., no font can be loaded for the given selected name, then recover by resuming with the current font. Before, the recovery went to the default font. That was done to work around missing bitmap font in [patch #276](#).
- document OSC 119 in the control sequences listing (report by Egmont Koblinger).
- modify special handling of `XF86Paste` or `SunPaste` keysyms (see [patch #227](#)) to use the standard shift/lock modifiers in case those are, for example, used in level 3 in an XKB file (patch by Matthieu Herrb).
- configure macro updates:
 - drop the `-no-gcc` option from `CF_INTEL_COMPILER`
 - modify `CF_XOPEN_SOURCE` to suppress the check for defining `_XOPEN_SOURCE` on Solaris

- reduce bss storage used for ReGIS/Sixel modules, as well as cleanup storage usage in other modules.
- initial changes for ReGIS support (Ross Combs):
 - document control-sequences
 - separate ifdef's for sixel and color-register features
 - add configuration for VT382

Patch #303 - 2014/03/06

- improve check for `/etc/shells` to allow its entries to be symbolic links.
- fix a regression in [patch #302](#) fixes relating to interaction of SHELL and XTERM_SHELL variables (Debian [#740919](#)).
- improve manpage discussion of use of `/etc/shells` for validating the SHELL environment variable.
- further improve the approximation for color map by ignoring bits which would not be applied by the rgb masks for the current visual (report by Joe Peterson).
- add `-report-colors` to usage-message (report by Joe Peterson).

Patch #302 - 2014/03/02

- amend approximation for color map introduced in [patch #277](#) to make that apply only to TrueColor (adapted from patch by Joe Peterson).
- add `-report-colors` option, to show colors as they are allocated.
- fix some gcc `-Wcast-qual` warnings.
- correct app-defaults location for CentOS-4 in `xterm.spec`
- improve check in `minstall.sh` for X manpage's section number; add sample dependencies for the relevant documentation package to packaging test-scripts (prompted by Novell [#779474](#)).
- modify sample build-scripts for dpkg and rpm to ensure that `vttests` scripts are uncompressed and executable.
- modify Perl scripts in `vttests` to use `env` to find Perl rather than relying on `/usr/bin/perl` This makes the sample scripts usable with NetBSD and other systems using `pkgsrc`.
- amend check from [patch #301](#) for valid shell to permit existing SHELL value to specify the shell; clarify the behavior in the manpage (report by Emmanuel Thomé).
- amend change to wide-character processing from [patch #257](#) to allow switching to/from UTF-8 encoding if the `utf8` resource was not set to "always" (report by Honza Maly).
- fix incorrect free from [patch #301](#) changes, if explicit program without `-e` option is a valid shell (patch by Romain Francoise).

Patch #301 - 2014/01/19

- OSC 104 and 105 did not accept parameter to reset a specific color (patch by Egmont Koblinger).
- add configure check for `initgroups`, and use that function to complement its use of `setgid` (prompted by patch by Miroslav Lichvar).
- improve manpage description of scrollbar translations versus the vt100 translations (Debian [#723573](#)).
- add a few paragraphs to manpage explaining the implications of xterm's reliance on X Toolkit for command-line parsing.
- modify cursor-theme logic to check if the environment variable `XCURSOR_THEME` is set to a nonempty value before constructing a dummy them (prompted by similar check added in OpenBSD CVS).
- add check for a case where TrueType bold font is missing a glyph where the non-bold font has it. Temporarily switch to the non-bold font to draw the glyph (report by David Demelier).
- minor documentation fixes for `ctlseqs.ms`
- only set SHELL environment variable to programs found in `/etc/shells` (prompted by patch/report by Al Poole).

- build-fix, when `--disable-wide-chars --disable-boxchar` is used (prompted by patch by Andrey Panov).

Patch #300 - 2013/12/03

- amend workaround for Xcursor library from [patch #298](#); the suggested solution for Debian [#466704](#) fell afoul of a bug in Xcursor which treated an empty value for `Inherits=` as a valid theme—and resulted in a stack overflow due to unbounded recursion. Certain environments such as XFCE4 exposed the bug. A related report in Debian [#531679](#) was closed without following the recommendation to limit stack recursion in this library (reported by Sergey V Dyatko, Debian [#731269](#)).

Patch #299 - 2013/12/01

- fix regression in line-drawing from [patch #297](#) changes for NRCS exposed by change to `assumeAllChars` resource in [patch #298](#) (report by Markus Waldeck).

Patch #298 - 2013/11/27

- quiet a warning about ambiguity when `-h` command-line option is parsed, since `-help` is used rather than the options mentioned in the message. This warning was caused by fixes in [patch #272](#).
- remove an extra check for keypad-mode which interfered with the [patch #280](#) `modifyKeyboard` feature for the numeric keypad (report by David Conners).
- change default for `assumeAllChars` resource (Debian [#725682](#)). There are unresolved issues with Terminus fonts, e.g., Debian [#722017](#).
- add `-report-fonts` command-line option and `reportFonts` resource to optionally report the fonts which are loaded, and their metrics such as the number of missing glyphs.
- work around Xcursor library to make `pointerColor` resource work as documented (Debian [#466704](#), analysis by Vincent Lefèvre).
- amend change from [patch #297](#) for ASCII-equivalents to ensure that missing characters which happen to be double-width are padded to the expected number of columns. Also, correct the choice between normal/wide Xft fonts used when checking for missing characters (reported by WU Yue, Debian [#728949](#), Gentoo [#491334](#)).
- modify sixel-graphics drawing to account for scrollbar width (report by Mario Edelmann).
- fix remaining issue with DECNRCM; the British character set was confused with ISO Latin-1 (report by Hayaki Saito).
- build-fix for `--disable-boxchars` configure option.
- updated configure macros, from ongoing work on lynx and ncurses.
- update `config.guess`, `config.sub`

Patch #297 - 2013/09/10

- modify check for missing cells in bitmap font to work around terminus 10646 encoding, which is mostly missing, add `assumeAllChars` resource to provide the older behavior.
- modify macros used to check for missing cells in bitmap fonts to pick up a long-overlooked improvement made to `xfd` in XFree86.
- improve workaround for groff versus ASCII-equivalents; [patch #185](#) had overlooked Xft configuration (reported by anonymous user on Arch Linux forum).
- review/extend DECNRCM support (prompted by report by Hayaki Saito asking about the two "A" codes).
 - make pasting of DECNRCM data work by translating the pasted data into the selected encoding.
 - limit mode changes to VT220 and up.

- ignore SCS for National Replacement Characters if DECNRCM is not set.
- add tables and logic to decode SCS controls ending with "%" and one additional character. This expects the parsing of SCS to VT320.
- also added parsing for SCS of DEC Supplemental and DEC Technical, which are for VT2xx and VT3xx respectively.
- implement VT220 Multinational character set "GR" aka "DEC Supplemental Graphic".
- DEC Technical character set based on [vt100.net description](#).
- implement Portuguese NRC.
- provide for temporarily switching to/from NRC mode from UTF-8 mode when DECNRCM is set or reset.
- minor fix to assert's found while testing examples from [ttdoda's slrm-test1.txt](#).
- modify DECLRMM to not update the cursor position (report by Iwamoto Kouichi forwarded by Hayaki Saito).
- modify cursor-position report to take origin-mode into account (report by Hayaki Saito, see also [iTerm2 pull request 129](#)).
- correct off-by-one comparison in when handling carriage-return at left margin (patch by Iwamoto Kouichi, forwarded by Hayaki Saito).
- improve handling of faceName resource when a "size=" property is embedded in it, by using that size to replace the default faceSize resource. This lets xterm honor the other faceSize resources (report by Jens Schweikhardt).
- improve OSC 52 selection-data by setting its timestamp to correspond to the most-recent event received by xterm, to ensure that calls to XtOwnSelect succeed even if the selection is manipulated solely through the keyboard (prompted by patch by Richard Tollerton).
- change configure-script defaults for "luit" and "wide-chars" options to match the values used in the imake configuration, to lessen user surprise if they are accustomed to building xterm using imake (report by Andries E Brouwer).
- improve the imake-related configuration's check if xterm is started in a locale that uses UTF-8 encoding. Before, this checked the locale settings only for "UTF-8", now it checks ignoring case for "UTF-8" and "utf-8" (report by Andries E Brouwer).

Patch #296 - 2013/07/10

- improve experimental sixel feature (Ross Combs).
- modify delimiter in configure macro used to add a library after a given library to avoid confusion with -Wl pass-through options to linker (NetBSD [#48031](#)).
- fix quoting in expression used to trim extra libraries from [patch #295](#) changes (report by Thomas Klausner).

Patch #295 - 2013/07/06

- adjust order of libraries to work around incomplete symbol resolution when using --as-needed option (ArchLinux [#36047](#)).
- minor fix for plink.sh, for IRIX64.

Patch #294 - 2013/07/05

- add note in ctlseqs.ms for CPR response pointing out a potential point of confusion with the string sent by a modified F1 key (suggested by Bram Moolenaar).
- improve plink.sh by checking if the linker supports the --as-needed option (suggested by David Philippi).
- improve clearing for private mode 1049 when switching to the alternate screen (Debian [#711758](#)).

- amend fix from [patch #292](#) by removing now-unneeded chunk which introduced problem in selection (Debian [#714527](#)).
- add definition to optionally override compiled-in class for xterm from makefile, needed for test-packages.
- add configure option `--enable-sixel-graphics`
- add experimental support for sixel graphics (Ross Combs).

Patch #293 - 2013/05/27

- modify sample xterm.spec to use newer icon
- add configure option `--with-icon-symlink` to work around systems which map icon requests for to a single "xterm" icon, but neglect to install the icon needed for window decorations (report by H Merijn Brand).
- improve parameterizing of sample xterm.spec
- amend fix for printer from [patch #280](#), removing a reset of the signal handler for SIGCHLD (report by Joe Julian).
- set environment variable XTERM_FILTER if a locale-filter is used.
- enable DEBUG logic when `--enable-trace` configure option is given.
- improve description of `initialFont`, `set-vt-font` and `set-tex-text` in manpage (Debian [#707899](#)).
- fix regression from [patch #292](#); selecting a word that ended at the right margin without wrapping would not select the last cell (report by Christian Weisgerber).

Patch #292 - 2013/04/25

- add limit-check when double-click selects a word; if the saved-lines were scrolled back and the word selected wrapped at the screen's lower right corner, an assertion was triggered (patch by Taketo Kabe).
- correct limit-check in `unsaveEditBufLines`, fixing a case where enlarging the terminal size could show a blank line where there actually is available text (patch by Bertram Felgenhauer).
- add `PasteControls` feature to `allowWindowOps` which by default disallows pasting control characters other than formatting such as carriage return (discussion with Hayaki Saito).
- fix typo in `ctlseqs.ms` for DECRCQM response (patch by Emanuele Giaquinta).
- update default shown in configure `--help` message for `--with-terminal-id` option (patch by Andres Perera).
- rename script/preprocessor variables used for substituting the `backarrowKey` default value for consistency (patch by Andres Perera).
- set `umask` to 077 before creating debugging-trace files.
- add configure option `--disable-openpty` to control whether `openpty()` may be used in preference to `posix_openpty()`.
- improve workaround from [patch #279](#) for BSD systems which do not complete initialization until both sides of the pseudoterminal are opened, by preferring `openpty()` function over `posix_openpty()` when available (report by Christian Weisgerber).

Patch #291 - 2013/02/26

- add validity check for xterm widget parameter to `AlternateScroll` function, needed to handle wheel mouse events in the scrollbar area since [patch #282](#) changes which introduced `alternateScroll` feature (Redhat [#874327](#)).

Patch #290 - 2013/02/12

- revert of [patch #282](#) change was incomplete (report by Jim Reisert).
- fix typo in manpage (report by Vincent Lefèvre).

Patch #289 - 2013/02/08

- revert the [patch #282](#) change which restored "lost" text after shrinking/growing the screen size. If the screen was updated between the two resizing operations, unexpected text might be shown at the end (report/testcase by Joe Peterson).
- reverse the arrow-keys sent for `alternateScroll` to match the usage in browsers (suggested by Dieter Roelants).
- modify mouse reports to consistently indicate motion events whether or not a button is pressed. Old behavior (since [patch #127](#) modified encoding for wheel mouse) showed only that the button was released if no button had been pressed (report by Andy Koppe).
- correct and improve behavior for SGR 1006 mouse protocol on button release in any-event mode. Initial implementation in [patch #277](#) left internal state showing the last button pressed when reporting motion events. It now keeps track of all buttons which have been pressed and released, showing the lowest remaining button by number in the response (reports by Hayaki Saito, Andy Koppe).
- fix inconsistency between `TermColors` and `OscTextColors` enums which interchanged values for tektronix cursor color and highlight foreground in control sequences in [patch #225](#) (report/patch by Peder Stray).
- fix inconsistent use of `noreturn`-attribute in `Exit` function which interfered with `clang --analyze`.
- remove incorrect `free` used in computation of `XTERM_SHELL` variable, from Coverity fixes in [patch #288](#) (FreeBSD [#175782](#)).
- add `--with-valgrind` option to configure script for consistency with my other programs.
- update table of ambiguous width characters in `wcwidth.c` based on Unicode 6.2.0
- update table of combining characters in `wcwidth.c` based on Unicode 6.2.0
- update `precompose.c` based on Unicode 6.2.0

Patch #288 - 2013/01/09

- fix a special case in `ShowCursor` where the foreground and background colors of the current position are the same. In that case, choose the further of the window's foreground and background colors for the cursor color.
- modify `alternateScroll` feature added in [patch #282](#) to use either CSI or SS3 according to the cursor keys application mode setting, to simplify using it in vi, etc. (suggested by Diatar Roelants).
- revise manpage for `resize` to clarify the changes which `resize` may make to the terminal settings as well as to the terminal itself.
- remove code such as `struct tysize`, used for SunOS 3 and 4.
- modify configure script and makefile to check for `groff` and suppress `groff`-specific rules if `groff` is not found.
- modify `ctlseqs.ms` and makefile to work around bugs in `grohtml` which cause ".png" files to be truncated when producing html documentation.
- modify suffix rules for "make docs" to make the names of the generated ".png" files predictable, helping to work around longstanding problems with this feature of `groff`—none of its releases work for *all* of `xterm`'s tables..
- correct typo in `ctlseqs.ms` for DECIC and DECDC; the character preceding the final "~" is an ASCII single-quote "'" rather than a space (report by Paul LeoNerd Evans).
- update `CF_GCC_VERSION` macro, handling both Debian and Darwin.
- improve configure script checks for the `--with-desktop-category` option. After [patch #280](#) changes, if no value was given for this option, and no existing desktop files found for comparison, the incorrect "auto" value was passed into the generated desktop file (report by Julien Cristau).
- modify sample build-scripts to disable check for `imake` due to code-rot in Xorg.

- add `-v` command-line option to `resize`, reporting the same version string as `xterm` and the two shell-wrappers.
- make name-transformation apply to other occurrences of `resize`, other manpages.
- special-case the name-transformation in `xterm`'s manpage in the `NAME` section so that the result works with `makewhatis` (report by Julien Cristau).
- modify install-rules for manpages to put each program's respective transformed name into the header rather than `xterm`'s.
- remove deprecated files: `proto.h`, `os2main.c`
- minor fixes based on Coverity scan, including:
 - correct caching of `Atom` value for the font menu's "Selection" entry.
 - ensure that `utmp/utmpx` calls do not depend upon trailing nulls in the `ut_id` and `ut_line` values.

Patch #287 - 2012/11/25

- fix a case where `in_put()` loop could continue when it has found an X event rather than the pty, causing the pty-read to be delayed (patch by Balazs Kezes).
- add option to `pointerMode` resource and corresponding control sequences to allow text-cursor to remain hidden if the pointer leaves/enters the window via accelerator keys. Ordinary motion within the window restores the pointer (prompted by patch by Balazs Kezes).
- remove special case of modifiers for the `Mode_switch` and `XK_ISO_Level3_Shift` from [patch #223](#). Verified that the conflict which this was intended to resolve does not happen for normal compose- or modeswitch-handling (prompted by patch by Balazs Kezes, Debian [#638694](#)).
- modify the handling of focus-change events to ignore those whose detail is `NotifyPointer`, since those are sent in addition to focus-change events directed to the old/new windows having focus. In particular, this prevents the urgency-hint from being reset inadvertently (prompted by patch by Balazs Kezes).
- modify description of `iconName` in manpage to make it clearer that this resource does not specify the filename of an icon (discussion with Ian Collier).
- modify `iconHint` resource to allow suppressing the built-in icon by setting this to "none" (discussion with Ian Collier).
- make `-i` option work with the toolbar configuration.
- correct initialization of window manager hints used to set the icon-pixmap. That detail from [patch #282](#) overwrote state used to control the `-i` command-line option (report by Ian Collier).
- fix `paste64` feature for the case where the selection comes from the current terminal. The selection callback can happen after the reply is partly built, making it necessary to flush the reply-buffer to keep things in the proper order (report by Ailin Nemui).
- reject command-line options which are longer than the options in `xterm`'s table, to avoid mismatches (Redhat [#875305](#)).
- correct attribution for [patch #282](#) changes.

Patch #286 - 2012/10/29

- fix `install.in` to work with "make docs" rule, so that patch number appears in the corresponding generated documentation.
- modify `install.in` to keep the name shown in the heading consistent with any renaming, e.g., for test-builds.
- check for misconfigured `printerCommand` resource on the first use, warn and disable it if it does not specify an executable command (Debian [#691642](#)).
- improve check for window-manager name needed to establish usable default for `activeIcon` resource. This works around a scenario where `gdm` does incomplete cleanup, leaving window properties that refer to windows which no longer exist (Redhat [#869959](#)).

Patch #285 - 2012/10/23

- add/adapt FreeBSD ports files for test-building.
- modify `install.sh` to use the patch-number and date in the manpage footer.
- add check for failure to allocate the fg/bg colors at startup, e.g., misconfiguration. Work around by setting both to the default colors (suggested by Scott Bertilson).
- amend change for [patch #280](#) which added `modifyKeyboard`, to make `modifyOtherKeys` work (report by Ailin Nemui).
- add `query-colors.pl` example for OSC 4.
- correct mis-applied fix for `install.sh` (report by Miroslav Lichvar).

Patch #284 - 2012/10/14

- amend configurability changes for icons from [patch #283](#), moving the new functionality to the `iconHint` resource to avoid conflict with existing uses of the `iconName` resource in the `Shell` widget (report by Emanuel Haupt).
- fix documentation errata reported by Miroslav Lichvar:
 - correct manpage default for `allowTcapOps` (see [patch #243](#))
 - modify documentation for `configure --enable-backarrow-key` to match the script (see [patch #280](#)).
 - fix typo in `install.sh` in [patch #283](#), which made the leading-cap "Xterm" become "xterm" (patch by Miroslav).
- fix two typos in `configure.in` from [patch #283](#) changes; one broke the `--regex` `configure` option (report by H Merijn Brand).

Patch #283 - 2012/10/09

- modify makefile and script to generate appropriate renaming `s/xterm/xterm-dev/` for test-package's manpage.
- improve makefile rules for installing/uninstalling pixmap files, to include the newer mini- and filled-variants.
- clarify change in manpage regarding [patch #282](#) change to always set a window-decoration icon, even if `iconName` is not set.
- add a fourth flavor of window-decoration icons, "filled-xterm" for a monochrome xterm with filled interior.
- use `shape-mask` to improve contrast of the window-decoration icons.
- minor changes to icon colors to improve contrast on bright-mud backgrounds.
- drop `configure` checks for `memmove` versus `bcopy`, and `sterror` function; all currently tested platforms support these.
- cleanup `configure` macros, as done in byacc 20121003.
- improve configurability of the built-in icon selectable via the `iconName` resource.
- update `config.guess`, `config.sub`

Patch #282 - 2012/09/28

- improve `configure` check for `XkbKeycodeToKeysym`, fixing a regression on some older systems in the [patch #280](#) changes.
- add clarification in manpage for `alwaysBoldMode` and `veryBoldColors` resources (prompted by Derek Martin question about using the former with TrueType fonts).

- add `alternateScroll` resource and corresponding control sequences which modify the `scroll-forward` and `scroll-back` actions: when the alternate screen is displayed, wheel mouse up/down will send cursor keys (Debian [#683942](#)).
- improve rendering for the case when a Unicode character is absent in the bold font but present in the normal font by temporarily falling back to the normal font (Debian [#359006](#), Debian [#408666](#)).
- provide configure option `--enable-double-buffer` and `ifdef`'s to allow comparisons with/without double-buffering. The default uses normal buffering.
- add feature to optionally scroll current page before clearing, controlled by resource setting `cdXtraScroll` (prompted by patch by Balazs Kezes):
- integrated patches from Arch Linux forum posting (patches by Balazs Kezes):
 - modify reallocation limit of line-data when resizing screen so that "lost" text will be restored if the screen is first shrunk and then grown.
 - modify output to use double-buffering to reduce flicker.
- modify `scroll-lock` action to handle `on/off/toggle` keywords like other actions. Previously the optional parameter was interpreted as an integer.
- extend `DECSCUSR` to provide a way to set the cursor to a vertical bar (patch by Paul Bolle).
- add `-8`, `-c`, `-d` and `-u` options to `88colors2.pl` and `256colors2.pl` scripts. No current terminal emulator recognizes C1 controls while handling UTF-8 encoding—see notes in [patch #119](#) and [patch #109](#) regarding `utf8controls`—but the `-u` and `-8` options are useful for demonstrating this point.
- improve speed when changing color palettes using OSC controls by deferring repaint while followup controls might be additional color palette changes.
- modify `SGR 38` and `SGR 48` to accept RGB index, matching the closest entry in xterm's palette.
- extend `SGR 38` and `SGR 48` to accept colon as parameter separator (request by Paul LeoNerd Evans).
- modify `fullscreen` action to allow it to toggle the full-screen mode rather than only set or unset it (prompted by Eeri Kask's suggestion to support `_NET_WM_TOGGLE`). This implementation does not yet use `_NET_WM_TOGGLE`.
- add support for `_NET_WM_STATE_MAXIMIZED_VERT` and `_NET_WM_STATE_MAXIMIZED_HORZ` EWMH properties (suggested by Eeri Kask).
- make fullscreen mode work with the tek4014 window. This change makes only the currently active window to be changed to fullscreen rather than changing both windows.
- modify `TekClear` function to discard pending output before clearing the tek4014 display (patch by Kevin Ryde).
- fix `deleteISDEL` feature, broken in [patch #280](#) changes (report by Mike Thornburg, forwarded by Jeremy Huddleston).
- fix a special case of wrapping double-width characters (report/test-case by Ken Winstein).
- add E3 extended capability to `xterm-basic` to match ncurses [20120728](#) patch.
- fix incorrect transformation of row-parameter for `ClearCurBackground` in [patch #279](#) which caused incorrect painting in some scrolling scenarios (report by Chuck Silvers).
- fix typo in manpage description of `+maximized` option (Paul Maier).
- change default for configure option `--with-xpm`, turning it on unless requested otherwise.
- add configure option `--with-icon-name` which can be used to override the default icon used in icon-themes.
- extend `activeIcon` resource to provide `default` value which tells xterm to determine the window manager's name and automatically enable the feature for fvwm and window maker. The explicit true/false values can be used to override this behavior.
- add "mini" xterm icon, which scales better than the standard xterm icon, e.g., for the gnome/kde "panel" feature.
- extend `iconName` resource to search for icon named according to resource value and use that if found. If not found, use compiled-in pixmap. Both set the `WM_ICON_NAME` property which is used by various window managers, usually for window decoration.
- updated autoconf patch, adding support for `--datarootdir`, which changes the default location of manpages.
- further improved autoconf macros for configuring icons, from vile 9.8h

Patch #281 - 2012/06/26

- remove "\$(srcdir)/" from install-icon rule to fix builds when --srcdir configuration option is used.
- fix for configure script's search for icon file when it is not found in the current directory, e.g., when building out of tree (patch by Thierry Reding).
- undo the XK_Home / XK_End change from [patch #280](#) which broke the non-VT220 keyboard for those keys (report by H Merijn Brand).

Patch #280 - 2012/06/24

- add configure check to work around warning from desktop-file-install for "Encoding", noting that it emits deprecation warnings without providing its version information.
- add configure option `--with-icon-theme` to tell xterm whether to install into an icon theme, defaulting to "hicolor" (Redhat [#755206](#), Redhat [#799614](#) and Redhat [#804279](#)).
- change `--with-icondir` to look for "icons" directory rather than "pixmap" by default. Add new option `--with-pixmapdir` to allow these two uses to be installed concurrently.
- modify configure options `--with-app-defaults` and `--with-icondir` to accept "auto" as value to look for existing directory from well-known locations.
- add missing codes for secondary DA response which tell the type of terminal as in the primary DA response.
- update primary DA response for VT420 to include user windows and horizontal scrolling.
- add `modifyKeyboard` resource to support keypad-modifier changes per request by Thomas Wolff.
- add XK_Home / XK_End to editing-keypad checks
- add back-tab key kB to termcap entries to match the terminfo.
- update terminfo to match corresponding entries in ncurses, e.g., add XT and adjust sgr string for xterm-bold entry.
- add configure options to predefine the most commonly customized resources for terminal-settings, use those to substitute into the manpage the corresponding compiled-in values: `altSendsEscape`, `backarrowKey`, `backarrowKeyIsErase`, `deleteIsDEL`, `metaSendsEscape` (Redhat [#819588](#)).
- change default emulation level to VT420 (discussion with Ailin Nemui).
- improve logic for DECSC; [patch 279](#) partly enforced limitation of this to higher-level emulations. This patch finishes that change.
- improve check for base of combining characters, preventing combination when cursor movement has intervened. Mosh's webpage gives two different examples of this, with other causes ascribed to the behavior.
- modify IL/DL to set cursor to first column on row for better VT102/VT220 compatibility (prompted by code review of mosh).
- separate state-table entries for DECSC/DECRC from the ANSI.SYS save/restore cursor, since the latter conflicts with DECSLRM when DECLRMM is enabled since [patch #279](#) (report/analysis by Ailin Nemui).
- fixes to avoid using SIGCHLD handler of main program in printer's subprocess (report by Joe Julian).
- correct restore-parameter for mouse-modes from [patch #279](#) changes.
- add null-pointer checks to input-method caching added in [patch #277](#) to fix a problem in the exposure code, when deselecting a window (report by Kriston Rehberg).
- unset `DESKTOP_STARTUP_ID` environment variable to lessen confusion on the part of GTK applications which use the variable without checking it (report by John Little).

Patch #279 - 2012/05/10

- fill in missing cases in the save/restore modes feature (report by Thomas Wolff).

- add check to ensure that combining characters are precomposed in the order given (report/analysis by Andries E Brouwer).
- improve workability check for `posix_openpt()`, to take into account BSD systems which do not complete initialization until both sides of the pseudoterminal are opened (report by Christian Weisgerber).
- amend fix for Debian [#650291](#) in [patch #277](#) changes to account for different data returned by `vnc4server` (Debian [#670638](#)).
- add check in DECCRA operation to make copies of blinking text also blink by updating a line-level flag.
- modify rectangle operations to work with DECOM.
- modify DECSERA to use the current protected state rather than preserving it.
- add `precompose` resource to allow storing character data in Normalized Form D as described in <http://unicode.org/reports/tr15/> (report/discussion with Andries E Brouwer).
- modify CBT, other ISO-6429 controls which are used by VT520 to work with DECOM.
- add HPR and VPR controls, ISO 6429 cursor movement used in VT520.
- remove "linux" restriction for IUTF8 ifdef in `main.c` (prompted by Matthew Dempsky posting on mailing.openbsd.tech).
- implement the remaining VT420-level device status reports.
- change `DECXCPR` to return page 1, rather than 0.
- improve VT-level checks on reporting functions, such as `DECXCPR`.
- change limit on `decTerminalID` to 525.
- fixes to improve `vttest vt52` screen when running as a VT420:
 - add checks for some VT2xx and up controls for consistency: `DECSCSL`, `S1C8T`, `S1C7T`.
 - modify `DECQRSS` return for `DECSCSL` to only return that when running as VT2xx and up.
 - when exiting from VT52-mode, resume in VT100 level rather than the level before starting VT52-mode.
- implement `DECLRMM`, `DECCLRMM` and `DECNCMSM` (prompted by discussions with Ailin Nemui and Paul LeoNerd Evans). This modifies several controls to obey top/bottom and left/right margins.
- correct macro definition used for testing modes used in ANSI/DEC request-mode controls introduced in [patch #262](#).
- modify `x_getlogin` to check `$LOGNAME` and `$USER` before fallback to `getlogin`, so that user's choice for these variables can be carried forward to the xterm process (Debian [#611487](#)).
- document `DECSCUSR` response for `DECQRSS` in `ctlseqs.ms`
- add `ZIconTitleFormat` resource to allow customizing the "**** " prefixed to the icon title when the `ZIconBeep` feature is activated (request by Thomas Adam).
- modify `DECSCUSR` to update the same internal variable as `RM/SM 12`, and document in `manpage` the two variables used for controlling blinking cursor (report by Paul LeoNerd Evans).
- correct response data for `DECSCUSR` in reply for `DECQRSS` response, which had inverted the blink-value (reports by Ailin Nemui, Paul LeoNerd Evans).
- add a null-pointer check in `OkPasswd` macro to fix a problem in `resize` with Fedora 17 and a serial console (report/patch by Daniel Drake).
- add workaround for Mac OS X, which loses the window size of a pseudo-terminal when the tty device is opened (report/analysis by Egmont Koblinger).
- updated configure check for workable `posix_openpt` versus `grantpt`, from `luit` fixes.
- modify `DECIC/DECDC/DECBI/DECFI` implemented in [patch #277](#) to enable them only in VT4xx mode and up (report by Ailin Nemui).
- update `config.guess`, `config.sub`

Patch #278 - 2012/01/18

- correct initialization for `eightBitMeta` resource (FreeBSD [#164101](#)).
- make special check for Darwin 9 (and lower) to *not* use `posix_openpt` (report by Christian Ebert).
- minor fixes (adding ".ne" directives) to reduce the cases where `groff`'s utility for generating images for tables dumps core. Most versions of `groff` (I've found 1.19.2 to be the most stable) dump core when attempting to report that there are too few lines on a page for a table to be shown.

Patch #277 - 2012/01/07

- remove special case for ISC pseudo-terminals which attempts to open the pty in two different ways.
- move call to `grantpt` before asking `utempter` to add a record, to work with `kFreeBSD` which does not update the terminal's ownership until this point (Debian [#652907](#)).
- document limitation of XIM interface in manpage (Debian [#230787](#)).
- cleanup error reporting with new `xtermWarning` function.
- add configure option `--disable-selection-ops` to make the new actions optional.
- add four new actions for making the selection or data directly copied from the screen (prompted by discussion in Debian [#637001](#), as well as report by Arjen van Tol):
 - `exec-formatted`
 - `exec-selectable`
 - `insert-formatted`
 - `insert-selectable`
- add `visualBellLine` resource to allow `visualBell` to flash only the current line (prompted by patch by Gertjan Halkes).
- add `eightBitMeta` resource to control the features which modify or interpret the eighth bit of a key when the meta modifier key is pressed (prompted by Debian [#326200](#)).
- improve discussion of `eightBitInput` in the manpage (prompted by Debian [#326200](#)).
- correct logic for `alt-sends-escape` action, overlooked when implementing `altSendsEscape` resource, which still used `eightBitInput` resource value.
- add a workaround for `XAllocColor()`, which does not actually allocate "a read-only colormap entry corresponding to the closest RGB value supported by the hardware", but rather a rough approximation (Debian [#650291](#)).
- undo parameter checks for `RequestResize()` added in [patch #251](#) and amended in [patch #270](#), because zeros also are special cases (report by John S Urban).
- modify some test-scripts to use `/bin/echo` rather than the shell's possibly-builtin `echo`, to work around broken configuration on Mac OS X, i.e., neither honoring the option nor flagging an error.
- add SGR 1006, as a better technical solution than SGR 1015:
 - the responses will not be confused with line-deletion and scrolling controls.
 - the button encoding is a little simpler, since it does not add an unnecessary 32 because the integer parameter does not have to be represented as a printable character.
 - the control responses for pressing and releasing a mouse button differ, allowing an application to tell which button was released.

Besides these improvements, in discussion, it was noted that `urxvt`'s implementation of 1005 is incorrect, relying upon a locale that provides UTF-8 encoding. In contrast, `vttest` demonstrates a correct decoding, independent of locale.

- add support for `urxvt` SGR 1015 to address shortcoming of SGR 1005 with `luit` (patch by Egmont Koblinger).
- add ISO and DEC controls useful for left/right scrolling.
- add some changes for OpenBSD and MirBSD (adapted from patch by Thorsten Glaser):
 - disable search for non-Unix96 ptys.
 - fix a gcc warning in `timestamp_filename`
 - modify `Imakefile` to install `xterm` `setgid` to `utmp`.
- add/use/prefer `posix_openpt()` for opening pseudo-terminal.
- modify special `errno` handling case in `ptydata.c` from [patch #158](#) to allow for the possibility that any platform may have special cases where `"/dev/tty"` is absent. For example, this can happen in a FreeBSD jail (patch by David Wolfskill).
- add keyboard logic to map shift-tab into `XK_ISO_Left_Tab`, which is usually, not always, done by the X keyboard configuration.
- portability fixes for some configure macros: `CF_XOPEN_SOURCE`

Patch #276 - 2011/10/10

- modify clipping limits for TrueType fonts to account for the `scaleHeight` resource setting, to work around another problem due to recent FreeType changes. In this case, the `DejaVu Sans Mono` set to `pixelsize=13.5` is truncated because the font descent is reduced by FreeType to match an incorrect height metric (report by Adam Lee).
- improve recovery when bitmap fonts are not installed, e.g., so that switching font-sizes works for TrueType fonts.
- modify lookup for `XTERM_SHELL` feature to allow relative pathnames.
- modify abbreviation disambiguation check for command-line parameters to account for `-geometry`, whose parameter may begin with "+" or "-" (report by Scott Bertilson).

Patch #275 - 2011/09/11

- add `ash`, `zsh` to known shells for `resize`.
- modify `resize` to reuse the logic from `xterm` which determines the actual logon-user's shell if `$SHELL` is not set.
- revert the `unsetenv("SHELL")` added in [patch #272](#).
- an `unsetenv("SHELL")` added in [patch #272](#) to help ensure that `luit` would get the user's shell consistently did not work as expected for cases where multiple names are in the password-file for a given uid. That was because changes in [patch #157](#) to handle this situation did not take into account that repeated calls to `getpwnam` and `getpwuid` return a pointer to the same static buffer. Fixed the older logic to work as intended, by ensuring that the passwd-data from each call is stored separately (report by Paul Keusemann).
- adjust `ifdef's` for `putenv` and `unsetenv` in case only one of those is provided on a given platform.
- correct comparison used in `ExposeContains` macro from [patch #274](#) changes, to handle window-dragging (patch by Todd Eigenschink).

Patch #274 - 2011/09/05

- portability fixes for cygwin: do not define `SVR4`, and work around nonstandard header location.
- `ifdef'd` use of `unsetenv` from [patch #273](#) changes to work with Solaris 9 (report by Waldemar Rachwal).
- modify logic for `XtAppPending` to merge adjacent `Expose` and `ConfigureNotify` events which are redundant (report by Edward McGuire).
- fix an unneeded warning message when `-r` option is given.
- remove a few redundant entries from table used for helping abbreviation-checking of command-line options, makes `-geom` work again after [patch #272](#) changes as an abbreviation of `-geometry`.
- add `scaleHeight` resource and command-line option `-sh` as workaround for some font-configurations broken by changes in FreeType 2.4.6 (report by Miroslav Hodak).
- portability fixes for some configure macros: `CF_FUNC_TGETENT`, `CF_XOPEN_SOURCE`, `CF_X_ATHENA_LIBS`.
- add configure option `--with-freetype-config` to improve selection over the plethora of configuration options which freetype has so far provided.
- build-fix for configure `--enable-load-vt-fonts` when `--enable-widec` is not specified.
- build-fixes for suppressing various features, needed after changes in patches 270, 271 and 272 (report by Brian Lindholm)

Patch #273 - 2011/08/25

- build-fix for out-of-tree "make docs" rule.

- correct a typo in `x_strdup`, from [patch #198](#) changes.
- correct initialization for `-e` option, broken in [patch #272](#) changes (report by Gabriele Balducci).
- build-fix for out-of-tree builds to address `install` script changes in [patch #272](#) (patch by Thierry Reding).

Patch #272 - 2011/08/24

- document limitation of `Gtk` in connection with `xterm`'s `-into` option, in the manpage (Ubuntu [#806969](#)).
- improve `-into` by checking for and using the size of the window within which `xterm` is embedded, overriding other clues.
- modify logic for `localeFilter` resource to allow that to include command-line options of `luit`.
- improve `-into` by checking for invalid window-id, and allowing hexadecimal/decimal/octal values.
- improve `keepSelection`, adding the case where the highlighting is cleared, overlooked in [patch #230](#) (patch by Marco Peereboom).
- improve command-line parsing to make abbreviate options work consistently across `xterm`-specific versus standard X toolkit options, and report cases where an abbreviated option happens to be ambiguous. In particular, `-d` now works as an abbreviation for `-display`.
- fix regression in command-line parsing introduced in [patch #271](#) changes for Debian [#629358](#), (Debian [#637910](#)).
- split-out new termcap/terminfo building block `xterm+kbs` for configurability.
- modify `terminfo` file to reflect changes in `ncurses` for `xterm-16color` and `xterm-256color`.
- modify `install.sh`, etc., to reflect the default default class, `$TERM` and `deCTerminalID` values.
- reword `resize` manpage to reflect the fact that `$TERMCAP` is not set on all systems (patch by Alan Coopersmith).
- work around combined `Xaw6/Xaw7` package in `DragonFlyBSD` which omits the usual symbolic link to the preferred library name.
- further improve build-fix for termcap systems by checking for some which are only partial implementations, e.g., termcap 2.08 in CentOS 5.2

Patch #271 - 2011/07/14

- omit permissions adjustments to `pty` on exit except for pre-Unix98 `ptys`, since modern implementations handle this (report by Sean C Farley).
- modify logic for switching fonts between UTF-8 and non-UTF-8 encoding to not merge the derivable bold-, wide- and widebold values from the VT100 fonts. Also suppress warning when not using UTF-8 fonts if wide- and widebold-fonts cannot be derived or otherwise loaded (report by Werner Scheinast).
- modify menu-creation to suppress entries which will never be used in the current configuration, rather than simply disabling them.
- add resource `printModeImmediate` and menu item to allow print of screen plus saved lines to a file.
- add menu item to allow runtime enable/disable of the `printFileOnXError` feature.
- append a timestamp to filename used in `printFileOnXError` feature, and restrict its permissions (request by Vincent Lefèvre).
- add a check when cancelling cursor-blinking, in case the cursor is blinked off. Fix so that the cursor is repainted without waiting for other events, e.g., keypress (report by Ailin Nemui).
- add configure `--with-app-class` option, to simplify building "xterm-dev" packages with filenames that do not conflict with conventional "xterm" packages.
- corrected logic flow for `DECSCCL`, which prevented the updated operating level from being reported via `DECRQSS` (report by Ailin Nemui).
- corrected default for `brokenStringTerm` resource to match manpage.
- add `vttests/dynamic.pl`
- add runtime check for locale not supported by X libraries, and fallback to `XA_STRING` in this case (request by Bryan Henderson).

- fix a special case in configure script after no FreeType libraries are found. The script was proceeding to check for a usable configuration.
- add `xterm+tmux` building block to `terminfo` (adapted from changes proposed by Ailin Nemui and Nicholas Marriott).
- improve discussion of `faceName` resource in manpage (adapted from suggestions by Jens Schweikhardt).
- correct mapping of shifted up/down cursor-keys in `termcap` function-keys mode, i.e., resource `tcapFunctionKeys` (patch by Gertjan Halkes).
- update AIX case in `CF_XOPEN_SOURCE` configure macro to add release 7.x.
- modify `ifdef's` in `xterm_io.h` for `__hpux` to force that to use the hacked `SYSV` support in that file. This fixes a problem with a non-blocking socket call (patch by Paul Lampert).
- improve filtering of desktop category scanning, to exclude XFCE.
- modify configure script to work with systems that have both `ncurses` (or other `terminfo`) as well as a real `termcap` library, e.g., Slackware (report by Andrew Watts).
- modify configure script to work around special case where user's environment adds compiler flags to the `CC` variable (prompted by report by Paul Lampert).
- amend change for Debian [#110226](#) so that `"-h"` or `"-v"` options cause an exit, rather than simply printing to `stdout` while the window is displayed (Debian [#629358](#)).
- add response for `DECRQSS` which gives the setting for `DECSCUSR`.
- modify `AllocateTermColor()` to handle `XtDefaultForeground` and `XtDefaultBackground`, which are not recognized by `XParseColor`. For example, this fixes the use of `OSC 112` when no explicit cursor color was set (report by Ailin Nemui).
- handle special-case of `KeyPress` translated to `popup-menu` action (Ubuntu [#756273](#)).

Patch #270 - 2011/04/26

- build-fix, e.g., for using `imake` on platforms which use the `termcap` library.
- modify `utf8` resource to accept a name.
- mention default for `fontWarnings` in manpage (report by Werner Scheinast).
- split "UTF-8" menu entry into "UTF-8 Encoding" and "UTF-8 Fonts" (prompted by discussion with Werner Scheinast).
- gray-out font-menu entries when a font fails to load, e.g., a bitmap font is not installed.
- improve behavior when there is no `app-defaults` file:
 - set the `toolbar` resource to `false`
 - gray-out the font menu entries where no resource is found.
- add configure option `--with-desktop-category` to allow customization of the `$.desktop` files.
- build-fix for the `install-desktop` makefile-rule, when the source/build directories differ (patch by Loïc Minier).
- add menu entry and corresponding resource which can be used to suppress all bold-fonts (discussion with Jan Engelhardt).
- make internal line-size value consistent with allocated sizes of character and related arrays to ensure that bulk copying of line data, e.g., in scrolling, accounts for the padding used for pointer alignment (adapted from patch by Rajesh Mandalemula, also reported by Ali Bahar).
- widen `ifdef` for screen-resizing logic from [patch #176](#) changes to send `SIGWINCH` to process group to include any system supporting `ioctl(*, TIOCGPGRP, *)` (prompted by linux-specific patch in OpenSUSE rpm package).
- add `printModeOnXError` and `printFileOnXError` resources, which allow the user to specify that `xterm` will write the contents of its screen to a file if it is exiting due to an X error (Debian [#280457](#)).
- restore logic that made reverse-video apply to the scrollbar's foreground/background, broken in [patch #158](#) (report by Bryan Ischo).
- amend some of the window operations parameter-checks added in [patch #251](#) for the push/pop title feature, to allow the parameters used for window resizing to be `-1`'s, which makes the corresponding values ignored rather than using the window's maximum width/height (report by Noah Friedman).

- correct order of initialization for translations vs fullscreen resources to enable a special case which omits the Alt-Enter translation when fullscreen is disabled (Debian [#612978](#)).
- update config.guess, config.sub

Patch #269 - 2011/02/19

- build-fixes for imake (report by Heiko Berges).
- modify autoconf macro CF_PKG_CONFIG to work with cross-compile environments (patch by Thierry Reding).
- modify MapToColorMode() to favor bold over underline, matching the precedence used before [patch #252](#) (report/analysis by Nicolas George).
- add omitTranslation resource, which can be used to suppress the default translations for these features:
 - fullscreen
 - scroll-lock
 - shift-fonts
 - wheel-mouse
- make the fullscreen feature configurable (Debian [#612978](#))
 - add it to the configurable list disallowedWindowOps.
 - add command-line option -fullscreen to allow the feature to be enabled at startup.
 - add resource fullscreen to control whether the feature is active or may be enabled.
- modify probe_netwm_fullscreen_capability for 64-bit machines. Contrary to XGetWindowProperty manpage, that function returns 32-bit data packed as long's.
- eliminate copy of name resource, which was otherwise used only to give the terminal-description name for the tcap-query feature. Use the actual \$TERM value instead, as derived from termName resource, etc.
- eliminate an old inconsistency with error messages, some used the -name option, while others used argv[0]. The latter is now used consistently.
- improve configure check for rpath-hack, to improve builds on systems where gcc will not search /usr/local/lib, etc.
- build-fix for Xaw3d configuration (report by H Merijn Brand).
- update config.guess, config.sub

Patch #268 - 2011/02/10

- fix an inconsistency of the "Enable Reverse Video" checkbox in the VT Options menu. This also removes a special case added in [patch #217](#) which limited the effect of the reverseVideo resource (Debian [#603808](#)).
- amend decoding of malformed UTF-8 sequences to avoid absorbing valid characters as documented in Unicode 6.0 section 3.9 (report by Keith Winstein).
- do not set urgency hint when window already has focus (patch by Dimitrios Christidis).
- amend extended mouse-coordinate mode from [patch #262](#) changes to include the Cb button-code, which also may be greater than 127 (report by Ailin Nemui).
- ensure that underline-cursor is visible when an application happens to set the background color (report by Christian Weisgerber).
- add feature for [full-screen toggling](#) using either Alt-Enter or a menu selection (integrated patch by Dave Simmons).
- add missing logic to handle reallocation of FIFO index for the "UTF-8" menu entry (report by David Holland, NetBSD [#44344](#)).
- add makefile rules docs-ctlseqs, docs-xterm, etc.
- correct typo in description of DECRPM in control sequences document (report by Ailin Nemui).

Patch #267 - 2010/11/20

- minor formatting changes to `ctlseqs.ms` to simplify a script which extracts the feature information. See the results in [Comparing versions, by counting controls](#) in the xterm FAQ.
- add `docs-clean` makefile rule.
- add `copy-selection` action (request by Timo Juhani Lindfors, Debian [#588785](#)).
- trim leading/trailing blanks from string used for "Selection" font-menu data.
- trim leading/trailing blanks from color resource values.
- configure script improvements:
 - add workaround for removal of X11 dependency from Xt's package file (report by Robert Hooker).
 - add workaround for removal of fontconfig dependency from Xft's package file (report by Jeremy Huddleston).
 - add workaround for removal of Xmu dependency from Xaw's package file (report by Jeremy Huddleston).
 - improve workaround in `CF_X_TOOLKIT` macro, checking for other possible packages where Xt's dependencies may be given.
 - prefer `name:=value` to `name-value`, since recent bash changes break legacy support for that feature.

Patch #266 - 2010/10/24

- add rpm and dpkg scripts, for testing.
- more fixes for Debian [#600707](#) (report by Cyril Brulebois).

Patch #265 - 2010/10/22

- fix a regression in fontname logic from [patch #263](#) changes (Debian [#600707](#), reported by Vincent Lefèvre).
- revert modification of any-event/any-button protocol from [patch #263](#) changes. It interferes with selection using a shifted mouse button (reports by Neil Bird, Bram Moolenaar).

Patch #264 - 2010/10/14

- replace a null-pointer check with check for empty string in `xtermOpenFont`, to eliminate a warning message from [patch #263](#) changes.
- build-fix for [patch #263](#) when toolbar is not configured (patch by Chris Clayton) (reports by Robby Workman, David Wood).

Patch #263 - 2010/10/13

- corrected initialization of "misc" resource values, to ensure that xterm has allocated a copy of strings which may not have been malloc'd by the X library (Debian [#600129](#)).
- modify handling of any-event/any-button mouse protocol; it now is active with any combination of key-modifiers.
- add debugging feature `showWrapMarks`, which marks lines which xterm knows are wrapped, showing where a double-click will select past the end of a line.
- build-fix to address change in include-guards for `Xlib.h` in ongoing Xorg edits (patch by Jeremy Huddleston).
- improve `pointerMode` by continuing to watch for motion events after mouse tracking is disabled if the pointer is hidden (Debian [#594856](#)).

- further extend initialization for active-icon font to check if the font was not loaded successfully, to retry with `font1`, or as even (if TrueType fonts are used) to use a TrueType font. The retries are to help with cases as in [patch #241](#) where the bitmap fonts are not available.
- fix special case of active-icon used when TrueType font is specified for the xterm window, from [patch #261](#) change. In that case, the default font's size was used for layout of the active icon's window (Debian [#591265](#)).

Patch #262 - 2010/8/30

- fix a case where changing the cursor color via escape sequences did not immediately update the screen (report by Andreas Wagner).
- implement ANSI and DEC request-mode control sequences. The latter includes the xterm-specific private modes such as the mouse mode. The feature is `ifdef'd` with the rectangle operations since its decoding overlaps that feature.
- correct typo in `ctlseqs.ms` for response of OSC 21 (patch by Kevin Schoedel).
- improve discussion of mouse tracking in `ctlseqs.ms`
- increase an array limit used in reporting mouse events (report by Ryan Johnson).
- add extended mouse-coordinates mode, allowing up to 2015x2015 windows, using UTF-8 encoding (patch by Ryan Johnson).
- modify manpage hyphens to conform with [Debian](#).

Patch #261 - 2010/6/28

- fix regression in `renderFont` logic, from [patch #260](#) changes (report by Joseph Quinsey).

Patch #260 - 2010/6/20

- modify `plink.sh` to work around problem linking to recent PCRE libraries.
- extend `renderFont` resource to allow deferred switch to TrueType fonts without affecting existing resource settings (Debian [#585620](#)).
- modify configure macro `CF_X_TOOLKIT` to work around omission of ICE library from ".pc" file (report by Miroslav Lichvar).
- change configure script default for `--enable-broken-st` i.e., the `brokenStringTerm` feature) to normally enable it. If the corresponding resource is enabled, this feature eliminates an apparent freeze of xterm when sending mis-encoded data to the screen (Debian [#584801](#)).
- document in manpage some actions which were overlooked:
 - `readline-button`
 - `scroll-lock`
 - `set-8-bit-control`
- undo a change to `limit-check` in `ScrnRefresh` in [patch #257](#), which broke `fastScroll` feature (Debian [#584841](#)).
- modify handling of `brokenLinuxOSC` and `brokenStringTerm` to also sound the bell.
- add `control/D` and `control/Q` to controls which will cause early exit from control string per `brokenStringTerm` resource.
- improve documentation of `brokenStringTerm` resource in manpage.

Patch #259 - 2010/6/5

- modify configure check for [luit](#) to include new aliases for the program (`xterm-filter` and `bluit`).

- add workaround in `xtermClearLEDs()` to account for Xkb's override, making vttest's LED demo reset the scroll lock.
- filter out client-message events when deciding whether to hide cursor, e.g., when using SCIM (patch/report by anonymous user).
- improve description of `-bd` option in manpage (report by Guy Daniel Clotilde).
- modify configure checks for PCRE and other libraries to use `pkg-config`, if available.
- amend change from [patch #252](#), to take `veryColorColors` resource into account when checking `colorBDMODE` resource for TrueType fonts (report by anonymous user).
- add `vttests/query-fonts.pl` script for demonstrating the `OSC 50` font query.
- improve manpage discussion of Scroll Lock feature.
- improve configure macros `CF_GCC_VERSION` and `CF_GCC_WARNINGS`.
- fix warnings for "clang --analyze".
- change default for `allowScrollLock` resource to `false`, noting that the supposedly unused key has been useful for various rebindings (Debian [#580946](#)).

Patch #258 - 2010/5/1

- add pointer-checks in `ScrnRefresh` to fix a case in rapid scrolling where an empty record is fetched from the scrollbar FIFO.

Patch #257 - 2010/4/22

- correct `ctlseqs.ms` description of OSC 17 and OSC 19 (patch by Emanuele Giaquinta).
- corrected logic for `menuLocale` resource; the `setLocale` function returns the original locale only when querying.
- improve filtering of translations resource, narrowing the scope of the `alwaysUseMods` to address only the translations that would cause a key to be sent to the host (report by Andrew Gaylard).
- change default value of `menuLocale` resource to "C", to work around longstanding [Xorg bug](#).
- modify handling of `scrollKey` feature to ignore XON/XOFF keys.
- implement scroll-lock feature.
- revise memory allocation in `UTF8toLatin1()` to fix an out-of-bounds index (Mandriva [#54531](#)).
- compute value for first wide-character rather than assuming it is 256, fixes problem with `-cjk_width` introduced in patches [242](#) and [249](#) (report by Thomas Wolff).
- improve configure script:
 - corrected check for `_XOPEN_SOURCE` for OpenSolaris.
 - when possible, add `rpath` option for libraries in unusual places
 - add configure option `--disable-rpath-hack` to control whether the `rpath` option can be added.
- modify `AllocateTermColor()` to separate initialization from control sequences, fixing problem from [patch #254](#) changes where enabling `allowSendEvents` resource prevents setting cursor color on command-line (Debian [#572928](#)).
- amend logic from [patch #185](#) to not reallocate cell-array if processing `ESC % G` to switch from UTF-8 if already in ISO-8859-1 character set (report by Michael Koehne).
- fix to avoid calling `XmuInternStrings()` with zero count (report by Johan Bockgård).
- fix build when `--disable-ansi-color` configure option is used.
- fix build when neither `OPT_TCAP_QUERY` or `OPT_TCAP_FKEYS` is defined (patch by Matthieu Herrb)

Patch #256 - 2010/3/6

- add `TerminalEmulator` to desktop category files.
- modify `install.sh` to ignore the "." appended to permissions by selinux.

- change app-defaults organization, installing UXTerm-color and KOI8XTerm-color for consistent behavior regarding customization: `color` (prompted by discussion in Ubuntu [#421261](#)).
- fix typo in `mininstall.sh` from [patch #255](#) changes, and add case for `/var/run` needed for full path of `utmp` (report by Julien Cristau).
- minor fix to `xterm manpage`, remove a comment stating that margin bell can be changed via the VT Options menu. That was replaced in [patch #225](#)
- add a "docs" rule to makefile.
- fix initialization of Atom used for `XkbBell` feature from [patch 243](#) changes. Unlike the other calls to `XInternAtom()`, in this case the flag telling X to create the Atom was unset (patch by Chris Adams).

Patch #255 - 2010/1/21

- rename `install.sh` to `install-sh` in case suffix-rules might interfere.
- extend range for `convertTOUTF8` function to full 31-bits, to use with printing, etc.
- improve `manpage` by checking for actual locations of `utmp/wtmp` files (Debian [#562640](#)).
- modify configure macro `CF_XOPEN_SOURCE` to remove -D's before adding the same name rather than relying on -U's, to reduce redefinition warnings for some platforms that have conflicting definitions in headers.
- correct logic used to switch to alternate screen using FIFO-lines configuration (Debian [#565772](#)).
- update `config.guess`, `config.sub`

Patch #254 - 2010/1/6

- add a configure-check to eliminate `install-ti` rule from Makefile when the system has no `tic` (terminfo compiler) program. This lets one use the `install-full` rule more consistently.
- amend change to `WriteText()` function in [patch #252](#) to take into account the `colorAttrMode` resource (report by Krzysztof Kotlenga).
- document `titleModes` resource in `manpage`, added in [patch #252](#).
- modify `tcap-query` table entries for shifted up/down cursor keys to match `ncurses` convention.
- improve lookup of `termcap-query` data, allowing for duplicate keycodes versus missing entries.
- add control sequence which can be used to modify the terminal data used for the `termcap-keyboard`.
- improve portability of `tcap-query` feature, using `terminfo` functions in preference to `termcap` on systems having `terminfo`.
- improve font-setting/querying control (`OSC 50`):
 - when TrueType font is selected, the `TrueType faceName` will be set, rather than the bitmap font.
 - when TrueType font is selected, querying returns the name of the TrueType font.
 - querying a font recognizes the relative-font convention that setting a font could use.
- add menu-entry for `allowColorOps`.
- add new resources for fine-tuning menu entries: `allowColorOps`, `disallowedColorOps`, `disallowedFontOps` and `disallowedTcapOps`.
- correct logic for disabling the "TrueType Fonts" menu item; it was not ensuring that the `faceName` resource value was non-empty.
- implement VT520-style controls `DECSMBV` and `DECSWBV` for setting the margin- and warning-bell volume.
- fix a minor error from [patch #243](#) which made the `zIconBeep` feature use a minor-error tone rather than an informational tone.
- add a null-pointer check for the case where `renderFont` resource is true, but `faceName` resource is unset, used in logic to strip "xft:" prefix from [patch #251](#) changes (patch by Michael Riepe).
- add special case to configure `CF_XOPEN_SOURCE` macro to use extensions on Darwin (patch by Dennis Preiser).
- improve configure checks for regular expressions header and library
- update `config.guess`, `config.sub`

Patch #253 - 2009/12/10

- add a null-pointer check in `getPrinterFlags()` per changes in [patch #252](#).
- add a null-pointer check, needed in UTF-8 mode for Xft fonts after changes in [patch #252](#) (patch by Alan CooperSmith).
- correct size when clearing struct for tek4014 (patch by Jochen Voss).
- parenthesize expression in `MOREROWS` macro, fixing a limit check added in [patch #251](#) (Debian [#560039](#)).

Patch #252 - 2009/12/7

- modify title-querying logic to support retrieval of titles encoded using UTF-8.
- add new "title-modes" control sequence for controlling whether window/icon titles can be set or queried using UTF-8, optionally encoded in a hexadecimal string.
- use `mkdir -p` rather than `mkdirs.sh` (prompted by discussion of mawk by Aleksey Cheusov).
- add appropriate copyright/license notices to the bulk of files lacking same, and modify to use identical terms in others which used different wording. The main exceptions are the files contributed by Markus Kuhn, who appears to prefer public domain distribution, noting that I have modified/improved several of these without changing the terms of distribution (request by Jari Aalto).
- add control sequences for resetting the "dynamic" colors to their default values.
- add control sequences for resetting the "special" colors to their default values.
- add control sequences for setting the "special" colors such as `colorBD` (bold).
- add overlooked case for setting highlight foreground color with the dynamic-colors control.
- add `OSC 104`, for resetting ANSI/16/88/256 colors to default.
- reset ANSI/16/88/256 colors to default in soft/hard reset functions.
- strip "xft:" prefix from `faceName` and `faceNameDoublesize` resource values,
- add `DECSCUSR` (discussion with Andy Koppe).
- add check/warning on failure to load font, to see if the name looks like an Xft pattern rather than XLFD. This can happen if someone happens to modify their X resource settings for programs that read data from xterm's namespace.
- modify handling of `print` and `print-everything` actions to allow the various printer flags to be overridden by supplying parameters.
- add resource `printerNewLine` (request by Ovidiu Gheorghioiu).
- minor cleanup, finish using `TScreenOf()` and `TekScreenOf()` macros introduced in [patch #224](#).
- improve checks in `ShowCursor/HideCursor` to get the background color, particularly when `highlightReverse` resource is used (reports by Jan Engelhardt, Christian Weisgerber).
- correct `checkVeryBoldAttr` to omit comparison of foreground color to special color values used for `color<XX>` resources (report by Jan Engelhardt).
- make `colorBDMode` and `colorULMode` resources work with TrueType configuration (report by Jan Engelhardt).

Patch #251 - 2009/11/11

- add window-ops controls to push/pop icon and/or window labels on a stack.
- minor fixes to align termcap file with terminfo.
- add resource `disallowedWindowOps`, to allow fine-tuning of features to suppress with the `allowWindowOps` resource (prompted by discussion with Bram Moolenaar).
- add makefile rules for `resize-manpage` to pdf, etc.
- further improve limit-checks in `select/paste` (Mandriva [#54531](#)).

Patch #250 - 2009/10/13

- add check and error-message for fonts that have no printable values in the ISO-8859-1 range (Debian [#542434](#)).
- some compiler-warning cleanup, in particular workaround for defective implementation of gcc's attribute `warn_unused_result` (report by Bram Moolenaar).
- improve estimate of single-column width for packed TrueType fonts by ignoring extents for codes 127 and 159.
- improve line-drawing for TrueType fonts which happen to have defined glyphs which are *not* line-drawing in 0..31 by assuming they're not, and just checking the existence of the Unicode codepoints. This makes it more likely that the user can override a misconfigured font using the "Line-Drawing Characters" menu entry.
- limit minimum cell-width for packed font to maximum-advance reported by Xft. Some fonts are wider than that, even in the Latin-1 range (Debian [#550497](#)).
- add list of direct-contributors in "THANKS" file.
- stylistic changes to this file to help scripted extraction of list of contributors.
- correct off-by-one in `okPosition` fix from [patch #249](#) limit-checks which prevented double-click selection on the bottom line of the screen (reports by Rajeev V. Pillai, Debian [#550368](#)).
- add `-q` option to `vttests/256colors2.pl` and `vttests/88colors2.pl` to demonstrate bulk initialization of color palette.
- improve the workaround from patch #188 by enabling resources for the 88-color model.
- document in xterm manpage the limited availability of resources `color16` to `color255` as noted in [patch #188](#) (Ubuntu [#438850](#)).

Patch #249 - 2009/10/1

- change default for `allowWindowOps` resource to false.
- add limit-checks for result of `visual_width()` function, needed from [patch #242](#) and exposed by #244 changes (Debian [#548321](#)).
- improve limit-checks in `select/paste`.
- fix a remaining bug from [patch #230](#) changes for displaying multi-column characters in a proportional font (report by Chris Jones).
- add new resource `forcePackedFont` and menu entry "Packed Font" to control whether to use the font's minimum (default) or maximum width when those differ. The workaround which xterm uses to accommodate proportional fonts is not necessary with certain fonts such as unifont which happen to store a mixture of multicolumn glyphs (report by Chris Jones).
- fix an (old) bug which did not restart the timer for blinking text if the only blinking text was temporarily scrolled out of view, e.g., using the scrollbar.
- fix an (old) flaw in the `delete-line` operation where the text which is scrolled into view while the display is scrolled up was not repainted.
- improve `delete-line` and `insert-line` operations, retaining selection when the selection does not intersect the deleted/inserted lines.
- fix an (old) off-by-one error when an application cleared above the cursor position while the display was scrolled up, that would leave an extra line of text uncleared.
- fix a similar problem where the `double-size` attribute would not be reset when clearing the screen while the display was scrolled up.
- fix an indexing error which would occur if an application cleared a line while the display was scrolled up and was also in UTF-8 mode (Redhat [#524503](#)). The error was from [patch #228](#) but more visible after changes from [patch #244](#).

Patch #248 - 2009/9/11

- fix an overlooked adjustment for selecting double-width characters in the narrow-character configuration.

- eliminate uses of XTERM_CELL and XTERM_CELLC where an appropriate LineData pointer is available.
- correct expression in okScrnRow macro, making selections give the length of lines below the visible screen (report by Stuart Henderson).
- correct logic used to improve performance of missing-glyph check, which did not handle line-drawing characters (Debian [#545220](#)).

Patch #247 - 2009/8/30

- add ifdef's and check for openpty() on DragonFly (patch by Alex Hornung).
- correct calculation for size of line's data block, which was sometimes off-by-one when configured using `--enable-16bit-chars` (report by H Merijn Brand).
- fix indexing error in print-everything feature from [patch #246](#) (patch by Ovidiu Gheorghioiu).

Patch #246 - 2009/8/16

- remove obsolete logic for saving/restoring wrapping flags, which did not work on 64-bit platform. Wrapping flags (stored in the line-index) are now copied with line-data (Debian [#541160](#)).
- modify comments in app-defaults files to avoid problem with C preprocessor used by `xrdb` (Debian [#541603](#)).
- restore special case in makeColorPair, needed for colorBDMODE resource (Debian [#541089](#)).
- correct SetLineFlags() macro, broken in [patch #244](#) when recoding to avoid gcc-specific bitfields (Debian [#541236](#)).
- modify initialization of screen buffers to ensure that pointers align to int-boundaries. This fixes a problem introduced in [patch #244](#) where the color- and character-arrays (stored after the video-attributes in each row) might be misaligned (report by Rajeev V Pillai).
- add limit-check in ScrnRefresh for handling saved-lines from the circular buffer which are repainted on a screen whose width has increased. To improve performance, circular buffer entries are not resized (report by Rajeev V Pillai).
- correct type for CellColor (a late change in [patch #244](#) to avoid gcc-specific enums made that unsigned rather than unsigned short, for the 256-color option).
- fix typo in configure option `--enable-16bit-chars` (report by Rajeev V. Pillai).

Patch #245 - 2009/8/12

- correct a special case in saving FIFO-lines from [patch #244](#). If the screen was shrunk, xterm used the wrong amount for copying to FIFO-lines, and then used this amount to adjust the current row on the screen. That was both a visible defect (Debian [#541109](#)) as well as a potential addressing error (Debian [#541132](#), Debian [#541160](#), and Debian [#541236](#)).
- add clarification in xterm manual about the various `allowXXXops` resources, which are disabled when the `allowSendEvents` resource is active (patch by Julien Cristau, Debian [#531597](#)).

Patch #244 - 2009/8/9

- refactored storage of saved-lines, providing a configure option to manage them as a FIFO (actually a circular buffer), improving performance. Added configure option `--enable-fifo-lines` to enable/disable the new feature (it is enabled by default).
- added `fastScroll` resource, to amuse people who measure terminal emulator performance by cat'ing large files to the screen.

- modify check in `readPtyData` from return values to provide exit on zero-bytes read from pty for FreeBSD, or eliminate high-CPU in "xterm-hold" processing (discussion with Ulrich Spoerlein, FreeBSD ports/136686). The check was originally modified to combine negative/zero values in XFree86-3.1.2E, 1996/05/06.
- add configure option `--enable-16bit-chars` to provide wide-characters with 16-bits (rather than the default 32-bits).
- add `retryInputMethod` resource to allow configuring out the retries xterm uses to connect to non-responsive XIM server, to work around defective X configurations as noted in [NetBSD mailing list](#).
- make regular-expression selection work for VT100 double-sized characters.
- improve layout when drawing missing characters in a proportional font, e.g., as boxes, to take into account whether they are double-width (report by Guilbert Stabilo on comp.unix.shell).
- add capability for keypad-center (kb2/KA2) to termcap entry for xterm-new, as well as xterm-8bit, xterm-sun and xterm-vt220 (FreeBSD conf/136336).
- change default for `keepSelection` resource to true (prompted by discussion with David Muir Sharnoff).
- remove a limit-check in `ptydata.c`, allowing Unicode values past 64k to be displayed using TrueType fonts (Debian [#458432](#)).
- remove a vt52-specific `ifdef` to allow mapping F1-F4 to PF1-PF4 when vt52 support is not compiled (report by Olaf 'Rhialto' Seibert).
- save/restore line-wrapping flags when converting from ISO-8859-1 encoding to UTF-8 encoding, as well as when resizing screen.
- remove extra adjustment of position in fix for Debian [#418324](#).
- modify default check for `mkWidth` resource to check for line-drawing characters, which are categorized as double-width in Solaris 10 (report by Sebastian Kayser).
- add "print-everything" action (patch by Ovidiu Gheorghioiu).
- start refactoring scrollbar data using new `getLineData()` function.
- demote recent change to Debian [#252873](#) fix to experimental, `ifdef'd` out as `EXP_BOGUS_FG` (Debian [#522141](#)).
- work around groff mapping of ASCII quotes using macros (requested by Reuben Thomas based on Colin Watson advice, fixes Debian [#378700](#)).
- correct symbol used for default of `allowWindowOps` which was `DEF_ALLOW_FONT` rather than `DEF_ALLOW_WINDOW` (report by Matthieu Herrb).
- amend fix for tek4014 from [patch #243](#) to make it only apply to the Tek Options menu.

Patch #243 - 2009/3/28

- revert change to default for `allowTcapOps` (request by Bram Moolenaar).
- reallocate result returned by `xtermEnvLocale()` to avoid reference to freed memory after handling `menuLocale` resource.
- fix an old (X11R5) bug in tek4014 for switching font sizes.
- add resource `defaultString` to make configurable the use of "#" when pastes of UTF-8 text fail due to limitations in the current locale settings.
- make the set of selection target Atom's configurable by two new resources `eightBitSelectTypes` and `utf8SelectTypes`, e.g., to use the TEXT Atom in preference to UTF8_STRING (discussion with Stanislav Sedov regarding koi8rxterm and the FreeBSD port).
- modify handling of TARGETS Atom by making it return exactly the set of targets as those which xterm is currently providing.
- set `MANPAGER` and `PAGER` explicitly to `/bin/cat` in `install.sh` to work around `/etc/man.conf`'s with those variables already set (report by Марьясин Семён).
- improve error-checking of `tcap-query` parser.
- add check for keyboard `tcap`, which ensures that terminal descriptions containing the same string for shifted/unshifted keys will be seen by `tcap-query` as only the unshifted key. (This would only happen with

- an incorrect terminal description).
- fix conversion for input event-state to modifier-parameter which made `tcap-query` feature not work with `tcapFunctionKeys` (keyboard type `tcap`).
- add `"DEF_ALLOW_XXX"` definitions to `main.h` to allow overriding the default compiled-in values for "allowxxx" resources.
- remove check on bell-percentage added in [patch #242](#), which disallowed zero/negative values (Redhat Bugzilla [#487829](#)).

Patch #242 - 2009/2/15

- fix configure check for `XkbBell` and provide appropriate parameter for it.
- fix a caching problem with double-size fonts versus reverse video that could cause core dump.
- repair double-size fonts from workaround used in [patch #240](#).
- add new section to the VT Fonts menu which allows enabling or disabling the font, termcap (`tcap-query`), title and window operations.
- add `fontWarnings` resource, to control whether to show warnings on failure to load a font.
- improve warnings for unloadable fonts introduced in [patch #240](#) by limiting those to the cases where a font would be specified directly by a resource setting rather than a derived fontname.
- further amend fix for Debian [#252873](#) from [patch #197](#) to treat a blank cell which does not have both foreground and background colored as a non-colored cell. This improves a special case where the cursor is on a blank cell which had foreground color scrolled in (report by Miroslav Lichvar).

Also add the same logic when hiding cursor, so the outline matches the in-focus cursor.

- modify internals to reduce places `PAIRED_CHARS()` is used, making `WriteText()` and `ScrnWriteText()` accept `IChar` array, as well as providing a wrapper for `drawXtermText()`.
- change default XIM font from "*" to "fixed" to improve startup time in `zh_CN.UTF-8` locale (Mike Fabian, SuSE Bugzilla [#464930](#)).
- typo in #240 log (Slava Semushin)

Patch #241 - 2009/1/26

- improve checks for missing bitmap fonts, fallback to "fixed" as needed to work around broken font-packages (report by Jacek Luczak).
- fix breakage from [patch #240](#) changes for `xtermAddInput()` (patches by Jeff Chua, Julien Cristau).

Patch #240 - 2009/1/25

- use `plink.sh` for linking `xterm` (suggested by Larry Doolittle).
- add resource descriptions for input method to `xterm` manpage.
- update configure script; consistently append to `$CFLAGS` rather than `prepend`.
- add `install-scripts` rule to `makefile`, to allow `koi8rxterm` and `uxterm` scripts to be altered independently of `install-bin`
- add `-maximized` command-line option and corresponding resource (prompted by `alt.os.linux` newsgroup comment).
- modify translations of scrollbar widget using `xtermAddInput()` (see [patch #181](#)) to accept the actions that the `vt100` widget accepts, such as `shift-insert` to perform a paste operation (request by Martin Zwickel).
- change default for `allowTcapsOps` resource to `false`, since it causes unexpected behavior for vim users with `AltGr`.
- update `config.guess`, `config.sub`

Patch #239 - 2009/1/8

- correct a cast in input.c, which broke translation of numeric keypad codes to pageup, pagedown, etc., on 64-bit platform (Debian [#511138](#), report by Larry Doolittle).

Patch #238 - 2008/12/30

- update configure macro CF_XOPEN_SOURCE for AIX 6.x and Mint platforms.
- reset the screen wrapping-flag at the end of ClearRight to fix an occasional case where the last character of a scrolled and wrapped line would be cleared (patch by Joe Peterson).
- modify to use POSIX coding for comparing resource settings such as locale, to work with locales such as Turkish (report by M Vefa Bicakci).
- turn on configure paste64 feature by default (request by Jean-Philippe Bernardy). It is runtime enabled/disabled with allowWindowOps.
- turn on configure tcap-query feature by default, add resource allowTcapOps to make this runtime enabled/disabled.
- make OSC 3 (change X property, from [patch #110](#)) subject to allowWindowOps resource.
- make VT220 DSR responses inactive in VT100-mode.
- make DECUDK feature inactive in VT100-mode.
- respond to incorrectly formatted DECRQSS with a cancel.
- add allowFontOps resource to allow the fontsize-switching and font query/set control sequences to be enabled/disabled (prompted by Debian [#510030](#)).
- some code cleanup based on gcc 4.x -Wconversion warnings in button.c and charproc.c
- modify tcap-query feature to not return data for shifted cursor-keys when the keyboard type is set to vt220, since returning the same string for shifted/unshifted keys may confuse some applications (Gentoo [#212546](#)).

Patch #237 - 2008/09/14

- improve usability of TrueType fonts by making the font-size switching for shifted keypad plus/minus use the faceSize resources to determine the order of fonts (when TrueType fonts are used) rather than the bitmap fonts, since their sizes may not be in the same order (report by H Merijn Brand)
- remove an optimization of ConfigureNotify events from [patch #236](#) which seems to interfere with passing SIGWINCH to applications (Gentoo [#233836](#)).
- modify handling of altSendsEscape to reset the eightBitInput mode, like metaSendsEscape (patch by Ted Phelps).
- add feature to show the text-cursor as an underline rather than a box, plus command-line options -uc and +uc and resource cursorUnderLine to control the feature (patch by Paul Lampert).
- update config.guess, config.sub

Patch #236 - 2008/07/27

- correct memory reallocation when handling a paste of UTF-8 text from [patch #225](#) changes (report/patch by Max Mikhanosha).
- correct allocation of temporary buffer in xtermFindShell in case the user's \$PATH contains no ":" (report/analysis by Victor Stinner, Freedesktop.Org Bugzilla [#16790](#)).
- modify CF_XOPEN_SOURCE to add case for DragonFly BSD, to fix new compile problem exposed by fix for fd_mask (patch by Hasso Tepper).
- add configure-check for ncurses use_extended_names, (report by Martin Mokejs).

- correct computation for toolbar height; layout manager already takes into account `borderWidth` resource.
- implement VT320-style SCS (select character set) for ISO Latin-1 supplemental.
- fixes for vt100-style character sets in UTF-8 mode (Ubuntu [#230919](#)).
- fix to make `luit` work with xterm's `-ls` option (report/patch by Marius Tolzmann).
- update `config.guess`, `config.sub`

Patch #235 - 2008/04/20

- add control sequences for some of the recent resource/menu settings:
 - `altSendsEscape` (private mode 1039)
 - `keepSelection` (private mode 1040)
 - `selectToClipboard` (private mode 1041)
 - `bellIsUrgent` (private mode 1042)
 - `popOnBell` (private mode 1043)
- add resource `formatOtherKeys` to provide an alternate escape sequence format for the `modifyOtherKeys` resource (request by Paul LeoNerd Evans).
- adjust saved-cursor position if the window is resized while displaying the alternate screen (Novell [#196880](#), Debian [#383384](#)).
- improve pointer-checks to fix a bug exposed by resizing during initialization under StumpWM window manager (Fedora Bugzilla [#437928](#)).
- modify `unselectWindow()` to ensure that the mouse pointer is not hidden after xterm loses focus (report by Jeremy Huddleston).
- add special check for `fd_mask` on Mac OS X (report by Jeremy Huddleston).
- add `dylib` to `autoconf`'s suffix list used for checking the result from `xmkmf`, to work with Mac OS X (report by Jeremy Huddleston).
- correct initialization of bold- and wide-, wide-bold fonts which may be set via the `utf8Fonts` subresource (Debian [#347790](#)).

Patch #234 - 2008/03/02

- modify `sinstall.sh` to use POSIX locale to bypass GNU `ls` changes to date-format.
- improved/refined changes for closing bitmap font (patch by Andrea Odetti).
- improve resize computation for situations where the negotiation fails, by invoking the xterm widget's core-class resize method (Debian [#365602](#), patch by Jim Paris).
- restore initialization of terminal's `VMIN` and `VTIME` settings, from [patch #232](#) changes (patch by Matthieu Herrb).

Patch #233 - 2008/02/24

- add configure check for `ttydefaults.h`, include if needed, e.g., for systems where defining `_POSIX_C_SOURCE`, etc., prevents it from being included via `termios.h` (prompted by comments by Robert Delius Royar and Jeremy Huddleston).
- bug-fixes for bugs.opensolaris.org (patches from Alan Coopersmith)

4029911

fix a typo in manpage

4045962

xterm doesn't properly set `ut_syslen`

4192572

left-left-right misinterpreted as triple click

- minor optimization to tab-initialization (patch by Németh Márton).
- fix a case where an incorrect font was freed during initialization from [patch #232](#) changes (patch by Andrea Odetti).
- improve comparison used in SameFont function for GC-caching (Julien Cristau).
- correct macro name used for default CKILL definition to work with Mac OS X (report by Jeremy Huddleston).

Patch #232 - 2008/01/30

- corrected logic in a font-cache used for reverse-video (Debian [#404079](#)).
- add control sequence to alter pointerMode at runtime.
- add limit-checks for rectangle operation parameters (report by Martin Pirker).
- modify `minstall.sh` to suppress `$MANPAGER` and `$PAGER` environment variables, which may interfere with redirecting output of `man` to a shell variable (report/patch by Zdenek Sekera).
- do not try to hide mouse pointer in the tek4014 window, fixes broken "-t" option at startup from [patch #230](#) changes (report by Robert K. Nelson).
- correct datatype used when drawing tek4014 data using xterm compiled for wide-characters, on big-endian machines (reports by Jeremy Huddleston, Harald Hanche-Olsen, Martin Costabel, Merle Reinhart).
- modify to cache the font-names along with the bitmap font data, to improve comparison of fonts.
- modify to allow building with configure options `--disable-ansi-color` and `--disable-leaks` (Debian [#459817](#), report/patch by Németh Márton).
- modify to allow building with configure options `--enable-wide-chars` and `--disable-c1-print` (Debian [#459816](#), report/patch by Németh Márton).
- add `pointerMode` resource to control whether and when the pointer cursor is hidden as the user types.
- simplify initialization of `ttyMode-` and related characters using a table.
- modify initialization-logic for stty values that correspond to `ltchars` structure and the BSD `TIOCSLTC` ioctl (`susp`, `dsusp`, `rprnt flush`, `werase`, `lnext`). These were reset to constants for both termios and legacy interfaces immediately after asking the system for the existing values since X11R6.1, rather than using them to provide inherited values. While the legacy interface has some constraints, e.g., on HPUX, the POSIX or termios interface should not. Your shell may reset these anyway (prompted by patch by Ed Schouten).
- improve logic for hiding/displaying pointer-cursor (report by Mark Brukhartz).
- add limit-checks to `tabs.c`, increase maximum column for setting tab-stops from 320 to 1024 (report by Németh Márton).
- correct length, i.e., number of types of selection targets, computed by `ConvertSelection()` when not handling wide characters for the `XA_TARGETS()` case. This leaves an extra Atom on the end of the list which is not handled by [Java applications](#). The problem was introduced in [patch #151](#) (report by David Wood).

Patch #231 - 2008/01/05

- undo change to `getXtermCell()` from patch #230 using `PACK_PAIR` macro (Debian [#459014](#), analysis by Caetano Jimenez Carezzato).
- minor documentation fixes (patch by Slava Semushin)
- add makefile actions to install `KOI8RXTerm` app-defaults file (patch by Julien Cristau).

Patch #230 - 2007/12/31

- add `quietGrab` resource, which when true, suppresses cursor repainting when `NotifyGrab` and `NotifyUngrab` event types are received during change of focus (request by Nicolas George).
- do not treat Unicode BIDI control characters as combining characters (Debian [#457634](#)).

- add `koi8rxterm`, from Debian.
- add manpage for `uxterm`, from Debian (Ubuntu [#128136](#), Debian [#438645](#))
- remove ".xpm" suffixes from Icon filenames in desktop files since it confuses some lookups following the [Icon Theme Specification](#) (report by Slava Semushin)
- correct width-calculation used for adjusting proportional fonts, to work with wide-characters (Debian [#441354](#)).
- fixes/improvements for double-size characters:
 - correct old clipping calculation which used total height of glyphs where ascent was needed.
 - if bold font is unavailable, fall back to normal font
 - adjust to "work" with Xft (which does not support double-width single-height characters).
 - restore reset of `doubleSize` for a line when it is cleared, broken in [patch #228](#).
- modify logic for `forceBoxChars` resource when using TrueType fonts to be consistent with bitmap fonts
- modify logic for `forceBoxChars` resource to make the "Line-Drawing Characters" menu entry use `uxterm`'s line-drawing characters even asked to draw wide line-drawing characters which are available in the font.
- modify rectangle-support functions to preserve colors when filling/erasing to match WRQ Reflection behavior (request by Enzo Toscano).
- add getopt-parsing to `tcapquery.pl`, including feature to test the extended cursor/editing keys.
- make missing double-width glyphs display as double-width (Debian [#456236](#)).
- change `tcap-fkeys` and `rectangles` configure options to enable them by default.
- hide the mouse pointer while user is typing (request by Rodolfo Borges).
- extend configure options `--enable-tcap-query` and `--enable-tcap-fkeys` to send cursor- and editing-keypad keys modified according to the keyboard (or `termcap`) selection for shift, alt, control, meta.
- modify `kdch1` in `termcap`, e.g., `xterm-r6` to match the terminfo file.
- add `-hm` option to turn `highlightColorMode` on or off.
- add `highlightColorMode` resource to separate the new (since [patch #225](#)) highlighting with both text- and background-colors (prompted by report/example by Thomas Wolff).
- add *Keep Selection* menu entry to turn the `keepSelection` resource on/off at runtime.
- add `keepSelection` resource, which when enabled, tells `xterm` to retain the X selection even after it stops highlighting it (patch by Sergey Vlasov).
- extend the `CSI > n` sequence to allow disabling all types of modified-keys that the `CSI > m` sequence affects.
- move include for `<xtermcap.h>` in `resize.c` to avoid redefinition of `termios` structure on OpenSolaris (report by Rahul Gopinathan Nair).
- extend terminfo building blocks for modified editing keys to include all six keys.
- synchronize terminfo with `ncurses` (report by Stephane Chazelas)
 - equate `xterm-xfree86` and `xterm-xf86-v44`.
 - add `ncurses` extensions `OTbs`, `AX`, for `termcap` conversions.
 - make old/legacy entries such as `xterm-24`, `xterm-65` and aliases `xterms`, `vs100` inherit from `xterm-old`.
 - make `xterm-r5` and `xterm-r6` the same, ignoring historical errors in X Consortium's version.
- fix an `ifdef` in logic for selecting regular expressions while in a narrow-character locale (Debian [#449227](#)).

Patch #229 - 2007/8/12

- override locale in `mininstall.sh`; change in [patch #226](#) does not work in UTF-8 locale (report by Zdenek Sekera).
- undo an incorrect fix for a memory leak in [patch #209](#) (Debian [#435858](#)).

Patch #228 - 2007/7/22

- modify configure script to permit combining `--with-utempter` and `--enable-setuid`, e.g., for using xterm with the utempter library on FreeBSD (report by Andriy Gapon).
- modify "Quit" menu entry to override the `-hold` command-line option.
- add a check in the startup error-reporting to avoid writing to pipe when it has not been opened. In that case, report errors directly to the standard error.
- add `OPT_READLINE` definition to `xtermcfg.hin`, overlooked in [patch #205](#) (report by Kalle Olavi Niemitalo).
- modify `88colors2.pl` and `256colors2.pl`, adding `-r` option to reverse the palettes for the extended colors.
- check for partial overwrite or deletion of multi-column characters in several cases, e.g., `insert-character`, `delete-character`, etc., and fill the remainder of the cells used by the multi-column characters affected with blanks.
- correct character-class codes in wide-character mode for characters 215, 247 (see also [patch #165](#)).
- fix missing assignment for UTF-8 parsing in widget initialization (Debian [#403360](#)).
- correct index expression used to set line-wrapping flag, making selection from scrollbar work consistently (Debian [#430121](#), report by Vincent Lefèvre).
- amend changes to handshake in [patch #226](#) to accommodate Solaris, which relies on the extra setting of the terminal size after I/O initialization. Do this by adding new resource `ptySttySize`, which is false for Linux and MacOS X, i.e., true for Solaris and other SVR4 platforms, as well as FreeBSD (reports by David Wood, Renato Botelho).
- check for X events after `cursor-left`, and carriage return, consistent with indexing operations (comments by Vegard Nossum and Ingo Molnar on a mailing-list).
- initialize the `.keyboard` structure, needed for some platforms (such as Solaris) after [patch #227](#) fixes for `keysyms` (patch by David Wood).
- update `config.guess`, `config.sub`

Patch #227 - 2007/6/27

- exclude the Intel compiler from the extra gcc warning options added in [patch #226](#).
- modify change for Debian [#422521](#) from [patch #226](#) to work with configurations where the X server does not recognize the `XF86Paste` or `SunPaste` keysyms (report by Paolo Pumilia).
- fix incorrect free in fix for "Selection" menu entry in [patch #226](#).

Patch #226 - 2007/6/17

- add configure check to use `-Wno-unknown-pragmas` for Solaris, and a few other new gcc warning options to address regressions in its warning options.
- add sample desktop and icon files, along with configure options for manipulating them.
- fix an infinite loop when showing a 2-column character in a 1-column screen (Debian [#426863](#)).
- add `XF86Paste` and `SunPaste` to the default translations (Debian [#422521](#), patch by Bernhard R Link).
- update `wcwidth.c` (partly based on/prompted by mailing list comment).
- update/improve `keysym2ucs.c` based on Unicode 5.0.1d3 and Xorg 7.1 `keysymdef.h` file.
- improve `gen-pc-fkeys.pl`, making it show all of the building-block terminfo entries used by xterm.
- correct strings used for modifiers applied to F1-F4 in `xterm+pcf1` terminfo entry.
- improve session management by adding the ICE connection number to the `select` call rather than waking up once per second (patch by Miroslav Lichvar).
- add environment variable `$XTERM_LOCALE` to help with shell initialization, e.g., to set a specific locale for xterm on systems where a global locale is set in the shell startup scripts.
- add resource settings `mkSampleSize` and `mkSamplePass` to modify the `mkWidth` added in [patch #201](#). In [patch #202](#), xterm would also check if the system's `wcwidth` matched its built-in tables "well

- enough" to be used when `mkWidth` was false, and if not would use the built-in tables anyway. These resources allow the user to customize the decision (prompted by comments by Emanuele Giaquinta)
- modify logic which resets/updates the screensize on the child process side of the pseudo-terminal to do this only if a successful handshake was received, e.g., as determined by the `waitForMap` resource (prompted by reports by Emanuele Giaquinta and Bernhard R Link, but see also [patch #177](#) and [patch #159](#)).
 - improve permissions logic when closing pseudo-terminal (Debian [#12261](#), patch by Nathanael Nerode, analysis by Richard Braakman).
 - add resource `highlightReverse` which controls whether xterm will allow selection highlighting to hide reverse-video or use the older behavior which inverts the foreground and background colors when selected text with reverse-video attribute (report by Adam M Costello, comments by Victor Vaile).
 - restore a special case for cursor-color in `ReverseVideo()` lost in rewrite for [patch #224](#) (report by Adam Sulmicki).
 - correct initialization for menu entry for `bellIsUrgent` (patch by Emanuele Giaquinta).
 - correct length of underlining for double-width Xft fonts (report by Shidai Liu "Leo").
 - correct clipping for double-width Xft fonts (report by Shidai Liu "Leo").
 - modify initialization for `italicULMode` to avoid `XftPatternBuild` reusing bold attributes (report by Shidai Liu "Leo").
 - add a check in case someone tries to call the `popup-menu()` action on a menu which is not initialized (Debian [#426364](#)).
 - improve `CF_IMAKE_CFLAGS` to work with Solaris sed (report by Peter Bray).
 - improve guess for X's manpage section in `minstall.sh`, (prompted by comment by Miroslav Lichvar).
 - modify `minstall.sh` to handle manpage patch with more than one dot (patch by Miroslav Lichvar).
 - fix configure message for `--disable-setgid` option (patch by Miroslav Lichvar).
 - add `allowTitleOps` resource to allow users to prevent the title- and icon-names from changing (request by John Bashinski).
 - fix "spawn-new-terminal" action, for the case where no parameter is passed to the action (patch by Daniel Colascione).
 - fix error-checking on internal font switching for "Selection" menu entry (Debian [#421523](#)).
 - amend select/paste change from [patch #225](#) by limiting it to non-UTF-8/non-KOI8-R encoding (Debian [#420974](#)).
 - add workaround for groff ".URL" codes which are not present in some commonly-used bitmap fonts (Debian [#418324](#)).

Patch #225 - 2007/3/24

- add `useClipping` resource to allow clipping to be disabled.
- use `XftDrawSetClipRectangles` to work around Xft pixel-trash (report by Reuben Thomas).
- add configure option `--enable-tcap-fkeys`, and resource `tcapFunctionKeys`, which can be used to tell xterm to use function-key definitions from the termcap (or terminfo) which it uses to set `$TERM` on startup.
- add resources `altIsNotMeta` and `altSendsEscape` to allow one to use Alt-keys like the meta-key even if they are bound to different keycodes (prompted by discussion with Daniel Jacobowitz).
- revert a change from [patch #216](#) that unnecessarily made the meta modifier override the `eightBitInput` resource if the alt- and meta-modifiers happened to overlap (report/patch by Daniel Jacobowitz).
- correct associated font for active icon for colored text (broken in [patch #224](#)).
- correct ifdef's for Darwin (patch by Emanuele Giaquinta).
- add `highlightTextColor` resource, and options `-selfg`, `-selbg` like `xwsh` (adapted from patch by Victor Vaile).
- revise `find_closest_color()` function to address concern about borrowing from Tcl/Tk (request by Dan McNichol).

- add "spawn-new-terminal" action, which can be assigned to key translation, allowing one to spawn a new copy of xterm using the current process's working directory (adapted from patch by Daniel Colascione).
- improve select/paste between UTF-8 and Latin1 xterms by adapting the translations from [patch #185](#). Extend that to include Unicode fullwidth forms FF00-FF5E. Also modify select/paste of DEC line-drawing characters in Latin1 mode to use ASCII characters.
- add "Enable Bell Urgency" to VT Options menu, removed "Enable Margin Bell".
- add `bellIsUrgent` resource to control whether the Urgency hint is set/reset.
- modify to set Urgency window manager hint on bell, reset it on Focus-In event (patch by Emanuele Giaquinta).
- add `--disable-setgid` configure option (request by Miroslav Lichvar).
- fix a possible infinite loop in last change to `dabbrev-expand()` (patch by Emanuele Giaquinta).
- modify initialization to set the `pty erase` value if the `erase` is set in the `tttyModes` resource. This overrides the `ptyInitialErase` setting (request by Lluís Batlle i Rossell).
- add `initialFont` resource to xterm widget, like `tek-widget` (Debian [#299669](#)).
- amend change to `boldMode` from [patch #223](#) for Debian [#347790](#). As noted in Debian [#412599](#), that made xterm no longer match the documented behavior. Add new resource `alwaysBoldMode` to allow overriding the comparison between normal/bold fonts when deciding whether to use overstriking to simulate bold fonts.
- restore background color in `ClearCurBackground()`, omitted in changes for [patch #223](#) (report by Miroslav Lichvar).
- correct logic for repainting double-width TrueType characters (prompted by test-case for Novell [#246573](#)).
- add a check to avoid trying to repeat a multibyte character (report by Sami Farin).
- modify parameter to `XftNameParse()` to select wide face-name as needed, to make `-fd` option work (patch by Mike Fabian, Novell [#246573](#)).
- correct logic for mouse highlight tracking's abort sequence, broken in a restructuring modification from [patch #224](#) (report by Thomas Wolff).
- revert the simplification of blinking cursor, since that broke the xor'ing introduced in [patch #193](#) (report by Thomas Wolff).

Patch #224 - 2007/2/11

- simplify code for set/reset mode for blinking cursor (patch by Emanuele Giaquinta).
- modify `dabbrev-expand()` to restart after the last match (patch by Emanuele Giaquinta).
- add control sequences for enabling/disabling focus in/out event reporting (request by Bram Moolenaar).
- improve startup performance of menus by adding resource setting `menuLocale` which can be set to override X's lengthy initialization of fontsets - which are seldom used for the Xaw popup menus (adapted from patch by Dave Coffin).
- modify `do_precomposition()` function and make `-precompose.sh` to handle 21-bit codes vs the 16-bit codes those were written for, and fix a few mis-sorted codes (patch by Thomas Wolff).
- handle special case in `-cjk_width` which unexpectedly caused a character's width to change when a combining character (patch by Thomas Wolff)
- fix build for GNU/KFreeBSD (Debian [#40111](#)).
- consolidate GC creation/updating into a single module to reduce GC manipulation (prompted by Debian [#389476](#), though a complete fix would involve optimizing the scrolling behavior).
- fix `ifdef` of `xtermCellWidth()`, which broke for a case without TrueType and without wide-character support (report by Martin Pirker).
- undo a comparison in `handle_translated_exposure` which did not work due to X server optimization. That caused the inner border to be repainted with unexpected colors when handling a repaint, e.g., after switching to/from another workspace (Debian [#401726](#), Redhat Bugzilla [#223027](#)).
- allow `-cr` option to override cursor color when `-ah` option is used (Debian [#406502](#)).
- add a note in xterm's manpage explaining that the `-bw` (or `-w`) option is only used by the window manager, if at all (Debian [#405043](#)).

- make Selection of VT Fonts work with selectToClipboard resource.
- correct length calculation for Selection entry of VT Fonts menu, broken since it ignored the actual selection length since X11R4.
- fixes for fontsize changes with -fa option (Redhat Bugzilla [#222340](#)).

Patch #223 - 2006/11/30

- add --enable-rectangles configure option (request by Martin Pirker).
- correct default value for --with-symlink configure option.
- fixes configure script macros that use \$X_EXTRA_LIBS.
- modify configure script to provide support for pre-package config versions of Xft aka "FreeType".
- add the Xaw scrollbar translations resource to the xterm manpage, add an example showing how to change the mouse button assignments (Debian [#382225](#)).
- amend a change from [patch #216](#), which omitted modifiers for control, meta, etc., if they were mixed with any other modifiers. The intent of the change was to avoid confusion with XK_Mode_switch and XK_ISO_Level3_Shift; the check is now done explicitly (report by Daniel Jacobowitz).
- interpret a negative value for modifyCursorKeys or modifyFunctionKeys resources to disable the respective features (prompted by Novell [#220728](#)).
- amend cell-width computation for FreeType from [patch #217](#), which did not work for VT100 line-drawing characters (Debian [#399638](#), Gentoo [#147111](#)).
- amend a change from [patch #216](#), which made alt-modifier on a cursor-key send a modifier parameter (Novell [#220728](#)).
- correct an off-by-one that made DECCRA not work (report/patch by Martin Pirker).
- revert an optimization in SGR_Foreground() and SGR_Background from [patch #209](#) (Debian [#347722](#), analysis by Pierre Lombard).
- fix for boldMode (Debian [#347790](#), patch by Tim Pope).
- amend fix for -iconic in [patch #208](#), which broke the positioning part of -geom with toolbar configuration.
- fix to prevent indexing error in regular expressions (patch by Dennis Schneider).
- fixes to make the internalBorder area not change color due to reverseVideo and/or related exposure events. The latter was a very old bug exposed in [patch #196](#) (report by Neil Hoggarth, also Debian [#397624](#)).

Patch #222 - 2006/10/17

- minor optimization for recoloring cursor via dynamic colors.
- fix a bug caused by restructuring of tek4014 widget (report by Paul Schenkeveld)

Patch #221 - 2006/10/1

- fix for regular expressions: the code which converted the column offset within a line did not check properly for the end of a line, and if allowed to match the whole line, would select the beginning of the following line. If the following line were empty, in turn it would select from the next, etc. (report by Sean Reifschneider).
- minor optimization of color allocation to avoid repainting the screen if the corresponding color had not been allocated.
- fixes for vttests/256colors.pl (report by Egmont Koblinger).
- add terminfo building block entries for modifiers of the 6-key editing keypad.
- fix for initialization of tek4014 which broke on QNX 6.1

Patch #220 - 2006/9/10

- make "xterm -t -iconic" work as expected, i.e., start in tek4014 mode, but iconified.

Patch #219 - 2006/9/4

- some internal restructuring to separate data for vt100 and tek4014 widgets.
- fix a few cases where form-events would be seen by the vt100 widget when built with the toolbar configuration.

Patch #218 - 2006/8/27

- change behavior when encountering an illegal character in a title string. Rather than reject the string, translate illegal characters into "?" and use the string (requested by Thomas Wolff).
- improve checks for nonprinting characters in title strings (report by Samuel Thibault).
- correct typo in menu labels, changing `print-redirect` to `print-redir`, making it follow the manpage and match the usage for the actions table (report by Samuel Thibault).
- correct a typo that prevents building with some older systems such as Solaris 2.6 (report by Julian Bridle).

Patch #217 - 2006/8/20

- minor improvements to FreeType font layout and drawing.
- add a check in the `ptyInitialErase` logic to ensure that the `termcap` was read (Redhat Bugzilla [#201246](#)).
- limit changes for reverse-video from [patch #216](#) to cases where the reverse-video command-line option is used (report by Zdenek Sekera).
- correct bitmap-derived pointsizes for TrueType fonts; they should be proportional to the square root of the area of the bitmap fonts.
- add resources to specify pointsize of TrueType fonts (request by Reuben Thomas).
- improve install of terminfo by filtering out harmless messages related to extended capabilities. At the same time, use `ncurses tic` to compile the extended capabilities if possible (report by Zdenek Sekera).
- update "xterm+pcfkeys" terminfo entry to correspond to [patch #216](#).

Patch #216 - 2006/8/3

- improve handling of `ConfigureNotify` events by checking if there are further events in the queue which obsolete the current one (adapted from `rxvt 2.7.5`). Only the normal normal (non-toolbar) configuration is addressed in this patch.
- several changes to terminfo:
 - incorporate some minor changes from `ncurses` to help keep these synchronized:
 - 2005-02-26
modify `sgr/sgr0` in `xterm-new` to improve `tgetent`'s derived "me".
 - 2006-02-18
remove `ncv` flag from `xterm-16color`
 - 2006-06-24
improve `xterm-256color` by combining the 16-color `setaf/setab` strings with SGR 48, and cancelling the `setf/setb` strings.
 - use extended function-key definitions for `xterm-sun`, `xterm-sco` entries.

- add terminfo building-blocks corresponding to the `modifyFunctionKeys` and `modifyCursorKeys` resources.
- ifdef'd Sun function-key feature to make it optional, like HP and SCO.
- extend table for `termcap-query` feature through F63, and updated `tcapquery.pl` to match.
- modify logic for function-key input processing to allow function key numbers which are constructed by control- and shift-modifiers to extend beyond X's hardcoded limit of 35.
- add control sequence to set or reset the `eightBitInput` resource.
- change default resource `modifyFunctionKeys` to 2 to avoid sending SS3 with parameters (report by Kalle Olavi Niemitalo).
- add control sequences for setting and resetting the values of the `modifyCursorKeys`, `modifyFunctionKeys` and `modifyOtherKeys` resources.
- add `modifyFunctionKeys` resource like `modifyCursorKeys`. Setting this to zero allows one to use the control- and shift-modifiers to construct function key strings, for terminals using many function keys, e.g., for `xterm-sun` or `xterm-sco`.
- modify screen responses and function-key logic to reduce the number of writes made, to make it less likely that an application would read only part of a function-key in a read operation (suggested by John E Urbanczyk).
- add `combiningChars` resource, which allows the user to specify the maximum number of combining characters that xterm will store for each cell in wide-character mode (prompted by request by Markus Kuhn to increase the limit from 2).
- improve logic in `metaSendsEscape` in case the Alt- and Meta-keys are mapped to different modifiers. That allows one to use the Alt-key for shifting in the `eightBitInput` and use a Meta-key modifier to prefix the result with an `<ESC>`.
- improve `modifyCursorKeys` logic to prevent it from modifying codes where `eightBitInput` or `metaSendsEscape` are set (request by Dan Nicolaescu).
- improve `modifyCursorKeys` logic to prevent it from changing the user input when other modifiers such as `AltGr` are used (report by Thomas Wolff).
- extend `modifyCursorKeys` to include the numeric keypad when in application mode.
- improve `-reverse` (`-rv`) option (patch by Jason Vas Dias, Redhat [#189161](#)).
- workaround for color resources on Fedora-5 which made the toolbar colors inconsistent.
- corrected calls used for `--disable-setuid` option, add debugging traces to help diagnose this area.
- modify configure script to ensure that `USE_UTMP_SETGID` is defined only if the check for POSIX `saved-ids` succeeds, or corresponds to one of the BSD systems known to have a workable `setegid` function.
- extend configure check for POSIX `saved-ids` to include BSD systems
- modify `CF_SYSV` configure macro to work with gcc on HPUX 10.20, whose broken `<term.h>` relies on including `<termios.h>`.
- change order of `setuid/setgid` ifdef checks in `Imakefile` to make it simpler to produce a `setgid` install, allowing the latter to override the former (prompted by an XFree86 commit).
- adapt a fix for `setgid` support from subsequent XFree86 changes (patch by Emanuele Giaquinta).
- further improve `setgid` support (patches by Emanuele Giaquinta).

Patch #215 - 2006/6/19 - XFree86 4.6.99.2

- improve `setgid` support by exploiting the `saved-ids` feature on which it relies (patch by Emanuele Giaquinta).
- make the `modifyOtherKeys` resource disabled by default since the intermediate setting altered some common bindings (report by Emanuele Giaquinta).

Patch #214 - 2006/6/18 - XFree86 4.6.99.2

- modify makefile rule for `ctlseqs.txt` to strip backspace/overstrikes, and add a copy of `ctlseqs.txt` to the source tarballs (requests by Bram Moolenaar, Emanuele Giaquinta).
- add `modifyOtherKeys` resource, analogous to the `modifyCursorKeys` resource. This applies to keys that normally would transmit nothing when a given modifier is applied (request by Dan Nicolaescu).
- add `default` to the acceptable values for the `keyboardType` resource, allowing the `-kt` command-line option to override `app-defaults` resource settings of `sunKeyboard`, etc.
- correct `ifdef's` for `XkbBell()` which used the header file but not the corresponding function in [patch #175](#) (report by Zach Beane).
- add `xterm manpage` to the `--with-symlink` logic.
- regenerated `configure` script to omit some debugging artifacts of the `SIGWINCH` test.
- fix `install-man` rule in `Makefile.in` to avoid including the `$(DESTDIR)` value in substitutions made on the manpages (patch by Emanuele Giaquinta).
- improved fix for cursor deallocation (Redhat [#186935](#), patch by Jason Vas Dias).
- improve checks for `setuid/setgid` operation to accommodate limited resource management in some kernels (Gentoo [#193238](#)).
- update `config.guess`, `config.sub`

Patch #213 - 2006/4/30 - XFree86 4.5.99.905

- minor optimization to cell layout; will use that to simplify some logic and allow for more than two combining characters in another patch.
- add `utf8Latin1` resource to make optional the feature from [patch #209](#) which allowed ISO-8859-1 fonts to be used in cases where a wide font was given. This would only work for the special case where the user normally used Latin-1 and wanted some wide characters (report by Rostislav Krasny).
- add `utf8Title` resource to manpage (Novell [#52655](#)).
- fix typo in table entry for `utf8Title` resource which made it treated as an integer rather than boolean (patch by Mike Fabian, Novell [#52655](#)).

Patch #212 - 2006/4/9 - XFree86 4.5.99.904

- improve description of `forceBoxChars` in manpage (discussion with Joe Wells).
- set checkmark for "Select To Clipboard" menu entry on startup, from resource setting.
- update manpage to note that `*customization:color` is not needed, though it is useful (Redhat [#188034](#)).
- add underscore to sample pattern for URL in `XTerm.ad` (Redhat [#188037](#)).
- modify `install` rule for manpage to use the configured `app-defaults` directory (Redhat [#188031](#)).
- add checks in `releaseCursorGCs()` to ensure GC's are distinct, needed since memory leak changes for [patch #208](#) (Redhat [#186935](#), patch by Jason Vas Dias).
- modify `Imakefile` definitions to allow `imake` to set `InstallXtermSetGID`. Add symbol `InstGidFlags`.
- add `configure` script check to ensure that `SIGWINCH` is defined even when headers undefine this as a side-effect of `_POSIX_C_SOURCE`, etc.
- resync with XFree86 CVS
 - `ifdef-out` `chmod` of terminal device for OS/2 (XFree86 [#1663](#), Frank Giessler).
 - move new `Imakefile` chunk which defines `$(CSGIDFLAGS)` before `DEFINES`, e.g., for IRIX64 (Marc La France).

Patch #211 - 2006/3/19 - XFree86 4.5.99.902

- modify prefix/suffix transformation in makefile to make `uxterm` install properly on Cygwin.

- restore the sizeof-comparison for `struct lastlog` added in [patch #208](#), rendered (mostly) obsolete in [patch #210](#), since an imake configuration can still turn that code on (prompted by comment by David Dawes).
- remove feature for `FreeBSDArchitecture` from `Imakefile` which would install xterm using the `utmp` group since a standard FreeBSD system has no such group, though it would support this configuration. FreeBSD packager uses the `configure` script, which can make the appropriate check (prompted by comment by David Dawes).
- fixes for gcc redefinition warnings when built using imake (reports by David Dawes, Marc La France).

Patch #210 - 2006/3/12 - XFree86 4.5.99.902

- add configure check for workaround in [patch #208](#) for Solaris' inconsistent support for `struct lastlog` to quiet compiler warnings (prompted by David Dawes commit message for XFree86).
- fixes for BASE64 selection manipulation, e.g., ensure that the string terminator is written after cut-buffer data (report by Joe Allen).
- add `vttests/paste64.pl` script to test experimental option for setting/getting selection data.
- add some error-checking in `fontutils.c` (prompted by David Dawes commit message for XFree86).
- change xterm manpage to show the actual color resource names `XtDefaultForeground` and `XtDefaultBackground` rather than black and white (prompted by discussion with Emanuele Giaquinta).
- add `utf8Title` resource and menu entry, allowing the user to control whether title strings are interpreted as ISO-8859-1 or UTF-8 encoding (Novell [#52655](#), Novell [#113206](#)).
- change order of `ifdef`'s for `utempter` versus platforms in `Imakefile` to ensure a proper value for `InstallXtermSetGID` (prompted by Marc La France commit message for XFree86).
- update the cursor GCs when menu entry for reverse video is toggled. (Redhat [#183993](#)).
- a memory-leak fix for `set_cursor_gc()` in [patch #208](#) broke the `-cm` option (Redhat [#182382](#)).

Patch #209 - 2006/2/12 - XFree86 4.5.99.22

- remove `setf` and `setb` from `xterm-256color` terminfo entry to avoid issues with applications that ignore the ANSI strings (report by Emanuele Giaquinta).
- remove obsolete references to "Xorg" to avoid confusion with "X.org" (prompted by David Dawes commit message for XFree86).
- improve initial layout performance for the toolbar configuration by precalculating the height of the toolbar.
- remove menu entry for "Enable Curses Emulation" (to make room for "Select To Clipboard").
- add resource `selectToClipboard`, action `set - select` and a menu entry to allow users to switch between PRIMARY and CLIPBOARD for select/paste.
- allow cursor to have the same color as foreground (text), since it is rendered as reverse (Debian [#350664](#)).
- amend change for loading `utf8Fonts` resource from [patch #204](#) to allow an ISO-8859-1 "normal" font to be combined with an ISO-10646 font if the latter is given via the `-fw` option or its corresponding resource value (prompted by comment in Novell [#49305](#)).
- add `TIOCSCTTY ioctl()` `ifdef'd` for `__GNU__` to set the controlling terminal (Debian [#348457](#)).
- add configure option `--disable-leaks`.
- add a check in `Bell` to ensure that the VT100 widget is realized, since it may be called by `xtermLoadFont` given an incorrect font resource (Redhat [#180450](#)).
- improve initialization of wide-bold font by not using the derived value when it happens to have few glyphs (report by Mboso Sampson).
- improve dynamic colors by not repainting the screen if only the cursor color changes (request by Bram Moolenaar).
- fix menu initialization for tek4014 window broken in [patch #206](#).
- typo in manpage (Debian [#351425](#)).

- correct loop logic in `dotext` to prevent an infinite loop if a wide character was just at the right margin when wrapping was disabled (report by Serge van den Boom).
- initialize the saved-cursor data so a restore-cursor operation without a preceding save-cursor operation will not modify the foreground color.
- add a new selection feature: regular expressions, and new resources which specify what happens on multiple mouse clicks: `on2Clicks`, `on3Clicks`, `on4Clicks` and `on5Clicks`.
- revert the `XTerm.ad` change from [patch #208](#) (Debian [#348384](#)).
- fixes for the print-window to make it handle combining characters in UTF-8 mode.
- add check to ensure that double-clicking to extend selection will not extend it into the scrollbar area. This still allows users to scroll back and select text (Debian [#347415](#)).
- add configure option `--with-tty-group` to help work around deficiencies in packager's build environment (Debian [#349142](#)).
- fix typo in configure script option `--disable-narrowproto` (report by David Martínez Moreno).
- amend `CF_X_FREETYPE` changes for `pkg-config` check to ensure that `Xft` is known to that tool (report and patch by Emanuele Giaquinta).
- add an `ifdef` to allow `./configure --disable-active-icon` to work, broken by new code for testing memory leaks in [patch #208](#) (report by Brian Lindholm).

Patch #208 - 2006/1/3 - XFree86 4.5.99.19

- add `charClass` resource to `XTerm.ad` and `UXTerm.ad` which simplifies selecting URLs (prompted by Kirill Ponomarew).
- modify install rule for `uxterm` to account for the `--program-prefix`, etc., options by invoking the transformed name of `xterm` rather than simply "xterm".
- modify configure `--with-app-defaults` option to allow `--without-app-defaults`.
- add configure `--with-symlink` option to make it simpler to install successive versions of `xterm` renamed using the `--program-prefix`, etc., options with a symbolic link pointing to the most recent.
- make `-iconic` option work with toolbar configuration (Gentoo [#113604](#)).
- suppress `lastlog` feature for 64-bit Solaris configuration since that platform provides only a 32-bit interface (report by Peter Bray).
- fix memory reallocation for the "UTF-8" menu entry when `xterm` is started using the `+u8` option (reported by Jan Willem Stumpel).
- add a configure check for the actual path of `luit`, to work around broken `imake` configurations.
- add a configure check for `pkg-config` (Redhat Bugzilla [#173541](#)).
- modify install-rule for `uxterm` to omit executable suffix, e.g., for Cygwin.
- modify `sininstall.sh` to work around quirks in Cygwin configuration.

Patch #207 - 2005/11/13 - XFree86 4.5.99.16

- enable `lastlogx` support for NetBSD (was added, but not enabled in [patch #186](#)).
- work around broken `lastlog.h` in `glibc 2.3.5`, which includes `utmp.h`.
- revert part of recent XFree86 `Imakefile` change, restoring the `-I.` needed for `xmkmf` builds of `xterm` (XFree86 Bugzilla [#1633](#), reports by Alexander Pohoyda, Matthieu Herrb).
- change compiled-in default for `printerCommand` resource to an empty string. People who want to use the printer should be able to read the manual (Debian [#311490](#)).
- modify `Imakefile` to work around old problems in `imake` configuration to allow test-builds using `xmkmf` on Linux. (This was not noticed since several releases had broken definitions relating to `Xft` which were harder to work around).
- link `resize` for SCO platforms (Kean Johnston).

Patch #206 - 2005/11/3 - XFree86 4.5.99.15

- add configure `--with-app-defaults` option to allow app-defaults directory for install-rules to be customized.
- remove default translations for `dabbrev-expand()` due to conflicts with existing keyboard arrangements.
- remove redundant check for `_NET_WM_PID` (report by Emanuele Giaquinta).
- set icon border width explicitly to work around fvwm problem with active icon resizing (report by Steve Morris, analysis by Dominik Vogt).
- modify resource files to make the font-resources a little more specific, e.g., changing `"*VT100"` to `"*VT100."`, to make the distinction between VT100.font and VT100.utf8Fonts.font sharper, in case a packager modifies one of those.
- expanded comments in `UXTerm.ad` regarding the font resources (Debian [#319179](#)).
- add `--enable-narrowproto` configure option to accommodate X.org "modular" build (report by Stephan Hermann, Gentoo [#17220](#)).
- fix typo in `xterm.man` description of `+wf` (patch by Tobias Stoeckmann).
- add `scrollBarBorder` resource (request by Floyd L Davidson).
- modify `xterm-new` terminfo entry to use capabilities for shifted scroll forward/reverse as shifted cursor up/down.
- correct updating of checkmark for toolbar entry in popup menu (report by Emanuele Giaquinta).
- fix `ifdef's` to allow compiling with toolbar and without tek4014 (patch by Emanuele Giaquinta).
- use `openpty()` for Darwin port (patch by Emanuele Giaquinta).
- fix Gentoo [#90697](#) a different way, postponing the logic in `SetupToolBar` until the toolbar is actually needed, i.e., the `+tb` option is handled as expected.
- revert fix made in [patch #203](#) for Gentoo [#90697](#). That introduced a problem with the control mouse click-popups, while most of the performance problems can be resolved by restricting the menu fonts (report by Emanuele Giaquinta).
- fix a file-descriptor leak when calling `openpty()` (OpenBSD system/4561).
- make a special case of resizing work like vt100: a hard reset also resets the 132/80 mode. The code to support this was present since X11R5, but not used because the corresponding initial state of the `-132` option was not saved.
- restore window manager hints after `XtMakeResizeRequest()` calls. One instance from [patch #205](#) resulted in the window manager displaying pixels rather than than characters after selecting a different font size (FreeBSD ports/87424).
- remove special case for Darwin in `CF_XOPEN_SOURCE` (Emanuele Giaquinta).
- modify parsing of control sequence `CSI T` to allow scroll-down to be sent while mouse tracking is enabled (request by D Hugh Redelmeier).
- correct termcap "me" (mode-end) string so it does not modify the alternate character set (report by Andrey Chernov).
- correct size-comparison in `HandleInterpret()` broken in changes from [patch #201](#) to allocate input buffer (Debian [#334317](#)).
- amend adjustments for scrollbar layout from [patch #204](#) to make this apply only to the toolbar configuration. In the non-toolbar configuration, the resulting scrollbar was shifted by its borderwidth (report by Matthieu Herrb).
- add `select-cursor-extend()` action.
- fix some broken href's in `xterm.log.html`, and typo in the `INSTALL` file (report/patch by David Martínez Moreno).
- modify `Imakefile` to use `setgid` mode for installing with Linux, OpenBSD and FreeBSD.
- add configure `--with-setuid` and `--with-reference` options to allow packagers more flexibility in customizing install permissions.
- generalize and make optional (configure `--with-utmp-setgid`) the change made for XFree86 Bugzilla #878 in [patch #205](#) (FreeBSD bug report #ports/86663).

Patch #205 - 2005/9/18 - XFree86 4.5.99.12

- correct a typo in CF_FUNC_TGETENT introduced in [patch #198](#) fix for Gentoo [#69926](#).
- implement logic in termcap query to process multiple parameters as documented in `ctlseqs.ms`
- fix buffer size used for termcap query, which was not long enough for the terminfo "colors" name (patch by Bradd W. Szonye).
- add configure option `--enable-readline-mouse`, which turns on the experimental `OPT_READLINE` code (patch by Ilya Zakharevich).
- for FreeBSD, drop `setuid` privileges after startup (XFree86 Bugzilla [#878](#), report/patch by Alexander Pohoyda)
- add menu entry (alt-esc) and corresponding action (alt-sends-esc) to toggle the `eightBitInput` resource setting.
- generate configure script with `autoconf 2.52` (patched) to use the feature therein which forces the script's locale to POSIX (Gentoo Bugzilla [#105369](#)).
- modify computation of rows/columns on resize to avoid extending beyond the given limits, e.g., if resizing in response to a "maximize" in Gnome or KDE which do not use the window manager hints for this case (Debian [#289123](#), Novell [#61153](#)).
- modifications to work with z/OS 1.4 (Paul Giordano).
- improve error-reporting when `chown/chmod` of the pseudo-terminal fails, e.g., if a copy of `xterm` which was designed to work with old-style pseudo-terminals is not installed `setuid` or `setgid` (report by Jeremy C. Reed).
- patches from Emanuele Giaquinta:
 - `ctlseqs.ms` says that primary and secondary DA accept a nonzero parameter, which is incorrect. Also modify code to agree with this.
 - correct a comment in `88colres.pl`
 - `ctlseqs.ms` says that the DEC Set/Reset control sequences for the backarrow key make it send DEL/BS, respectively, while it's the opposite.
 - update the menu entries for the `metaSendsEscape`, `deleteIsDEL` and `numLock` resources when changing them with the corresponding DEC Set/Reset control sequences.
- fixes for configure script:
 - add special case for QNX, defining `_QNX_SOURCE`.
 - check for preprocessors which do not perform `-U` and `-D` options in the given order.
 - improve macro to determine gcc version
 - improve check for Intel compiler and related warning options
- update `config.guess`, `config.sub`
- improve fix from [patch #198](#) for `Cleanup ()` by ensuring it is not called from the `SIGCHLD` handler (patch by Todd Miller (OpenBSD CVS)).
- eliminate a retry for a better-matching bold font, to work around recent font server changes.
- fixes for Novell [#113277](#):
 - specify weight for wide font which may be derived from normal fontname.
 - cache the derived wide- and widebold-fontnames.
- workaround for Gentoo Bugzilla [#100728](#).
- add `menubar's border width` to layout computation. Normally this is zero, but patterns such as `XTerm*borderWidth:1` would give poor layout for the toolbar configuration.

Patch #204 - 2005/8/4 - XFree86 4.5.99.9

- work around quirk in shell which allowed user to "run" `uxterm` script when there was no UTF-8 locale installed by entering `"sh -x uxterm"`. Also popup an `xmessage` to show the problem for users who run this via a GUI (Debian [#318513](#)).
- disallow changes to fonts, toolbar and scrollbar when the `vt100` window is iconified, to simplify management of the active icon.

- fixes to make `-geom` option work properly with the toolbar configuration (Gentoo [#90717](#), Gentoo [#91967](#)).
- minor improvements to scrollbar layout: ensure that the scrollbar border is zero if the vt100 border is zero.
- improve initialization due to `utf8` resource by loading the `utf8Fonts` resource in the case where `locale` resource is false. Also in this case, do not disable switching UTF-8 mode on/off.
- minor optimization of TrueType font-loading, loads italic font only when needed.
- correct variable used to store temporary result from lookup of bold font, when initializing the wide-bold-font data and no immediate match is found by asking for a bold variant of the wide-font. The result was to use overstriking rather than the actual bold font (Debian [#318162](#), patch by Eugene Konev).
- add checks to ensure vt100 widget is realized when it might be updated via actions handled from a tek4014-only configuration.

Patch #203 - 2005/7/6 - XFree86 4.5.99.7

- modify initialization of `allowSendEvents` and `allowWindowOps` to prevent modification with the editres protocol.
- fix compiler warning for NetBSD by including `util.h` in `main.c` (XFree86 Bugzilla [#1596](#)).
- fix to build on Darwin 8.x, which no longer provides `setpgrp()` (patch by Min Sik Kim).
- adapted fixes for Legend (SCO) from diffs attached to Freedesktop.Org Bugzilla [#3180](#).
- fix typo in xterm manpage description of `-ls` option (Freedesktop.Org Bugzilla [#3543](#)).
- add support for interpreting the underline attribute as an italic font in Xft mode (patch by Chuck Blake).
- improve initialization of toolbar so that individual pulldown menus are initialized on demand, as they are in the scenario where they are invoked as popup menus (Gentoo Bugzilla [#90697](#)).
- fix logic in `find_utmp`, which did not reset result in `getutid()`, causing an infinite loop in some conditions (report by Emil Mikulic).
- set the `_NET_WM_PID` property (Gentoo Bugzilla [#91008](#)).
- modify `ifdef's` in `ptyx.h` and `xterm_io.h` to build with DragonFly (patch by Jeroen Ruigrok).
- change default values for `minBufSize` and `maxBufSize` to 4096 and 32768 respectively so that the initial read request will match the value from before changes to use `sched_yield()`.
- make paste of UTF-8 faster for Western character sets by checking range of incoming data (patch by Joe Allen).
- add experimental option to allow applications to get or set the selection data as a BASE64 string (adapted from patch by Joe Allen).
- fix an off-by-one error parsing `-S/nn` option (Debian [#311438](#), report/fix by Peter Chubb).
- fix an initialization bug from [patch #201](#) that broke logging (report by Rodney Thayer).
- amend change to command-line processing in [patch #201](#) to avoid conflict with `-e` option (report by Servatius Brandt).
- suppress configure check for `_XOPEN_SOURCE` on darwin.
- update `config.guess`, `config.sub`

Patch #202 - 2005/5/2 - XFree86 4.5.99.3

- add extended shift- and control-modifier cursor keys to "xterm+pcfkeys" terminfo entry to correspond to ncurses 20050430 patch.
- fix a rare case where text would be written with the wrong colors because output of scrolled text would reset the colors and the new text would be written with the same colors (report/testcase by Thomas Glanzmann).
- rename `$CMD` variable in `plink.sh` because it is a reserved symbol in bash 3.00.16 (report by Ted Taylor).
- add environment variables `$XTERM_SHELL` and `$XTERM_VERSION` (request by Zdenek Sekera).
- corrected workaround for background color of menubar, which gave a too-broad expression, coloring the background of the VT100 widget unless overridden by another resource setting.

- correct an error in the logic which decides when `sched_yield()` is run; it would occasionally hang when contending with other pseudo-terminal applications such as `screen` (report by Kirill Ponomarew).
- modify initialization to decide whether to default to built-in `wcwidth()` versus system's version based on the starting locale and whether the system's version is poor quality (suggested by Bram Moolenaar).
- update table for `mk_width()` from UnicodeData 4.1.0 using Markus Kuhn's `uniset` script.

Patch #201 - 2005/4/21 - XFree86 4.5.99.2

- improve resource files to show how the menubar and popup menus can be colored (prompted by report by Joe Wells).
- modify parsing of OSC (and SOS, etc), strings so their contents are not interpreted as UTF-8. This allows non-ASCII title strings to be set, provided that the window manager complies (report by Thomas Wolff).
- improved some of the built-in line-drawing glyphs.
- correct color of "box" character drawn for line-drawing glyph 1 (report by Nicolas George).
- improve behavior when switching to UTF-8 mode after startup so `xterm` will check if the current fonts are already wide (ISO10646-1). If they are not, `xterm` will use the `utf8Fonts` subresource to load appropriate fonts (request by Bram Moolenaar).
- modify logic for setting title-string so it applies to the current widget rather than the `vt100` widget.
- modify initialization for wide-bold fontname, to search for one if none is given (report by Michael Schroeder).
- add resource `mkWidth` and command-line option `-mk_width` to control whether `xterm` uses the built-in version of `wcwidth()`.
- add resource settings for minimum/maximum input buffer size, and call to `sched_yield` to improve performance with newer Linux kernels (adapted from patch by Nicolas George).
- correct computation of width for wide characters with the invisible attribute (report by Thomas Wolff).
- modify interaction between `+u8` and `locale` resource to allow the command-line option to override the resource (requested by Thomas Wolff).
- add a limit check for scrolling margins in a one-line screen, overlooked in fixes for [patch #198](#) (Debian [#297430](#)).
- correct treatment of `iconBorderWidth` for resizing an active-icon, and its description in manpage (Debian [#296592](#)).
- modify configure script `--disable-imake` to use the script's definitions anyway if it cannot detect `imake` (prompted by FreeBSD bug 77408).
- ignore error in the I/O initialization that tries to set the `tty` to 7-bit input for the case where `eightBitInput` resource is false (Debian [#298551](#)).
- modify command-processing to accept an optional parameter that tells `xterm` which shell program to use (request by Zdenek Sekera).
- add simpler resource `keyboardType` which, when set, overrides the individual keyboard-type resources and eliminates the possibility of conflict between them.
- add initialization for `scoFunctionKeys` resource (report by Rick K).
- correct logic of `ReallocateBufOffsets()` which did not copy the content of the old screen buffer to the proper location, making a repaint clear after switching to wide-character mode (report by Bram Moolenaar):
- implement the remaining pieces to make `xterm` allocate cells for wide-characters when the "UTF-8" menu entry is selected. Also, load the UTF-8 font when that menu entry is selected, or the escape sequence for UTF-8 mode is received (report by Bram Moolenaar):
- add command-line options (`-tb`, `+tb`) and resource `toolBar` to allow menu/toolbar to disabled or enabled at startup (prompted by reports by Joe Wells).
- correct typo in configure script's `--enable-dec-locator` option (report by Bram Moolenaar).

Patch #200 - 2005/2/6 - XFree86 4.4.99.23

- increase color pairs value for xterm-256color and xterm-88color to match ncurses, which has an experimental option to support this.
- modify ifdef's to make AIX use termios rather than termio; the struct sizes for the two were not the same.
- improve CF_WITH_IMAKE_CFLAGS configure macro script for OSMAJORVERSION and OSMINORVERSION values, e.g., for Tru64 and AIX.
- modify ifdef to define USE_POSIX_TERMIOS for Darwin (patch by Min Sik Kim).
- modify find_utmp() to initialize the whole utmpx struct (except ut_id), since that is needed for OSF1 4.0D to prevent an infinite loop on exit.
- add configure check before adding -D_POSIX_SOURCE since some platforms predefine it, e.g., cygwin.
- add simplified sed expressions in CF_IMAKE_CFLAGS configure script macro to ensure value for PROJECTROOT is quoted on Solaris, i.e., when nested \ (and \) are not interpreted correctly.
- correct DEC rectangle operations to reset state after completing the operations.
- modify CASE_ST handling in charproc.c to ensure that the parse state is reset even if xterm is not currently processing an OSC or other string (patch by Johnny Billquist forwarded by Matthias Scheler, NetBSD xsrc/29003).
- fix OS/2 build for innotek_libc (patch by David Yeo).
- fix a regression from [patch #197](#) fix for Debian [#277832](#) which disowned the selection if it was scrolled, e.g., by the user pressing return at the bottom of the screen (Debian [#291787](#)).
- move the warning/exit for missing \$DISPLAY into the error handler in case -display is given, and the connect fails for some other reason.

Patch #199 - 2005/1/17 - XFree86 4.4.99.22

- instead of setting \$DISPLAY, check for the unset variable and warn/exit on this condition (comments by H Merijn Brand and Bernhard R Link).
- fix a typo in Imakefile from [patch #198](#) (reports/patches by Stefan Dirsch, Mike Castle).

Patch #198 - 2005/1/13 - XFree86 4.4.99.21

- set \$DISPLAY to ":0" if it is not set.
- add utmpDisplayId resource to allow users to control whether the display identifier (display number and screen number) are retained in the connection information recorded in utmp (discussion with Edoardo Tirtarahardja).
- add bellOnReset resource to allow users to disable bell which sounds on hard reset since [patch #183](#) changes to DECSCS (discussion with Danek Duvall).
- improve \$WINDOWID for configuration with toolbar by making it refer to the top-level shell rather than the parent of the current window. For that case, the parent is a form widget, which does not have a name, which made the \$WINDOWID not very useful as a parameter for xwininfo (suggested by Dave Bodenstab).
- fix a typo in WhichVFont() macro from [patch #197](#) changes which broke the --disable-active-icon configuration (report by Ralf S. Engelschall).
- improve some limit checks (Gentoo Bugzilla [#75604](#)).
- add --disable-setuid option to configure script (Gentoo Bugzilla [#76543](#)).
- add --disable-full-tgetent option to configure script, allowing one to ignore a termcap library in favor of ncurses/curses (Gentoo Bugzilla [#69926](#)).
- modify configure script to choose useful warning options for Intel version 8.0 compiler.
- update config.guess, config.sub
- make active-icon work properly when TrueType fonts are used (Debian [#286068](#)).
- correct change from [patch #157](#) which uses getlogin() to check for an alias; the storage used for the related getpwuid() call was overwritten by the data used for comparison (patch by Per Hedeland).
- correct case of SCS for character set 0 (line-drawing) to allow it to be selected into GR.
- fix a file-descriptor leak (Redhat Bugzilla [#139597](#)).

- modify `creat_as()` to only fork if xterm is actually running as `setuid` and/or `setgid`. This works around a Cygwin bug which hangs when logging is enabled and makes xterm a little faster for systems using interfaces such as `utempter` (report by Al Goodman).
- modify `Cleanup()` to avoid operations such as X calls that might use unsafe functions when it is called by a signal handler (report by Michiel Boland).
- fix bugs in [patch #191](#) and in SRM changes from [patch #197](#) that broke DECSET 38: switch to Tek4014 emulation (report by Dave Bodestab).
- fix for manpage escapes (Marc La France).
- improve on IRIX-specific change for `Imakefile` in XFree86 CVS versus `resize` linking against `termcap` library to reflect definitions for `USE_TERMCAP` in `resize.c`

Patch #197 - 2004/11/30 - XFree86 4.4.99.19

- modify `configure` script to remove empty `"-DPROJECTROOT="` definition which resulted unusable values for `luit`'s default path.
- update `precompose.c` based on Unicode 4.0.1
- several minor fixes based on Intel compiler warnings.
- change default translations so a `Btndown` which is not recognized is simply ignored rather than emitting a bell. That makes it less obtrusive when the user tries to use a mouse which provides more capabilities than the X mouse driver supports, e.g., one with a horizontal scroll wheel (Debian [#265133](#)).
- note in xterm's manpage that `translations` is not specific to xterm (Debian [#278897](#)).
- modify `uxterm` script to use locale program to verify if the derived locale is installed (Debian [#246398](#)).
- correct font handling for active icon when in UTF-8 mode (report by Paolo Liberatore).
- make active-icon and toolbar configurations work together.
- modify the criteria for disowning primary selection. Previously, this happened anytime the cursor was moved before the end of the selection. That would ensure that any insert/delete of char or line, as well as scrolling, would disown the selection. The new criteria change this to checking if the operations would modify the data which is highlighted (Debian [#277832](#)).
- reimplement `DECALN` with functions for vt420 rectangles, fixes selection for this case.
- implement vt420 rectangle operations.
- add parsing, for debug/test of vt220 soft-fonts.
- add menu entry, actions and escape sequence to allow enabling/disabling toolbars at runtime.
- improve rendering for Xft, allow it to draw non-linedrawing characters such as "pi", which were drawn from internal tables with [patch #180](#) (Freedesktop.org Bugzilla [#1260](#)).
- add `configure` option `--enable-mini-luit`, `ifdef'd` the mini-luit feature with `OPT_MINI_LUIT`.
- add mini-luit feature, which supports Latin9 directly rather than via `luit`, provided that Unicode fonts are used (Freedesktop.org Bugzilla [#1571](#), request by Stefan Dirsch, patch by Michael Schroeder).
- for Linux, if `IUTF8` is defined, e.g., on recent 2.6.x kernels, set the corresponding flag for the slave pty, to enable UTF-8 interpretation of backspace in cooked mode (Freedesktop.org Bugzilla [#1578](#), request by Stefan Dirsch).
- modify `faceSize` resource to use a floating-point internal value (adapted from patch by Sam Stephenson).
- correct handling selection of tabs over cleared space in UTF-8 mode. In this special case, xterm represents the whitespace with a null rather than a space character (Debian [#276447](#)).
- amend fix for infinite loop from [patch #192](#) to check if there is wrapped text to output in a following iteration (Debian [#273202](#)).
- fixes `ifdef'd` with `__INTERIX` to allow building with Interix (Windows Services for UNIX) 3.5 using the `xlibs` libraries from freedesktop.org (patch by Min Sik Kim).
- amend solution for Debian [#252873](#), Debian [#260471](#) from [patch #194](#) by making the cursor not explicitly colored if only the foreground color is set, and the cursor is on a blank space (Debian [#275473](#)).
- correct logic for send/receive mode (SRM) with regard to control characters.
- fix masking of invisible text in wide-character mode, which did not work for line-drawing characters.
- incorporate `CF_XOPEN_SOURCE` into `configure` script, replacing `CF_GNU_SOURCE`.

Patch #196 - 2004/8/15 - XFree86 4.4.99.12

- add a special case to configure script to ignore NetBSD's `grantpt()` which was recently added (but not part of a release), until someone is able to ensure that xterm can use it (report by Min Sik Kim).
- clear the buffer returned by `getuid()`. This fixes an infinite loop on some platforms introduced in [patch #193](#) by Debian [#256468](#) fix (report by David Ellement).

Patch #195 - 2004/8/8 - XFree86 4.4.99.11

- correct length used for blinking text, make the last column blink (patch by Alexander V Lukyanov).
- start changes to make doublesize characters work with TrueType fonts (see [patch #44](#)).
- trim leading/trailing blanks from color resources as done for other strings in [patch #167](#).
- fixes for `showBlinkASBold` resource (report by Christoph Berg).

Patch #194 - 2004/7/27 - XFree86 4.4.99.11

- change clearing operations so foreground color attribute is not set. Usually this is benign, but in some cases when the cursor color is not set explicitly, the cursor would show this color (Debian [#252873](#), Debian [#260471](#)).
- add extra state (`cursor-moved`) to guard against deciding that the cursor did not require repainting after an indexing operation that leaves the cursor in the same location on the screen.
- fix a case where a full-screen indexing operation would not restore the cursor-busy state.
- fix a repainting bug introduced in [patch #180](#): when using a font lacking line-drawing characters, a repaint of the screen could skip horizontally an extra amount after filling in the missing character (reports by Nicolas George, Hans de Goede, Redhat Bugzilla [#128341](#)).
- rename terminfo fragment `"xterm-pc-fkeys"` to `"xterm+pcfkeys"` for consistency with ncurses.

Patch #193 - 2004/7/19 - XFree86 4.4.99.10

- fix for wide-character selection from OpenBSD CVS (report/patch by Matthieu Herrb).
- modify initialization and cleanup of `utmp` data to also compare the `ut_line` member (Debian [#256468](#)).
- modify check on focus-change to ignore `FOCUSOut` events generated by `XGrabKeyboard`. This fixes a case where the text cursor would act as if focus were lost when selecting the "Secure Keyboard" menu option.
- add `gen-pc-fkeys.pl` script, use that to generate terminfo fragment corresponding to the pc-style function keys.
- fix a case where the checkmark by the "VT220 Keyboard" menu entry was not set on startup.
- separated two methods for making the cursor blink (menu and escape sequence) by using the menu as the primary method and XOR'ing the state of the escape sequence against that.
- modify logic for enabling blinking cursor via escape sequence as well as the related save/restore operations so this is only available if the `cursorBlink` resource was set on startup.

Patch #192 - 2004/7/12 - XFree86 4.4.99.9

- change resource settings for `color4` and `color12`, add some discussion in `XTerm-col.ad` (Debian [#241717](#)).
- add a note in xterm manpage discussing the difference between alt- and meta-keys, and the way the latter is used in the `eightBitInput` resource.
- add a note in xterm manpage regarding possible conflict between resource settings for `xterm.vt100.font` and `xterm.vt100.utf8Fonts.font` (Debian [#254650](#)).

- add compile-time customization of `backarrowKeyIsErase` and `ptyInitialErase` default resource values (adapted from OpenBSD CVS).
- change parameter of `FIONREAD ioctl()` call from `long` to `int` (discussion on tech-x11@netbsd.org regarding LP64 by John Heasley and Matthias Scheler).
- modify configure script options for Athena widgets to work as expected for "--without-Xaw3d", etc., (Gentoo Bugzilla [#53455](#)).
- add case to `uxterm` to accommodate locales ending with "@euro", e.g., `fr_FR.UTF-8@euro` (Debian [#255197](#), report/analysis by Matthieu Lagouge).
- add special case for VT100 graphic's "box" character (discussion with Ben Armstrong).
- add missing initialization for bitmap-font sizes needed to make fonts menu work with TrueType fonts (report by Ben Armstrong).
- save the fontnames for bold fonts that are derived from normal fonts, or from the `boldFont` resource, so the same value is restored when switching with the VT Fonts menu (Debian [#256086](#)).
- fix manpage preprocessing (Marc La France).
- fix typo in manpage's description of character classes (Debian [#257073](#)).
- modify `terminfo` to accommodate `luit`, which relies on G1 being used via an ISO-2022 escape sequence (Debian [#254316](#), analysis by Juliusz Chroboczek).
- modify `Makefile.in` rule for `ctlseqs.txt` to work around groff SGR misfeature.
- modify `XTerm.ad` to set `saveLines` default to 1024 (Redhat Bugzilla [#127132](#)).
- add a limit-check in `dotext()` to prevent infinite loop in a corner case of UTF-8 configuration.
- update `config.guess`, `config.sub`

Patch #191 - 2004/6/6 - XFree86 4.4.99.7

- correct options parsing for `-into` option so it can be combined with `-e` (Redhat Bugzilla [#124518](#), report/patch by James Armstrong).
- fix `ifdef`'s for `OPT_COLOR_RES2` so that the fake resource table introduced in [patch #188](#) is not compiled if it is empty. This happened to work with `gcc` (report by Joel Konkle-Parker).
- reorganize `ptydata.c` to use one input buffer shared between the VTxxx and tek4014 emulators. In the new scheme, UTF-8 decoding is performed on characters as they are needed by the state machine rather than on buffers as they are read.
- work around change in quoting of `PROJECTROOT` symbol when using configure script, from changes made in [patch #187](#) for `CF_IMAKE_CFLAGS` (Gentoo Bugzilla [#50982](#)).

Patch #190 - 2004/5/25 - XFree86 4.4.99.6

- correct state for values in the range 128-159 after translating from UTF-8: this should be ignored unless the user overrides it with the `allowC1Printable` resource (reported by Simon Strandgaard).
- add configure-script check for `nl_langinfo(CODESET)`, use this to replace check of environment variables for UTF-8.
- change `Makefile.in` rules for `256colres.h` and `88colres.h` so they are only made if they do not exist. The `maintainer-clean` rule will remove these files; they require `perl` to be made.
- remove check in configure script `--enable-toolbar` that suppressed this option when building with `Xaw7`.
- apply fixes to Tektronix widget used for VT100 widget to make toolbar work with `Xaw7` (XFree86 4.x).

Patch #189 - 2004/5/16 - XFree86 4.4.99.6

- do not call `xim_real_init()` if `openIm` resource is false (Debian [#249025](#)).
- minor improvements to built-in line-drawing.
- fix a few portability issues with dynamic abbreviation support, i.e., did not compile on Tru64.
- modify constraints in form used to layout toolbar, to work with newer `Xaw` in XFree86 4.x.

Patch #188 - 2004/5/12 - XFree86 4.4.99.6

- correct table entry for DEL in the ground state, which marked it as a printable character from [patch #171](#) (report by D Hugh Redelmeier).
- improve fix in [patch #186](#) for failure in `xim_real_init()` by adding a sleep.
- fix a typo in `os2main.c` (XFree86 Bugzilla #1358, report/patch by Frank Giessler).
- make escape sequence reporting dynamic colors consistent with the logic that sets it; choosing the opposite color when reverse video is set (XFree86 Bugzilla #1361, reported by Bradd W Szonye).
- modify initialization of 256- and 88-colors so that colors beyond 16 are normally not X resources. This works around a hard-coded limit in Xt which breaks xterm when 256-colors and luit are both configured (report by Noah Friedman).
- remove `ncv` from `xterm-256color` terminfo entry since it is no longer needed (report by Eli Zaretskii).
- add "erase2" and "eol2" keywords to `ttyModes` resource, for recent/current FreeBSD.
- improve `ifdef`'s for utempter library to omit direct calls to `setutent()` or `getutent()` (adapted from patch by Christian Biere).
- add dynamic abbreviation support like Emacs (patch by Tomasz Cholewo). This is `ifdef`'d with `OPT_DABBREV`, and enabled via the configure script `--enable-dabbrev` option.
- fix problem responding to session management events, e.g., which would make logging out very slow (patch by Eddy De Greef, Debian [#233883](#)).
- work around a newer bug in toolbar with XFree86 by forcing menus to be fully initialized at startup. In older versions of XFree86 and X11R6, it was possible to delay initialization of the menu contents until it was popped up. (The longstanding bug with XFree86 4.x layout for toolbar still exists, though).
- modify `xtermAddInput` to work around core dump on IRIX64 when initializing scrollbar translations if toolbar is compiled-in.
- fix some minor conflicts in the 2-character entry names in the termcap file.

Patch #187 - 2004/4/27 - XFree86 4.4.99.4

- change xterm version string to use `__vendorversion__` where that is available, and "XTerm" otherwise.
- improve description of `utf8` resource in manpage (Debian [#179407](#)).
- modify configure macros `CF_IMAKE_CFLAGS` and `CF_ADD_CFLAGS` to handle `-D` options that define string values, e.g., for `XVENDORNAME`.
- modify configure macro `CF_IMAKE_CFLAGS` to allow (if `$PATH` is set accordingly) to use the `xmkmf` script within an X build tree.
- add missing `#undef OPT_SESSION_MGT` to `xtermcfg.hin` to make the configure script's `--disable-session-mgt` option work.
- update `config.guess`, `config.sub`

Patch #186 - 2004/4/18 - XFree86 4.4.99.4

- change reset on `DECSC` to a soft-reset (appears some DEC manuals have errors).
- add a section to `ctlseqs.ms` elaborating on normal/alternate screens.
- modify initialization of `Acolors[]` so that any `XtDefaultForeground` or `XtDefaultBackground` values are translated as in the `Tcolors[]`, to use the window's foreground/background colors. This affects the `COLORBD` and similar resources which normally have no explicit color assigned.
- modify initialization of Tektronix window so that control sequences setting its color before the window is popped up will apply to its initial colors.
- add control sequence to set Tektronix window's text-cursor.

- modify initialization of terminal colors, e.g., mouse pointer and text cursor, to treat `XtDefaultForeground` and `XtDefaultBackground` values as the actual foreground and background colors of the terminal rather than white and black (Debian [#241717](#)).
- remove an incorrect comparison against `PTYCHARLEN` in parsing the `-S` option (report by Michael B Taylor).
- minor restructuring of `terminfo/termcap` files, having noted some packager's customizations which caused the structure to be confused.
- eliminate an isolated use of `MIN/MAX` in `charproc.c`
- replace `XtExtdefaultfont` and `XtExtdefaultbackground` by their more familiar equivalents `XtDefaultFont` and `XtDefaultBackground`.
- replace `ifdef`'s using `SCO`, `sco` and `SCO325` with `__SCO__` (XFree86 Bugzilla #1301, Kean Johnston). But ensure that it still builds on platforms where this symbol is not defined.
- add `SCOFunctionKeys` resource, to match manpage.
- update manpage discussion of menus and related resources.
- enable `utmpx` support for NetBSD 1.6C and newer (patch by Matthias Scheler).
- add a note in the manpage discussing `xterm`'s treatment of open file-descriptors (request by Dan Shearer).
- modify `Help()` to make "`xterm -h`" write to standard output rather than standard error (patch by Bram Moolenaar).
- check for type of failure in `xim_real_init()` to avoid looping when the problem is an unsupported input method rather than a failure to connect to the XIM server. Problem was introduced in [patch #175](#) (XFree86 Bugzilla #1306).
- modify `Imakefile` to remove dependency of "install" target on the `xterm` executable to make installs from tree without attempting to rebuild anything (commit by David Dawes, report/patch from Lee Olsen).
- remove call to `ShowCursor` from `SetCursorBlink()` since that is redundant, and can cause display glitches if the cursor is already blinking (XFree86 Bugzilla #1158, patch/report by Andreas Schwab).

Patch #185 - 2004/3/3 - XFree86 4.4

- fix `tcap-query` logic for the backspace key (XFree86 Bugzilla #1233, report/patch by Anton Kovalenko).
- add test-scripts `resize.pl` and `tcapquery.pl`
- add translation to ASCII of commonly-used characters that `groff` translates to Unicode, when the font in use does not provide the corresponding glyphs (Debian [#219551](#)).
- modify `RequestMaximize()`, which performs maximize/restore via control sequences, to account for window-frame (patch by Jess Thrysoee).
- improve pattern used in `uxterm` to check for UTF-8 locale, e.g., for HPUX (patch by H Merijn Brand).
- add `-fd` option and resource `faceNameDoubleSize` to specify double-wide fonts with Xft (adapted from patch by Zarick Lau).
- change a couple of resource classes from "Boolean" to specific values: `freeBoldBox`, `forceBoxChars`.
- add resource `showMissingGlyphs` to outline places on the screen where a font lacks the corresponding glyph.
- add resource `showBlinkASBold` to control whether blinking text should be shown as bold or actual blinking text.
- improve logic in `ShowCursor()` to avoid repainting the cursor when it is already visible, e.g., in response to the `DECTCEM` escape sequence. This also addresses XFree86 Bugzilla #1158.
- implement blinking text, using the timer for blinking cursor.
- modify FreeType support to allow resizing the font, in the same ways the window can be resized if fixed fonts are used. The relative font sizes are derived from the fixed font sizes.
- add menu items and corresponding actions for switching on/off the UTF-8 mode and Xft (TrueType) support.
- add logic to handle switching UTF-8 mode on/off. It worked if the escape sequences were flushed, but if data was mixed in with the same write, some were not handled properly (report by Nicolas George).

- modify to allow turning UTF-8 mode on/off via escape sequence even if `-wC` option was not given at startup (patch by Peter Berg Larsen).
- amend fix for XFree86 Bugzilla #981, adjusting for savedlines value (report by Tim Adye).
- fix a typo in computing relative font size (Jess Thrysoee).

Patch #184 - 2003/12/31 - XFree86 4.3.99.903

- improve configure-script checks for FreeType and related libraries, using `xft-config` or `freetype-config` scripts when available.
- fix configure-script check for SYSV definition by ensuring whether `sys_errlist[]` is declared, and by modifying the test program to include `X11/Intrinsic.h` to check that `wchar_t` is declared consistently (report by H Merijn Brand).

Patch #183 - 2003/12/26 - XFree86 4.3.99.903

- correct logic for configurations that may attempt to open both old/new-style pseudoterminals. In this case, the old-style are preferred. Logic was broken in [patch #145](#) (XFree86 Bugzilla #997, report/patch by Kean Johnston).
- modify handling of `eightBitInput` resource in UTF-8 mode to translate the value into UTF-8. Otherwise an illegal UTF-8 code is sent to the application (report by Bram Moolenaar).
- modify `uxterm` script to interpret help and version options so `xterm` does not always create a window when the user requests this information (Debian [#223926](#)).
- add a limit check to `ScrnTstWrapped()` (XFree86 Bugzilla #981).
- modify `DECSCCL` to perform a hard reset (RIS) as per DEC manuals. Extended `DECSCCL` to accept parameters for `vt4XX` and `vt5xx` terminals.
- correct logic for ANSI conformance level escape sequences, which were confused with DEC conformance level escape sequences.
- correct state for `vt52` shift-in/shift-out, which was not reset properly after [patch #171](#).
- correct handling of graphics characters for `vt52` mode, which did not display line-drawing characters after G1 fix from [patch #182](#).
- fixes for configure script to work with current Cygwin headers and libraries.
- modify `Imakefile` to put the current directory at the beginning of the include searchpath (patch by David Dawes).

Patch #182 - 2003/12/2 - XFree86 4.3.99.901

- correct logic for `metaSendsEscape` resource to allow for the meta-right key to be tested. Improve check for meta/alt modifiers by dropping the assumption that a keysym is associated with only one modifier, and by ignoring `NoSymbol` entries in the `xmodmap` data (XFree86 Bugzilla #924, patch by David Dawes).
- correct wrapping logic for line-drawing characters written in non-UTF-8 mode of `xterm` build for wide-characters (XFree86 Bugzilla #918, report/patch by Jürgen Keil).
- improve manpage description of resources, in particular the `utf8Fonts` class (XFree86 Bugzilla #905).
- add definitions to compile with glibc-based GNU/Hurd, GNU/KFreeBSD and GNU/KNetBSD (XFree86 Bugzilla #893).
- compiler-warning fixes (patch by Christian Biere).
- add `README.i18n` (Tomohiro Kubota).
- correct initialization of G1 character set mapping, which used line-drawing set as a result of confusion between "DEC Supplemental Graphic" and "DEC Special Graphic" character sets (see [patch #34](#) regarding `DECSTR`).
- correct `ifdef` in `main.c` for variable `utret` (patch by Bernhard Rosenkraenzer).

- document in xterm's manpage how to use XFree86 ":unscaled" keyword to suppress scaling of bold fonts.
- when deriving bold fontname from normal fontname, use the normal font's average width to avoid for example selecting 7x13bold from an 8x13 normal font (Debian [#107769](#)).

Patch #181 - 2003/10/26 - XFree86 4.3.99.15

- implement boldMode for wide-character logic in drawXtermText() (report by Michael Schroeder).
- modify UXTerm.ad resource file to include "XTerm-color" rather than "XTerm", in case the latter file contains no color resource definitions, e.g., after [patch #180](#).
- add action load-vt-fonts() and configure option --enable-load-vt-fonts which allows users to define additional sets of VT-fonts which can be loaded at runtime.
- add logic to wide-character support which attempts to load fonts specified by utf8Fonts subresources at startup. The subresources have the same names as the fonts which they replace, e.g., font, font1, etc., so that the ISO-10646-1 fonts can be specified in the XTerm app-defaults file (adapted from patch by Tomohiro Kubota).
- improve Set Font escape string handling by making the relative settings apply to the size of the font, as in shift keypad plus/minus rather than the menu index.
- simplify parameter passing for the set-vt-font action and related code.
- cleanup some include-ordering, moving some recently-added hardcoded stuff into xterm.h where it will not interfere with the configure script.
- modify xtermAddInput() (see note on augmentation in [patch #158](#)) to use the complete set of default keyboard translations so that one can use shifted pageup, wheel mouse, etc., while the mouse pointer is over the scrollbar. (Debian [#178812](#)).
- make save/restore mode controls apply to show/blink cursor states.
- add escape sequence to start/stop blinking cursor, which allows implementing cvvis terminfo capability (request by Nate Bargmann).
- add indp and rin to terminfo entry.
- fix an out-of-bounds array reference in ScrnRefresh() for wide characters (report by Dan Harnett, patch by Todd Miller). This bug dates from [patch #141](#).

Patch #180 - 2003/10/12 - XFree86 4.3.99.15

- several fixes for rendering using Xft via option -fa:
 - translate Unicode values, i.e., from UTF-8 output to xterm, for line-drawing to xterm's internal code, etc., since TrueType fonts generally do not have either set of line-drawing glyphs. xterm can draw these directly (report by Abigail Brady).
 - pass 16-bit values rather than 8-bit values to xtermXftDrawString() to allow for wide-characters.
 - remove spurious check for colorBDMODE resource in logic that does bold fonts.
 - implement underlining.
- patches by Ilya Zakharevich:
 - improve drawXtermText() by making the recursive calls communicate through arguments, and not through saving/restoring global variables.
 - make double-width characters work with -u8 option.
 - modify lookup of double-sized fonts by checking for a match ignoring x/y resolution if the first check fails.
- make height of TrueType fonts match ascent+descent (patch by Keith Packard).
- correct configure-script check for imake \$CFLAGS, which did not check properly if imake was not available.
- correct install rule in Makefile.in for xterm, which was attempting to strip the script (newsgroup posting by Fernan Aguero).
- correct AF/AB strings in termcap for xterm-256color and xterm-88color entries (report by Josh Howard).

- update `wcwidth.c` to incorporate changes from Markus Kuhn's 2003-05-20 (Unicode 4.0) version of that file.
- modify `scroll-back` and `scroll-forw` actions to accept an adjustment value, e.g.,

`scroll-back(1, page-2)`

to scroll back by 2 lines less than a page (patch by Greg Klanderma).

- use color resource setting from Debian package for xterm VT100 widget, since the choice of blues provides better contrast.
- remove color resources from `XTerm.ad`, leaving them only in `XTerm-col.ad` (prompted by Debian package for xterm).
- correct configure script option `--enable-pty-handshake` (report by Paul Gilmartin).
- add `visualBellDelay` resource to modify the length of time used for visual bell, for very slow displays or very fast computers (reports by Ingo van Lil and Doug Toppin).
- correct logic for initializing dynamic highlight color (patch by Jess Thrysoee).
- add a check for non-zero size in call to `XCopyArea()` to accommodate a Solaris bug.
- correct typo in example for character classes in xterm manpage (Debian [#198910](#)).
- link xterm with `bind_on_load` option on Darwin to work around a deadlock in the dynamic loader when a signal is received while the dynamic loader is looking up symbols (patches by Rob Braun, Torrey Lyons).
- modify configure script to avoid using "head -1".
- update `config.guess`, `config.sub`
- modify `ifdef's` to work around inclusion of types `FcChar32` and `XftCharSpec` with FreeType 2.0 (see [patch #175](#)).
- modify the predictable version of the generated logfile name (see [patch #171](#)) to append the process-id rather than a random value.
- resync with XFree86 CVS
 - Enable SCO function keys in xterm
 - Make Delete key send DEL by default on SCO in xterm

Patch #179 - 2003/5/21 - XFree86 4.3.99.5

- modify `ifdef's` for `WTMPX_FILE` to allow building on cygwin again.
- change the default of `pty-handshaking` configure option (and related default for `imake`) to assume this feature is needed.
- add `ifdef's` so configure option for XawPlus library works (patch by Pavel Roskin).
- add `$(MAIN_DEFINES)` to the variables checked by the configure script that may contain information set by `imake`. This allows xterm to build/run properly using the configure script on IRIX64.
- add configure check for ".exe" suffix on cygwin.

Patch #178 - 2003/5/18 - XFree86 4.3.99.5

- modify default for configure `--enable-pty-handshake` option to enable it for Solaris (report by Nelson Beebe).
- modify `in_put()` function to call `PreeditPosition()` only when the cursor's position has changed. This addresses report by Stefan Baums of high CPU usage while xterm with `chinput` are running in the background (patch by Yong Li).
- improved explanation of `-ls` conflict with `-e` option in xterm manpage (adapted from comments by Henning Makhholm).
- correct comment in terminfo file regarding modifier used for kDC (Debian [#189764](#), report by Henning Makhholm).
- correct/extend some of the keypad description in `ctlseqs.ms` (report by Henning Makhholm).
- correct keypad-mapping table in `input.c` so `XK_KP_Equal` works (report by Henning Makhholm).

- modified to work with CJK double-width (bi-width/monospace) fonts. They're similar to Roman Czborá and David Starner's gnuunifonts in that Latin letters and numbers have all the same width which is exactly the half of the width of East Asian characters. (patch by Jungshik Shin <jshin@mailaps.org>).
- add configure option `--enable-broken-osc` and resource `brokenLinuxOSC` to accommodate scripts which do not distinguish between running in the Linux console and running in X. Linux console recognizes malformed control strings which start with an OSC, but are fixed-length, with no terminator.
- add configure option `--enable-broken-st` and resource `brokenStringTerm` to allow user to revert one part of the parsing table corrections from [patch #171](#). (reports by Matthias Scheler and Kirill Ponomarew indicate that someone's network firmware sends an `<escape>X`).
- modify configure `--disable-imake` to provide values for `OSMAJORVERSION`, `OSMINORVERSION`, `FUNCPROTO` and `NARROWPROTO` (report by Heiko Schlichting).
- correct `vttests/16colors.sh`, which omitted the `$SUF` variable in output strings (patch by Paul Gilmartin).
- modify shell scripts in `vttests` directory to attempt to use named signals in the `trap` statement, making this portable to OS/390 (report by Paul Gilmartin). Tested on SunOS 4.1.4, which implements only numbers.

Patch #177 - 2003/3/23 - XFree86 4.3.0

- fix definition of `USE_HANDSHAKE`, must be numeric (reported by Jens Schleusener).

Patch #176 - 2003/3/22 - XFree86 4.3.0

- add configure option `--enable-pty-handshake` to allow one to compile-in support for the pty handshaking logic, and resource `ptyHandshake` to enable or disable it (suggested by Ian Collier).
- restore `USE_HANDSHAKE` ifdef removed in [patch #159](#) to address Debian [#39964](#).
- move ifdefs for `ttysize/winsize` into `xterm_io.h`
- simplify loop on `tgetent`, check if the successive entries in the lookup table are the same. That makes `xterm` do one less lookup if there is no "xterm" entry in the termcap file (report by Derek Martin).
- correct manpage discussion of `$TERM` and `$TERMCAP` variables, which omitted the Tektronix emulation and a note of the final "dumb" fallback.
- broaden ifdef for `XRegisterIMInstantiateCallback()` from [patch #175](#) (XIM fix) to exclude non-XFree86 (report by Nelson Beebe indicates this breaks for Solaris, IRIX and OSF/1).
- correct resource-size for `iconFont` (this was added by X11R6.3).
- improve configure check for XKB bell extension, to work around inconsistent implementation of this feature (reports by Nelson Beebe, Kriston Rehberg and David Ellement).
- modify configure-check for `tty` group to be less strict in batch mode (report by Nelson Beebe).
- modify to allow building with `g++`, to use its compiler warnings (suggested by Nelson Beebe).
- modify `dec2ucs[]` table to reflect newer codes available for scanlines 1, 3, 7, 9 (report by Michael Schroeder).
- add configure option for `XawPlus` library.

Patch #175 - 2003/3/9 - XFree86 4.3.0

- fix a `SIGSEGV` which could occur if `xterm` is connecting to XIM server, and the XIM server is destroyed (patch by Nam SungHyun).
- modify to use built-in line-drawing characters for Xft fonts (patch by Andrew Tipton).
- make menu reflect the state of the `tekInhibit` resource.
- make `signalInhibit` resource work, i.e., disable the menu entries that would send signals to, or exit `xterm`. This was probably broken in X11R5 when logging was disabled (report by Sven Mascheck).

- changed classes of `colorBDMode` and similar resources that override colors when a video attribute is set to `ColorAttrMode`, to make them distinct from `ColorMode`. This avoids an unexpected rendering of reverse video, for example (report by Paul Fox).
- changed class of `veryBoldColors` to `VeryBoldColors`, since `ColorMode` is associated with boolean resources.
- add option `-k8` and resource `allowC1Printable` to allow users of non-VTxxx character sets such as KOI-8 to treat the C1 control area (character codes 128-159) as printable rather than control characters.
- add a null-pointer check for return-value of `ptsname()` in HP-UX-specific code (report by David Ellement).
- revise the `ifdef`'s used for XKB bell support. The code was using a nonstandard call `XkbStdBell()`. Changed to use `XkbBell()` (based on patch by <derek@signalmarketing.com>).
- add a null-pointer check in `xtermLoadFont()` in case there is no wide-bold font (Nam SungHyun).
- change `Makefile.in` to use `autoconf`'s `bindir`, `libdir` and `mandir` variables (report by Nam SungHyun).
- add `le` to termcap `xterm-basic` entry. Though missing from older termcaps for `xterm`, some applications check for it (report by Matthias Buelow).
- modify `uxterm` script to strip modifiers such as `"@euro"` from the locale setting before adding `".UTF-8"` (Debian [#179929](#)).
- modify the remaining places where `tek4014` emulation uses `XDefineCursor()`, to make it work as originally implemented, e.g., when switching back to alpha mode. Added test-screen in `vttest` to test this feature properly.

Patch #174 - 2003/2/25 - XFree86 4.2.99.903

- work-around for XFree86 bug which made `XDefineCursor()` on a shell-window no longer work. The `tek4014` emulation used this. Use the next lower window (report by Karl Rudolf Bauchspiess).
- add a resource setting `allowWindowOps` to control whether the extended window operations should be allowed, e.g., `resize`, `iconify`, report window attributes. This is to accommodate people who are not capable of using a pager to view log-files.

Patch #173 - 2003/2/6 - XFree86 4.2.99.902

- reset mouse mode to normal on a full reset. This does not apply to mouse hilite tracking mode, of course (see `ctlseqs.ms`).
- add a time-delay at the point where mouse hilite tracking mode chooses to not handle X events, to avoid runaway CPU usage (report by D Hugh Redelmeier).
- check for illegal character in `DECUDK` string, quit if detected.

Patch #172 - 2002/12/27 - XFree86 4.2.99.3

- fixes to make repainting of 256-color example work properly (reports by Abigail Brady and Scott A Crosby).
 - set flag in `AllocateAnsiColor()` to ensure the color is allocated once only.
 - fix check in `ScrRefresh`, which was comparing background colors only if the ANSI foreground colors also were set.
- merge `Error()` calls and some `exit()` calls into `SysError()`, and change that to add the brief explanation for each error code which is provided in the manpage. Change a few `SysError()`, calls to avoid using code 1, to avoid confusion with exit status from places that do not use `SysError()`.
- simplify logic used to open a debug logfile as the standard error.
- modify the `-e` option so that if it fails, `xterm` will check if only one argument follows, e.g., it was quoted, and then retry using `sh -c`.

- modify parsing of DECUDK string parameter to allow a comma between pairs of hexadecimal digits (Ray Neuman <raymond@one.com.au> reports that "real" terminals accept this; perhaps they simply ignore unexpected characters).
- fix a few problems with the \$TERMCAP string generated by `resize`:
 - for Bourne shell, add an `export` command. This was missing as far back as X11R5.
 - escape exclamation marks, used in xterm's reset string.
 - translate literal `\177\` to `"^?"`.
- improve configure check for `tgetent()` to work when \$TERMCAP has been set to a specific entry.
- modify `minstall.sh` to use `"%"` rather than `"@"`, to avoid problems with AFS (report by Zdenek Sekera).
- list fatal error codes from `error.h` in the manpage, remove unused codes in `error.h`.
- use more explicit wording for manpage list of color resources, since at least one user confused the generic names such as "black" with the names in `rgb.txt` (the latter are now used).
- minor fix to description of 1003 mouse mode in `ctlseqs.ms` (Larry Riedel).

Patch #171 - 2002/12/12 - XFree86 4.2.99.3

- modify parser tables to improve detection of malformed control sequences, making xterm behave more like a real DEC terminal (patch by Paul Williams).
- update comment in `input.c` to document `Meta` as a modifier for escape sequences (patch by D Roland Walker).
- add `ifdef'd` code for logging option which adds the hostname and a timestamp to the generated logfile name. The `ifdef's` are setup with the configure script (patch by Nelson Beebe).
- remove `xevents()` call from the end of `BlinkCursor()`, to fix an occasional problem which caused xterm to pause until a key was pressed. The reason for this was that there was no check to ensure that there really were events for `xevents()` to process. (patch by Semen A Ustimenko <semenu@FreeBSD.org>).
- remove unused mode-params from `open()` calls that do not create a file.
- modify configure script to put new items first on `$CPPFLAGS` and `$CFLAGS` to avoid conflict with environment's `-I` and `-D` options.
- update `config.guess`, `config.sub`
- resync with XFree86 CVS
 - fix `va_args` glitches for `xterm/libfontconfig`: `0 == (void*)0` isn't true for all platforms (Egbert Eich).
 - initialise `ProgramName` in xterm's main before referencing it (XFree86 [#5473](#), Peter Valchev).
 - some cleanup of `Imakefile` `ifdef's` (Marc La France).

Patch #170 - 2002/10/13 - XFree86 4.2.1

- correct an off-by-one allocating data for sorted help message.
- modify configure script to check for Xpm library, on which XFree86 Xaw library depends.
- update `config.guess`, `config.sub`

Patch #169 - 2002/10/5 - XFree86 4.2.1

- modify wording of some options in help message to make them use `-/+` consistently with respect to "on/off" or "off/on".
- sort options list which is displayed in help- and syntax-messages at runtime to simplify maintenance.
- remove support for Amoeba and Minix (Juliusz Chroboczek noted it was removed from XFree86 server; there have been no users since 1996).
- add configure script option `--disable-session-mgt` to control whether the session management code should be compiled-in (request by H Merijn Brand).

- ifdef'd the session-management changes with `OPT_SESSION_MGT`, to accommodate X11R5 which predates the related definitions.
- fix `decode_keyvalue()`, which did not properly parse multiple settings as needed for the `ttyModes` resource, since it did not skip over the parsed data.
- fix an option-parsing conflict between `-class` and `-cjk_width` (Nam SungHyun)
- add a missing null in `XtVaSetValues()` call used in `Cleanup()` (Nam SungHyun)

Patch #168 - 2002/9/29 - XFree86 4.2.1

- improve data reported for control sequence that requests window position by taking into account the window decorations, e.g., border and title (patch by Jess Thrysoee <jess@thrysoee.dk>).
- add `-cjk_width` and corresponding resource `cjkWidth` (patch by Jungshik Shin <jshin@mailaps.org>).
- add `-into` option, for embedding xterm in a Tcl/Tk application (patch by George Peter Staplin <georgeps@xmission.com>).
- add simple session management (XSM) client capabilities to xterm. So a session manager such as, e.g., xsm, should be able to respawn or kill xterms without the help of an SM proxy (like smproxy), which is a hack and almost always buggy (patch by David Madore).
- fix conflict between ifdef's for `OPT_DEC_LOCATOR` and `OPT_READLINE` in `button.c` (reported by Ilya Zakharevich).
- fix for inconsistent use of `struct utmp` versus `struct utmpx` introduced in [patch #167](#) (patches by Paul Gilmartin, Marc La France).
- modify logic for `metaSendsEscape` to allow it to work in a setup where the Meta-key is not recognized as a modifier by the key-translations logic (discussion of `eightBitInput` with H.J.Lu). Note however that Vincent Lefèvre reported this in January).
- use null pointer values consistently, rather than literal "0", for ending variable-length argument lists, e.g., for `execvp()` (based on patch by Matthieu Herrb).
- correct logic of `ChangeAnsiColorRequest()`, which would do a screen repaint after replying to a request for information.
- improve scripts in `vttests` to work with systems whose shells support `echo -n` and have, as does Debian, an unrelated `print` utility.
- add `vttests/acolors.sh` to demonstrate OSC 4, which queries or sets ANSI colors.
- fixes for `ctlseqs.ms` (Pavel Roskin, Ilya Zakharevich).
- typos in xterm manpage (Jens Schweikhardt)
- remove a redundant `GCC_UNUSED` from `InitPopup()` (Nam SungHyun)

Patch #167 - 2002/8/24 - XFree86 4.2.0

- correct ifdef's for `USE_TERMCAP` to match cygwin configuration.
- fix several places in `ctlseqs.ms` which had no boxes around the literal text (report by Ilya Zakharevich).
- extend mouse support for `readline`, ifdef'd with `OPT_READLINE` (integrated patch from Ilya Zakharevich).
- modify terminfo description to match default for `modifyCursorKeys` resource.
- add `modifyCursorKeys` resource to control how the shift- and similar modifiers are used to make a cursor escape sequence. The default makes a modified escape sequence always start with CSI and puts the modifier as the second parameter, to avoid confusing applications that would interpret the first parameter as a repeat count. The original behavior can be obtained by setting the resource to 0 (newsgroup discussion with Stephen J Turnbull, Jeffrey Altman).
- correct missing initializations for `appdefaultCursor` and `appdefaultKeypad` resources.
- add configure option `--enable-luit` and ifdef'd the luit-related code with `OPT_LUIT_PROG`.
- modify xterm to invoke `luit` (integrated patch by Tomohiro Kubota)
- update `wcwidth.c` to match Markus Kuhn's 2002-05-18 version.

- correct limit-checking in `ComputeSelect()` to handle selections that extend off the visible area; rather than modify the parameters to `TrackText()`, use `ScrollSelection()` to update the highlighting limits. (reported by Yegappan Lakshmanan and Nelson Beebe, patch by Alexander V Lukyanov).
- correct manpage description of `tiXtraScroll` resource (reported by Tony Finch).
- changes from OpenBSD:
 - Make `xterm` `setgid utmp` to be able to update `utmp` even with root privileges revoked.
 - If not updating `utmp`, revoke group privileges totally too.
- changes from NetBSD:
 - Check that the return value from `ttyslot()` is greater than 0 before writing the `utmp` file. Fixes w's "w: Stale utmp entry: <user> <tty> <pty>" errors.
 - Use `openpty()` to deal with new `pty` naming scheme.
- add `print-redir` action and menu entry to allow user to switch terminal in/out of printer controller mode. It appears from the manual that a real `vt220` would not switch back to normal mode, so another mechanism is used (addresses Debian [#37517](#)).
- check if `printerCommand` resource string is empty, use this to allow user to disable printer function.
- trim trailing blanks from resource strings.
- check return value from `ptsname()`, which may return null for example if someone has changed the permissions of `/dev/pts` to zero (Debian [#121899](#)).
- modify `OS/2` version to use `__UNIXOS2__` definition rather than `__EMX__`, related cleanup (patch by Holger Veit).
- used modified indent 2.0 (patch [20020428](#)) to reformat most of the C source files, to simplify maintenance.
- fix a couple of places where there were leading tabs on symbol-definition lines in `Imakefile` (Marc La France from report by Tony Finch)
- add `imake` variable (`TraceXTerm`) to allow building debug version (Egbert Eich).

Patch #166 - 2002/3/25 - XFree86 4.2.0

- correct a bug in selection: double clicking on a word which was partly scrolled off the screen may select that text (report by Vincent Lefèvre <vincent@vinc17.org>).
- implement `veryBoldColors` resource to control whether the corresponding video attribute such as `bold` is displayed when using `colorBDMode`, etc. (request by Josh Howard <jrh@vicor-nb.com>).
- define escape sequences for function keys F21-F35 (patch by Stephen P Wall).
- change the colors for the 256-color model, making them less skewed toward black (patch by Stephen P Wall).
- add `vt100Graphics` resource (see [patch #115](#), based on discussion with Glenn Maynard).
- `ifdef'd Xaw/Xaw3d/neXtaw` includes separately to avoid potential incompatibilities between these flavors of Athena widgets.
- add configure check for XFree86 4.x Xaw library, whose geometry management is broken, to avoid trying to use it for toolbar configuration.
- updates to configure script from `vile` and `lynx` to allow `configure.in` to be compiled with `autoconf 2.5x`
- add a check for null pointer return by `ptsname()` (newsgroup posting from Mike Silva <mikesilva@lucent.com>).
- fill in a few details needed to allow UTF-8 mode to switch on/off after startup. This requires that `wideChars` resource be set. (based on comments in 4 Aug 2001 by Alexey Marinichev <lyosha@lyosha.2y.net>).
- remove duplicate install rules that make directories, e.g., so installing manpage will not create `app-defaults` directory.
- add comment in `do_osc()`, reserving cases 30 and 31 for `Konsole` (request by Stephan Binner <Stephan.Binner@gmx.de>).
- fixes for `ctlseqs.ms` and `xterm.man` (patch by Werner Lemberg <wl@gnu.org>).
- add check for monochrome display, disabling `colorMode` in that case (fixes Debian [#134130](#)).
- resync with XFree86 CVS

- Fix some xterm build warnings on *BSD (patch by David Dawes).
- Only use SA_RESTART in xterm when it's available (patch by Frank Liu).
- Fix incorrect code in signal handlers in most of the clients, xterm and xdm not done yet (patch by Matthieu Herrb).

Patch #165 - 2002/1/5 - XFree86 4.1.0

- modify `uxterm` script to strip encoding part from environment variable before adding ".UTF-8" (based on Debian [#125947](#), but using a more portable solution).
- add an assignment statement in `VTInitialize()` to make `awaitInput` resource work.
- use new macros `init_Bres()`, etc., in `VTInitialize()` to add trace of the initialization of resources.
- modify checks for `$LC_ALL`, related environment variables to ensure the resulting strings are nonempty (report by Markus Kuhn).
- add an `ifdef` in `charproc.c` for `num_ptrs` variable in case all configure options are disabled.
- modify definition of `getXtermBackground()` to avoid negative array index warning on Tru64 (report by Jeremie Petit).
- improve fix from patch #165 (still Debian [#117184](#), report by Matt Zimmerman <mdz@debian.org>)
- correct install rule for `uxterm` in `Makefile.in`, to handle the case where building in a different directory than `xterm`'s source (patch by Paul Gilmartin).
- documented ANSI.SYS-style cursor save/restore escape sequences in `ctlseqs.ms`, which are in `xterm` since X11R5.
- correct two entries in the default `charClass` table, which did not follow the manpage comment about the character number corresponding to the class (patch by Marc Bevand <bevand_m@epita.fr>).
- fix a couple of typos in comments in the `app-defaults` files (David Krause <xfree86@davidkrause.com>).
- resync with XFree86 CVS
 - update language of copyrights in some files to reflect the fact that they were reassigned from X Consortium to The Open Group in 1998. Note that this `xterm` source is derived from the 1996 version from X Consortium, does not incorporate changes made by X Consortium or The Open Group after that date, hence we do not add The Open Group's 1998 copyright date to related files.
 - save/restore `errno` in signal catcher (patch by Matthieu Herrb).
 - modify `UXTerm.ad`'s `font5` resource so that `xterm` can display double width characters using a font distributed with XFree86 (Tomohiro Kubota).

Patch #164 - 2001/11/13 - XFree86 4.1.0

- correct a case where `ptyInitialErase` and `backarrowKeyIsErase` resources combine to set DECBKM mode, but a `reset` command would not reset `xterm` to that state, making the erase character revert to `^H` (Debian [#117184](#))

Patch #163 - 2001/11/04 - XFree86 4.1.0

- correct `ifdef`'s for `__QNX__` and `USE_SYSV_PGRP` in `main.c` call to `tcsetpgrp`, which broke bash behavior around [patch #140](#) (report/patch by Frank Liu <fliu@mail.vipstage.com>).
- modify `trace.c` to fix missing definition of `GCC_UNUSED` for compilers other than `gcc` when configured for trace code (report/patch by Paul Gilmartin).
- change format in `TraceOptions()` to use long rather than int, since the latter could lose precision on 64-bit machines (report/patch by Nelson Beebe).
- modify `xterm` manual page and `mininstall.sh` to allow `imake` rules to define location of `app-defaults` directory (Debian [#87611](#)).
- review/update list of conflicting preprocessor symbols to remove from `$CPPFLAGS` at the end of the configure script. In particular, this allows one to configure `xterm` without the `utempter` library on Redhat

7.1 (report/patch by Adam Sulmicki).

Patch #162 - 2001/10/23 - XFree86 4.1.0

- correct logic that processes `-class` option, so that a following `-e` option is handled (Debian [#116297](#)).
- improve options-decoding to allow `-version` and `-help` options to be combined (Debian [#110226](#)).
- add a 10 millisecond delay in event loop when processing `-hold` option, to avoid using too much CPU time (Debian [#116213](#)).
- prefix final program execution in `uxterm` with "exec" to avoid a useless shell hanging around (Christian Weisgerber).

Patch #161 - 2001/10/10 - XFree86 4.1.0

- modify logic that resets keypad application mode to avoid doing this if there is no modifier associated with the `Num_Lock` keysym (report by John E Davis <davis@space.mit.edu> and Alan W Irwin <irwin@beluga.phys.uvic.ca>).
- add built-in translation for `Control/KP_Separator` to `KP_Subtract`, to accommodate users who wish to use `xmodmap` to reassign the top row of the numeric keypad.
- correct `Imakefile` install-rule for `uxname` script (reported by Nam SungHyun <namsh@lge.com>).
- resync with XFree86 CVS – correct typo in `<ncurses/term.h>` `ifdef`.

Patch #160 - 2001/10/7 - XFree86 4.1.0

- modify logic in `main.c` (see [patch #145](#)) to avoid generating the same identifier, for example, for `/dev/tty1` and `/dev/pts/1`, which is used to denote an entry in the `utmp` file (Debian bug report [#84676](#)). A similar fix was also sent by Jerome Borsboom <borsboom@westbrabant.net> in May, but I overlooked it when reviewing bug reports.
- add configure check for `<ncurses/term.h>` to get rid of hardcoded `__CYGWIN__` `ifdef` in `resize.c`

NOTE: The CYGWIN port should not be linking `resize` with `ncurses`. It appears that the only reason it is, is because both the `ncurses` and `termcap` ports on that platform are badly misconfigured (essential pieces have been removed, etc). Checking for `<ncurses/term.h>` does not hurt anything, since there are some correct installations that are set up that way.

- add a sample `uxterm` script, which uses the `UXTerm` application defaults for UTF-8 environments.
- undo change to `xterm` application defaults, since this introduced an unnecessary incompatibility. The intended functionality was already addressed by the [UXTerm](#) `app-defaults` file.
- resync with XFree86 CVS
 - Modified `xterm` app default to use LFD fontnames instead of old type (Michael Schroeder).
 - Fix `xterm` when `XIM` is disabled - caused a segfault (Tomohiro Kubota).

Patch #159 - 2001/9/19 - XFree86 4.1.0

- remove an `ifdef` for `USE_HANDSHAKE` added in patch #158 from the second `TIOCSSIZE` `ioctl` call in the initialization code. Paul Gilmartin reports that for Solaris 2.6 (sparc), `stty` does not show that `xterm` sets rows and columns unless the second `ioctl` is executed.
- correct treatment of empty parameter list for some OSC strings (report by Sami Farin <sfarin@ratol.fi>).

Patch #158 - 2001/9/8 - XFree86 4.1.0

- augment key translations for scrollbar widget to ensure that keystrokes intended for the text area are not lost if the mouse pointer happens to fall on the scrollbar. This can happen, for instance, if the user's `app-defaults` or `.Xdefaults` file contains a translations resource, though it may also happen through unrelated resource settings: probably a bug in libXt (reported by Paul Fox <pgf@foxharp.boston.ma.us> and Dmitry Yu. Bolkhovityanov <D.Yu.Bolkhovityanov@inp.nsk.su>).
- widen `ifdef's` in `xterm.h` to define `__EXTENSIONS__` on Solaris, for compilers other than gcc. This was added along `_POSIX_C_SOURCE` with in [patch #151](#), but is not sufficient since Sun's compiler does not define `__STDC__` by default (report by Matthias Scheler <tron@zhadum.de>).
- modify `xterm` to obtain the closest matching color if an exact color is not available, e.g., on 8-bit displays (patch by Stephen P Wall)
- implement "OverTheSpot" preedit type of XIM input (patch by Tomohiro Kubota):
 - This preedit type is a reasonable compromise between simpleness of implementation and usefulness. "Root" preedit type is easy to implement but not useful; "OnTheSpot" preedit type is the best in the point of view of user interface but very complex. And more, "OverTheSpot" is the preedit type which the most XIM servers support. Thus, to achieve reasonable usability, support of "OverTheSpot" preedit type is needed.
 - In "OverTheSpot" preedit type, the preedit (preconversion) string is displayed at the position of the cursor. On the other hand, it is XIM server's responsibility to display the preedit string. Thus, it is needed for XIM client (here XTerm) to inform the XIM server of the cursor position. And more, to achieve good visual proportion, preedit string must be written using proper font. Thus, it is XIM client's responsibility to inform the XIM server of the proper font. The font must be supplied by "fontset". Fontset is a set of fonts with charsets which are specified by the current locale. Since XTerm uses ISO10646 fonts regardless of the current locale, the fonts for XIM must be prepared separately. It is difficult to prepare fonts which are similar to XTerm font. Thus, my patch uses a simple way - the default font is "*" which matches every fonts and X library will automatically choose fonts with proper charsets. I added "-fx" command option and "ximFont" resource to override this default font setting.
 - changed the definition of "OverTheSpot" preedit type from `XIMPreeditPosition|XIMStatusArea` to `XIMPreeditPosition|XIMStatusNothing`. This matches the behavior of other programs such as `Rxvt`, `Kterm`, `Gedit`.
 - A tiny XIM bugfix is also included. By calling `XSetLocaleModifiers()` with parameter of "", it can consider `XMODIFIERS` environmental variable which is a standard way for users to specify XIM server to be used.
- adjust `configure` script to accommodate repackaging of `keysym2ucs.c` as include-file for `xutf8.c` (patch by Tomohiro Kubota).
- add the `UXTerm` `app-defaults` file to `makefile` install rules (request by Juliusz Chroboczek).
- correct logic in `get_termcap()`, which returned false if the `tgetent()` call indicated that `xterm` was linked with `terminfo`. Although the `$TERMCAP` variable cannot be adjusted in this case, `xterm` still needs information from this call to extract data to initialize the erase-mode when the `ptyInitialErase` resource is false.
- modify `ScrollbarReverseVideo()` function to cache the original border color, so it can restore that when an application flashes the screen (Bugzilla [#38872](#)).
- resync with XFree86 CVS
 - remove `ifdef's` for `X_NOT_STDC_ENV` (patch by David Dawes).
 - add Cygwin to special `errno` handling case in `ptydata.c` (Alan Hourihane)
 - set screen size earlier in initialization, to address a race with window manager resizing its clients (Keith Packard).

Patch #157 - 2001/6/18 - XFree86 4.1.0

- clean up `button.c` and `input.c` (patch by Juliusz Chroboczek). The basic idea is to use a single set of APIs in the XTerm core, and put a set of workarounds in a separate file. As you will notice, this drastically simplifies parts of the code; in particular, the only remaining `ifdefs` related to the differences between

Xutf8 and legacy systems are related to the selection provider logic. This defines two new files, xutf8.h and xutf8.c, provide some half-hearted but fully portable emulation for the three Xutf8* functions that XTerm uses. Putting these in a separate file will allow people to experiment with more complex versions without making the core of XTerm more difficult to maintain. The functionality of the emulation is as follows.

- Xutf8TextListToTextProperty fully handles XStringstyle and XUTF8StringStyle. It will only generate STRING for XStdICCTextStyle, and will only generate Latin-1 in XCompoundTextStyle (but label it as COMPOUND_TEXT, as the spec requires). (I have hesitated to make this function fail for XStdICCTextStyle and XCompoundTextStyle; this might be a smart thing to do, in the hope that the selection requestor will try UTF8_STRING afterwards; opinions?)
- Xutf8TextPropertyToTextList fully handles STRING and UTF8_STRING. It systematically fails for COMPOUND_TEXT.
- Xutf8LookupString will properly handle single-keystroke input for the keysyms covered by Markus' keysym2ucs function. It will not handle either compose key input or external input methods.
- add an ifdef for SunXK_F36, used in xtermcapKeycode () (patch by Mark Waggoner <waggoner@ichips.intel.com>).
- modify check for login name to try getlogin () and \$LOGNAME, \$USER environment variables to detect if the user has logged in under an alias, i.e., an account with the same user id but a different name (Debian bug report [#70084](#)).
- add resource tiXtraScroll, which can be used to preserve the screen contents in the scrollbar rather than erasing it when starting a fullscreen application such as vi (patch by Ken Martin <fletcher@catsreach.org>).
- two patches by Denis Zaitsev <zzz@cd-club.ru>:
 - added forceBoxChars resource to control the "line-drawing characters" option.
 - added freeBoldBox resource, which, when set true, suppresses check in same_font_size (), so xterm does not attempt to ensure that the bold font is the same size as the normal font.
- change the color class for ANSI colors and similar ones such as bold-color, etc., to follow the convention that the classname is the instance name with a leading capital (e.g., color0 and Color0 rather than color0 and Foreground). There was little use for Foreground as a class other than to create occasional confusion and bug reports, most recently by Nelson Beebe who reports that it disables colors in xterm but not on Linux, which is probably due to a difference in resource evaluation order. A configure script option (--disable-color-class) is provided for anyone who did use the older behavior.
- fix a signal-handling bug. When running xterm with ksh or similar shell such as bash 2.05, xterm will hang and not respond to keystrokes after the user types suspend. Additionally the popup menus do not respond, so it is not possible to send SIGCONT to the shell. What is happening is that the shell is sending itself SIGSTOP, and it is being stopped. Per specification it also means that the operating system is sending SIGCHLD to parent to the bash (XTERM). Now the issue is that xterm assumes it cannot happen and it expects to receive SIGCHLD only upon *termination* of its children. This causes a deadlock with xterm waiting for the child to die, and the child waiting for SIGCONT. (report/patch by Adam Sulmicki), analysis/testing by Sven Mascheck <sven.mascheck@student.uni-ulm.de>).
- correct some inconsistent checks for XtReleaseGC () calls in xtermLoadFont () (patch by Nam SungHyun <namsh@lge.com>).
- updated wcwidth.c and keysym2ucs.c to versions dated 2001/1/12 and 2001/4/18, respectively from <http://www.cl.cam.ac.uk/~mgk25/ucs/>
- correction to change from [patch #90](#), which was intended to reset the saved cursor position for normal/alternate screens on a soft reset, but actually wiped out all of the saved cursor information. Just reset the saved position for the current screen (report by Michael Schroeder).
- modify ShowCursor() and HideCursor() so that if the cursor points to the second part of a wide character, make the show/hide operate on the first position of the wide character (patch by Sven Verdoolaege).
- scrolling in the alternate screen just before switching back to the main screen can cause extra blank lines to be inserted into the scrollbar buffer (patch by Paul Vojta <vojta@math.berkeley.edu>).
- resync with XFree86 4.1.0:

- Use TermcapLibrary as -lncurses instead of -ltermcap, fixes problem building xterm/resize on Cygwin/XFree86 (Harold Hunt).
- Install xterm.termcap and xterm.terminfo when installing xterm (Torrey T. Lyons).
- Fix some build issues on Cygwin/XFree86 (Suhaib Siddiqi).
- Define CBAUD, when it's missing in xterm, on LynxOS (Stuart Lissaman).

Patch #156 - 2001/4/28 - XFree86 4.0.3

- change order of selection-target types to make 8-bit xterm prefer UTF8_STRING to COMPOUND_TEXT (patch by Juliusz Chroboczek).
- document -fa, -fs command-line options and faceName, faceSize resources which are used by the freetype library support.
- if configure script finds freetype libraries, but imake definitions do not have the XRENDERFONT definition, define it anyway.
- modify configure script check for freetype libraries to include <Xlib.h>, since an older version of the related headers relies on this (patch by Adam Sulmicki).

Patch #155 - 2001/4/20 - XFree86 4.0.3

- correct return type of in_put() from [patch #153](#) changes, which left it not wide enough for UTF-8 (patch by Bruno Haible).

Patch #154 - 2001/4/11 - XFree86 4.0.3

- undo check for return value from pututline (used for debugging) since that function does not return a value on Slackware 3.6.
- correct length in ScreenWrite, when rendering invisible text (patch by Sven Verdoolaege <skimo@kotnet.org>).
- fixes/improvements for the i18nSelection resource from patch #153, by Bruno Haible:
 - add missing initialization for i18nSelection resource.
 - split-out the non-ICCM aspect of the i18nSelection resource as a new resource, brokenSelections.
- add configure check for <time.h> and <sys/time.h>, to allow for Unixware 7, which requires both. If the configure script is not used, only <time.h> will be included as before (report by Thanh Ma).
- fix redefinition of dup2, getutent, getutid, getutline and sleep functions on Unixware 7 (report by Thanh Ma <Thanh.Ma@casi-rusco.com>)
- add a fall-back definition for __hpux, which is apparently not defined in some compilers on HP-UX 11.0 (reported by Clint Olsen).
- change VAL_INITIAL_ERASE, which is used as a fallback for the "kb" termcap string to 8, since that matches the xterm terminal description (request by Alexander V Lukyanov).
- correct an off-by-one in ClearInLine, which caused the erase-characters (ECH) control to display incorrectly (patch by Alexander V Lukyanov).
- correct escape sequences shown in terminfo for shifted editing keys. The modifier code was for the control key rather than the shift key.

Patch #153 - 2001/3/29 - XFree86 4.0.3

- increase PTYCHARLEN to 8 for os390, add some debugging traces for UTMP functions (patch by Paul Gilmartin).
- correct an misplaced brace in SelectionReceived() (patch by Bruno Haible).

- correct an assignment dropped in `SelectionReceived()` which made it not compile for wide-characters combined with debug traces.
- correct typo, clarify description of 88- and 256-color controls (report by Bram Moolenaar).
- correct a typo in `ctlseqs.ms` which caused DEC Locator control sequences using single quote `''` display grave ```` instead (reported by Paul Williams, apparently in patch #114).

Patch #152 - 2001/3/13 - XFree86 4.0.2

- correct index in inner loop in `VTInitI18N()` from patch #151 changes, which resulted in infinite loop under some conditions (report/analysis by Paul Gilmartin).
- remove spurious `"%|"` from terminfo `sgr` capabilities (report/analysis by Adam M Costello, Debian [#89222](#)).
- add shell script to adjust list of dynamic libraries linked by `resize` when building with the standalone configure script. Otherwise it uses the same list as for `xterm`, which is excessive.
- fix a few compiler warnings reported by the 20010305 gcc snapshot.

Patch #151 - 2001/3/10 - XFree86 4.0.2

- alter the behaviour of selections in XTerm (patch by Juliusz Chroboczek). It is believed to follow the ICCCM + UTF8_STRING to the letter, both in UTF-8 and in eight-bit mode. From his description:
 - When compiled against XFree86 4.0.2, the patched XTerm will make the selection available as COMPOUND_TEXT, STRING or UTF8_STRING in both modes. It will request selections in the following order:

UTF-8 mode: UTF8_STRING, TEXT, COMPOUND_TEXT, STRING.
eight-bit mode: TEXT, COMPOUND_TEXT, UTF8_STRING, STRING.
 - When compiled against an earlier version of XFree86 (or compiled with `OPT_UTF8_API=0`), it will still obey the ICCCM, but will neither request nor provide UTF8_STRING in eight-bit mode, and neither TEXT nor COMPOUND_TEXT in UTF-8 mode.
 - For compatibility with previous versions of XTerm, a resource `i18nSelections` is provided, please see the manpage for details. However, due to an unexpected combination of ICCCM extensions by various bits and pieces of the libraries, interacting with previous versions of XTerm will work in many locales even without this flag. (Please do not set this resource to true by default, as this would violate the ICCCM.)
- improved error checking/reporting in `VTInitI18N()`, ensuring that lack of input method styles is treated distinctly from a mismatch.
- remove an incorrect `ifdef` from patch #141 which suppressed overstriking to simulate bold font when `xterm` was compiled to support wide characters (report/analysis by Adam M Costello <amc@cs.berkeley.edu>, Debian [#76404](#), Debian [#77575](#)).
- modify `RequestResize()` function to save/restore window manager hints. Its call to `XtMakeResizeRequest()` had the undesirable side-effect of clearing window manager hints, e.g., when switching to 132-columns via `DECCOLM` escape sequence. Window manager hints make it simple to resize `xterm` in terms of character cells rather than pixels (reports by Christian Weisgerber, Debian [#79939](#)).

This applies to the normal configuration. When built with toolbar support, the hints are applied to a different widget level (more work will be needed to make hints work with the toolbar).

- fix a redefinition warning for `resize.c` on OpenBSD (patch by Christian Weisgerber).
- change resource corresponding to `-T` option to match Xt library's `-title`, i.e., `.title` rather than `*title` so the command-line options are interchangeable as documented (Debian bug report [#68843](#)).

- add script used from autoconf'd makefile for installing manpages, since recent XFree86 changing the way section numbers are represented makes the install dependent on extra scripts.
- add configure check for freetype libraries and configure option `--disable-freetype` to override this feature.
- modify some configure script macros to avoid using `changequote()`, which has been rendered useless in the latest autoconf alpha 2.49c
- update `config.guess`, `config.sub` to 2001-2-13
- remove redundant/contradictory `__CYGWIN__` definitions from `resize.c`
- correct manpage typo introduced by X11R6.5 resync.

Changes from XFree86 4.0.2:

- add definition of `_POSIX_C_SOURCE` for Solaris to make this compile with `gcc -ansi -pedantic` (report by `<mark@zang.com>`).

Patch #150 - 2000/12/29 - XFree86 4.0.2

- move the binding for shifted keypad plus/minus, which invokes the `larger-vt-font()` and `smaller-vt-font()` actions, respectively, into the translations resource (suggested by Marius Gedminas `<mgedmin@puni.osf.lt>`).
- modify configure script to support the `--program-prefix`, `--program-suffix` and `--program-transform-name` options (request by Alison Winters `<alison@mirrabooka.com>`).
- fixes for wide/combining characters (Robert Brady):
 - fix a scrolling / combining characters display anomaly
 - fix a problem with double-width characters where if the primary font had no box-drawing characters, the right hand half of double-width characters was erased (reported by Yao Zhang `<yzhang@sharemedia.com>`).
 - fix special case of null byte for key handling in UTF-8 locales.
- modify logic that compares sizes of normal and bold fonts to be more forgiving of the font server's choice of bold font which must match the normal font's size. Now `same_font_size()` compares the height of the fonts rather than individually ascent and descent, and allows the bold font to be one pixel smaller than the normal font (addresses a report by Alan Citterman `<alan@mticket.com>`, who says that something in patches [#146](#) to [#148](#) made xterm more likely to overstrike bold fonts, and indirectly Debian bug report [#76404](#), which reports the opposite).
- make configure script use `$CFLAGS` and `$CPPFLAGS` consistently, including removing a chunk from `configure.in` which attempted to save/restore `$CPPFLAGS` while processing value set by the `--x-includes` option, but lost values set in an intervening `AC_CHECK_HEADERS`. This change modifies macros `CF_ADD_CFLAGS`, `CF_ANSI_CC_CHECK` and `CF_X_TOOLKIT`, as well as removing variables `IMAKE_CFLAGS` and `X_CFLAGS` from the generated makefile (the `AC_CHECK_HEADERS` problem was reported by Albert Chin-A-Young `<china@thewrittenword.com>`).
- correct a comparison in `SELECTWORD` case of `ComputeSelect()`, which resulted in a word-selection wrapping past the first column without checking the first column's character class (reported by Christian Lacunza `<celacunza@netscape.net>`).
- correct a logic in UTF-8 mode for selecting double-width characters; a combining character was omitted (patch by Markus Kuhn).
- add feature to pop (raise) window when a bell is received (patch by Gael Roualland `<gael.roualland@dial.oleane.com>`).
- add `__NetBSD__` and `__OpenBSD__` to special-case in `xterm_io.h` for `USE_POSIX_TERMIOS` definition (patch by Christian Weisgerber).
- move special-case HPUX include for `<sys/bsdtty.h>` to `xterm_io.h` to define `TIOCSLTC`, making `HAS_LTCHARS` defined for HPUX 10.20 (report by Bruno Betro).

Patch #149 - 2000/12/6 - XFree86 4.0.1h

- restructured includes for `termios.h`, `termio.h` and related definitions for `main.c`, `os2main.c`, `screen.c` and `resize.c` so they will share equivalent definitions in a new header `xterm_io.h`. This is intended to solve some problems mainly for HPUX which appear to arise from inconsistent definitions for SIGWINCH- and HAS_LTCHARS-related symbols (reports by Bruno Betro, Jeremie Petit and Clint Olsen).
- improve usability of double-width fonts by allowing normal fonts to be given as double-width (from a patch by Fabrice Bellard <bellard@email.enst.fr>).
- correct a few compiler warnings in TRACE() macros for signed/unsigned variable differences (reported by Clint Olsen).
- make configure script use \$CFLAGS and \$CPPFLAGS more consistently, i.e., by using CF_ADD_CFLAGS in CF_ANSI_CC macro.
- expanded description of environment variables in manual-page.
- modify OPT_TCAP_QUERY feature to always return the termcap or terminfo capability string in the response, and to read/write the names in hexadecimal form to allow for the special case of termcap's k; name (patch by Bram Moolenaar).
- add OPT_SAME_NAME and OPT_TCAP_QUERY to xtermcfg.hin, so the corresponding configure options work (patch by Bram Moolenaar).
- resync with XFree86 4.0.1g:
 - Rewrite Xft library for Render extension/core text and font management Change xterm to use new interface (Keith Packard).

Patch #148 - 2000/10/31 - XFree86 4.0.1d

- document logfile options in man-page.
- correct spelling of -samename option in help message.
- add configure script option --enable-`tcap-query` (request by Bram Moolenaar).
- add a "Co" or "colors" entry to the OPT_TCAP_QUERY feature (patch by Bram Moolenaar).
- patch by Kiyokazu Suto <suto@ks-and-ks.ne.jp>:
 - add support for bold font for double width characters. The font name may be specified with the command line option -fwb or with resource wideBoldFont (class WideBoldFont).
 - correct underlining of double width character string, which was drawn only half width.
 - correct binary search of precomposed character table, which may return wrong result when int is just 32 bits.
- some changes to align terminfo with ncurses 5.2:
 - remove xtermm description, retaining xterm-mono since the former conflicts with ncurses.
 - modify initialization and reset strings to avoid putting the save/restore cursor operations bracketing changes to video attributes, since the changes could be lost when the cursor is restored. This affects xterm-r6 and xterm-8bit (the xterm-xfree86 entry uses the soft-reset feature which resets scrolling margins and origin mode without requiring us to save/restore the cursor position).
 - make a few entries explicitly inherit from xterm-xfree86 rather than xterm: xterm-rep, xterm-xmc, xterm-nrc
- ensure that sign-extension does not affect ctype macros by using CharOf() macro to coerce the parameter to an unsigned char.
- resync with XFree86 4.0.1d:
 - Add primitive support in xterm for Xft based fonts (Keith Packard). The changes are ifdef'd with -DXRENDERFONT.

Patch #147 - 2000/10/26 - XFree86 4.0.1c

- correct implementation of ptyInitialErase: the value assigned to initial_erase was for the control terminal, which is correct as far as it goes. But there was no following test for the pseudo-

- terminal's erase value, which would overwrite the default obtained from the control terminal (reported by Christian Weisgerber <naddy@mips.inka.de>).
- modify check for printable-characters in OSC string to use xterm's `ansi_table` rather than `isprint()` macro, to isolate this check from locale settings. This fixes a problem using 8-bit characters to set the title (reported by Ricardas Cepas <rch@richard.eu.org>).
- modify sample scripts to check for `printf` before print, since the latter is not as well standardized (e.g., on Linux).
- updated `config.sub`, `config.guess` to reflect changes on `subversions.gnu.org`

Patch #146 - 2000/9/12 - XFree86 4.0.1c

- correct two instances overlooked from patch #141 which assumed UTF-8 mode without checking, causing a core dump in non-UTF-8 mode (one instance was reported by Tommi Virtanen <tv@debian.org>).
- correct a problem selecting from the scrollbar buffer in UTF-8 mode by changing remaining `getXtermCell()` calls to `XTERM_CELL()` as in the non-UTF-8 cases (report by Markus Kuhn, patch by Robert Brady).

Patch #145 - 2000/9/11 - XFree86 4.0.1c

- changes for UTF-8 configuration (Robert Brady):
 - doublewide characters don't lose their accents when the cursor moves onto or from them (a visual bug)
 - fix logic in `addXtermCombining`, which mean that if the low byte of a cell's first combining char was 0, a following combining char would go into combining slot 1, not 2.
 - modify logic for cut-buffers so UTF-8 data is first converted to Latin1.
 - collapse surrogates, `0xffff`, `0xffff` to `UCS_REPL`.
 - modify to allow xterm to show combining characters attached to doublewidth characters.
 - correct bug in `linewrap` with `-u8` option (reported by Andreas Koenig <andreas.koenig@anima.de>).
- several changes to PTY logic (based on request by Tim Ryan <timryan@nortelnetworks.com>).
 - modify treatment of `-S` option to make it work with Unix98 PTY's.
 - restore sense of `IsPts` flag in `get_pty()`, which was lost in Unix98 changes.
 - use new functions `my_pty_id()` and `my_pty_name()` to simplify/fix strings used for `utmp`, `wtmp` identifiers.
 - simplify `get_pty()` function, making it have a single return point so its inputs/outputs can be identified.
- update `config.guess` and `config.sub` and scripts to my 20000819 patch, adding cases for OS/2 EMX.
- add special case for `os390` compiler options to configure script (patch by Paul Gilmartin)
- fix some unused-variable compiler warnings (reported by Zdenek Sekera).
- split-out some string functions into `xstrings.c`, to use them more consistently among `main.c`, `os2main.c` and `resize.c`
- align `termcap/terminfo` files, adding entries to make them match. The `termcap` entries are necessarily less complete than the `terminfo`, to fit within 1023 character per entry.
- add `terminfo` entry for `xterm-sco` (SCO function keys).
- modify `same_font_name()` to properly handle wildcard introduced in `bold_font_name()`, making comparison for different fonts succeed when only the normal font is specified. This is needed to decide if 1-pixel offset should be used. (reported in a newsgroup by Bart Oldeman <enbeo@enbeo.resnet.bris.ac.uk>)
- correct preprocessor line for `OPT_WIDE_CHARS` in `drawXtermText()` from patch #141 which resulted in overstriking for bold fonts not working.
- correct `Imakefile` from 4.0.1c resync so UTF-8 modules are in `UTF8SRC`, `UTF8OBJ` lists, allowing build without UTF-8 support.

Patch #144 - 2000/8/23 - XFree86 4.0.1b

- remove a spurious assignment in ScreenWrite() from Robert Brady's patch which set a null at the "end" of the buffer to be written. That made the autowrap feature write a blank in the first column for the non-UTF-8 configuration, rather than the actual character (reported by Alan Citterman <alan@mticket.com>).

Patch #143 - 2000/8/19 - XFree86 4.0.1b

- add a check to ensure that `-class` command-line option is not confused with `-c` (reported by Paul Townsend <aab@aab.cc.purdue.edu>).

Patch #142 - 2000/8/18 - XFree86 4.0.1b

- correction to precompose scripts, so 0061 + 0300 will now be really be displayed as 00C0 (patch by Robert Brady <robert@susu.org.uk>).
- correct macro ClassSelects() in button.c, used to hide ifdef's for OPT_WIDE_CHARS in patch #141 (reported by Andreas Paul <paula@informatik.tu-muenchen.de>).
- change wwidth.h to include stddef.h rather than wchar.h, which is not present on OpenBSD and FreeBSD (reported by Christian Weisgerber and Bram Moolenaar).
- newer config.sub and config.guess, from lynx 2.8.4dev.7

Patch #141 - 2000/8/14 - XFree86 4.0.1b

- changes for doublewidth and combining characters, from <http://www.ecs.soton.ac.uk/~rwb197/xterm/> (integrated patch by Robert Brady). In this context, doublewidth refers to 16-bit character sets which may have glyphs occupying two cells.
- add command-line option `-class`, which allows one to override xterm's resource class. Also add resource file `UXTerm.ad`, which simplifies using xterm for both 8-bit character sets and UTF-8.
- fixes/improvements to OPT_TCAP_QUERY logic (patches by Bram Moolenaar, Stephen P Wall).

Patch #140 - 2000/7/23 - XFree86 4.0.1

- modify Makefile.in to circumvent GNU make's built-in suffix rule for ".sh" which confuses install.sh with the "make install" target (report/patch by Paul Gilmartin).
- implement an experimental control sequence which an application may use to query the terminal to determine what sequence of characters it would send for a given function key. This is ifdef'd with OPT_TCAP_QUERY (request by Bram Moolenaar).
- add /usr/local to search path in CF_X_ATHENA configure macro to build with Xaw3d on OpenBSD (patch by Christian Weisgerber).
- add missing `#undef HAVE_TERMIO_C_ISPEED` to xtermcfg.hin, omitted in patch #133 fix for IRIX 6.5 baudrate (report by Alain Filbois <Alain.Filbois@loria.fr>).
- correct a few errors in xterm.man: font in filename example for Tektronix emulation, and description of `-nul/+nul` command-line options (report by Eric Fischer <enf@pobox.com>).
- update config.guess and config.sub, from tin and lynx.

Patch #139 - 2000/6/17 - XFree86 4.0d

- back out change to `-name` command-line option, restoring its original behavior (as noted by David Madore, the correct interpretation of this option is the application instance rather than the application

class).

Patch #138 - 2000/6/15 - XFree86 4.0c

- workaround for fixed fonts which are generated from Unicode fonts: they omit glyphs for some xterm's less-used line-drawing characters, which caused xterm to set a flag telling it to use only its internal line-drawing characters. Do not set the flag (it can be set from the popup menu), and xterm will generate only the line-drawing glyphs which actually are missing.
Otherwise, when used for large fonts, xterm may generate a 2-pixel wide line, which can leave dots on the screen.
- restore first line of 256colres.pl, omitted in 4.0c diffs.

Patch #137 - 2000/6/10 - XFree86 4.0b

- make command-line `-name` option work as documented. Apparently this was lost in X11R5 when coding to use `XtAppInitialize`.
- limit numeric parameters of control sequences to 65535 to simplify checks for numeric overflow.
- change index into UDK list to unsigned to guard against numeric overflow making the index negative (Taneli Huuskonen <huuskone@cc.helsinki.fi>).
- change `sun function-keys` resource name to `sunFunctionKeys` to work around redefinition of the token `sun` by `xrdb` on Solaris. Similarly, renamed resource `sun keyboard` to `sunKeyboard` (Stephen P Wall).
- change similar resource names for HP and SCO to avoid potential conflict with `xrdb` symbols on other systems, as well as for consistency.
- reorganized the install targets in the autoconf'd Makefile, adding `install-app`, `install-bin`, `install-dirs` and `install-man`. The `app-defaults` class can be overridden by setting the make variable 'CLASS', simplifying customization of xterm as a Unicode terminal, e.g., `CLASS=UXTerm`.
- add limit checks to `ClearInLine()`, `ScrnInsertChar()`, `ScrnDeleteChar()` to correct potential out-of-bounds indexing (prompted by Debian bug report [#64713](#), which reported a problem with ICH escape sequences).
- updates to `config.sub` and `config.guess` Kevin Buettner <kev@primenet.com> for elf64_ia64 Bernd Kuemmerlen <bkuemmer@mevis.de> and MacOS X.
- for os390, add check for `errno` set to `ENODEV` on failure to open `/dev/tty` when there is no controlling terminal (patch by Paul Gilmartin).
- fixes for building on Digital Unix 4.0 and AIX 4.2 (patch from H Merijn Brand <h.m.brand@hccnet.nl>).
- modify `DECRCSS` reply for `DECSCS` to additionally report if the terminal is set for 8-bit controls.

Patch #136 - 2000/6/3 - XFree86 4.0b

- add a resource (`limitResize`) limiting resizing via the `CSI 4 t` and `CSI 8 t` sequences.
- ignore out-of-bounds resize requests, i.e., where sign-extension or truncation of the parameters would occur.

Patch #135 - 2000/5/29 - XFree86 4.0b

- remove code introduced in #134 which made some backgrounds bold.
- minor correction to format of updated `$TERMCAP` when adding `kb` capability for `ptyInitialErase` logic.
- improved test for `SVR4` definition.

Patch #134 - 2000/5/28 - XFree86 4.0b

- update URL's and mailing addresses, moved to <http://dickey.his.com> and dickey@herndon4.his.com
- correct missing quotes in CF_TTY_GROUP configure script macro in case the script is run in batch mode.
- modify ownership-check of log file to ignore the group ownership. Otherwise xterm cannot create logfiles in directories with set-gid permissions.
- simplify the logic that reads termcap data.
- add fallback definition for B9600 in case line speed definition for 38400 is missing (report by Jack J Woehr <jwoehr@ibm.net>, for OpenBSD 2.6).
- fix: Set highlightColor, and select a region containing the text cursor. If the window loses focus, the cursor becomes hollow, with the region inside the cursor being background/foreground, unlike the rest of the selection, which is foreground/highlight (patch by Ross Paterson <ross@soi.city.ac.uk>).
- add configure script tests to define SVR4, SYSV and USE_POSIX_WAIT, which enables xterm to compile on Solaris 7 and SCO Openserver without imake, though there are still a few features for the latter which require SCO to be predefined.
- patches from Stephen P Wall:
 - add support for two Sun-specific function keys. These keys are labeled F11 and F12 on Sun Type 5 keyboards, but return SunXK_F36 and SunXK_F37. Support will only be compiled in if the header file <X11/Sunkeysym.h> exists and contains the appropriate symbol definitions. The keycodes for the DEC keycodes were arbitrary unused codes, but the ones for the Sun keycodes are what cmdtool and shelltool actually send.
 - add colorRV and colorRVMode resources to allow specifying a color to use for reverse video, similar to the existing UL, BD, and BL modes.
 - add alwaysUseMods resource, to override check if alt or meta modifiers are used in translations resource. Revamped the code to calculate the modifier value, and included Meta if alwaysUseMods is TRUE, using values 9-16.
- fixes for os390 (Paul Gilmartin):
 - regularize the definition of CONTROL() and remove an acknowledged "trial and error" table.
 - translate "^?" into A2E(0177) which is the EBCDIC "DEL" rather than plain 0177 which is the EBCDIC quotation mark.
 - modify xtermMissingChar () so that EBCDIC codes 128-159 are not rendered as blanks by X server running on Solaris, which sees those as control characters.
 - make debugging traces (configure --enable-trace) work properly with EBCDIC.

Patch #133 - 2000/5/2 - XFree86 4.0a

- add substitutions in autoconf'd Makefile for CPPFLAGS, LDFLAGS and AWK (reported by Neil Bird).
- correct uninitialized childstat variable from patch #131 in creat_as () function, which caused logging to not work on Solaris, whose waitpid () function does not initialize its parameter. Add check for EINTR on return from waitpid () as well (reported by Neil Bird <neil.bird@rdel.co.uk>).
- remove a redundant check for working setuid () function introduced in patch #132. Greg Smith reports that this does not work as intended on os390.
- change line speed from 9600bd to 38400bd, to accommodate people who mistakenly use \$TERM set to vt100, to reduce the effect of padding associated with this terminal type.
- add configure script check for IRIX 6.5's redefinition of baud rates associated with struct termio, to correct a situation where the baud rate was initialized to zero (reported by Andrew Isaacson <adi@lcse.umn.edu>).
- remove unused configure script check for VDISABLE.

Patch #132 - 2000/4/11 - XFree86 4.0a

- undo an incorrect change from patch #113 caused the right scrollbar to be positioned incorrectly when re-enabling it (analysis by D Roland Walker).
- add ctrlFKeys resource, replacing constant for adjusting control-F1 to control-F12 to VT220-style F10-F20. The resource changes the constant 12 to a default value of 10 (request by Jim Knoble <jmknoble@pobox.com>).
- correct ifdef'ing for conflict between definitions in AIX's <sys/select.h> and <X11/Xpoll.h> (reported by Clint Olsen).
- add checks for return-values of getutid(), initgroups() and setuid() in main.c, as well as modifying ifdef's for __osf__ to include tty-group and WTMP logic (adapted from patch by Paul Szabo <psz@maths.usyd.edu.au>)
- modify resize.c to build and work on os390 (uses EBCDIC) (adapted from patch by Phil Sidler <Phil.Sidler@airborne.com>)
- use Ires(), Bres() and Sres() macros to simplify resource list in charproc.c
- resync with XFree86 4.0a:
 - correct a typo in os2main.c (Holger Veit, from 4.0a).

Patch #131 - 2000/3/3 - XFree86 3.9.18b

- improve logfile security (integrated patch by Branden Robinson)
 - make the `creat_as()` function more strict by using `O_EXCL` rather than `O_APPEND`.
 - fixes to make `DEBUG` ifdef's compile/run, including making the debug logfile more unique by appending a timestamp to its name.
 - include <term.h> in `resize.c`, to fix a missing-prototype warning.
- modified `creat_as()` a little more, retaining the ability to append to a logfile If the user specifies the name. Also, check if the opened file (which [patch #130](#) ensures is owned by the effective user) is not writable by other users.
- use `creat_as()` logic to make tek4014 screen-copy more secure (noted by Branden Robinson).
- ifdef'd some of Branden's changes to build/work on older machines.
- correct missing initialization of the `.mode` flag in `ColorRes` struct, from patch #129. This worked on Linux because `malloc()` zeroes memory on that platform (reported by Christian Weisgerber).
- modify logic for `deleteISDEL` resource so it has internally 3 states: unspecified, true and false. If unspecified, the keyboard type determines whether the Delete key transmits <ESC>[3~ or \177, and the popup menu entry reflects the internal state. Otherwise, the popup menu entry overrides the keyboard type (suggested by Dr Werner Fink, to make it simpler to set resources that imitate the legacy X11R6 xterm).

Patch #130 - 2000/3/1 - XFree86 3.9.18a

- modify `scroll-forw()` and `scroll-back()` actions, adding a third parameter which will direct xterm to ignore the action when mouse reporting is enabled. This is needed for the wheel mouse to be used to report to the application rather than scroll the window.
- add menu entry and action to allow disabling xterm's assumption that the current font contains line-drawing characters if the font cells 1-31 are nonempty. Some fonts may have other characters (reported by Bruno Betro <bruno@iami.mi.cnr.it>).
- add a check in `creat_as()` to ensure that the user really owns the logfile that has been opened.
- add logic to implement SCO function-keys. (This is really incomplete, since I intend to revisit this and make xterm able to emulate scoansi better than just the function-keys).
- add configure script option `--enable-sco-fkeys`, minor related fixes (patch by Dr Werner Fink).
- fix typos in `ctlseqs.ms` (reported by Bram Moolenaar)
- fix typo in `install.sh` default for `$TST_PROG` (reported by Paul Gilmartin <pg@sweng.stortek.com>)

Patch #129 - 2000/2/26 - XFree86 3.9.18a

- improve initialization of ANSI colors by delaying allocation until each color is first used.
- remove ifdef that prevented colorBD/colorUL/colorBL resources from working when 256-color configuration was built (reported by Todd Larason).
- fix some minor inconsistencies in terminfo (Debian [#58530](#)).

Patch #128 - 2000/2/17 - XFree86 3.9.18

- correct logic for oldXtermFKeys resource, fixes a core dump when attempting to set it from the command-line (reported by Dr Werner Fink).
- correct ifdef for meta-sends-escap so configure --disable-num-lock builds.

Patch #127 - 2000/2/12 - XFree86 3.9.17e

- add resource, popup menu entry and control sequence to allow changing the Delete key to send either DEL or the VT220-style Remove escape sequence.
- remove logic for metaSendsEscape that would allow xterm to send <ESC> [3~ before a function key that would begin with <ESC> [3~ (request by Christian Weisgerber).
- add missing action and documentation for meta-sends-escape.
- correct a few typos in ctlseqs.ms (incorrect code for Cyan color)

Patch #126 - 2000/2/8 - XFree86 3.9.17c

- ensure that xterm will automatically activate the UTF-8 mode whenever the name of the locale environment variable suggests that a UTF-8 locale is in use (patch by Markus Kuhn). This will help that by simply setting LC_CTYPE an entire system can be switched over to UTF-8, without users having to remember the UTF-8 command line options ("-u8", etc.) of the various applications. Command line options and X resource entries can still be used to override this default choice.
- add old function-keys control sequences and popup menu entry, for compatibility with legacy X11R6 xterm.
- revert translation of editing keypad "Delete" key to legacy \177.
- simplify the color-resource data expressions with macro COLOR_RES, for later use in restructuring color initialization.
- change encoding of wheel mouse (buttons 4 and 5) to avoid conflict with legacy mouse modifiers (suggested by Bram Moolenaar).

Patch #125 - 2000/1/31 - XFree86 3.9.17c

- make this work on OpenVMS (integrated patch by David Mathog).
- rename some functions, e.g., Index to xtermIndex so that ports such as VMS which link externals ignoring case will not have library conflicts (reported by David Mathog).
- correct logic of do_reversevideo(), which did not update the corresponding popup menu check mark (reported by David Mathog, this was a detail overlooked in patch #94).
- change TRACE macro so semicolon is not within definition, making *indent* and similar programs work better.
- add depend rule to Makefile.in
- modify logic of boldColors resource to suppress it if an extended color control has been used, e.g., for 88-color or 256-color mode (patch by Todd Larason).
- revise logic that handles menus and input translation for keyboard type so only one can be selected at a time.
- restore kdch1=\177 for the Sun function-key type, and make the the Delete key send DEL (\177) if the oldXtermFKeys resource is set.

- rephrase logic and `ifdef`'s for POSIX `VDISABLE` to avoid preprocessor expression that will not compile on NetBSD/x86 1.4.1 (reported by Takaaki Nomura <amadeus@yk.rim.or.jp>).

Patch #124 - 2000/1/27 - XFree86 3.9.17b

- change coding of editing keypad's "Delete" key to `<escape>[3~`, in the default (Sun/PC) keyboard mode. This makes the terminfo `kdch1` capability independent of the coding of the backarrow key, which sends either backspace (8) or DEL (127). The reason for doing this (compatibility with the *screen* program) outweighs the choice of DEL (127) which was used in X11R5/X11R6 xterms. The *screen* program translates whatever matches `kdch1` into `<escape>[3~`, even if it happens to be the stty erase character.
- add encoding for `control/?`, to work around `xmodmap` or key translations which may confuse backspace and delete. A `control/?` will send DEL (127), and a `control/H` will of course send backspace (8).
- add encoding for `kcbt` to `<escape>[Z` (fixes Debian #54840).
- minor correction to logic that encodes Sun and DEC function keys to avoid sending an escape sequence if the key symbol is not found in xterm's lookup table.
- simplify `ifdef`'s in `main.c` for POSIX `VDISABLE` so the `"^-"` pattern is more likely to be implemented when *imake* configures xterm (fixes Debian #55105).
- change manpage to make it clearer what codes are sent by the backarrow key.

Patch #123 - 2000/1/22 - XFree86 3.9.17a

- add a note reserving OSC 51 for use in Emacs shell (request by Rob Mayoff <mayoff@dqd.com>).
- correct a missing backslash in `xterm-vt220` termcap.
- cleanup remaining quoted includes, preferring bracketed form.
- minor `configure-script` macro updates from `tin` and `vile`.
- add `configure-script` option for using `utempter` library, adapted from Redhat 6.1 patch for XFree86 3.3.5
- resync with XFree86 3.9.17a:
 - correction to QNX support (Frank Guangxin Liu)
 - some cosmetic changes that did not correct any reported problems.

Patch #122 - 1999/12/28 - XFree86 3.9.16f

- move the suggested wheel-mouse button translations into `charproc.c` to simplify customization. Correct some minor logic errors in the support for buttons 4 and 5, used for wheel mice (reported by Bram Moolenaar).
- implement `metaSendsEscape` resource, with corresponding control sequence and menu entry. Like `eightBitInput`, this causes xterm to send ESC prefixing the given key, but applies to all keys and is independent of the 8-bit/7-bit terminal setting. (requests by Alexander V Lukyanov and Marc Feeley).
- correct potential indexing with negative subscript in `udk_lookup()`, (reported by Ian Collier <Ian.Collier@comlab.ox.ac.uk>).
- modify `configure script` that sets `TERMINFO_DIR` to use `${prefix}` rather than `/usr` if the `--prefix` option was specified (request by Zdenek Sekera <zs@sgi.com>).
- modify checks for repeat-character control sequence to test the character class against xterm's state table, rather than the `isprint()` macro (patch by Alexander V Lukyanov).
- change several functions to macros to improve speed
- two corrections to simulation of bold font via overstriking:
 - use clipping to avoid leaving trash at end of the text, and
 - add brackets so wide-character logic does not fall-through into the overstriking logic (reported by Marc Feeley <feeley@IRO.UMontreal.CA>)
- add several entries to termcap file to make it have the same set of aliases as the terminfo file.
- scale the color values used for `xterm-256color` terminfo entry to 0..1000, as expected by `ncurses`.
- change `xterm-r6` terminfo definitions for F1-F4 to match program.

- Add QNX/Neutrino support (Frank Guangxin Liu <frank@ctcqx4.ctc.cummins.com>)

Patch #121 - 1999/11/14 - XFree86 3.9.16c

- change label on "Sun/PC Keyboard" popup menu entry to "VT220 Keyboard", since the checked state corresponds to VT220 rather than Sun/PC.
- add configure test CF_UTMP_UT_XSTATUS to handle the variants of utmp exit status (reports by Dave Ellement, Jeremie Petit, Tomas Vanhala).
- amend treatment of ALT key (see [patch #94](#)) so that if ALT is used as a modifier in key translations, then no parameter will be sent in escape sequences for Sun/PC function keys (request by Dr Werner Fink).
- modify default for OPT_I18N_SUPPORT to assume that XtSetLanguageProc() is available in X11R5.

Caveat: XtSetLanguageProc() was added fairly late in the X11R5 patches, and some vendors shipped buggy versions of this function (request by Tomas Vanhala).

- correct configure macro CF_SYSV_UTMP to test-link with functions consistent with the header, e.g., getutent() for utmp.h and getutxent() for utmpx.h (reported by Greg Smith).
- modify terminfo entry for `xterm-xfree86` to reflect modifiers for shift and control (from a patch by Alexander V Lukyanov).
- modify terminfo entry for `xterm-sun` to match the function-key definitions in ncurses. The pageup/pagedown and related function keys correspond to the Sun keyboard, which does not necessarily correspond with X's notion of those keys.
- modify treatment of XK_Delete keysym so it transmits parameterized VT220-style <ESC> [3~ if modifiers (shift, control alt) are given (request by Alexander V Lukyanov).
- corrected misspelled resource name in command-line option for HP function keys.

Patch #120 - 1999/10/28 - XFree86 3.9.16c

- refine the change to SGR_Background() in patch #119, by not flushing the pending scrolling operation if the background color is not actually changing. This combination occurs when using color-ls to display a long listing, since each line ends with an SGR0 which affects only the foreground color. The unnecessary flushing made it noticeably slower (reported by D Roland Walker <walker@pobox.com>).
- remove obsolete documentation about modifiers which can be returned in mouse tracking mode, and modify logic to ignore modifiers other than the existing ones, e.g., NumLock (prompted by discussions with Christian Weisgerber and Brad Pepers <brad@linuxcanada.com>).
- use free bit from obsolete shift-modifier coding of mouse tracking button events to encode buttons 4 and 5, e.g., for a wheel mouse (requests by Brad Pepers and Bram Moolenaar).
- correct a place where the ptyInitialErase logic did not set the backarrowKey state, and modify it further to use tgetstr() rather than parse the termcap data returned from tgetent() so the ptyInitialErase logic will work when xterm is linked with a terminfo library (based on a patch by Dr Werner Fink <werner@suse.de>).
- fix definition of HAVE_UTMP_UT_HOST for ISC configuration (patch by Michael Rohleder).
- improve configure script's utmp tests (based on reports by Greg Smith for os390, and David Ellement for HPUX).
- modify `install.sh` to use `uid=0` rather than 'root' to determine if the installer is privileged. This is needed on some systems since more than one account may be privileged (report by Greg Smith).
- add an application resource, `messages` (and a corresponding `-/+mesg` option) which controls the initial permission on the terminal: if `messages` is set to true (the default), behavior is as without the patch; if it is set to false (as per `-mesg`), the terminal is opened in mode 0600, thus producing the effect of the `mesg n` command. This is useful for users who want to redirect all their messages to one particular xterm: it is

more pleasant to do this with xterm resources than with explicit calls to the `mesg` program (patch, description by David Madore <david.madore@ens.fr>).

Patch #119 - 1999/10/16 - XFree86 3.9.16c

- add responses (DA and DSR) for DEC locator mode
- add coding for ANSI color to DA response
- implement UTF-8 translation for Media Copy (print) operations.
- implement vt320 control sequences for Print Composed Main Display and for Print All Pages. The latter directs xterm to print the current screen as well as the scrollbar buffer.
- correct error in `_GNU_SOURCE` configure test, which left it always defined.
- add more information, i.e., with `strerror` for some system calls in the main program which may fail due to insufficient permissions (prompted by a problem report for `-C` by Jeremie Petit <Jeremie.Petit@digital.com>).
- add workaround for conflict between <X11/Xpoll.h> and <sys/select.h> on AIX 4.3 (Richard Griswold <griswold@acm.org>).
- add configure script test to resolve conflict between <X11/Xpoll.h> and <sys/select.h>
- modify translation of UTF-8 sequences to reject "overly long" variations (patch by Markus Kuhn).
- remove `utf8controls` resource, since Markus' change removes the corresponding logic.
- correct a case where colors were not rendered properly. This happened when an application inserted several lines, then changed colors. If this was done all in one write, then there would be no intervening refresh, and the new color was applied to the pending scrolling operation which was awaiting the next refresh (reported by Stephane Chazelas <Stephane_Chazelas@Raytheon.com>).

Patch #118 - 1999/10/5 - XFree86 3.9.16b

- refine configure test for `utmp` versus `utmpx`, to build on HP-UX 10.x (reported by David Ellement).
- move the configure check for `CONST` after the check for ANSI C compiler options, since those may be required to make it work properly on HP-UX.
- add configure test for defining `_GNU_SOURCE`
- correction to `-hold` option, ensure that if data is already in the output buffer that it will be displayed before closing the PTY.
- move the configure checks for `setuid` install of xterm into a script to avoid installing it `setuid'd` to a non-root user (reported by Adam Sulmicki <adam@cfar.umd.edu>).
- correct configure script's check for `termcap.h` to avoid using `ncurses'` version of it on systems that have a working `tgetent()` function. This is needed to make `resize` work properly.
- fix some typography in `ctlseqs.ms` description of DEC locator events (reported by Stephen P Wall).

Patch #117 - 1999/9/29 - XFree86 3.9.16b

- change order of tests in configure script for `utmp` and `utmpx` to test `utmpx` first, to compile on Solaris (reported by Leena Heino <liinu@uta.fi> and Patrik Hagglund <patha@ida.liu.se>).
- add a configure test for `utmp.ut_xtime`, needed for SCO Openserver, and for `lastlog`, needed for Redhat 6.0, to refine the `utmp/utmpx` auto-configure.
- remove a spurious comma in an `#undef` (reported by David Green <greendjf@cvhp152.marconicomms.com> and David Ellement <ellement@sdd.hp.com> both on HP-UX, whose compiler does care about syntax).
- change `ifdef's` using `__CYGWIN32__` to `__CYGWIN__` (reported by Suhaib M. Siddiqi <Ssiddiqi@InspirePharm.Com>, who is told that the next Cygnus release will drop that symbol in their next release).
- minor cleanup of `ifdef's` for `makeColorPair` (patch by Stephen P Wall).

- work around problem observed in XFree86 3.3.5 (patch by Alexander V Lukyanov, Redhat [#5419](#)). From the problem report:

xterm consumes cpu when selecting text with mouse (holding down left mouse button) and when a program working under the xterm outputs something to stdout.

Easy way to reproduce:

```
while ;; do echo aaa; sleep 1; done
```

(while this runs, select text and hold down left mouse button) watch cpu load.

release left mouse button - spinning stops.

Patch #116 - 1999/9/25 - XFree86 3.9.16a

- modify warning if change-ownership of PTY fails; some configurations may not happen to have old-style pty's (reported by Bob Maynard).
- improve check in configure script for group ownership of installed xterm; some platforms use the -g option of ls to toggle group off rather than on (reported by Greg Smith).
- minor improvement to toolbar geometry, to make it not resizable. This still is not satisfactory (but is usable) since the toolbar overlaps the xterm widget if the window is resized to make it smaller. It appears that some work is needed for the xterm widget's geometry management to make it function properly.
- implement configure script tests for utmp, tty group.
- implement *-hold* option, allowing users to retain the window after a shell has exited (this is recently an FAQ, but prompted by a comment by Joachim Plaettner-Hochwarth <plaettner@aem.umn.edu> in comp.unix.programmer, that the IRIX winterm provides this option).
- add support for DEC Locator control sequences for xterm (integrated patch by Stephen P Wall):

```
DECEFR, "Enable Filter Rectangle"
DECELR, "Enable Locator Reports"
DECSLE, "Select Locator Events"
DECRQLP, "Request Locator Position"
```

This allows the xterm mouse to be used with applications that use the DEC Locator sequences, such as VAX Tpu, or SMG\$ based applications.

- improve print action (patch by Matthias Baake). From his notes,
 - Bug 1
Underlined text is preceded by ESC [0;2m . This should be ESC [0;4m , ESC [2m doesn't seem to have any effect. (print.c/send_SGR)
 - Bug 2
The check for the last non-empty column (while (last > 0) ... in print.c/printLine) omits the rightmost column of the screen, the loop must start with last = screen->max_col+1 instead of last = screen->max_col.
 - Bug 3
Any attributes of the first character (and of all immediately following characters with the same attributes) are ignored. The variable attr (print.c/printLine) should be initialized with 0, not with *a & SGR_MASK.

Patch #115 - 1999/9/18 - XFree86 3.9.16a

- integrated changes by Stephen P Wall to implement an 88-color model for systems where 256-colors cannot be allocated.
- when 256-color configuration is compiled, colored bold and underlining is not available; ifdef'd to avoid possible odd effects in this case (reported by Stephen P Wall).

- add resource *cacheDoublesize*, to limit the caching of font information for double-sized characters. This addresses a problem reported by Aryeh Koenigsberg for X terminals with limited font memory.
- modify treatment of line-drawing characters in UTF-8 mode so that the Unicode values are used rather than the C0 codes for storing the translated characters (request by Markus Kuhn).

Patch #114 - 1999/9/15 - XFree86 3.9.16

- add configure script checks for Athena headers and libraries under /usr/contrib to work on HPUX (reported by several people: David Nixon <djn@csc.liv.ac.uk> Aryeh Koenigsberg <aryeh.koenigsberg@telrad.co.il> Johannes Mähner <johanm@camline.com> Andrew Gaylard <andrew.gaylard@bsw.co.za>).
- add check to configure script if xterm is installed setgid rather than setuid, since wtmp and utmp may be installed with group-writable permissions other than root (based on Debian bug report [#7112](#) by Bo Branten <bosse@ing.umu.se>).
- rewrote logic that removes data from termcap entry, e.g., for titeInhibit, to make it less likely to remove the wrong data.
- correct logic which checks for missing characters used for line drawing. The 0 character was tested unnecessarily, leading to some inefficiency when rendering.
- change termcap capability which is used as input or output of ptyInitialErase logic from *kD* to *kb*. Christian Weisgerber <naddy@mips.rhein-neckar.de> pointed out in effect that *kD* (in terminfo *kdch1*) should correspond to the control sequence for *dch1*, which deletes from the current position toward the right.
- check for failure to change ownership of the PTY device and warn when xterm is running setuid'd to root. This was reported to happen on the FreeBSD/NetBSD/OpenBSD systems as a result of the chflags() call.
- add xterm-noapp terminfo entry to illustate a nominally bash-compatible terminal description.

Patch #113 - 1999/8/15 - XFree86 3.9.15b

Several fixes. The main one is a first draft of pulldown menus. It's not complete (I have some minor/annoying geometry problems to correct), but is usable. Once it's complete I plan to add a menu to support additional selections that won't fit on the current popup menus. Also, this fits into my longterm plan to allow configuring with Motif libraries.

- correct error in input conversion for NRC mode (reported by Stefan Traby <stefan@sime.com>).
- fix initialization of num_lock data in Misc struct (since those fields of the reference widget aren't initialized), and add logic to deal with XVision whose NumLock key does not transmit but does alter keypad state.
- correct a missing return-value in get_pty(), for SCO
- add E2A fix for backspace (patch by Greg Smith), i.e.,
#define VAL_INITIAL_ERASE A2E(127)
- correct foreground color within cursor outline when the window is unfocused (reported by Stephane Chazelas).
- corrected position of scrollbar set in ResizeScrollBar(), which left it positioned incorrectly if the right scrollbar were enabled from the popup menu but was not initially enabled.

I have noticed some additional problems with right-scrollbar on X11R5 which I will correct later.

- integrate changes by Jean-Claude Michot for QNX from XFree86 3.3.4c
- add resources menuBar/MenuBar, menuHeight/MenuHeight for later use in toolbar geometry.
- add configure option --enable-toolbar
- add missing definition to make ziconbeep logic not compile-in when configure script disables it.
- add configure-check for input-method support in X libraries

Patch #112 - 1999/7/17 - XFree86 3.9Pw

- add null-pointer check to FlushLog(), fixes a core dump when both -l and -lf options are used when xterm is configured with wide-character support.
- remove "ISO" case for SD, which was due to a typographical error in ECMA-48 (reported by Paul Williams <paul@celigne.co.uk> for vttest).
- add "FILES" section to manpage.
- generate header file to initialize default resources for colors 16-255.
- fixes for os390 (Greg Smith):
 - add README.os390
 - use the pty_search() function to find an available pty/tty pair.
 - move E2A() call out of getXtermCell() to SaveText() function so it will be available in all configurations.
- patches by Todd Larason:
 - enable SGR 48 5 in ISO color mode, not just 256 color mode
 - change configure's --disable-256-color option to --enable-256-color, to match its effect
 - fix OSC 4 xx ? (report ansi color) to report a string which can actually be used to set the color back
 - fix OSC 4 xx yy (change ansi color) to not allow setting colors > 15 in 16 color mode
 - simplify the COLOR_ settings a bit in ptyx.h, along with setting NUM_ANSI_COLORS needed for #1 and #4 above
 - correct string-terminator code passed for reference to OSC responses; when in 7-bit mode, only the final byte of ST was seen.
 - Allow multiple color #;name pairs in OSC 4, and document changes to match.

Patch #111 - 1999/7/10 - XFree86 3.9Pw

- add control sequences for specifying the RGB value of the ANSI colors, and for configuring with 256 colors (patch by Todd Larason <jtl@molehill.org>). I made the default configuration to 16-colors, because xterm uses the default color map (which has only 256 colors).
- correct an error in DCS \$ q m reporting for colors 8-15 (Todd Larason).
- add test/demo script for double size characters. Used this to test/correct display of double size characters that should wrap, underlined double size characters.
- increased cache size for double size fonts to 8, to allow for both normal and bold fonts (discussion with Aryeh Koenigsberg <aryeh.koenigsberg@telrad.co.il>).
- add fixes for port to OS390 aka MVS (integrated patch from Greg Smith <rys@epaibm.rtpnc.epa.gov>). OS390 uses EBCDIC rather than ASCII.
- correct an off-by-one in binary search limits in keysym2ucs.c (Markus Kuhn).
- implement logging for UTF-8 mode. The output is written in UTF-8 form.

Patch #110 - 1999/6/29 - XFree86 3.9Pu

- If colorMode is enabled by default, compile-in default resources to match the colors listed in XTerm-col.ad (this should fix a longstanding FAQ).
- added new OSC 3 ; PROPNAME=VALUE ST escape sequence to set an arbitrary X property on the top level xterm X11 window. Omit "=VALUE" to delete the X property (patch by Greg Badros <gjb@cs.washington.edu>).
- change internal flag used for *utf8controls* resource so we allow 31-bit range of characters (suggested by Thomas Wolff).
- add check for 16-bit characters in OSC strings, change them to '?' (reported by Thomas Wolff).
- modify logic of same_font_name() to avoid trying to interpret both parameters as wildcard patterns. That does not (cannot) work, and in some instances the font server will return unresolved wildcards for the

normal or bold fontnames, making them match inadvertently, triggering the fallback overstrike logic (reported by Tim Adye).

Patch #109 - 1999/6/23 - XFree86 3.9Pt

- correct range-check from patch #108, which resulted in not being able to select from the scrollbar buffer (reported by Tim Adye <T.J.Adye@rl.ac.uk>)
- correct "no available ptys" problem with Cygwin B20.1 (patch by Tim Adye).
- modified install-ti rule in Makefile.in to allow override of the terminfo directory when doing a "make install", i.e., by assigning to TERMINFO_DIR (request by Zdenek Sekera <zs@sgi.com>).
- added install-full rule to Makefile.in
- resync mkdirs.sh and install.sh scripts against current autoconf
- implement \$(DESTDIR) in Makefile.in, making it simple to install xterm and associated files into a directory just for packaging a binary release (suggested by CaT <cat@zip.com.au>).
- change IChar type to unsigned, rather than unsigned short, making room for a flag to keep with 16-bit characters to prevent them from being interpreted as C0 or C1 controls (reported by Thomas Wolff).
- correct a typo from patch #107, incorrect array name, in the filterUTF8 function (patch by Bruno Haible <haible@ilog.fr>)
- add *utf8controls* resource to specify whether xterm should interpret 16-bit characters unpacked from UTF-8 form as control characters if they happen to fall into that range. This behavior is left unspecified by the Unicode standard (request by Thomas Wolff).
- modify handling of OSC to recover if application sends 16-bit characters with codes above 255. We cannot display them as is, but translate out-of-range characters to a '?' (reported by Thomas Wolff).

Patch #108 - 1999/6/19 - XFree86 3.9Ps

- add a range-check to LastTextCol(), to guard against indexing before the beginning of the scrollbar buffer. This appears to happen with certain fonts under X11R5 (reported by Stephane Chazelas <Stephane_Chazelas@Raytheon.com>).
- implement resource *boldMode*, to allow disabling the simulation of bold fonts when the bold and normal fonts are not different (requested by Will Day <willday@rom.oit.gatech.edu>).
- change the atom "UTF-8" to "UTF8_STRING", and fixes a few bugs in the UTF-8 selection (patch by Juliusz Chroboczek).
- correct logic of binary-search in keySYM2ucs.c (patch by Markus Kuhn).
- add special interpretation of keySYM codes above 0x1000000 as the corresponding UCS value plus 0x1000000 (patch by Markus Kuhn).

Patch #107 - 1999/6/12 - XFree86 3.9Pq

- Two changes from Stephen P Wall. From his description:

The first change is simple - I added ESC[3J to erase the stored lines above the screen. That's what the changes to util.c and ctlseqs.ms are.

The second change is to get the blinking cursor working. I took out the cursorBlinkTime resource, and put in cursorBlink (Boolean), cursorOnTime (time cursor is on in msecs) and cursorOffTime, and added a cursorblink item to the vtMenu to enable/disable it.

- improve selection (integrated patch by Juliusz Chroboczek). From his description:

With this patch, selection conversion works properly:

```

        ISO 8859-1 xterm -> ISO 8859-1 xterm (transferred as
STRING);
        ISO 8859-1 xterm -> UTF-8 xterm (transferred as
STRING);
        UTF-8 xterm -> ISO 8859-1 xterm (transferred as
STRING);
        UTF-8 xterm -> UTF-8 xterm (transferred as UTF-8).

```

It will not work properly if one xterm is in, say, ISO 8859-2. Actually, for this case xterm breaks the ICCCM routinely (sending ISO 8859-2 data as STRING), so I wouldn't worry too much about it. I have not changed the behaviour in eight-bit mode in any way.

Patch #106 - 1999/6/9 - XFree86 3.9Pq

- remove duplicate fix for OpenBSD in `resize.c`
- correct logic in `ScreenWrite`, which did not reset the high bytes of 16-bit characters when overwriting them with a 8-bit character string (reported by Thomas Wolff).
- provide limited support for input of UTF-8 16-bit data by a lookup table (integrated patch by Markus Kuhn).
- correct check in `non_blank_line` to ensure we're in wide-character mode before looking at the high bytes, for `InsertChar`.

Patch #105 - 1999/6/5 - XFree86 3.9Pp

- implement new resource `trimSelection`, which allows xterm to trim trailing blanks from selected lines. This does not affect the highlighting. (reported by several people using `mutt`, including Hans Morten Kind <edphk@uib.no>, Jeremy <jeremy@exit109.com> and (Michael Fuller <msf@mds.rmit.edu.au>).
- include `term.h` in `resize` for OpenBSD (patch by Matthieu Herrb).
- correct logic for UTF-8 in functions that hide and show the cursor; it was displaying a space whenever the low byte of the character at the cursor position was zero (reported by Thomas Wolff <Thomas.Wolff@icn.siemens.de>).

Patch #104 - 1999/5/30 - XFree86 3.9Pn

This is a resync patch against XFree86 3.9Pn, reflecting changes which were submitted by Branden Robinson, who worked with Wichert Akkerman <wichert@cs.leidenuniv.nl> to set up `ifdef`'s to handle GNU libc 2.1, and use `getpt()` which lets xterm avoid having to know the actual PTY name.

I have also added a few fixes for signed/unsigned mismatches, and corrected a problem in the configure script (the UTF-8 code was always configured since the `Imakefile` defines this).

Patch #103 - 1999/5/14 - XFree86 3.9Pm

- correct selection logic: I omitted an offset that accounts for the distance into the scrollbar buffer when rewriting this for [patch #101](#). Also fixed a similar problem for selecting double size characters from the scrollbar buffer (first was reported by D Roland Walker <walker@pobox.com>).
- improved support for Unix98 PTY's, using patch in Debian bug report [#35650](#), by J.H.M. Dassen <jdassen@wi.leidenuniv.nl>. From the patch description:
 - No longer links xterm against `libutil` on a `glibc2.1` system. `libutil` is a compatibility library and should only be used when necessary. Rather than having `get_pty()` use

openpty() from this compatibility library, use the real UNIX98 pty support in get_pty() (open()ing the master pty, through getpt() if available (glibc extension)). Use openpty() only under glibc2.0.

- o GNU libc2 is not Linux-specific; already it runs on the Hurd. It provides the UNIX98 pty functions (plus the getpt() extension), regardless of the underlying OS. Changed two constructs to look for GNU libc2 only, not GNU libc2 on Linux.
- improve font configuration, by checking if the user's resource settings for normal and bold fonts give the same font sizes (fixes problem reported by Peter Waltenberg <peterw@dascom.com>).

Patch #102 - 1999/5/12 - XFree86 3.9Pm

- revert change to openpty call in [patch #101](#); this causes xterm to fail on DEC-Alpha OSF/1 4.0B (reported by H Merijn Brand).
- modify print.c to move include of stdio.h after the autoconf'd xtermcfg.h since HP's ANSI C compiler otherwise sees inconsistent prototype for getopt, probably due to problem with const (reported by H Merijn Brand).

Patch #101 - 1999/5/10 - XFree86 3.9Pm

- moved includes and definitions for 'select' from data.h to xterm.h to fix problem introduced by prototype for get PtyData, part of UTF-8 changes (reported by Jens Schleusener <Jens.Schleusener@dlr.de>)
- added "Meta <Btn2Down>:clear-saved-lines()" default translation (patch by H Merijn Brand)
- fixes to configure script and ifdef's in main.c to build on a HP9000/D390 (hppa-2.0w) running HP-UX 11.00 (64 bit) with egcs 1.1.2 and HP's ANSI C compiler (patch by H Merijn Brand <PROCURA_BV@CompuServe.com>)
- add more parentheses in ifdef's (patch by Bob Maynard).
- eliminate conflicting definitions for USE_TERMINFO in resize.c (reported by Jeremy Buhler).
- change openpty call to pass NULL rather than ttydev parameter, since that was used only to estimate the length of the corresponding data, and may not really be long enough (reported by Andreas Jaeger)
- update description in xterm manpage for character class table, which said it handles only 7-bit codes.
- correct a typo in ScrnDeleteChar() which made it not clear the high byte of wide-character data.
- add logic to convert selection to UTF-8 form when appropriate. This makes select/paste "work", but further work is needed to make UTF-8 recognized as a locale in Xlib.
- correct right-limit check when selecting double-width characters.
- change default answerback response to an empty string.

Patch #100 - 1999/5/3 - XFree86 3.9PI

- Correct a typo in the default resource value for backarrowKeyIsErase: it was always true (reported by Bram Moolenaar).
- improve configure script's test if the installed xterm is setuid, in case that is a symbolic link.
- correct "install-ti" rule in Makefile.in, by not setting a blank \$TERMINFO value. That is interpreted as "." by ncurses' tic.

Patch #99 - 1999/5/2 - XFree86 3.9Pk

- correct logic that computes num_ptrs count of the number of indices into the screen buffer. This is the maximum of the colors and character-set indices; was incorrect in patch #97.
- correct argument type for sigsetjmp, incidental change in patch #96's Unix88 PTY patch (reported by Bram Moolenaar).
- correct description of secondary DA in ctlseqs.ms (reported by Bram Moolenaar).

- decouple the `backarrowKey` and `ptyInitialErase` resources by adding a new resource `backarrowKeyIsErase`, to accommodate people using applications which have hardcoded tests for characters 8 and 127 rather than relying on the `stty` settings.
- modify the UTF-8 decoder so that all possible illegal UTF-8 sequences are properly represented by `U+FFFD`. This should be very helpful for developers of code that output UTF-8 strings for debugging. See the file `utf-8-test.txt` in <http://www.cl.cam.ac.uk/~mgk25/download/ucs-fonts.tar.gz> for a demonstration text that contains numerous illegal UTF-8 values. (patch by Markus Kuhn).
- correct a place in `ScrnRefresh` where I was filling the high byte of a wide character with a space rather than a null (reported by Markus Kuhn).

Patch #98 - 1999/4/26 - XFree86 3.9Pk

- correct data manipulation in `unparseputc()`, broken for little-endian machines by patch #97's UTF-8 changes. This meant that keyboard input on SunOS did not work, though Linux i386 was fine.
- modify initialization for `backarrowKey` and logic for initial-erase to prevent the initial-erase from overriding an explicitly set `backarrowKey` resource (reported by Vikas Agnihotri).
- add a missing null-pointer check in `ScrnRefresh`, for the wide-characters configuration.

Patch #97 - 1999/4/25 - XFree86 3.9Pk

- add configure script test for `-lutil`, needed for `openpty` call when configuring `xterm` for `Glibc-2.1` and `Unix98 PTY's` (first reported by Martin Lorentz" <m.lorentz@w12.link-goe.de>).
- completely parenthesize `ifdef` expressions for `Glibc` (suggested by Bob Maynard).
- add initial-erase options (`-ie`, `+ie`) to help message (reported by Vikas Agnihotri).
- remove duplicate definition of `USE_USG_PTYS` (reported by Jeremy Buhler).
- change termcap `kD` and terminfo `kdch1` to a `DEL` (`\177`). I overlooked this when separating the styles of keyboard with the `sunKeyboard` resources in patch #94, so that it normally matches the value of the `stty` erase character:
 - Reported by Jae Gangemi <jgangemi@ccf.rutgers.edu>, this caused `emacs` to not process the `DEL` properly, combining it with succeeding characters.
 - This does not appear to be related to a problem which I have found with `screen`, which translates the `stty` erase into the termcap `kD` or terminfo `kdch1` value (depending on how it is linked) if the `$TERMCAP` variable is set when `screen` is invoked.
- add command-line options for enabling UTF-8 mode: `-u8` and `+u8`. The more obvious `-utf8` and `+utf8` would conflict with `xterm's -ut` and `+ut` (`utmp`) options. The UTF-8 changes were requested by Markus Kuhn <Markus.Kuhn@cl.cam.ac.uk>. This patch does not complete UTF-8 implementation, but makes it usable, i.e., display and refresh work, and I am able to display the test cases which Markus provides. More work is needed to complete this feature:
 - the control sequences for switching in/out of UTF-8 mode are partly implemented (don't use them). Similarly, the switching between `vt100` and `tek4014` emulations when UTF-8 mode is enabled will not work properly.

You must use the `-u8` command line option to use this feature, as well as compile with the `OPT_WIDE_CHARS` definition.

- `cut/paste` only copies 8-bit characters.
- logging is disabled in the wide-character configuration
- printing only writes 8-bit characters.
- input only does 8-bit characters. This is the area that I know least about.

Patch #96 - 1999/4/19 - XFree86 3.9Pj

- modify Makefile.in to work with configure script's --srcdir option. (patch by Jeremy Buhler <jbuhler@cs.washington.edu>)
- add checks for 'echo -n' equivalent for 8colors.sh and 16colors.sh scripts (reported by Vikas Agnihotri).
- improve logic that looks for bold fonts to allow for wildcards in the specification for normal fonts, and to ensure that if a bold font is specified as normal, that xterm will simulate a bold version of that using a one-pixel offset overstrike (reported by Henrik Harmsen <harmsen@erv.ericsson.se>).
- correct horizontal spacing of double width line-drawing characters that xterm simulates.
- improve support for Unix98 PTY's, using patch in Debian bug report [#35650](#), by Topi Miettinen <Topi.Miettinen@medialab.sonera.fi>. Andreas Jaeger says this also corrects a permissions problem reported by cat@zip.net.au
- modify initial-erase logic to ensure that t tyModes resource overrides it.

Patch #95 - 1999/4/5 - XFree86 3.9Ph

- modify primary DA response to allow a '1' parameter.
- add printer and national replacement character sets to VT220 primary DA response.
- document primary and secondary DA responses in ctlseqs.ms
- use the patch number (e.g., 95) in the secondary DA response, providing user applications a means of determining the version of xterm for feature comparison (request by Bram Moolenaar).
- make xterm respond to secondary DA when the decTerminalID is set for VT100.
- limit user-defined keys (DECUDK) to VT220-style keyboard when sunKeyBoard resource is true.
- modify ifdef's for Linux-2.2.x with Glibc-2.1 to work with Glibc-2.1 and no Unix98 PTY support (patch from Andreas Jaeger <aj@arthur.rhein-neckar.de>)
- add optional feature (resource and command-line options) to make xterm use the PTY's sense of erase character on startup, rather than requiring it to be \177, or set the PTY's erase character to match xterm's configuration. Note that while \$TERMCAP is modified to reflect the actual configuration, the terminfo kdch1 string is not (request by Dirk H Hohndel <hohndel@suse.de>)
- improve scripts in vttests to work with newer shells that do not use 'echo -n'.
- add fonts.sh example script
- correct inequality in handling of "#1" font specification.
- correct call to XGetWMNormalHints() used for computing maximum screen size; the size hints may not have been set.
- begin implementation of support for wide-characters (configure option --enable-wide-chars defines OPT_WIDE_CHARS, invoke xterm with -wc option to activate this feature). This patch optionally widens internal data structures, invokes the 16-bit text output rather than the 8-bit version and adds some tables.

Patch #94 - 1999/3/27 - XFree86 3.9Pf

- further fixes for terminfo: ka1, ka3, etc., differ between the default xterm-xfree86 and xterm-vt220 entries.
- change default (with sunKeyboard resource false) behavior of the editing keypad "Delete" to send a 127, like xterm-r6. The VT220-style <ESC>[3~ is sent when sunKeyboard is true (reported by Tomas Vanhala).
- add parameters to function keys to indicate if shift, control or alt are set. The codes are based on a description of a DEC VT510 with a PC keyboard, from Jeffrey Altman <jaltman@watsun.cc.columbia.edu>.
- add control sequence 1035, set-num-lock action and num-lock menu entry to control the use of the NumLock and Alt keys for the Sun/PC and VT220 keyboard extensions.
- implement DECSET/DECRST numeric keypad (DECNKM) mode.
- modify terminfo and termcap to use recommended "X Window" or "X11" names rather than "X Windows" (reported by Tomas Vanhala).
- suppress translation of shifted keypad "+" when sunKeyboard is true.

- workaround unexpected behavior (perhaps bug) in XmbLookupString, which returns trash in the string buffer for numlock and control-key combined with keypad-keys.
- modify ScrollBarReverseVideo() to keep scrollbar border visible when reverse video is toggled.
- correct missing case for parameter 17 (set highlight color) in dynamic colors control sequences.
- extend dynamic colors control sequences to allow users to determine the colors and font which are currently active.
- minor tweak to OSC responses, to use BEL if the application used that to end the request, rather than ST. This works better with shell scripts, which may not handle an <ESC>backslash very well.
- separate menu settings for reverse video from that done under program control.
- corrected ifdef's for menus, which did not allow tek4014 to be suppressed properly (reported by Clint Olsen).
- changes for Linux-2.2.x with GLibc-2.1 and /dev/ptmx support (integrated patch from Pavel Roskin):
 - main.c and resize.c were using different rules to determine whether ATT should be defined (actually USE_USG_PTYS is more apt).
 - copy definitions from main.c to resize.c to prevent sys/stream.h and sys/ptem.h from inclusion when SYSV is not defined
 - define CNUL if not already defined like other variables.
 - /dev/tty does exist in Linux, but it doesn't mean, it should be used. Therefore EACCES is now an acceptable result.
 - ifdef'd several calls such as ioctl (ptyfd, I_PUSH, "ptem") to build on Linux (I_PUSH is not defined when sys/stropts.h is not included).
- initialize second "lrc" variable in main.c (reported by David Dawes).
- provide definition for USE_USG_PTYS in screen.c
- add resource-files to install rule in standalone Makefile.in
- add sample scripts to illustrate titlebar controls, resizing and colors.

Patch #93 - 1999/3/14 - XFree86 3.9Pd

Here are several fixes and minor enhancements. The chief ones are the fixes for NumLock mode and reverse video, since we had become used to working around the problems.

- remove kfnd/kl/kslt strings from terminfo, because curses applications do not necessarily return khome/kend pairs (reported by Vikas Agnihotri).
- implement NumLock resource which overrides the keyboard tables for the special case of keypad keys. This is a problem introduced in xterm by X11R6 changes, i.e., an ambiguity which in effect discarded vt100 keypad support.
- modify Sun/PC keyboard mode to extend this (emulation of DEC vt100 keypad) to the remainder of the numeric keypad. Now, the default operating mode of xterm uses the keyboard tables as-is (except if the NumLock mode overrides), but provides good vt100 keypad compatibility if the Sun/PC keyboard menu item is checked.
- separate command-line settings for reverse video from that done under program control. This is a problem which was introduced by X11R6. Though *correct*, most users are confused by allowing the reset command to undo the effect of the command-line -rv option.
- add description of function keys, keypad and cursor keys to ctlseqs.ms
- add terminfo entries for xterm-vt52, xterm-sun and xterm-hp
- correct typo (missing case value) for DECSET 35, enable/disable shifted keypad action and a few compiler warnings (reported by Zdenek Sekera <zs@sgi.com>).
- correct reporting of color values 8-15 in DECROQS (reported by Vikas Agnihotri).
- modify parsing of ttyModes resource to recognize "^_" as "undef" (requested by Tomas Vanhala).
- integrate/extend changes to add iconify/maximize actions (from Edward S. Arthur <eda@ultranet.com>).
- add control sequences for maximizing/restoring window, and for reporting maximum screen size.
- add 'interpret' action, to support local function-key interpretation. Used properly, this makes most of the specialized actions of xterm redundant.

- add control sequence private modes 1051, 1052 and 1052, for setting the Sun and HP function key modes, and for setting the Sun/PC keyboard mode.
- add configure option --disable-maximize
- add configure option --disable-num-lcok
- extend descriptions of configure script options in INSTALL.

Patch #92 - 1999/2/5 - XFree86 3.9Nz

- increase buffer size for tgetent (i.e., termcap) to 1500. This fixes a problem where *screen* is built using ncurses or GNU termcap and *xterm* is built using the standard termcap interface. The former does not limit the termcap size, while the latter is assumed to be no longer than 1023 characters. The *screen* program's termcap entry is about 1200 characters long.
- change update_menu_item() to a function, to simplify debugging. This also reduces the executable by 4Kb.
- add control sequences for DECSET 30, 1010, 1011 like rxvt (enable or disable some features that were only settable via resources or command line arguments).
- add control sequence for DECSET 35, which enables/disables the shifted keypad functions.
- add support for switching font sizes, by stepping through the font menu using shifted keypad plus and minus.
- correct missing initialization of tekInhibit and tekSmall resources.
- correct ifdef's in charproc.c for XtNgeometry and XtCGeometry (reported by Bram Moolenaar).

Patch #91 - 1999/1/21 - XFree86 3.9Nw

- Implement logic to translate input characters which are mapped when in vt220 National Replacement Character mode (requested by Tomas Vanhala).
- Resync configure scripts with my patches to autoconf 2.13
- Change order of -lXmu and -lXext to accommodate cygwin32 (reported by Vikas Agnihotri).
- Add "-ti" option to set terminal emulation level from command line rather than via resource.
- Simplify some of the preprocessor logic using #elif.

Patch #90 - 1998/12/13 - XFree86 3.9Nq

This implements several small fixes and enhancements. The chief one implements fallback support for line drawing characters with fonts that do not include those characters. But I implemented that last.

- If any of the glyphs in positions 0-31 (used by xterm to implement the VT100 alternate character set) are zero-sized (i.e., missing), xterm will reserve a normal space for the glyph when drawing. I implemented a simple stroke-drawing function to draw the line-drawing characters and a couple of the other (simpler) characters such as diamond. (This was suggested by Vikas Agnihotri).
- Modify the computation of doublesize characters to work around font servers which shift the scaled characters up/down or do not give the correct width.
- Add popup menu item and corresponding resource settings to disable the font-scaling logic for doublesize characters to work around (older) font servers which simply do not draw the fonts scaled to the size that they said they would. I see this problem on a SunOS system running X11R5; the X11R6 servers seem well behaved.
- Implement new escape sequence, private mode 1049, which combines the switch to/from alternate screen mode with screen clearing and cursor save/restore. Unlike the existing escape sequence, this clears the alternate screen when switching to it rather than when switching to the normal screen, thus retaining the alternate screen contents for select/paste operations.

When I implemented the popup menu entry to toggle between the normal and alternate screens, I considered only pasting from the normal screen to the alternate; this improvement allows either direction.

- Changed the termcap and terminfo for xterm-xfree86 and xterm-8bit to use the new 1049 private mode.
- Modify the logic which switches between normal and alternate screens so that the save/restore cursor operations apply only to the current screen. That means that applications which use the terminfo smcur/rmcur or termcap ti/te capabilities will restore the cursor to the original position on the normal screen rather than to the most recent place where a save-cursor operation was performed.

I note that a real VT100 terminal would not behave in this way, but it is a moot point since the VT100 does not implement alternate screen, and therefore the save/restore cursor sequence would not be used in this context. I reviewed the logic which switches between normal and alternate screens based on some recent newsgroup postings as well as a proposed patch in the Debian group which attempts to do this (the patch has a bug, however, so I did not use it).

- Add popup menu entry for toggling the titeInhibit resource.
- Add new resource answerbackString, which overrides the default "xterm" returned by xterm when responding to an ENQ (control/E) character (request by Rajesh Vaidheeswarran <rv@fore.com>).
- Add new resource keyboardDialect for setting the NRC display character set (request by Tomas Vanhala, who notes that I should add logic to translate the keyboard as well).
- Add new command-line option and corresponding resources for making xterm generate escape sequences compatible with HP terminals. Like the existing Sun escape sequences, this is available as a popup menu item. It is enabled by the configure script with the option --enable-hp-fkeys (requested by Toni Mueller <sales@oeko.net>).
- Add configure script option --disable-boxchars to disable the fallback support for line drawing characters.
- Fix ifdef's for configure script --disable-ansi-color, and reviewed all configure options to ensure that all can be enabled/disabled appropriately.
- Update config.guess and config.sub, from Lynx.

Patch #89 - 1998/11/20 - XFree86 3.9Nm

This patch completes the implementation of double-sized character support for the VT100 emulation, and fixes a few minor bugs:

- corrected the cursor position in HideCursor, which did not multiply the column by two when in doublesize mode. This bug, which did not appear in normal use, dates back to my original [changes](#) to partly implement double-sized characters. I noticed it when cat'ing a typescript from vttest's double-sized character test.
- ensure that the current line is repainted when switching between single and double width characters.
- reduce the number of bits used for double-sized character coding from 3 to 2, to make more room for soft-font codes.
- copy newer ifdef's from the XFree86 3.3.3 release's main.c, which address details of glibc and powerpc.
- moved definition of DECL_ERRNO in xterm.h to match XFree86 3.3.3
- modify *resize* to remove the ifdef on SVr4 that suppressed printing the script for \$LINES and \$COLUMNS. Solaris' *resize* utility does this; suppressing the behavior is unnecessary.

I tested the double-sized characters using vttest and the xfsft patch. These fonts worked reasonably well:

```
-bitstream-courier-medium-r-normal--0-0-0-0-m-0-iso8859-1
9x15
```

The iso8859 font does not include box characters, of course, but looks good.

Patch #88 - 1998/10/31 - XFree86 3.9Nk and 3.3.2h

This refines my [patch #85](#) by checking for a case where the font server returns a bold font that does not quite correspond to the normal font. When I asked for a bold version of the 6x12 font, the font server returned a near equivalent where the ascent and descent values did not match, causing xterm to leave lines across the display. This patch makes xterm reject that type of mismatch, falling back to the old font behavior.

Patch #87 - 1998/10/21 - XFree86 3.9Nj and 3.3.2f

This corrects a problem reported by Stefan Dalibor. My table entries for the *printerExtent* and *printerFormFeed* resources used the wrong types for sizeof, causing the printer to not work properly on some platforms because the *printAttributes* resource was overwritten (e.g., Digital Unix with DEC Alpha).

I reviewed all of the resource table entries and fixed a potential problem with *resizeGravity*, which was typed as *int* rather than *XtGravity*.

Patch #86 - 1998/10/14 - XFree86 3.9Nj and 3.3.2e

A small fix: when switching to/from the continuous mouse reporting mode, the event mask was incorrect if xterm was built under X11R5 because the original data was saved under an ifdef for active-icon.

Patch #85 - 1998/10/12 - XFree86 3.9Nj and 3.3.2e

Some cleanup (I noticed the pixel droppings a few months ago after getting a new 17" monitor):

- split-out the functions that load/reload fonts for xterm as new file fontutils.c to extend them to support automatic loading of bold font corresponding to the normal font. Adapted logic from EMU 1.3 for this purpose. This fixes most occurrences of pixel droppings from bold characters.
- modified by renaming variables and adding casts to permit compile with g++.
- modify headers so they can all be compiled without order dependencies, and use bracketed rather than quoting includes to allow compile from separate directory.
- renamed xterm terminfo entry to xterm-mono, to avoid conflict with Solaris entry now in ncurses.

Patch #84 - 1998/10/9 - XFree86 3.9Ni and 3.3.2e

Several small fixes and enhancements, including a patch from Bjorn Helgaas:

- correct initialization of TERMCAP environment variable, which was frequently set to garbage on non-Linux systems because "termcap" and "newtc" contained random data from the stack.
- remove the LINEWRAPPED attribute from lines as they are cleared. Previously, the attribute was set but never cleared.
- make word and line selections work even when lines are wrapped by xterm. Previously, selections were limited to one screen line.

as well as

- modify logic for line-wrapping to reset the associated flag if the application deletes a character. This fixes a problem reported by Bjorn Helgaas where word/line selection would still wrap even after deleting characters from the first line.
- add kll/kH capabilities to xterm-xfree86 entries in termcap and terminfo (request by Michael Schroeder).
- shorten descriptions in termcap to make resolved entries all shorter than 1023 character limit.
- use DECSTR control sequence to shorten initialization and reset strings in xterm-xfree86 termcap and terminfo.
- use rmul/smul and rmir/smir in xterm-r5 terminfo to match termcap.

- correct typos in initialization and reset strings in xterm-r5 termcap and terminfo.
- disable special translations of key symbols (the backarrow key, the editing keypad and the keypad "+") when a modifier other than shift, control or numlock is used. This makes xterm handle the meta key as expected by people using emacs (reported by Pete Harlan <harlan@pointofchoice.com> in linux.debian.user newsgroup).

Resync #83 - 1998/10/7 - XFree86 3.3.2e

Merge changes through [patch #83](#) with the 3.3.2e version.

This follows a change from XFree86 CVS which adds checks for non-null return from malloc (patch by Matthieu Herrb).

Patch #83 - 1998/8/25 - XFree86 3.9Nb

Several small fixes and enhancements:

- add configure test to infer if xterm should be installed setuid based on previously installed xterm (reported by Stephen Marley and Stefan Dalibor).
- implement quasi-continuous mouse reporting (integrated patch by Jason Bacon).
- correct control sequences transmitted by function keys F1 to F4 when sunFunctionKeys resource is true (it was still using the VT100 control sequences).
- modify handling of backarrow key so that the control modifier toggles the backspace/delete interpretation set by the backarrowKey resource.
- limit the row and column values used to report mouse position.

From resync with XFree86 3.9Nb:

- add support for the VSTATUS control character (patch by Robert Earl <rearl@teleport.com>).

Patch #82 - 1998/7/15 - XFree86 3.9Aj

Bug fix for [patch #81](#):

- remove an #undef for NBBY, which caused compile problem on FreeBSD (reported by David Dawes).

Patch #81 - 1998/7/14 - XFree86 3.9Aj

More bug fixes:

- fix conflicting ifdef's for TIOCSLTC when building with Linux on AXP aka DEC Alpha (reported by Robin Cutshaw).
- correction to patch #79, move assignment for *utptr->ut_user = 0; back into non-SVR4 ifdef in main.c, since this clobbers username on Solaris 2.5.1 (analysis by Will Day <willday@rom.oit.gatech.edu>).
- corrected khome/kend in xterm-8bit terminfo description.
- improve cursor color by making it always the reverse of fg/bg unless the cursorColor resource is set, i.e., to something other than the default foreground (reported by Vikas Agnihotri and Bram Moolenaar).
- minor fixes for compiler warnings, including a syntax error in the AMOEBA ifdef's.

From resync with XFree86 3.9Aj:

- correction to patch #73, supply missing #else for fallback definitions of size_t, time_t (Robin Cutshaw <robin@intercore.com>).

Patch #80 - 1998/6/29 - XFree86 3.9Ai

This fixes a couple of items leftover or introduced by patch 79:

- take out the logic that suppresses editing-keypad in vt100 mode (those keys are too valuable to give up for a fine point of emulation).
- corrected a couple of places in terminfo where I missed using the vt220-style editing-keypad codes for Find/Select (mapped to Home/End).
- checked termcap file against terminfo, fix several places where it was inconsistent.

Patch #79 - 1998/6/28 - XFree86 3.9Ai

This patch fixes several small bugs:

- use X_EXTRA_LIBS in standalone Makefile.in (patch by Tomas Vanhala).
- add new resource 'oldXtermFKKeys' which provides backward compatibility for F1-F4 control sequences with TOG's xterm.
- determine the server's default foreground/background Pixel values, needed if the -flipPixels X server option is used (reported by David Dawes).
- correct logic for F1-F4 function keys so that they generate VT100 compatible escape sequences in VT220 mode, since that is what the numeric keypad is supposed to do (reported by Ron Johnson, Jr. <ronjohn@communique.net>).
- modify logic for editing keypad to work more like VT220: don't pass those codes in VT100-mode unless oldXtermFKKeys mode is set.
- correct an interaction with the editing-keypad logic that prevented backarrow key from sending a 127 for the delete key (the 'remove' escape sequence was being sent instead).
- use return-value from getuid() rather than the parameter, to work on systems which do not update the latter (patch by Kevin Buhr <buhr@mozart.stat.wisc.edu>)
- correct scrollbar border color when toggling to/from secure keyboard mode (patch by Jeff Uphoff <juphoff@tarsier.cv.nrao.edu>)
- modifications to terminfo file:
 - rename description to xterm-xfree86, adding an entry 'xterm' which is derived from xterm-xfree86 to simplify customization.
 - change string for kdch1 from \177 to \E[3~, to address complaints from Debian developers. (This applies to the key labeled "Delete", and does not affect the backarrow key).
 - add user-strings u6, u7, u8, u9 to entries to make them work with Daniel Weaver's "tack" program.
 - modify xterm-24, xterm-bold, xterm-boldso entries to disentangle them from explicit dependency upon xterm-xfree86.
 - add generic 'xterm-color' entry.
 - minor corrections to xterm-xfree86, xterm-8bit, xterm-r5 and xterm-r6 entries.

Patch #78 - 1998/6/3 - XFree86 3.9Ah and 3.3.2

Again, most of the bulk of this patch is for ANSI conversion. I used the IRIX compiler's -wlint option to find the remaining functions that use K&R syntax (since gcc does not do this properly). Also, I changed the logic in the print code slightly to close unwanted files before opening a pipe to the printer. This may help in some configurations where the line printer hangs until xterm closes the pipe.

Patch #77 - 1998/5/26 - XFree86 3.9Ah and 3.3.2

Most of the bulk of this patch is to convert the extended C (K&R functions with prototypes) to ANSI. I verified that on Linux by comparing object files, to ensure that I did not, for example, interchange parameters in the function declarations.

The rest of the patch fixes several minor bugs, and adds a few features:

- back-out my use of ncurses "captinfo -f" option (if/then/else/endif) formatting, since ncurses did not correctly filter embedded newlines in terminfo capability strings until `_after_` ncurses 4.1, thus corrupting `setf/setb/sgr` strings (reported by Darren Hiebert and others).
- document SGR 8, 28 (invisible/visible), add corresponding capabilities to terminfo description.

I would also add the 'prot protected capability, but the control sequences for that would not be recognized or properly ignored by the older xterm programs.

- modify `ChangeGroup` to not suppress a null-resource, but treat it as an empty string (recommended by Stefan Dalibor).
- add `printerAutoClose` resource to control whether printer is closed when going offline. More than one person reports problems (on Solaris 2.6 and Digital Unix 4.0) getting the printer to proceed unless xterm exits; I think that it is a problem flushing the pipe. Closing it ought to flush it.
- adapt TOG fix-3 to in `HandleKeymapChange` and `VTInit18N` (but adapt `XtStackAlloc/XtStackFree` for clarity, as well as fixing memory leak).
- change calls on `FillCurBackground` to `ClearCurBackground`, in effect using `XClearArea` rather than `XFillRectangle` when clearing as a side-effect of scrolling and insertion (patch by Alexander V Lukyanov)
- correct some places where insert/delete did not `_move_` the color attributes, using `memmove` (patch by Alexander V Lukyanov <lav@long.yar.ru>)
- add `ifdef's` for `__CYGWIN32__`, for port to cygnus version B19.1 (patch by Andrew Sumner <andrew_sumner@hotmail.com>).
- remove `#define` for `hpux` that turned on `USE_SYSV_ENVVARS`, since this causes some applications (such as 'less') to get incorrect `$LINES` and `$COLUMNS` values (reported by Clint Olsen).
- modify behavior for HP-UX, to set the "reserved" process group controls to `_POSIX_VDISABLE` so the `TIOCSLTC` ioctl does not produce an error (patch by Ben Yoshino <ben@wiliki.eng.hawaii.edu>).
- correct length of underlining, reducing it by one pixel to avoid leaving a dot when the application does not clear the whole screen I noticed this only recently myself (and other people as well); it depends on the font chosen. A 6x10 font shows it, but the other fonts from XTerm.ad do not. I also see a similar problem with the emulation of bold fonts. (patch by Sergei Laskavy <Laskavy@cs.msu.su>).
- add include for `Xos.h` to `xterm.h`, to ensure proper definitions (reported by Holger Veit).
- update `config.guess` to recognize Unixware 2.1 and 7 (patch by Mike Hopkirk <hops@sco.com>).

Patch #76 - 1998/5/8 - XFree86 3.9Ah and 3.3.2

A fix for the print-window function, and some minor cleanup:

- modify logic that closes pipe in the print-window function to not use `pclose`, which does not work on all systems, since I did not open the pipe with `popen` (reported by Stefan Dalibor).
- correct name of `$(EXTRA_LOAD_FLAGS)` `imake` variable (reported by Stefan Dalibor).
- guard logic in `ChangeGroup()` function against null pointer (reported by Stefan Dalibor).
- ensure that menu entry for toggling `sunKeyboard` resource is initialized (reported by Branden Robinson <branden@purdue.edu>).
- gcc unused-variable warnings (reported by Bernd Ernesti <bernd@arresum.inka.de>)
- rename global variable 'buffer' to 'VTbuffer'

Patch #75 - 1998/5/7 - XFree86 3.9Ah and 3.3.2

This incorporates fixes from several people, as well as some improvements that I made based on feedback from users:

- add option to standalone configure script, "--with-own-terminfo-dir", which causes xterm to pass a predefined value of \$TERMINFO to the application. Also use this value in install rule "make install-ti", for the standalone configure script. (patch & feedback from Tor Lillqvist <tml@hemuli.tte.vtt.fi>)
- change ifdef's for "hpux" to "__hpux" (patch by Tor Lillqvist). The imake configuration uses the former, but the latter is predefined by HP's compilers.
- define USE_SYSV_ENVVARS for HP-UX, curses does not use \$TERMCAP (patch by Tor Lillqvist).
- on HP-UX, use the /dev/ptym/clone device to allocate PTY's. Works both on HP-UX 9 and 10. (patch by Tor Lillqvist).
- modify configure script to obtain the \$(EXTRA_LOADFLAGS) value from imake, needed for compiling under DEC OSF/1 (reported by Stefan Dalibor)
- modify print-window action so that the printer is closed after printing a window, unless the printer was already opened (i.e., by an application running in the window). This makes the printing complete without having to exit xterm, since not all systems treat fflush through a pipe very well (reported by Stefan Dalibor)
- modify printing code so that the ^M's are not printed if the printAttribute resource is set to zero (request by Stefan Dalibor).
- correct typo in xterm.man, for the default value of printAttribute (reported by Stefan Dalibor).
- correct printing code so that the alternate character set is printed, like other attributes, with escape sequences.
- correct termcap description, removing spurious 'm' character from the 'op' capability (reported by Greg Woods <woods@weird.com>).
- correct trace code so that the initial timestamp is set.
- correct/modify utmp data for the Linux glibc 2 configuration, so that the ut_line member is set before using it to update wtmp (patch by Bill Nottingham <wen1@cec.wustl.edu>).

Patch #74 - 1998/4/27 - XFree86 3.9Ag and 3.3.2

This corrects a couple of recent bugs and adds a new resource:

- modify definition of TRACE_CHILD so that it does not conflict with ifdef's for USE_USG_PTYs in main.c (reported by Vikas Agnihotri <VikasA@att.com> and Stefan Dalibor).
- correct ownership of file (actually pipe) written by the print controls. When undoing the setuid changes in patch #69, I overlooked this. Now xterm forks a process which resets setuid and routes the printer data as the real user.
- add a new resource, "printAttributes", which controls whether color attributes (or any attributes) are sent to the printer.

Patch #73 - 1998/4/25 - XFree86 3.9Ag and 3.3.2

This patch does the following:

- implements a print-window facility for xterm. Though useful in itself, I added it as part of some debugging which I am doing. (Occasionally during an exposure event xterm fails to restore the proper colors for highlighted text, and printing the screen will show the internal states nicely).

The print facility now also displays the color information. (I will probably make this a resource).

- modified the xterm-16color terminfo description to use the setaf and setab strings, which is a little more efficient (requested by Stephen Marley).
- reduced some clutter of the ifdef/includes (e.g., stdlib.h, unistd.h, errno) making the configure script test for these.

I removed the symbols Size_t and Time_t, since they no longer serve a useful purpose.

- added some debugging traces to show the initial screen size, and the success/failure of the ioctl calls pass handle window resizing events to the application (for Clint Olsen).

I also modified the trace code to produce two files since some of the information is produced by the child process. So now they are Trace-parent.out and Trace-child.out

- updated configure test for ANSI compiler options to handle a special case for HP-UX 10.x (reported by Clint Olsen).

Patch #72 - 1998/4/17 - XFree86 3.9Ag and 3.3.2

This is a patch from Chris Siebenmann <cks@hawkwind.uts.toronto.edu>, which I have cleaned up a little, and integrated into the configure script.

From his description:

This set of patches is the latest incarnation of patches originally written by Ian! D Allen, then of the University of Waterloo and now of who knows where; I have been carrying them forward from xterm to xterm ever since about X11R4. What they do is add an option so that when an iconified xterm receives output it prepends '*** ' to its icon title and (optionally) beeps the bell; deiconifying the xterm removes the '*** '. Over the years I've found this to be incredibly convenient for monitoring all sorts of low-activity things.

Patch #71 - 1998/4/12 - XFree86 3.9Ag and 3.3.2

This patch is a slightly modified version of one by Richard Braakman, which prevents buffer overflow in the input-method and preedit-type parsing in xterm. I changed a couple of details to make the code more maintainable, and looked for similar things - copying into a fixed-size buffer (found none, though I did spot an unused variable).

Patch #70 - 1998/3/29 - XFree86 3.9Af and 3.3.2

This patch corrects some minor bugs in xterm, and fills in some more details in the VT220 emulation:

- modify Imakefile to use SpecialCObjectRule for menu and data modules, making xterm build properly if logging is enabled (patch by Scott Sewall <scott@iprg.nokia.com>).
- restore "ich" capability to terminfo entries, since Michael Schroeder points out that "ich1" is the one which is the problem in Solaris vi.
- correct color of cursor, which would disappear on inverse-video since the initialization did not compare the cursor color against both foreground and background (reported by Olivier Calle).
- correct abbreviation-test for -version and -help options, making command-line option -vb work (reported by Stefan Dalibor).
- correct a dependency between ifdef's for OPT_I18N_SUPPORT and OPT_INPUT_METHOD (reported by Stefan Dalibor).
- split-out character-set translations as new module charsets.c, to implement VT220 national replacement character sets (a mode where some of the characters are displayed as specific European glyphs). This relies

on xterm using an ISO 8859-1 font (approach suggested by Kenneth R. Robinette <zkr01@mailbox.neosoft.com>).

- correct a missing increment, which made SS2 and SS3 controls repeat the shifted character.
- add xterm-nrc to terminfo to illustrate the VT220 national replacement character sets.
- reformat terminfo using new ncurses tic option "-f", which makes if/then/else/endif expressions easier to read.

Patch #69 - 1998/3/16 - XFree86 3.9Ad and 3.3.2

This corrects the problem in xterm with utmp, reported by Olivier Calle <olivier@tc.fluke.com> as well as some other people after the XFree86 3.3.2 release.

The error was introduced by my [patch #53](#) in XFree86 3.9r (October 1997).

The correction removes the reset of setuid/setgid before the main event loop, and solves the problem which I had worked around in a different manner: for some reason, the particular waitpid() call in creat_as() hangs, does not return when the child process exits. I changed the ifdef's to force the Linux configuration to use wait() instead. This call appears to work properly on other platforms such as SunOS and Solaris.

I also added tests in the standalone configure script to check for the existence of waitpid().

Patch #68 - 1998/3/4 - XFree86 3.9Ad and 3.3.1z

This corrects another problem with the logic for highlightColor resource. As reported by David Dawes:

I've just noticed a problem with with the "inverse" control sequence (ESC[7m) with the 3.3.2 xterm. What it does is sets the background black, and the text the usual foreground colour rather than simply swapping the foreground/background.

This appears to be because when I added logic to check that the highlightColor was distinct from foreground and background colors, I did not add a further check to see that it was not black (I would make an explicit check for the resource not being set, but see nothing definite in the headers that would let me reference an explicitly-undefined Pixel value, though there are some implications in xpm.h). But this should work.

Patch #67 - 1998/2/23 - XFree86 3.9Ad and 3.3.1e

This patch does the following:

- improve test for highlightColor so that xterm does not attempt to use that unless it is different from the foreground and background colors (reported by Stefan Dalibor <Stefan.Dalibor@informatik.uni-erlangen.de>).

I could not reproduce this until I noticed that the -rev option exposed it nicely.

- remove ich and ich1 from xterm and xterm-8bit terminfo descriptions. SVr4 terminfo documents that you must not combine these with smir/rmir, but ncurses allows it, opening a hole. Solaris 2.6 vi does not work properly if it is using a terminfo description when these are combined, since it was written to accommodate old terminals that required it (reported by Stephen Marley).
- restore 1-pixel overlap of scrollbar border with left edge of window (reported by Jim Burmeister <jimb@metrolink.com>).
- add a configure option, --enable-logfile-exec, which allows the user to specify a pipe for logfile. This defines ALLOWLOGFILEEXEC.
- makes the ALLOWLOGFILEEXEC code compile & run, if configured.

- minor documentation nits.

Patch #66 - 1998/2/16 - XFree86 3.9Ad and 3.3.1d

This fixes the problem reported with failure to build the *resize* program (BSDI, OSF/1) due to not having `<termcap.h>`, by changing the `ifdef` to one that would be set only if the file exists (not currently specified, except by the standalone configure script). We do not really need to include `<termcap.h>` to build, but only for a clean compile, since it may declare the `tgetent()` prototype. I also updated the man-page for *resize*, since I had recently noticed that it can be used to resize *xterm* using the "Sun" control sequences option.

Patch #65 - 1998/2/14 - XFree86 3.9Ad and 3.3.1c

This is a small patch to *xterm*'s 8-bit terminal description. I noticed while testing ncurses that I had specified the wrong (VT100-style) codes for the F1-F4. *Xterm* only uses VT220-style function keys in 8-bit mode.

Patch #64 - 1998/2/8 - XFree86 3.9Ad

This fixes the following problems with *xterm*:

- save/restore the ANSI foreground and background colors with the other visible attributes in the save-cursor and restore-cursor operations. This works around a problem with vim, which apparently assumed that switching between the normal and alternate screens resets the colors (reported by Jim Battle [<jb@chromatic.com>](mailto:jb@chromatic.com)).

It would be nice to implement save/restore cursor as a stack (and solve this type of problem completely), but that would lead to incompatibility with applications which assume they are running with a VT100 or VT220.

- corrects behavior of a restore-cursor operation which does not follow a save-cursor (it is supposed to set the character sets to a known initial state).
- extends the `sunKeyboard` resource (and menu toggle) to modify the home, end and delete keys on a Sun or PC editing keypad, making them generate codes compatible with DEC VT220's Find, Select and Remove keys.
- corrects a length in checking command-line options, which caused the "-help" message to not work when X was not running.
- add some detail to the man-page (requested by Jason Bacon [<acadix@execpc.com>](mailto:acadix@execpc.com))
- modify the standalone configure script to ignore the broken `ns1` and `socket` libraries on IRIX 6.2 (the ones on 5.2 also are broken, so this change just widens the check for the system version number).

Patch #63 - 1998/2/5 - XFree86 3.9Ad

This is another patch from Bjorn Helgaas [<helgaas@rsn.hp.com>](mailto:helgaas@rsn.hp.com), which I've reviewed (and learned some). Following are his notes:

I poked around some more and finally got *xterm-62* to build and run cleanly on HP-UX 10.20. Here are the patches. They look sort of ugly, so here's a little explanation:

- `aclocal.m4`: Removed side effects from the `AC_CACHE_VAL` commands in `CF_FUNC_TGETENT`. Previously, `LIBS` was set inside `AC_CACHE_VAL`, which worked fine the first time configure was run, but failed if there were cached values.
- `aclocal.m4`: Added temporary setting of `LIBS` before `AC_TRY_LINK` in `CF_FUNC_TGETENT`. Previously, the last value set by the `AC_TRY_RUN` loop was used, so only `-lcurses` was checked.

- configure.in: Added temporary setting of CPPFLAGS before AC_CHECK_HEADERS for X11 files. Previously <X11/DECkeysym.h> and <X11/Xpoll.h> were found only if they were in the compiler's default include directories, even if '--x-includes=DIR' had been used or AC_PATH_XTRA had found them elsewhere.

The problem on HP-UX was that we were linking with -lcurses rather than -ltermcap due to the second bullet above, and apparently something in HP-UX curses is broken. This seems very strange, because the only thing used is tgetent, which should affect any tty/pty configuration, but I lost interest in tracking down the exact problem.

Patch #62 - 1998/1/23 - XFree86 3.9Ac

This is a patch mostly by Bjorn Helgaas <helgaas@dhc.net> (I added the os2main.c change, and a little of the documentation). From Bjorn's description:

- If you use the "-hc <color>" option or set the "highlightColor" resource, text is highlighted by changing only the background color, rather than using reverse video. I find this easier to read, especially when selecting multi-colored text, and it is similar to the way Netscape shows selections.
- Most of the code changes are under "#if OPT_HIGHLIGHT_COLOR". The principal exception is in screen.c, where I added a couple calls to resetXtermGC(). This seems like it could be a bug even without the color highlighting changes (though I don't pretend to understand all the logic).

Patch #61 - 1998/1/17 - XFree86 3.9Ac

This patch modifies the reset behavior of xterm slightly:

- change the terminfo entry so that rs1 (one of the strings used by the 'reset' program) does a hard reset rather than switching character sets. This is more in accord with other terminal descriptions.
- modifies the treatment of hard reset by the xterm program to reset the saved lines.
- corrects hard reset by also resetting user-defined keys, i.e., DECUDK.

Patch #60 - 1998/1/10 - XFree86 3.9Ab

This fixes some minor bugs and adds new functionality:

- add support for blinking text.
 - This does not actually cause the text to flash, but text with the blink attribute can be displayed in color, using new resources colorBL and colorBLMode.
 - If colors are not used, the blinking text will be displayed as before (just like bold). The main purpose of this is to make applications work properly when they assume the emulator supports blinking text.
 - I did this by moving the per-cell LINEWRAPPED flag to a per-line flag, to make room for the new BLINK flag. There were no per-line flags, so this changes a lot of logic.
- corrected missing save-cursor logic in the handling of SGR 1048 (the new control sequence I added in patch #54, 1997/10/17). Reported by Darren Hiebert.
- flush the output of the transparent printing after each line Reported by Tomas Vanhala <vanhala@ling.helsinki.fi>.
- correct the modes that are affected by save/restore cursor by adding WRAPAROUND and PROTECTED.
- corrected placement of one of the XSync calls that I added in patch #51, 1997/9/15, which had the side-effect of writing on the window border when the xterm was resizing from 132 to 80 columns.
- work around an incompatibility of the XKB definition used in xterm versus that symbol from IRIX 6.2's imake definitions (by adjusting the standalone configure script).

Patch #59 - 1998/1/5 - XFree86 3.9Ab

My last patch has an off-by-one error in the comparison for `argc`. Douglas Kosovic <douglask@dstc.edu.au> showed me where (he got a core dump). Also, I think this explains Clint Olsen's problem, but the symptoms were more subtle (EINVAL for a system call if the `-display` option is omitted).

Patch #58 - 1998/1/3 - XFree86 3.9Ab

This patch does the following:

- implement logic to permit xterm to work with proportional fonts.
 - Thomas Wolff <Thomas.Wolff@sietec.de> requested this (but it isn't exactly what he's asking for - that's a more involved task).
 - I chose to do this by rendering the characters on a fixed pitch, because it would not be useful for existing applications to display varying numbers of characters on each line.
 - Except that this forces the display to be wider, it works reasonably well. A couple of special cases (reverse + colorBD, for example) do not display with proper colors, since the inter-character gaps are painted with the background.
- added a version number to the program (several people have requested this).
- make the `-version` and `-help` options interpreted before the program attempts to open the display.
- minor reorganization of the man-page (ordered the options, resources and translations alphabetically - and eliminated some duplication).
- corrected a misspelled filename in `Makefile.in`, and added a lint rule.
- updated the configure script to correct behavior when it cannot find `imake`, as well as to fix the IRIX+gcc build (conflict with `/usr/include`).
- regenerated the configure script with a newer patch to `autoconf` that fixes a problem with environment space vs the configure `--help` message.

Patch #57 - 1997/12/26 - XFree86 3.9Aa

This patch is mostly concerned with the standalone configure script; a few minor corrections are added:

- add configure option `--disable-tek4014`, to allow xterm to be built without the tek4014 emulation.
- add configure option `--with-terminal-type`, to allow xterm to be compiled with default `$TERM` value other than "xterm" (e.g., "xterm-16color") -- requested by Stephen Marley <stephen@memex.com>.
- fix a typo in the configure `--help` message -- reported by Darren Hiebert <darren@hmi.com>.
- review diffs between `main.c` and `os2main.c`, to make them more alike. (applies some minor bug-fixes to OS/2's version).
- add missing quotes in `memmove/bcopy` configure test

Patch #56 - 1997/11/28 - XFree86 3.9x

This patch is based on analysis by Arfst Ludwig <arfst@luxor.IN-Berlin.DE>, who reported:

Setting the following resources xterm (all current versions) receives a segmentation fault on <Btn2Up> after scrolling:

```
*XTerm*VT100*translations:      #override \
    ~Shift~Ctrl<Btn2Up>: insert-selection(PRIMARY,
CUT_BUFFER0)\n\
    Shift~Ctrl<Btn2Up>:  insert-selection(CLIPBOARD,
CUT_BUFFER1)\n\
```

```

~Shift<BtnUp>:      select-end(PRIMARY,
CUT_BUFFER0)\n\
Shift<BtnUp>:      select-end(CLIPBOARD,
CUT_BUFFER1)

```

(The above resources intention is to be able to paste the latest selection even if the xterm was cleared.)

And here is how it works (and a fix!): The widget given to the action handler as first argument is not guaranteed to be a `XtermWidget` (it can be the `ScrollbarWidget`). Instead of accessing the widget's member directly `XtDisplay` gives the required pointer in a safe way.

I noticed that this was not the only instance (by reading the code, and testing with his example), and extended the solution to check the widget-class to ensure that it is indeed xterm's widget class before attempting to use it in the context of translations.

Patch #55 - 1997/11/25 - XFree86 3.9x

This fixes the segmentation violation noted by Rogier Wolff about a month ago. He'd set xterm to 400 (rows) by 150 columns, which broke because there were limited buffers (200 rows) used for juggling data when adding or deleting lines and for switching between alternate and normal screens. I replaced this by an allocated buffer.

The bug is simple to test if you set `titeInhibit` false.

Patch #54 - 1997/10/17 - XFree86 3.9s

This patch does the following:

- correct a minor placement problem with the right scrollbar.
- implement a new set of control sequences for switching between the normal and alternate VT100 screens. These work around the older sequences limitation that required modification of the runtime `$TERMCAP` to cooperate with the `titeInhibit` resource (that can't work with `terminfo`). I do this by moving all of the functionality of the `rmcur` `terminfo` capability into the control sequences.
- implement the alternate-screen menu entry

Patch #53 - 1997/10/12 - XFree86 3.9r

This patch adds a fix and implements a new feature (as well as some minor typos):

- JCHANDRA@Inf.COM (JCHANDRA) noted that there was still a problem with the wait call with the logging option. It hung when the logfile was opened as a command-line option. I fixed this by moving the `StartLogging()` call down past the place where I'd reset the `setuid` mode. So the logfile is opened as the real user, without having to fork.
- improve Rohleder's changes by renaming the command-line options and reducing the number of `ifdef`'s.
- implement right-scrollbars for xterm (patch by Michael Rohleder <michael.rohleder@stadt-frankfurt.de>).

Patch #52 - 1997/9/29 - XFree86 3.9q

This patch addresses bugs and requests reported by

- Bob Maynard <rmaynard@montana.com>,
- Clint Olsen <olsenc@ichips.intel.com>,

- JCHANDRA@Inf.COM (JCHANDRA),
- Michael Schroeder <Michael.Schroeder@informatik.uni-erlangen.de>,
- Pablo Ariel Kohan <pablo@memco.co.il>

Some of the changes are interrelated (it was an unusually busy week).

- change the default resource value for colorMode to true, matching the Xterm.ad file.
- correct behavior of 'ech' control, making the default and 0 parameters erase one character rather than to the end of line (reported by Michael Schroeder).
- add resource boldColors, command-line options +pc and -pc and configure-script option to specify behavior of xterm's mapping bold colors 0 through 7 to colors 8 through 15. (request by Pablo Ariel Kohan).
- add resource colorAttrMode to specify whether colorULMode and colorBDMMode can override the ANSI colors (report by Clint Olsen).
- correct a conflict between colorULMode/colorBDMMode versus ANSI colors, where exposure events would occasionally pick up the former (e.g., colorBD) rather than ANSI colors. Testing the colorAttrMode made this apparent, though it has been in the code since 3.2A ([patch #35](#) in Jan 1997).
- correct two problems with the optional logging support. On Linux at least, the waitpid call in creat_as hangs when the logging is toggled from the popup menu. Also, the mktemp template has the wrong number of X's (since X11R5!). Fixed the waitpid problem by exploiting the fact that the setuid behavior is reset before the popup menus are available. (reported by Jayachandran C.).
- add configure script options for building with the Xaw3d and neXtaw libraries.
- correct CF_IMAKE_CFLAGS standalone configure script macro, so that it will pick up \$(ALLDEFINES) rather than \$(STD_DEFINES). This is needed to make scrollbars work on Linux, since that uses narrow prototypes. (reported by Bob Maynard).
- various minor updates to configure-script macros.

Patch #51 - 1997/9/15 - XFree86 3.9p

Most of this patch is related to the standalone configure script, though there are fixes/enhancements as well:

- add a new resource sunKeyboard, with associated command-line option and menu-toggle that allows using a normal Sun or PC keyboard to generated the complete DEC-style function keys and keypad.
- correct a reversed foreground/background test in the control sequence that replies with the current SGR settings.
- correct, by invoking XSync, a display problem that caused the program to not properly update newly exposed areas when a font change or 80/132 resize request was not completely accepted.
- restructured autoconf macros (I made a library of all of the macros across the complicated configure scripts I'm working on).
- use the autoconf config.guess and config.sub scripts to better identify the host-os.
- improve the configure script that uses 'imake' as a fallback for definitions.
- correct several instances of unsigned/signed mixed expressions.

I've tested the configure script on Linux, SunOS 4.1.3, Solaris 2.5.1, IRIX 5.2 and 6.2, AIX 3.2.5 and CLIX 3.1 (all but the last run properly as well).

Patch #50 - 1997/8/22 - XFree86 3.9m

This is a collection of small fixes, and a couple of minor enhancements:

- plug a security hole in the implementation of Media Copy (print) by invoking setuid just before the main loop.

- add an ifdef'd include for <sys/termio.h> for HP-UX, which allows the program to process SIGWINCH events (this is a bug in X11R6.3)
- add state-table entries for VT52 emulation to enter/exit keypad application mode.
- disable the popup-menu entry for 8-bit controls when the terminal-id is less than 200 (e.g., VT52 or VT100).
- ensure that the popup-menu entry for 8-bit controls is updated when the application enables/disables this mode, including the response to a full-reset.
- implement VT300 DECBKM feature: set interpretation of the backarrow key to either backspace or delete. The initial setting is via resource; it can also be modified in the main popup menu.
- implement VTxxx KAM (ISO AM), which allows a keyboard to be locked (i.e., the terminal discards input).
- implement VTxxx SRM, which is used to control local echoing of input on the terminal.
- add terminfo and termcap entries for xterm-8bit, a variation of the xterm description that uses 8-bit control characters.
- add fallback definitions for Imakefile to allow it to work on some X11R5 systems that have no SpecialCObjectRule or ProgramTargetName macros.
- add .c.o and .c.i rules to standalone Makefile.in
- correct order of -lXmu and -lXext in standalone configure script.
- add configure script options to allow selective disabling of active-icon, input-method and i18n code (mainly for users with X11R5 or an incomplete X11R6 configuration).
- change menu-indices from #define's to enum values, thereby making it work better with the ifdef's for logging and active-icon (the X11R6.3 active-icon code is incorrectly ifdef'd; this corrects an error introduced by incorporating that code).
- correct minor compile errors in the configuration where active-icon is not used.
- add configure option to suppress echoing of long compiler commands
- correct spelling of decTerminalID in configure script help message
- use gcc __attribute__((unused)) to quiet warnings about unused parameters when compiling with -W (to make it simpler to find the real problems).

Patch #49 - 1997/8/10 - XFree86 3.9k

This patch implements the VT100/VT220 Media Copy (i.e., print-screen) control sequences.

Patch #48 - 1997/7/26 - XFree86 3.9j

This patch does the following (all but the first affect only the standalone configure script):

- minor correction to positioning of underlines for small (e.g., 5x8) font size.

The existing behavior allowed underlines to be drawn outside the character-cell, so they weren't cleared properly under some circumstances.

- adds more special-case tokens to the standalone configure script's imake-option filter (e.g., "&&", since a "make -n main.o" on my IRIX system uses that shell construct).
- adds a '--enable-logging' option for the standalone configure script.
- adds check and ifdef's for the standalone configure script to allow for building on platforms with X11R6, which lacks Xpoll.h (introduced in X11R6.1).

Patch #47 - 1997/7/13 - XFree86 3.9i

This patch does the following

- corrects an indexing error in the doublesize character logic (button.c) that caused core dump (this was reported by J. Wunsch).
- corrects the logic of ShowCursor when it is painting in a doublesize cell (charproc.c).
- corrects, according to vttest, the behavior when switching to doublesize characters and back again (doublechr.c).
- adds cbt (back_tab) to the terminfo description (this was something that I'd overlooked as applicable to curses optimization last summer).
- corrects, for the standalone xmc test, the logic for disabling xmc.

Patch #46 - 1997/7/4 - XFree86 3.9h

This is a patch to provide test-support for some work I'm doing on ncurses. It does not modify the normal configuration of xterm; the code is compiled if the standalone configure option "--enable-xmc-glitch" is specified.

Patch #45 - 1997/7/2 - XFree86 3.9h

This fixes the problem reported with xterm's cursor color versus the background (the second chunk in this patch) and also removes some duplicate initialization of the cursor GC's. If the cursor color at startup is the same as the background, then xterm will use the reverse GC, ignoring the setting of the colorMode resource.

Patch #44 - 1997/6/22 - XFree86 3.9g

This implements the first part of the VT100 doublesize characters for xterm, as well as fixing a handful of bugs:

- the doublesize character support uses the normal font (using scaled fonts will be another patch) with blanks to simulate doublesize characters. This patch does most of the global changes that'll be required. I've hidden most of the details in macros and ifdef's so it's easy to configure out (part of the patch is a configure option for that purpose).
- corrected limits in DeleteChar() function -- it's always ignored the size of the left border and scrollbar. I noticed this when working on the doublesize characters since the glitch was doubled in size (i.e., it wrapped some garbage around the right margin).
- corrected 'memmove()' logic, for standalone builds (it referenced a malloc wrapper from my development library).
- add a check for HideCursor() to prevent repeated screen updates (which can cause a spurious cursor glitch to appear, e.g., during scrolling). I noticed this with the 3.2A version (but only a few weeks ago, when I started working on this patch).

Patch #43 - 1997/6/10 - XFree86 3.9d

Here's a fix for two problems:

- modify handling of tgetent results in xterm and resize programs to make them tolerant of missing termcap file, or unknown terminal name. In this scheme, an explicit "-tn" option will succeed, overriding the fallback list.
- a nit in the configure script (log extra information to help diagnose which case of the test-compile of tgetent was used).

Patch #42 - 1997/6/8 - XFree86 3.2XI

Bram Moolenaar reported that the cursor color changed unexpectedly while scrolling. The cause was that it used the same GC's as the logic that draws the ANSI colors. The bug only appears if the cursorColor resource isn't set, and has been present since the initial implementation early last year. (The same bug also appears in rxvt ;-). Here's a fix.

Patch #41 - 1997/5/28 - XFree86 3.2XI

Some nits found by Darren Hiebert (missing part of install-rule, incorrect assignment for --enable-color-mode option).

Patch #40 - 1997/5/26 - XFree86 3.2XI

Patch for the configure script's logic for obtaining imake predefined symbols.

Patch #39 - 1997/5/24 - XFree86 3.2XI

This patch does the following:

- integrate the 16-color change for 'xterm'
- minor fixes/clarification of tgetent in terminfo vs termcap to 'resize'

(both changes also modify the configure script)

Patch #38 - 1997/5/22 - XFree86 3.2Xh

This implements a simple configuration script with autoconf (to which I'll add more options later). It does the following:

- configures xterm to build with X11R5 (at least on SunOS 4.1, Solaris 2.4, possibly IRIX - sorry network was down today, but I did test an earlier version yesterday).
- enables/disables the configuration ifdef's for ANSI color and VT52 emulation.

It does not make tests for the things that imake does (that's another project), instead it uses a hybrid of the autoconf tests for libraries and adds imake's compiler options (which are necessary in some cases to get main.c to compile).

Patch #37 - 1997/5/7 - XFree86 3.9a

This corrects a minor, but annoying error in the vt220 emulation: the DECUDK is only supposed to be interpreted for `_shifted_` function keys.

Patch #36 - 1997/1/16 - XFree86 3.2r

This corrects something that I overlooked in patch #27 (21-aug-1996), which is that when trimming the region to be repainted for the highlightSelection resource of xterm, I still have to paint the background past the highlighted region. This only happens when I first do a selection in a window that's partly off-screen, then move the window on-screen.

Patch #35 - 1997/1/7 - XFree86 3.2o

This patch does the following:

- combines the coding for foreground and background colors into a single byte, reducing the memory required to store saved-lines in color. (I'll take back that byte in a following patch to use to ensure the character-set, so there's no long-term decrease in memory use).
- modifies the PF1-PF4 coding in termcap/terminfo. Because xterm is still by default emulating vt100, the function key codes are vt100-compatible (I overlooked this in patch #31). I also reformatted the whole terminfo file into a single-column, for consistency.
- adds an interim xterm-vt220 description to accommodate the old and new styles of function-keys (though probably it'd be better to drop the old-style altogether).

Patch #34 - 1997/1/5 - XFree86 3.2o

This patch does the following:

- implement DECSTR (soft terminal reset). The biggest diff is due to adding another state table (note that there's only one useful state here, but it's only 256 bytes rather than 1k as it would have been before I reduced the size of state entries).
- some minor tidying up (e.g., signed/unsigned use bitcpy, MODE_DECCKM, resetColor, resetCharsets). More is done in [patch #35](#).

I got the description of DECSTR from a vt420 user's manual. I'll do some testing with vttest to ensure that there's nothing else to do than what was documented.

Patch #33 - 1996/11/24 - XFree86 3.2

This adds to the reset-fix by Matthieu Herrb <Mathieu.Herrb@mipnet.fr> a small change to make xterm able to output 8-bit characters in VT100 mode. Applications that run on real VT100's don't do that anyway, and this feature should be removed sometime after finishing off the VT220 emulation (VT220's can do 8-bit characters). That would be a good time to change the default terminal-id to 220.

Patch #32 - 1996/11/21 - XFree86 3.2

This implements the REP (repeat) control for xterm. That isn't part of the DEC VTxxx series, but is defined in ISO 6429. (Note that the base xterm terminal description is *not* changed -- I added a variant, "xterm-rep").

Patch #31 - 1996/11/16 - XFree86 3.2

This implements vt52 emulation in xterm (ifdef'd so it can be removed). I've been using it for testing for the past month or so.

Patch #30 - 1996/11/16 - XFree86 3.2

From bug-report by <auroux@clipper.ens.fr> (Denis Auroux), missing reset to ground state. I checked through the rest of *that* table and found another, in the unimplemented MC (screen print).

Patch #29 - 1996/9/15 - XFree86 3.1.2Gb

This patch does the following:

- corrects the restoration of color for bold/underline color mode
- adds a resource 'decTerminalID' to control the reporting level of xterm (e.g., VT100, VT220).
- uses the new resource to implement/correct the DA1, DA2 and DECRPTUI reports.
- change valid-response code in DECRQSS from 0 to 1 (the manual says 0, but the VT420 terminal I've been testing on says 1).

All of these changes are based on vttest 2.6

(Most of the volume in the patch is to add 2 more state tables for parsing the 2nd/3rd device-attribute controls).

Patch #28 - 1996/8/31 - XFree86 3.1.2F

This patch corrects the following reported by Roland Rosenfeld <roland@spinnaker.rhein.de>:

- handle SGR 22, 24 and 25 in combination with colorUL and colorBD resources. Also noted & fixed reset of colored underline/bold with SGR 0.
- a typo in the termcap (missing '['), from 3.1.2Dj (my error)

Roland also complained that he couldn't use box characters with

```
-adobe-courier-bold-r-normal--12-120-75-75-m-70-iso8859-1
```

but that's a known xterm limitation (the box characters must be part of the font, in the first 32 locations).

Patch #27 - 1996/8/21 - XFree86 3.1.2Ek

This patch fixes one of my long-term gripes: xterm's selection doesn't clearly show what's being selected (as per David's request, it's controlled by a resource, which defaults to the older behavior).

Patch #26 - 1996/8/20 - XFree86 3.1.2Ei

Here's a patch to fix a problem with xterm's cut/paste and another to modify the appearance of the highlighting while selecting. (The changes are independent, so you can see if the change to screen.c is desirable).

Patch #25 - 1996/8/18 - XFree86 3.1.2Ei

Here's a correction for two minor bugs that I picked up in testing, plus some lint (from Solaris 2.5) where NULL was used incorrectly:

- make the second alternate font the same as the first (that's what vt420 and dtterm do)
- corrected DECSCL report when DECSCL hasn't been set (i.e., don't return a '60').

Patch #24 - 1996/8/11 - XFree86 3.1.2Ee

This patch does several things. In effect, xterm can (I think) do a reasonably good job of emulating vt220 and vt320 terminals (as well as it was doing vt100, at any rate ;-).

It does NOT do:

- soft fonts
- rigel or sixel graphics

Anyway, I:

- added ECH, CPL, CNL, SU, SD, CBT, CHT controls
- added popup-menu for switching between DEC and Sun function keys. (corrected alignment err wrt logging entry at that point).
- make xterm recognize both 8-bit and 7-bit controls (including popup menu for switching modes).
- add user-definable function keys (aka DECUDK)
- support concealed text
- support protected text (both ISO compatible and DEC compatible - that's not the same thing, btw), with SPA, EPA, DECSCA, DECSED, DECSEL controls.
- implement DECSCL.

I'll be continuing to test this patch for a while, but don't expect to add any new functionality (it passes all of the current tests I've built in vttest, but I need to make more tests)..

Patch #23 - 1996/7/31 - XFree86 3.1.2Ec

This removes the blinking cursor I added last week (for performance reasons). Time-permitting, I'll revisit this after 3.2 is released (there *will* be more work after XFree86 3.2, I assume).

Patch #22 - 1996/7/26 - XFree86 3.1.2Ec

I looked more closely at my "double-negative" and realized that I had been confused by the default color scheme (black on white) in combination with reverse video. However, I did see that the original_fg and original_bg data weren't really used - so I removed that logic.

Also:

- during initialization, check if ANSI colors are set with non fg/bg values, disable color mode if not. This makes xterm tolerant of applications that allocate the whole color map.
- implemented blinking cursor (default is *off*)

Patch #21 - 1996/7/24 - XFree86 3.1.2Ec

This patch does the following:

- fixes some minor typography in the control-sequences documentation (it didn't occur to me til I'd sent the last patch that I could use ghostview for previewing the troff output ;-)
- adjusts the shell's background color in ReverseVideo so that flicker in resizing is reduced
- adds an ifdef OPT_ISO_COLORS to allow configuring xterm without the ISO color support (saves a lot of memory)
- used that ifdef to isolate/modify logic so that if the user doesn't have the colorMode enabled, then ISO color support is disabled (saving memory).

(If anyone needs numbers, I had savedLines set to 2000, and found a reduction from ~700k to ~400k of allocated memory, according to Purify).

Patch #20 - 1996/7/24 - XFree86 3.1.2Ec

This documents the changes in control sequences for window operations that I added in my previous patch. I'm testing another patch that allows the user to use less memory if colors aren't needed.

Patch #19 - 1996/7/21 - XFree86 3.1.2Ec

This patch does the following:

- fixes the core dump that I reported on IRIX 5.2 (in main.c)

(it's worth noting that this bug exists in X11R6.1, so I'd like to assume that someone's already submitted a fix to X Consortium...)

- change the interpretation of zero rows or columns in a resize-window request to use the root window's size (looking more carefully at dterm, that seems to be what it does).
- change some memmove calls to memcpy for slightly better performance. also, a couple of memset calls to bzero, since Quantify says bzero runs 20% faster, I assume because there's one less argument.
- interpret character sets 1 and 2 (so that vttest gives a reasonable result) Both rxvt and dterm do something equivalent.
- fix a minor memory leak in the logic that retrieves the window or icon names (Purify found this for me while I ran vttest).

Patch #18 - 1996/7/18 - XFree86 3.1.2Ec

This implements the following:

- escape sequences that act like the CDE dterm's window operations (though I have implemented the default width and height -- I've seen a rather buggy dterm running that seems to treat width=0 or height=0 literally -- maybe that's a feature, not a bug?)
- minor tweak to the screen-repainting when resizing (I still cannot entirely get rid of flicker).
- still more fixes to terminfo & termcap (I corrected my error for the hpa code and added some other stuff by comparing to ncurses' description and rxvt's).
- a tweak to the changes by Michael Rohleder for the color translation
- re-order attribute codes to allow later implementation of protected fields (dterm supposedly does this; it's probably more useful than blinking or invisible text -- that uses up all of the available bits without changing the attribute scheme radically).

Patch #17 - 1996/7/2 - XFree86 3.1.2Eb

This patch implements for xterm several minor features from ISO 6429 which are useful for terminfo applications. The HPA and VPA control sequences allow cursor movement along a row or column, cutting down a little on the characters transmitted. The other codes allow resetting specific graphic rendition attributes without modifying the other attributes. (now if someone just had time to implement blinking cursors...)

Patch #16 - 1996/6/25 - XFree86 3.1.2Ea

Adam Tla/lka <atlka@pg.gda.pl> told me a couple of weeks ago that I'd missed some of the background coloring in xterm. I investigated, and found that while I'd picked up on the clear-to-bottom and clear-to-end-of-line operations, I'd overlooked the insert/delete lines. Just so I wouldn't overlook any more of these, I updated a copy of vttest to test ISO colors and bce (background color erase). This patch introduces a new function, ClearCurBackground, whose calls replace the direct XClearArea calls that I'd overlooked. (There's also a few compiler warnings fixed, etc ;-)

Patch #15 - 1996/5/29 - XFree86 3.1.2E

This fixes the problem reported by David Dawes, by making the 50msec select timeout for the Xaw3d arrow scrollbar a resource. (I made it a boolean for a variety of reasons -- to make it a number, you'd need an additional resource, to avoid breaking the logic).

Patch #14 - 1996/5/12 - XFree86 3.1.2Dj

This patch brings the termcap and terminfo descriptions for xterm up to date. I made the following changes:

- reformatted the terminfo description in a single-column (this is ok for terminfo, and will simplify future patches -- can't do that for termcap, since it would impact buffer requirements on some systems).
- omitted obsolete features in termcap to save a little space (bs, pt)
- added color capabilities to termcap (ut, Co, NC, op, AB, AF)
- corrected some capabilities (vi, ve)
- added 'st' (set tab)
- reduced function keys in termcap for 'xterm' to 12 because color capabilities makes that description larger than 1023 characters.
- created new termcap name 'xtermm' (monochrome) to match the terminfo list, and make that description have 20 function keys.
- added corresponding color capabilities to terminfo (bce, colors, pairs, op, ncv, setab, setaf)
- corrected corresponding capabilities in terminfo (civis, cnorm, rmcup, smcup)
- added capabilities (el1, hts)
- in both, corrected home/end keys to match the code correction made by Thomas Mueller in 3.1.2Bk

=> (I'm still considering modifying the code & description to match the rxvt program).

Patch #13 - 1996/4/23 - XFree86 3.1.2Df

This corrects my earlier changes for colors - the inner border of the xterm was getting painted with the wrong color, since I'd moved the call to set the background into the logic that tracks SGR information.

Patch #12 - 1996/3/16 - XFree86 3.1.2Dc

This corrects a memory leak in xterm that happens whenever one switches fonts.

Patch #11 - 1996/3/5 - XFree86 3.1.2Db

This patch corrects the behavior of the ANSI colors in xterm when reverse video is used, as well as some other lesser sins:

- button.c
 - (compiler warnings: shadowing of 'time', redundant cast)
- charproc.c
 - renamed screen.colors[] array to screen.Acolors[] to more easily distinguish the non-ANSI colors from the ANSI colors.
 - moved logic of SGR_Save() into VTInitialize, getting rid of local private variables original_fg and original_bg.
 - moved some logic into getXtermForeground and getXtermBackground from SGR_Foreground, SGR_Background, etc.
 - corrected misleading 'row' to 'col' in case for CUF, CUB sequences.
- ctlseqs.ms
- xterm.man

- (correct a misconception which I'd added that the color0 through color6 resource values apply to non-ANSI colors)
- ptyx.h
 - added original_fg, original_bg to TScreen structure.
- scrollbar.c
 - (compiler warnings: redundant cast)
- util.c
 - new functions getXtermForeground and getXtermBackground replace the macros GET_FG and GET_BG, with the added functionality of checking for the reverse-video status of xterm.
 - in ReverseVideo, swap the SGR foreground and background colors also.

Patch #10 - 1996/2/14 - XFree86 3.1.2Cd

I observed an occasional glitch in the xterm's color behavior; a clear to end of line would get a color that had been used in a program that supposedly reset colors. I traced this down to the way xterm was modifying colors of GC's on the fly; it didn't restore the original color of the GC, even though it would later be used in functions (such as ClearRight) that assumed (my error) that the GC would have the current foreground or background color.

I fixed this by resetting the GC's colors with a new function 'resetXtermGC()', and direct calls on SGR_Foreground/SGR_Background, as appropriate and using a new function 'updatedXtermGC()' to encapsulate the logic that modifies the GC's color. (I also removed some commented-out code that was trying to do this -- the problem was a little more obscure).

Patch #9 - 1996/2/10 - XFree86 3.1.2Cb

This patch fixes the remaining problems that I had making xterm run with x11r5, as well as a couple of other bugs. It follows my patch from yesterday, that added ifdef's for some of the input-method resources.

- corrected ifdef's that suppress the input-method code (doesn't exist in my x11r5, and xterm works adequately without it).
- corrected fallback definition for 'Select()' macro (oops: I'd copied the wrong text...)
- moved the declarations for the fd_set variables to data.[ch]
- corrected an ifdef in resize.c (sunos 4.x doesn't have termcap.h)
- corrected (in main.c) some unused/orphaned variables.

Patch #8 - 1996/2/9 - XFree86 3.1.2Cb

This is mostly a documentation patch for xterm. It describes the color control sequences in more detail, and documents some other features of xterm that aren't described elsewhere.

I've also added a couple of ifdef's to fix (part of) the problem that I'm working on (making the program work properly on x11r5, where I'm doing memory testing -- I have a "good" version from mid-January, but my resync version doesn't work properly on x11r5). I'm not done with *that* yet.

Patch #7 - 1996/1/28 - XFree86 3.1.2n

I did a (clean) build of 3.1.2n on Linux 1.2.13 (ELF). I've got an S3 card.

This fixes the following in the 3.1.2n xterm:

- initialize cur_foreground, cur_background in charproc.c (Purify told me they weren't initialized).

- add interpretation of codes 39, 49, to reset background and foreground to default value (I'm told that ISO 6429 does this; but I don't have a written reference -- yet -- can anyone help here?). Anyway, rxvt does it, and it'll solve my remaining color management problems.
- shadowing of 'time' in menu.c
- 'Cardinal' vs 'int' in scrollbar.c
- several changes to permit compile with X11R5 (the system that I've got Purify on won't be upgraded to X11R6 for a long time).

I built this version (with a minor nit that I'll patch soon) on SunOS 4.1.3 so that I can test it some more with Purify.

btw: the changes made in Xpoll.h won't work on some older systems, because fd_set isn't a defined type (I've got one machine at least that this applies to).

Patch #6 - 1996/1/8

This patch does all of the SGR foreground/background fixes (i.e., clearing the screen after an SGR color is set causes that color to be used in the foreground and/or background). If the FG_COLOR and/or BG_COLOR flags aren't set, then the xterm foreground and background default to the window's values. This usage is consistent with various types of hardware (especially the IBM PC), and is also used in rxvt.

- charproc.c:
 - add/use new macros GET_FG, GET_BG - n/c.
 - add/use new functions SGR_Foreground() and SGR_Background() to set corresponding colors in GC's, and to retain sense of "original" colors.

=> This makes redundant some of the corresponding logic in HideCursor to set the foreground and background, but I left it in since it *may* be fixing an unrelated requirement.

 - set GC's in LoadNewFont() according to whether the SGR fg/bg colors are active.

=> This fixes some glitches in the accompanying resize, that leaves parts of the window in the original background color.
- screen.c:
 - modified ClearBufRows() to use the SGR fg/bg colors if they're set.
 - added function ScrnClearLines(), used this to replace portions of ScrnInsertLine() and ScrnDeleteLine(). The new function uses the SGR fg/bg colors if they're set.

=> Otherwise, selection after an index or reverse index will paint the wrong colors.

 - modified ScrnDeleteChar() and ScrnInsertChar() to use SGR fg/bg colors.
- util.c:
 - modified ClearRight() so that if either of the SGR fg/bg colors is set, we don't bzero the attributes and color arrays, but instead fill them with the appropriate codes.
 - modified ClearLeft to use SGR fg/bg colors.

Patch #5 - 1996/1/7

This patch modifies the object code, by replacing indexing expressions with temporary variables with the full indexing expression. At first glance, this seems inefficient (it did to me ;-), until remembering comments made in the compilers newsgroups that trying to "help" the compiler doesn't really work that well. A good optimizing compiler can do a better job than the programmer can. (There's a moral in the use of 'register' variables also, but I won't fix those...).

Anyway, the revised code generates a smaller object...

- charproc.c:
 - recode index expressions in ShowCursor() and HideCursor() using SCRN_BUF_XXXX macros - changes object.
 - replace constant '4' by MAX_PTRS - n/c.
- ptyx.h:
 - defined the SCRN_BUF_XXXX macros in terms of BUF_XXXX macros, to pick up references to ScrnBuf data directly, and added MAX_PTRS symbol to pick up those '4' constants strewn about the code - n/c.
- screen.c:
 - recode index expressions in ScreenWrite() using SCRN_BUF_XXXX macros - changes object.
 - replace constant '4' by MAX_PTRS - n/c.
 - use macros BUF_CHARS, BUF_ATTRS - n/c.
 - cast calloc to 'Char *' to fix compiler warning on IRIX - n/c
- scrollbar.c:
 - replace constant '4' by MAX_PTRS - n/c.
 - cast calloc to 'Char *' to fix compiler warning on IRIX - n/c

Patch #4 - 1996/1/7

When setting up for this phase, I saw that you'd corrected the bug that I found in ClearLeft. I decided to make this series of patches anyway, since readability never hurt (and there's the potential for finding another bug while reviewing this set).

- button.c:
 - use SCRN_BUF_XXXX macros - n/c
- charproc.c:
 - use SCRN_BUF_XXXX macros - n/c
- ptyx.h:
 - added four macros: SCRN_BUF_CHARS, SCRN_BUF_ATTRS, SCRN_BUF_FORES, SCRN_BUF_BACKS to represent the four arrays that are derived from screen->buf.
- screen.c:
 - use SCRN_BUF_XXXX macros - n/c
- util.c:
 - use SCRN_BUF_XXXX macros - n/c

Patch #3 - 1996/1/7

This is my third (and final cleanup) patch for xterm. It gets rid of the unused stuff, and converts several functions to static (thereby reducing their scope).

At this point, the only compile warnings I've got (on Linux) are those about the select arguments (int vs fd_set type), and a missing declaration for waitpid. Those both are hard to get right without autoconfigure.

The next patches will address the functional changes...

- Tekproc.c:
 - changed several functions to 'static' that aren't used outside this module -- changes object
- charproc.c:
 - changed several functions to 'static' that aren't used outside this module -- changes object
 - deleted unused function unparsefputs -- changes object.
- main.c:

- changed several functions to 'static' that aren't used outside this module -- changes object
- ifdef'd out unused function 'consolepr()' -- changes object
- removed unused variable 'dummy_tio' -- changes object
- moved variable 'discipline' to quiet unused-warning -- changes object
- main.h:
 - deleted unused definition of DEFBORDERWIDTH - n/c
- misc.c:
 - changed several functions to 'static' that aren't used outside this module -- changes object
 - provide dummy return statements for xerror and xioerror to quiet compiler warnings -- changes object
- ptyx.h:
 - change sbuf_address and abuf_address to 'Char *' - n/c
- resize.c:
 - changed several functions to 'static' that aren't used outside this module -- changes object
- screen.c:
 - remove unnecessary 'Char **' casts - n/c
- util.c:
 - changed several functions to 'static' that aren't used outside this module -- changes object

Patch #2 - 1996/1/7

This is my second patch to xterm. It corrects most of the gcc warnings (except for some that are due to X header files ;-). I compared objects to keep track of the changes that don't affect the object code (n/c) versus those that do.

At this point, I'm compiling (fairly) clean with gcc options

```
-Wall -Wstrict-prototypes -Wmissing-prototypes -Wshadow -Wnested-externs
```

(I also compiled with -Wshadow, but while that found some things that I wanted to find, there's far too many warnings from the X headers to be usable in this context).

The changes:

- Tekproc.c:
 - parenthesized expression to avoid gcc warning -- n/c.
 - corrected nested-extern declaration for Bool waiting_for_initial_map; ourTopLevelShellArgs, and number_ourTopLevelShellArgs - n/c
- charproc.c:
 - corrected potentially-uninitialized variables 'scstype', 'xim', and 'input_style' -- changes object.
 - adjusted logic of VTparse so that gcc won't warn about setjmp clobbering parsestate -- changes object.
 - corrected initialization of 'scstype', which could have been clobbered by setjmp/longjmp - changes object.
 - corrected nested-extern declaration of 'term', 'ProgramName' - n/c
- cursor.c:
 - corrected nested-extern declaration of 'term' -- n/c
 - renamed 'term' parameters to avoid gcc -Wshadow warning - n/c
- input.c:
 - change interface of StringInput to assume size_t (i.e., unsigned) nbytes -- changes object.
 - change interface of funcvalue, and sunfuncvalue to use 'KeySym' type instead of 'int' - changes object.
- main.c:

- moved definitions of SIGNAL_T, SIGNAL_RETURN to proto.h - n/c
- corrected missing params of 'do_hangup()' -- changes object (note: the missing params were not used).
- corrected missing param of 'Error()' -- changes object
- corrected nested-extern 'environ' - n/c
- adjusted assignments to 'tty_got_hung' and 'no_dev_tty' so that gcc can see they won't be clobbered by the longjmp - changes object.
- use Size_t type - n/c.
- menu.c:
 - removed redundant prototype for 'do_hangup()' -- n/c.
 - renamed 'time' parameters to avoid gcc -Wshadow warning - n/c
- menu.h:
 - renamed 'time' parameters to avoid gcc -Wshadow warning - n/c
- misc.c:
 - corrected definition of 'HandleFocusChange()' -- changes object
 - cast parameters in call to 'TekExpose()' -- n/c
 - corrected nested-extern declarations of 'term', 'toplevel', ProgramName, and 'environ' -- n/c.
 - use Size_t type - n/c.
- proto.h:
 - moved definition of SIGNAL_T (and SIGNAL_RETURN) here from main.c, resize.c to allow use of this symbol in prototypes (mostly in xterm.h).
 - added definition 'Size_t' to use as corrected type for strncpy, malloc sizes - n/c.
- resize.c:
 - moved SIGNAL_T definition to proto.h -- n/c.
 - use Size_t type - n/c.
- screen.c:
 - use Size_t type - n/c.
- tabs.c:
 - corrected nested-extern declaration of 'term' -- n/c
- util.c:
 - corrected/supplied parameters to 'TekExpose()' -- changes object (note: 'TekExpose()' doesn't use its parameters).
 - corrected nested-extern declaration of 'waiting_for_initial_map' -- n/c.
 - renamed 'term' parameters to avoid gcc -Wshadow warning - n/c
- xterm.h:
 - prototype 'do_hangup()', 'HandleFocusChange()', 'TekExpose()', 'Error()', 'Exit()' - forces changes in various places.
 - adjusted prototypes that pass 'Boolean' arguments to use 'int' (this is the "correct" ANSI approach to extended compiles; it's worth mentioning that gcc doesn't meet the ANSI spec here). I used gcc -Wconversion to find these, but there's a lot of unrelated warnings that are due to setting NARROWPROTO in the config - n/c.
 - renamed 'term' parameters to avoid gcc -Wshadow warning - n/c

Patch #1 - 1996/1/6

This is my first cleanup patch for xterm. It addresses all of the gcc warnings for -Wall, -Wmissing-prototypes and -Wstrict-prototypes that I can change without modifying the object code. (I'm compiling this with gcc 2.7.0 for an aout target, which makes it simple to compare objects. When I do ELF-only, I've got a tool that compares that sort of thing as well).

Briefly, this patch adds (and uses) two header files in the xterm directory:

```
proto.h
xterm.h
```

I expect this to be the biggest patch by far. However (barring a misplaced prototype), it shouldn't break anything, since the intent of the patch is to provide missing declarations.