LuaTEX-CN Documentation

— Classical Page Replication · clreq-Conformant Modern Chinese —

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Table of Contents

LuaTEX-CN Wiki

Installation Guide

Quick Start

Page Anatomy

Examples

Templates and Customization

Fonts

Features Overview

Modern Vertical Books

- Punctuation System
- Judou (Punctuation Modes)

- Interlinear & Side Notes
- Annotations & Marginal Notes
- Correction & Decoration
- Elevation (Taitou)
- Textbox
- Seals

Debug Mode

Changelog

Development Documentation

Release Process

LuaTEX-CN Wiki

Welcome to the LuaTEX-CN Wiki. This site provides comprehensive documentation for users and developers to help you create high-quality Chinese typesetting with LuaTEX-CN — classical vertical books, modern vertical books, and clreq-conformant horizontal documents.

> **Current Version**: v0.4.5 | **CTAN**: v0.4.5

Quick Access

- 🚀 Quick Start - Get started with your first project in 5 minutes
- 📦 Installation - Install LuaTEX-CN on your system
- 📚 Examples - Explore "Records of the Grand Historian" (Shiji) and "Dream of the Red Chamber"

Documentation

1. Fundamentals

- Templates & Format - Understand the "Banxin" (Page Center) concept
- Font Setup - Config Chinese fonts and fallback chains
- Layout Control - Chapters, TOC entries, and fine-grained layout control

2. Writing Modes

Vertical — four document classes

- guji (Ancient Books) - Traditional vertical typesetting (default class)
- guji-digital - Digitization mode: one source line = one vertical column, for reproducing a source edition's page layout exactly
- cn-vbook / tw-vbook (Modern Books) - Modern vertical books with punct squeeze and footnotes

Horizontal — one package

- \usepackage{luatex-cn} (horizontal) - Modern horizontal Chinese per W3C clreq: CJK–Western spacing, four kinsoku levels, per-line compression/stretch, interlinear marks and ruby, paragraph and widow control. Loads on top of `article` and friends — it is a package, not a class
- clreq conformance matrix - per-clause status for both directions, with evidence and documented deviations

3. Punctuation & Judou

- Punctuation System - Modern punct styles (mainland/Taiwan), squeeze, kinsoku
- Judou - Classical Chinese punctuation (judou/plain/normal modes)

4. Specialized Commands

- Interlinear & Side Notes - Detailed usage of jiazhu and side notes
- Annotations & Marginal Notes - Floating annotations and marginal notes (MeiPi)
- Decorations - Underlines, book titles, and correction marks
- Elevation - Honorific elevation formatting

5. Advanced Features

- Text Boxes - Absolute positioning and adaptive containers
- Seals - Adding and positioning electronic seals
- Debugging - Grid visualization and layout debugging

Developers

For information on contributing or understanding the internal architecture:

- Development Guide
- Release Process

Contact

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Installation Guide

This page describes how to install the `luatex-cn` package.

Method 1: Via CTAN/Package Manager (Recommended)

Install using your TEX distribution's package manager:

```
# TeX Live (Windows/Linux)
tlmgr install luatex-cn

# MiKTeX
# Open MiKTeX Console → Packages → Search for luatex-cn
```

> ⚠ **Note**: The CTAN version may lag behind GitHub. We recommend using GitHub Release. When installed via CTAN/package manager, the documentation lands in the texmf doc tree automatically, so `texdoc luatex-cn` opens the PDF manual out of the box.

Method 2: Manual Installation from GitHub Release

1. **Download**: Go to GitHub Releases and download the latest `luatex-cn-tex-v*.zip`
2. **Locate texmf directory**:
   - **Windows**: `C:\Users\<username>\texmf`
   - **macOS/Linux**: `~/texmf`
3. **Place files**: Put the contents of `tex/` into:

   ```
   texmf/tex/latex/luatex-cn/
   ```

4. **Refresh database**:

   ```
   texhash
   ```

5. **(Optional) Install the PDF manuals**: put the contents of `doc/` (`luatex-cn-wiki-zh.pdf` / `luatex-cn-wiki-en.pdf` , etc.) into:

   ```
   texmf/doc/latex/luatex-cn/
   ```

   After that, `texdoc luatex-cn` opens the PDF manual directly (the release zip ships `doc/` since v0.4.0).

Method 3: Direct Usage

Place the contents of `tex/` in the same directory as your `.tex` file and compile directly.

Verify Installation

Create a test file `test.tex` :

```
\documentclass[四库全书]{ltc-guji}
\begin{document}
\begin{正文}
天地玄黄，宇宙洪荒。
\end{正文}
\end{document}
```

Run:

```
lualatex test.tex
```

If compilation succeeds, installation is complete.

System Requirements

- LuaTEX (TEX Live 2024+ recommended)
- `luaotfload` and `fontspec`

Font Requirements

We recommend installing these fonts for best results:

- Noto Serif CJK SC (Source Han Serif)

• FangSong or KaiTi (for traditional book effects)

Quick Start

This page helps you quickly get started with `luatex-cn` for traditional Chinese book typesetting.

Basic Template

```
\documentclass[四库全书]{ltc-guji}
% Optional: specify font
% \setmainfont{Noto Serif SC}

\title{钦定四库全书}
\chapter{史记\\卷一}

\begin{document}
\begin{正文}

This is sample vertical text for ancient book typesetting.

\end{正文}
\end{document}
```

Common Commands

Interlinear Notes (Double-line Small Text)

```
Main text\\夹注{This is interlinear note content, auto-balances}continued text.
```

Side Notes

```
Main text\\侧批[yoffset=10pt]{This is side note content}continued text.
```

Paragraph Indentation

```
\\begin{段落}[indent=2]
    天地玄黄\\\\
    宇宙洪荒
\\end{段落}
```

Spaces

```
Need\\空格[2]two spaces here.
```

Annotation Box

```
\\批注[x=5cm, y=2cm, height=6, color={1 0 0}]{Annotation content}
```

Seal

```
\\印章[page=1, xshift=2cm, yshift=5cm]{seal.png}
```

Force Column Break

```
End of this column\\\\
Start of new column
```

Metadata Setup (v0.2.0+)

```
\title{Book Title}
\publisher{Publisher Name}
\ChapterMarker{Volume 1}
```

Or using the setup command:

```
\metadataSetup{
  title = Book Title,
  publisher = Publisher Name
}
```

Debug Mode (v0.2.2+)

```
\LtcDebugOn   % Enable debug ruler, shows grid coordinates
\LtcDebugOff  % Disable debug mode
```

Preset Styles

Choose preset styles via document class options:

Option	Description
`四库全书`	Qing Dynasty Siku Quanshu style, single fishtail
`红楼梦甲戌本`	Manuscript style, no fishtail

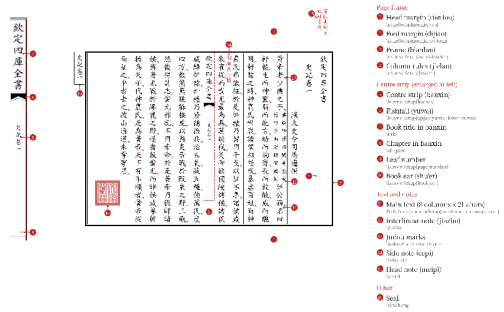
```
\\documentclass[四库全书]{ltc-guji}
% or
\\documentclass[红楼梦甲戌本]{ltc-guji}
```

Next Steps

- See Examples for more complex usage
- Read Changelog for latest features

Anatomy of a Traditional Chinese Book Page

If you are new to traditional Chinese book layout, start here. Each number in the figure marks one element of the page; the table below gives its standard Chinese name, the luatex-cn command or option that controls it, and the page with the details.



> The figure is one whole printing block (two half leaves plus the centre strip between them), typeset with `\documentclass[四库全书]{ltc-guji}` and `\关闭分页` so it is not split into two pages. The centre strip is enlarged at the left. The source and the script that draws the figure are in `资源/wiki-figures/anatomy/`.

Name Table

No.	Element	Meaning	luatex-cn	Details
1	天头 tiantou (head margin)	Blank space above the frame	`\pageSetup{margin-top}`	Command Reference
2	地脚 dijiao (foot margin)	Blank space below the frame	`\pageSetup{margin-bottom}`	Command Reference
3	版框 / 边栏 bianlan (frame)	Outer frame around the block; "double border" means two lines	`\contentSetup{outer-border, outer-border-thickness, outer-border-sep}`	Templates
4	界栏 jielan (column rules)	Vertical lines between columns	`\contentSetup{border, border-thickness, border-color}`	Templates

No.	Element	Meaning	luatex-cn	Details
5	版心 banxin (centre strip)	Narrow column in the middle, where the leaf is folded	`\banxinSetup{banxin}` ; width: `\contentSetup{banxin-ratio}`	Features
6	鱼尾 yuwei (fishtail)	Dividing marks in the centre strip	`\banxinSetup{upper-yuwei, lower-yuwei}`	Features
7	版心书名	Book title in the upper centre strip	`\title{...}`	Features
8	版心篇名 / 卷次	Chapter or volume in the middle of the strip	`\chapter{...}`	Features
9	页码	Leaf number in the lower strip	`\banxinSetup{page-number={...}}`	Command Reference
10	书耳 shu'er (book ear)	Small box outside the top corner of the frame, holding the chapter name	`\banxinSetup{book-ear}` (releases after v0.4.4)	—
11	正文 main text; 行款 format	Main text; a format such as "8 columns of 21 characters per half leaf"	`BodyText` (`正文`) environment; `\contentSetup{n-column, n-char-per-col}`	Templates
12	夹注 jiazhu (interlinear note)	Two-column small-print note inside the text	`\JiaZhu{...}` (`\夹注`), `\单行夹注{...}`	Side Note
13	句读 judou	Punctuation marks beside the characters	`\JudouPunctuationMode` (`\开启句读模式`), `\judouSetup`	Judou
14	侧批 cepi (side note)	Comment written between columns	`\Sidenote{...}` (`\侧批`)	Side Note
15	眉批 meipi (head note)	Comment written in the head margin	`\MeiPi{...}` (`\眉批`); anywhere: `\PiZhu` (`\批注`)	Annotation
16	钤印 seal	Collector's seals and stamps	`\YinZhang[...]{image}` (`\印章`)	Seal

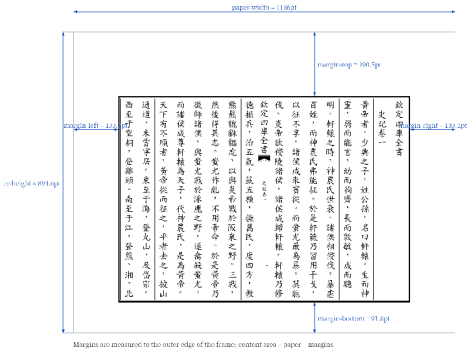
Common elements not shown in the figure:

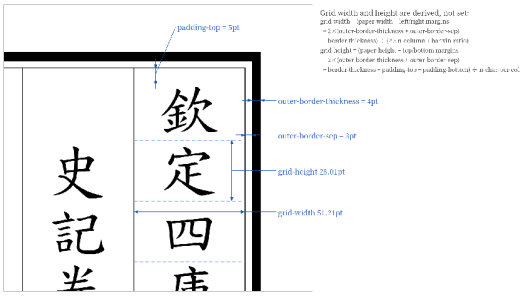
Element	luatex-cn	Details
抬头 taitou (elevation of honorifics)	`\TaiTou` (`\抬头`), `\平抬`, `\单抬`, `\双抬`, `\NuoTai` (`\挪抬`)	Elevation
牌记 colophon	`\colophon{...}` (`\牌记`)	Textbox
筒子页 folded leaf (one block printed as two half leaves)	On by default; `\关闭分页` turns it off	Command Reference

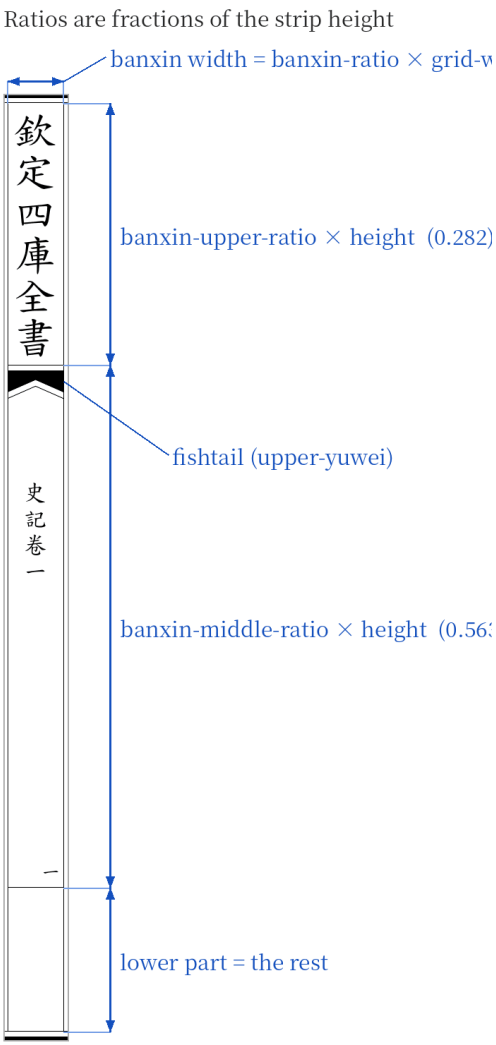
> Variants such as a black mouth (黑口) in the elephant trunk (象鼻) or decorated fishtails do not have dedicated options yet.

Parameter Diagrams

Where the common geometry options land on a real page. Every dimension is measured from typeset output by a script and checked against the setting, so the figures stay in step with the code.







Further Reading

- Wikipedia: Thread binding (線裝書, Chinese)

Examples

This directory contains multiple usage examples for the `luatex-cn` package, demonstrating everything from traditional ancient book typesetting to modern vertical and horizontal layouts.

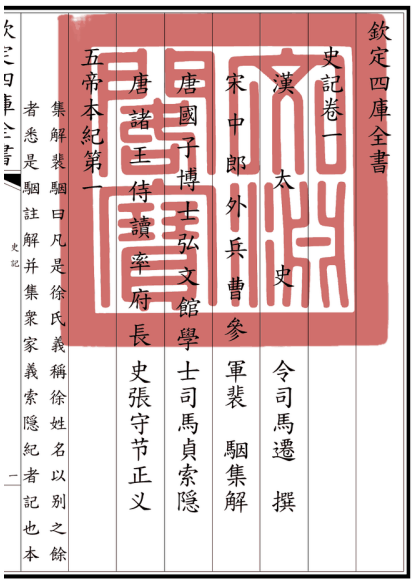
Example List

1. Records of the Grand Historian - Basic Annals of the Five Emperors

Features: Demonstrates highly complex ancient book typesetting.

Capabilities:

- Absolutely positioned red seals (overlaying text)
- Customized page center text with single fishtail
- Complex interlinear note typesetting
- Traditional black silk frame and indentation

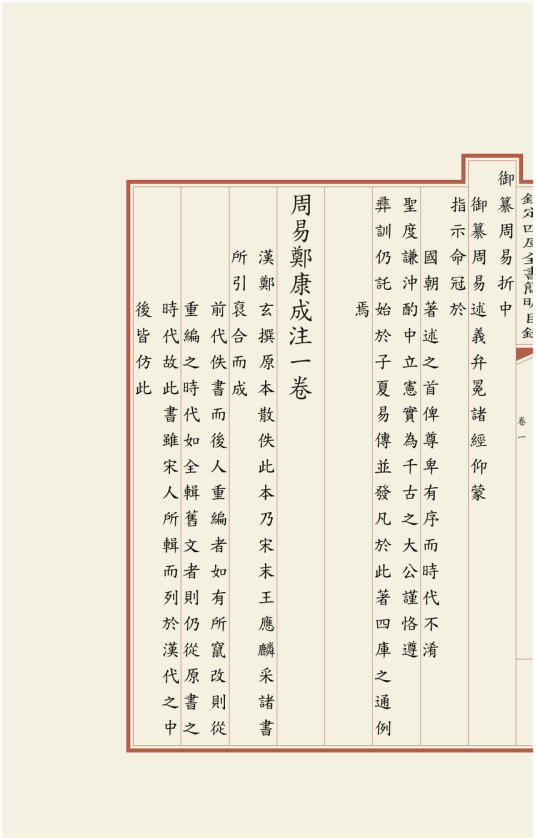


View Source

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2. Annotated Catalogue of the Siku Quanshu - Table of Contents

Features: The Wenyuan Pavilion edition, in Qing Dynasty "Siku Quanshu" style.



Capabilities:

- Standard ancient book table of contents layout (`\条目[level]{...}`)
- "Eight lines, twenty-one characters" format restriction
- White mouth, double borders on all sides, single fishtail format
- Double-line small annotations (`\注{...}`) and an overlaid imperial seal (`\印章[page=1, opacity=0.7]{...}`)

View Source | View PDF

> A full multi-volume reproduction lives in 全书复刻/欽定四庫全書簡明目錄.

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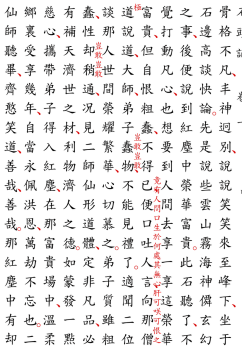
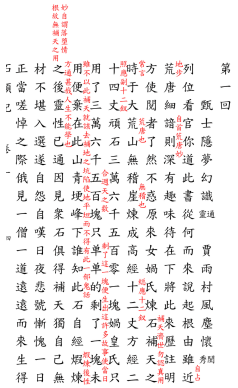
3. Dream of the Red Chamber - Jiaxu Manuscript

Features: Simulates manuscript/annotated copy style.

Capabilities:

- **Side notes** (`\侧批{...}`): red interlinear commentary
- **Floating annotations** (`\批注{...}`)
- **Double-column small text** (`\夹注{...}`): double-line small annotations in main text
- **Judou mode** (`\开启句读模式`)
- No fishtail page center, bottom page numbers

> Marginal notes (`\眉批{...}`) are not in this example — see the Jiaxu manuscript under Full-Book Reproductions.

Page 2 (Punctuation)	Page 1 (Marginal Notes)
	

View Source

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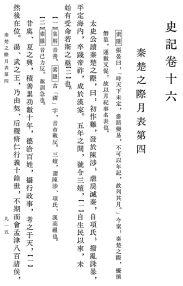
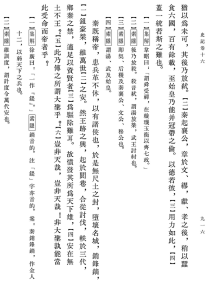
4. Records of the Grand Historian, Vol. 16 - Modern Vertical

Class: `ltc-cn-vbook` (default config)

Capabilities:

- Modern punctuation squeeze (`\punctSetup{punct-squeeze=true}`)
- Kinsoku line-breaking rules (`\punctSetup{kinsoku=true}`)
- Footnotes (`\脚注{...}`) with lujiao numbering

- Paragraph indentation (`\begin{段落}[indent=2]`)
- Mainland punctuation style

Page 1	Page 2
	

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5. 論辯的魂靈 by Lu Xun — Modern Horizontal (clreq)

Setup: `article` + `\usepackage{luatex-cn}` (v0.4.0+).

The same essay set twice for comparison: the traditional-character part uses `style=taiwan` (centered punctuation), the simplified part uses `style=mainland` + `quote-style=curly` (corner quotes converted to curly, double outside and single inside).

Capabilities:

- CJK–Western spacing and basic-level kinsoku
- Consecutive-punctuation reduction (2 em → 1.5 em) and line-start/line-end compression
- Orphan-character avoidance at paragraph end
- `\horiSetup{last-line=right}` for the closing colophon
- Traditional size numbers via `\字号{二号}`

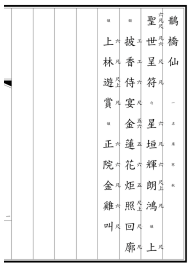
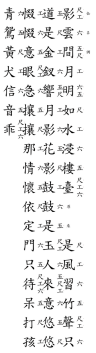
View Source | View PDF | Horizontal

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6. Gongche Notation — Kunqu Scores

Class: `ltc-guji` | **Templates**: default (printed edition) and `红楼梦甲戌本` (manuscript)

Two reproductions, one per source form:

Printed: 鵲橋仙·聖世呈符	**Manuscript:** 西廂記·佳期·臨鏡序
	

Capabilities:

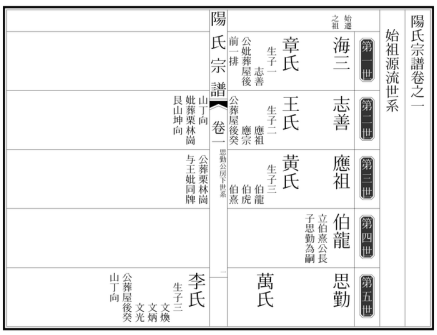
- Lyric character with its notation (`\工尺{影}{\音[板]{尺}\音[眼]{工}}`) — beat/eye marks as red dots
- Mode and tune-name annotations (`\宫调{仙吕調}` , `\调名注{一名廣寒秋}`)
- Judou characters (`\句读字`) phrasing the lyrics
- Tightened line format (`\contentSetup{n-char-per-col=12, n-column=8}`) to match the printed edition's density

View Source | Printed PDF | Manuscript PDF

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7. Yang Clan Genealogy — European-Style Genealogical Table

Class: `ltc-guji` | **Template**: `欧式族谱`



Reproduces the opening spread of 《陽氏宗譜》 vol. 1: generations divided into horizontal bands, each cell carrying the given name on the right and the spouse's clan plus burial notes on the left.

Capabilities:

- **The table system** (the only table example): `\begin{表格}[分栏=6，栏高度=43.2pt，行填充=页]`，`\栏格式`，`\单元格`，`\换栏`
- Reversed octagonal ink frames (`\八角墨围反白[高度=3，填充]{第一世}`) as generation labels
- Style overrides (`\样式[格高=28pt，字号=28pt]{...}`)
- Install-free font families (`\设置字体族{Jigmo}`)
- Debug toggle (`\开启调试` , left commented in the source)

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8. Thread-bound Cover — Modern Blue Cover

Class: `ltc-guji` | **Template**: none (built-in command)



The modern blue thread-bound cover used by Zhonghua Book Company, Guangling Press and other facsimile publishers (after CY/T 247—2021 fig. 1–2): navy ground, cream title label at the top left with double rules. The four pages show a short title with volume, a juan number, a long title with volume and juan (the label grows automatically), and small type following the title.

Capabilities:

- `\线装书封面[册次=…，卷次=…]{title}` (v0.4.3+)

- `小字位置=随后` and the `订线` preview switch
- `\pageSetup{paper-width=370mm, paper-height=260mm}` (a 16mo thread-bound spread)

View Source | View PDF

Full-Book Reproductions

`示例/` holds one- to few-page feature demos; `全书复刻/` holds complete volume-length reproductions — many pages, slow to compile.

Project	Class	Progress	Unique to it
欽定四庫全書 簡明目錄	`ltc-guji` + `ltc-guji-digital`	Volume 1 of 10 (20 juan)	**Digitization mode** (`\双列{\右小列{…}\左小列{…}}` , `\缩进` , `\换页`), the full elevation system (`\单抬` / `\平抬` / `\挪抬` / `\相对抬头`), `\文本框` , `\校对页`
紅樓夢 · Jiaxu manuscript	`ltc-guji`	Fanli + chapter 1	**Marginal notes** (`\眉批{...}` , 35 of them), **character corrections** (`\改{...}`)

The same book exists in both a semantic edition (`tex/`) and a digitization edition (`ditigal_tex/` , `*-digital.tex`), so the two input styles can be compared side by side.

Feature Coverage

Feature	Where to see it
Banxin and fishtail	Shiji Five Emperors, Siku Catalogue (varies by template)
Interlinear notes `\夹注`	Shiji Five Emperors, Siku Catalogue, Honglou, Genealogy
Side notes `\侧批`	Honglou (Jiaxu)
Floating annotations `\批注`	Honglou (Jiaxu)
Marginal notes `\眉批`	Full-book Honglou only
Seals `\印章`	Shiji Five Emperors, Siku Catalogue
Judou	Honglou (Jiaxu), Gongche
TOC entries `\条目`	Siku Catalogue

Feature	Where to see it
Elevation (single/flat/shifted/relative)	Siku Catalogue, full-book reproductions
Text boxes `\填充文本框` / `\文本框`	Shiji Five Emperors, full-book reproductions
Tables	Genealogy
Gongche notation	Gongche (both)
Ink frames / reversed octagon	Shiji vol. 16, Genealogy
Styles `\样式`	Genealogy, full-book reproductions
Character correction `\改`	Full-book Honglou only
Modern punctuation and kinsoku	Shiji vol. 16
Footnotes `\脚注`	Shiji vol. 16
Thread-bound cover `\线装书封面`	Thread-bound Cover
Digitization double columns	Full-book Siku Catalogue only
Horizontal clreq	論辯的魂靈

> **Not covered by any example**: the `ltc-tw-vbook` class, line marks (`\线标` / `\专名号` / `\书名号`), decorations and tone circles (`\装饰` / `\圈点` / `\发圈`), missing-character marks, sidenotes via `\旁注`, colophons and floating text boxes, illustration pages and half-page breaks, Layout Export, and the horizontal package's interlinear marks / ruby / even spread / paragraph styles (the example only uses `\字号` and `\horiSetup`). These currently have test documents under `test/regression_test/` but no showcase example.

Note: All ancient book examples are digital reconstructions based on historical document scans, intended to demonstrate `luatex-cn`'s adaptability to various complex typesetting scenarios.

Templates and Customization

In `luatex-cn` a "template" is a configuration file (`.cfg`) containing setup commands such as `\pageSetup` , `\contentSetup` and `\banxinSetup` . Give the template name as a document class option to load it.

Built-in Templates

Template Name	Document Class	Description
`四库全书` (`default`)	`ltc-guji`	Classic official book style (B&W); the `ltc-guji` default
`四库全书彩色` (`SiKuQuanShu-colored`)	`ltc-guji`	Classic official book style (color)
`红楼梦甲戌本` (`HongLouMengJiaXuBen`)	`ltc-guji`	Manuscript style with side/top notes
`欧式族谱` (`oushizupu`)	`ltc-guji`	Genealogy style
(default config)	`ltc-cn-vbook`	Modern vertical, mainland punctuation
(default config)	`ltc-tw-vbook`	Modern vertical, Taiwan punctuation

The two modern vertical classes have no named templates; each loads its default configuration. See ltc-book.

Using Templates

Specify the template name in the document class options:

```
\documentclass[四库全书彩色]{ltc-guji}
\documentclass[红楼梦甲戌本]{ltc-guji}

% Or switch in the preamble (Chinese or English name, v0.4.5+)
\gujiSetup{ template = HongLouMengJiaXuBen }
```

Custom Templates

Method 1: Create a Configuration File (recommended)

For a template named `<name>`, the class first looks for `<name>.cfg` in the document folder, then in `configs/` on the TEX path.

Class	File name
`ltc-guji`	`<name>.cfg` or `configs/luatex-cn-guji-<name>.cfg`
`ltc-cn-vbook` / `ltc-tw-vbook`	`<name>.cfg` or `configs/luatex-cn-vbook-<name>.cfg`

Then load it with `\documentclass[<name>]{ltc-guji}`.

guji Template

```
% MyTemplate.cfg (in the document folder)

\gujiSetup{ template = default }   % start from Siku Quanshu, then change below

\pageSetup{
    paper-width = 1077.2pt,
    paper-height = 1077.2pt,
}

\contentSetup{
    n-column = 12,
    font-size = 30pt,
    border = true,
}

\banxinSetup{
    upper-yuwei = true,
    lower-yuwei = true,
}

\endinput
```

cn-vbook / tw-vbook Template

The template is loaded after the default configuration, so only list what you change:

```
% mytemplate.cfg

\pageSetup{
    paper-width = 148mm,
    paper-height = 210mm,
```

```
    margin-inner = 18mm,
    margin-outer = 15mm,
    page-number-style = digits,
}

\contentSetup{
    font-size = 11pt,
    line-spacing = 13pt,
}

\punctSetup{punct-style=taiwan}

\endinput
```

Method 2: Direct Configuration in the Document

Write the setup commands in the preamble; set the book and chapter titles with `\title` and `\chapter`:

```
\documentclass{ltc-guji}

\contentSetup{
    n-column = 10,
    font-size = 24pt,
    border = true,
}

\title{My Book Title}

\begin{document}
\begin{正文}
\chapter{Chapter One}
% ...
\end{正文}
\end{document}
```

> Since v0.4.5, `\gujiSetup` and `\defineGujiTemplate` accept layout keys besides `template` (`n-column`, `font-size`, `margin-top`, `border`, …). Each key is handed to whichever of `\pageSetup` / `\contentSetup` / `\banxinSetup` knows it; a key none of them knows only gives a warning, not an error. The `\gujiSetup{book-name=…}` form from older versions of this wiki still has no effect (you get that warning).
>
> ```
> \defineGujiTemplate{narrow}{ template = default, n-column = 5, font-size = 20pt, margin-top = 100pt }
> \gujiSetup{ template = narrow }
> ```

Changing parameters on top of a template v0.4.5+

The guji templates (四库全书, 红楼梦甲戌本, …) set `n-column` and `n-char-per-col`, so the grid width and height are computed from the page and writing `grid-height` / `grid-width` on top of them has no effect: for larger cells lower `n-char-per-col` or `n-column`; to give the grid height directly, set `n-char-per-col = 0` first. Likewise, do not use `page-columns` when the banxin is on, and keep `font-size` below the grid height. Each of these gives a warning when compiling (values the template itself sets do not). See Command Reference: how parameters override each other for the full list.

Common Settings

Defaults below are the code defaults with no template loaded; templates override some of them. For every key see Command Reference.

Command	Parameter	Description	Default
`\gujiSetup`	`template`	Template name (Chinese or English)	—
`\contentSetup`	`n-column`	Columns per half page (0 = free width)	8
	`n-char-per-col`	Characters per column (0 = auto)	0
	`font-size`	Font size	12pt
	`grid-width` / `grid-height`	Cell width / height (computed from `n-column` / `n-char-per-col` in the guji templates; setting them there has no effect)	1.5em / 1.2em
	`line-spacing`	Line spacing (natural mode)	`\baselineskip`
	`border`	Show column rules	false
	`border-color`	Rule color	black
	`font-color`	Text color	*(empty)*
	`layout-mode`	`grid` / `natural`	`grid`
	`horizontal-align`	Horizontal position of the column block: `right` / `center` / `left` (v0.4.5+)	`right`
`\pageSetup`	`paper-width` / `paper-height`	Paper size	210mm / 297mm
	`margin-*`	Margins	0pt

Command	Parameter	Description	Default
	`twoside`	Facing pages (mirrored margins)	false
	`page-number-style`	Page number style	*(empty)*
`\banxinSetup`	`banxin-upper-ratio`	Upper section ratio	0.28
	`upper-yuwei` / `lower-yuwei`	Upper / lower fishtail	true
	`book-ear`	Book ear (v0.4.5+)	false
`\punctSetup`	`punct-style`	Punctuation style	`taiwan`
	`punct-squeeze`	Squeeze	`true`
	`kinsoku`	Line-breaking rules	`true`

☞ Next: See Debug Mode or Features

Fonts

`luatex-cn` provides intelligent cross-platform font detection and a powerful multi-font fallback mechanism to gracefully handle missing characters (rare glyphs).

1. Automatic Font Detection

By default, the `ltc-guji` (or `ltc-cn-vbook` / `ltc-tw-vbook`) document class automatically selects the most suitable installed fonts based on your operating system:

- **Windows**: Prioritizes SimSun, SimHei, etc.
- **macOS**: Prioritizes Songti SC, PingFang SC, etc.
- **Linux**: Prioritizes Fandol series or Noto CJK series.

To manually trigger and apply the auto-detected font:

```
\ApplyAutoFont
```

Chinese Font Name Support (v0.2.2+)

Since v0.2.2, font detection supports simplified and traditional Chinese font names:

```
\设置字体{宋体}          % Simplified Chinese name
\设置字体{標楷體}        % Traditional Chinese name
\设置字体{思源宋体}      % Open source font Chinese name
```

The system automatically maps Chinese font names to corresponding system fonts.

2. Font Family & Fallback

v0.1.5 introduces the concept of **Font Family**. By setting a font family, the system establishes a "fallback chain". When the main font lacks a specific character (e.g., a rare CJK ideograph), it automatically looks for it in the next font in the chain.

`\setFontFamily`

This command accepts a comma-separated list of fonts. The first font in the list becomes the main font, and the rest serve as fallbacks.

```
% Sets "Source Han Serif SC" as the main font.
% If a character is missing, it tries "SimSun", then "SimHei".
\setFontFamily{Source Han Serif SC, SimSun, SimHei}
```

Chinese Alias:

```
\设置字体族{Source Han Serif SC, SimSun, SimHei}
```

Registry Aliases and Font Files (No Installation Needed)

`\setFontFamily` also accepts **registry aliases** and **font filenames/paths**; all three forms can be mixed, and none requires installing fonts into the system:

```
\setFontFamily{Jigmo}                    % alias: expands to a Jigmo + Jigmo2 fallback chain
\setFontFamily{fonts/MyFont.ttf, TW-Kai}   % file path mixed with a font name
\setFontFamily{TW-Kai, Jigmo2.ttf}         % bare filenames work too
```

Each font resolves in three steps:

1. **Installed on the system** → used by name;
2. **Local file** → searched in `./fonts/`, the document directory, then kpse (covering TEXMFHOME and OSFONTDIR);
3. **Not found anywhere** → compilation stops with an error that prints the exact download-script commands (see §4), instead of rendering tofu.

System fonts and local files mix per member — e.g. with Jigmo installed but only `Jigmo2.ttf` on disk, the `{Jigmo}` alias still builds the chain correctly. Built-in aliases so far: `Jigmo` (Jigmo + Jigmo2).

To define a named fallback chain for custom usage:

```
% Define a chain named "mybackup"

% Apply this chain to a specific font
\setmainfont{MyCustomFont}[RawFeature={fallback=mybackup}]
```

3. Standard Font Setting

If you only need to set a single font without fallback logic:

```
\setmainfont{KaiTi}
% or
\设置字体{KaiTi}
```

> [!NOTE] For vertical layout, `luatex-cn` generally handles vertical features (`RawFeature={+vert}`) automatically.

4. Fonts Without System Installation

Don't want to (or can't) install fonts into the system font library? LuaTEX can load fonts **by file** — as long as the `.ttf` / `.otf` file sits in the document directory, a `./fonts/` subdirectory, or your TEXMFHOME tree, referencing it by filename just works.

The repository ships a download script (requires Python 3) that fetches recommended open-source fonts (TW-Kai series, Jigmo, KingHwa Old Song, Zhuque Fangsong, etc.) according to `scripts/font-manifest.json`, with SHA-256 verification:

```
# Option 1: install into your personal TeX tree (recommended; available everywhere)
# Goes to TEXMFHOME/fonts/truetype/luatex-cn/ — no admin rights, no system fonts touched
python3 scripts/download_fonts.py --all --user

# Option 2: download into your document project (self-contained, easy to redistribute)
python3 scripts/download_fonts.py --all --dest ./fonts
```

Then reference fonts **by filename** in your document:

```
% Bare filename works when the font is in TEXMFHOME or next to the .tex file
\setmainfont{TW-Kai-98_1.ttf}

% Use Path for a subdirectory
\setmainfont{TW-Kai-98_1.ttf}[Path=./fonts/]
```

> [!NOTE]
>
> - After `--user` installation, run `luaotfload-tool --update` once if you want to reference fonts by **font name** instead of filename.

> - Fonts distributed as npm woff2 slices (e.g. Zhuque Fangsong) are downloaded and merged into a single TTF automatically (vertical features preserved); this requires `pip install fonttools brotli`.

☞ Next: Correction or Features.

Features Overview

`luatex-cn` provides a rich set of features for Chinese typesetting, from the core vertical engine and traditional book elements to a clreq-conformant horizontal pipeline. Per-clause conformance status and intentional deviations are documented in the clreq conformance matrix, verified by 119 PDF metric assertions.

1. Core Typesetting Engine

A grid-based layout system built on LuaTEX for high-precision vertical text flows.

- **RTT Direction**: Native support for top-to-bottom, right-to-left direction.
- **Grid Positioning**: Characters are precisely aligned to a defined grid.
- **Pagination & Column Flow**: Handles complex page splitting and column transitions automatically.

2. Vertical: Four Document Classes

- **guji**: Traditional ancient book typesetting with banxin, fishtail, silk frames.
- **guji-digital**: Digitization mode — one source line is one vertical column, with `\双列{\右小列{…}\左小列{…}}` for manual interlinear splitting, to reproduce a source edition's page layout exactly.
- **cn-vbook / tw-vbook** (v0.2.7+): Modern vertical books with clean design, built-in footnotes and punctuation system.

3. Horizontal: `\usepackage{luatex-cn}`

A modern horizontal Chinese pipeline implementing W3C clreq. It is a package, not a class: load it on top of `article` or any other horizontal class. Its rule kernel in `tex/shared/` is the same implementation the vertical engine uses.

```
\usepackage{fontspec}
\setmainfont{Source Han Serif SC}[Script=CJK, Language={Chinese Simplified}]
\usepackage[style=taiwan]{luatex-cn}
```

- **CJK–Western spacing**: 1/4 em, shrinkable to 1/8 and stretchable to 1/2, with the three clreq exceptions.
- **Punctuation width adjustment**: mainland / Taiwan / no-adjustment presets, consecutive-punctuation reduction, half-width line-final punctuation, optional hanging punctuation.
- **Line breaking**: four kinsoku levels (none/basic/gb/strict) plus the symbol-separation prohibition; per-line redistribution in clreq priority order (7 compression levels / 2 stretch levels with an even-spread fallback).
- **Interlinear marks and annotations**: `\专名`, `\书名号甲`, `\着重`; `\拼音` / `\对照` word-aligned phonetic guides.
- **Paragraphs and pages**: two-character first-line indent, orphan-character avoidance, widow/club line control, hanging-indent and indented-paragraph environments, four last-line alignments, and the `\字号` traditional size system.
- **Quotation-mark conversion**: off by default; convertible to curly or corner style automatically or explicitly.

The implementation is verified clause by clause by `test/clreq_test.py`, which measures the PDF content stream and runs in CI. See **Horizontal**.

> ⚠ Requires LuaTEX and is mutually exclusive with `luatexja` (which `ctex` loads under LuaLATEX).

4. Punctuation Processing

- **Punctuation System** (v0.2.7+): Modern punct squeeze, kinsoku, vertical quote replacement with mainland/Taiwan styles. Vertical punctuation width adjustment is context-sensitive per clreq, and glyph placement is anchored by measured ink extents rather than the font's own design. Since v0.4.0 additionally: hanging punctuation at column end (`punct-hanging`), CJK-Western spacing (1/4 em, `western-space`), sideways Western text (`\Sideways`), short runs set horizontally in one slot (`\CombineUpright`, tate-chū-yoko), and the extended connector/interpunct/solidus classes (mainland interpunct at half width).
- **Judou**: Traditional punctuation marks with three modes (normal/judou/none) switchable at any time.

5. Traditional Book Elements

Full support for visual elements required by traditional binding:

- **Banxin & Yuwei**: Support for single/double fishtails, black silk frames, etc.
- **Split Page**: Support for electronic reading and traditional "tube page" binding.
- **Border System**: Double borders, inner borders, and customizable thickness.
- **Book Ear** (v0.4.5+): `\banxinSetup{book-ear=true}` (`书耳`) draws a small box outside the top corner of the frame recording the chapter title, taken from the current `\chapter` by default; position (left / right / both), size and font size are configurable. Keys in the Banxin section of Command Reference (#87).
- **Thread-bound Cover** (v0.4.3+): `\线装书封面[keys]{title}` renders the modern blue thread-bound cover; see §8 below.

6. Annotation & Revision System

Multiple ways to add comments to the text:

- **Interlinear Notes**: Double-line small text within main body with auto-balancing.
- **Side Notes**: Vertical annotations between text columns.
- **Annotations**: Floating annotation boxes placed anywhere on the page.
- **Marginal Notes** (v0.2.3+): Top-of-page annotations.
- **Footnotes** (v0.2.7+): Endnotes and page-bottom notes with lujiao/circled numbering.
- **TOC Entries**: `\条目` (v0.2.5+) with hierarchical indentation.

7. Style Control (v0.2.8+)

`\Style` (or `\样式`) temporarily overrides font size, font, text color, cell height and spacing inside the body text without changing the layout mode.

```
% Inline
\样式[字号=16pt, 字体颜色=red]{important text}

% Environment (for several lines)
\begin{样式设置}[字号=14pt, 间距=0.5em]
  several lines of styled text...
\end{样式设置}
```

Key	Chinese	Description
`font-size`	`字号`	Font size
`font`	`字体`	Font
`font-color`	`字体颜色`	Text color
`grid-height`	`格高`	Cell height
`spacing-top`	`上间距`	Extra space above
`spacing-bottom`	`下间距`	Extra space below
`spacing`	`间距`	Both of the above

Styles live in an internal registry, survive page breaks and nest. See Command Reference.

8. Covers (v0.2.8+)

The `Cover` environment (`\begin{封面}`) sets a cover page. It turns off the borders and banxin and can set a page background color.

```
\begin{封面}[底色=200,200,200]
  \行[对齐=center, 字号=24pt]{Title}
  \行[对齐=center, 字号=14pt]{Author}
\end{封面}
```

Key	Chinese	Description
`background-color`	`底色`	Cover background (color name or RGB)

The environment wraps `SinglePage` + `BodyText`, so no manual page handling is needed. The background color applies to the cover page only.

Thread-bound Cover (v0.4.3+)

`\ThreadBoundCover[keys]{title}` (`\线装书封面` / `\線裝書封面`) outputs one page of the modern blue thread-bound cover seen on facsimile editions by Zhonghua Book Company, Guangling Press and others (after CY/T 247—2021, figures 1 and 2): a navy cover with a cream title label at the top left, a thick-thin double frame inside the label, and the title in large type from top to bottom. The label has a minimum height (50% of the page height by default) and grows with a long title; if it would overflow the page, the title and small type shrink proportionally. Only the label is printed: no author or publisher.

```
\线装书封面[册次=第一冊]{史記}
\线装书封面[卷次=卷一]{李白詩集}
\线装书封面[册次=第九冊，卷次=卷二十一至二十三]{欽定四庫全書簡明目錄}
\线装书封面[册次=第一冊，小字位置=随后]{四書章句集注}
\线装书封面[册次=第一冊，订线]{史記}   % preview: draw the binding thread
```

Key (EN / ZH)	Default	Description
`volume` / `册次`	empty	e.g. 第一冊
`juan` / `卷次`	empty	e.g. 卷一; with `volume`, set side by side (volume on the right)
`small-position` / `小字位置`	`bottom` (`底部`)	`follow` (`随后`): right after the title
`binding-thread` / `订线`	off	Draw the binding thread, for preview only
`thread-holes` / `订线眼数`	4	6 for six-hole binding
`thread-distance` / `订线距`	page width × 0.08	Distance of the thread from the right edge
`thread-color` / `订线颜色`	`236, 236, 230`	
`background-color` / `底色`	`30, 50, 90`	Cover color (RGB 0–255 or color name)
`label-color` / `签条底色`	`232, 228, 212`	Label paper color
`ink-color` / `墨色`	`25, 25, 25`	Title, small type and frame color
`label-width` / `签条宽`	page width × 0.23	
`label-left` / `签条左距`	page width × 0.05	Label left edge from the page left
`label-top` / `签条上距`	page height × 0.04	Label top from the page top
`label-min-height` / `签条最小高`	page height × 0.5	
`title-font-size` / `书名字号`	label width × 0.56	
`small-font-size` / `小字字号`	title size × 0.3	

Length keys left out (or `0pt`) are derived from the page size; the page size follows the document (half the sheet width in split-page mode). Full example: `示例/线装书封面/`.

9. Line Marks: Proper-name and Book-title Marks (v0.2.8+)

`\LineMark` (or `\线标`) draws a straight or wavy line beside the characters, used for **proper-name marks** and **book-title marks**. The lines are drawn with PDF graphics, not Unicode characters, so they are precise and flexible.

```
% Proper-name mark (straight)
\专名号{孔子}

% Book-title mark (wavy)
\书名号{红楼梦}

% Custom
\线标[类型=wavy, 颜色=blue, 振幅=large]{emphasis}
```

Command	Chinese	Effect
`\ProperNameMark`	`\专名号` `\下划线`	Straight line
`\BookTitleMark`	`\书名号` `\波浪线`	Wavy line

Key	Chinese	Description	Default
`type`	类型	`straight` or `wavy`	`straight`
`color`	颜色	Line color	`black`
`offset`	偏移	Distance from the text	`0.6em`
`amplitude`	振幅	Wave amplitude: `small` `medium` `large`	`medium`
`line-width`	线宽	Line width	`0.8pt`
`style`	风格	`standard` (compact) or `cursive` (hand-drawn feel)	`standard`

Line marks scale automatically inside jiazhu, side notes and other small-type contexts.

10. Layout Control & Commands

- **Force Column**: `\Column` (or `\行`) sets its content as a column of its own.
- **Last Column**: `\LastColumn` (or `\末行`) places content in the last column.
- **Flexible Widths**: `\行[width=2cm]{...}` (v0.2.7+) for variable-width columns.

- **Page Breaks**: Supports standard `\newpage` and `\clearpage`.
- **Half-Page Break** (v0.3.6+): `\NewHalfPage` / `\换半页` jumps to the next half-page in split-page mode.
- **Illustration Page** (v0.3.6+): `\IllustrationPage` / `\插图页` hides silk frames while keeping borders, for full-page illustrations (fix #29).
- **Natural Layout** (v0.2.7+): `layout-mode=natural` for non-uniform spacing.
- **Free Column Width** (v0.2.8+): with `n-column=0` column widths follow the content (default in `ltc-cn-vbook` / `ltc-tw-vbook`).
- **Facing-page Padding** (v0.4.4+): `\pageSetup{facing-pages=true}` (`对页补页`) makes every chapter start on an odd (right-hand) page: when a `\chapter` lands at the top of an even page, a page is inserted before it. Off by default; only `\chapter` inside a `正文` block counts; not applied in split-page mode. `\InsertBlankPage` (`\补空白页`) forces a page anywhere; two in a row give two pages. Inserted pages keep the frame, banxin or header and page number by default; `blank-page-style=blank` (`补页样式=空白`) makes them fully blank, both in `\pageSetup` and as `\InsertBlankPage[blank-page-style=blank]` (#176).
- **Centered Page** (v0.4.5+): `\begin{CenteredPage} … \end{CenteredPage}` (`居中页`) sets a block of text on a new page with the columns centred horizontally in the content area, for title and volume pages; place each column vertically with `\行[align=center]`. In ordinary body text use `\contentSetup{horizontal-align=center}` (`right` / `center` / `left`, default `right`) (#175).

```
\begin{居中页}
  \行[align=center]{王又朴集}
  \行[align=center]{上}
\end{居中页}
```

11. Decorations & Utilities

- **Seals**: Add collection or personal seals anywhere with opacity support.
- **Fonts**: Auto-detection, font families, and fallback chains. Supports simplified/traditional Chinese font names since v0.2.2.
- **Textbox**: Grid-based layout with auto-compression and filling. Transparency control (v0.3.6+).
- **Colophon** (v0.3.6+): `\colophon` / `\牌记` — opaque double-border floating text box.
- **Missing Characters**: `\MissingChar` (`\缺字`) inserts a white square □ as a placeholder; `\缺字[3]` for three.
- **Correction & Decoration**: Correction marks and character decoration.
- **Elevation** (v0.2.6+): Honorific elevation formatting (single/double/triple/flat).

12. Architecture & Debug Features (v0.2.0+)

- **Style Registry**: Multi-attribute style storage with cross-page preservation.
- **Metadata System**: Centralized book metadata management.
- **Debug Mode**: Grid visualization and layout debugging.
- **Layout Export**: `\enableLayoutExport` exports layout results to JSON, including precise character coordinates, page/column/row info, jiazhu and sidenote data.
- **Plugin Architecture**: Standardized plugin API with three-phase interfaces.

13. Template System

Preset classical styles available out-of-the-box. See Templates.

- `四库全书` (Siku Quanshu): Qing Dynasty imperial style.
- `四库全书彩色` : Colored version.
- `红楼梦甲戌本` : Manuscript style.
- `欧式族谱` : Genealogy style.
- `ltc-cn-vbook` / `ltc-tw-vbook` default configs: modern vertical layout with mainland / Taiwan punctuation.

☞ Next Steps: Check Templates | Debug Mode | Examples

Modern Vertical Book Classes (v0.2.7+)

luatex-cn provides two document classes for modern vertical Chinese book typesetting. Unlike `ltc-guji` (ancient book typesetting), they use a clean, modern design: no banxin, no fishtail, no silk frames — suitable for contemporary publications that need vertical layout.

Class	Punct Style	Description
`ltc-cn-vbook` (v0.2.8+)	Mainland	Simplified Chinese vertical books
`ltc-tw-vbook` (v0.2.8+)	Taiwan	Traditional Chinese vertical books

Basic Usage

```
\documentclass{ltc-cn-vbook}
\setmainfont{Noto Serif SC}

\begin{document}
\begin{正文}
天地玄黄，宇宙洪荒。日月盈昃，辰宿列张。
\end{正文}
\end{document}
```

Template System

Each class loads its own default configuration; both share `configs/luatex-cn-vbook-common.cfg`: 16-kai (170×240mm), 14pt font, free column width (`n-column=0`), facing pages (`twoside=true` , 24mm spine side, 16mm fore-edge side), running headers and page numbers, lujiao-numbered footnotes.

Class	Default config	Punct style
`ltc-cn-vbook`	`luatex-cn-vbook-default.cfg`	Mainland (`punct-style=mainland`)
`ltc-tw-vbook`	`luatex-cn-tw-vbook-default.cfg`	Taiwan (`punct-style=taiwan`)

A template name given as a class option loads `<name>.cfg` (document folder) or `configs/luatex-cn-vbook-<name>.cfg` ; see Templates. There are no built-in named templates (the `中华书局` template mentioned in older versions of this wiki does not exist).

Differences from guji

Feature	cn-vbook / tw-vbook	guji
Design	Modern, clean	Traditional ancient
Banxin/Yuwei	No	Yes
Borders/Silk frames	No	Yes
Layout mode	Free column width (`n-column=0`)	Fixed grid (`n-column=8`)
Default punct	Modern (normal)	Configurable judou/normal
Footnotes	Built-in	Manual loading
Page numbers	Auto vertical	In banxin center

Punctuation Style

`ltc-cn-vbook` / `ltc-tw-vbook` enable the modern punctuation system by default. See Punctuation System.

`ltc-cn-vbook` defaults to mainland style and `ltc-tw-vbook` to Taiwan style. Override in either class:

```
\documentclass{ltc-tw-vbook}
\punctSetup{punct-style=mainland}  % Override to mainland style
```

Judou Mode

The modern classes use modern punctuation by default, but can switch to judou mode:

```
\documentclass{ltc-cn-vbook}
\开启句读模式  % switch to judou mode

\begin{document}
\begin{正文}
天地玄黄，宇宙洪荒。
% commas become small dots at the lower right, full stops small circles
\end{正文}
\end{document}
```

Two-side Mirror Margins (v0.3.2+)

Vertical books bind on the right: **an odd page is the left page of a spread**, with the spine on its right; an even page is the right page, spine on its left. vbook enables twoside mode (`twoside=true`) by default, mirroring inner/outer margins on odd/even pages:

- **Inner margin** (`margin-inner`): spine side (odd pages = right, even pages = left), default `24mm`
- **Outer margin** (`margin-outer`): fore-edge side (odd pages = left, even pages = right), default `16mm`

```
\pageSetup{
    twoside = true,
    margin-inner = 24mm,   % spine side
    margin-outer = 16mm,   % fore-edge side
}
```

> Which pair is read is decided by `twoside` (v0.4.3+): `twoside=true` reads only `margin-inner` / `margin-outer` , `twoside=false` reads only `margin-left` / `margin-right` ; setting the ignored pair emits a warning. With `twoside=false` the running-header page number is fixed on the left instead of alternating.

> **v0.4.4 direction fix**: `margin-inner` used to be placed on the left of odd pages (the horizontal-book convention), which is actually the fore-edge of a vertical book. It now follows the spine, and the vbook defaults were swapped to inner 24mm / outer 16mm, so the default layout is unchanged. Documents that set `margin-inner ≠ margin-outer` will flip left/right: swap the two values. guji templates use equal inner/outer and are unaffected.

Fixed content area on facing pages (v0.4.4+)

To keep the text block in the same place on odd and even pages (like fixed margins in InDesign / Word), set `mirror-margins = false` :

```
\pageSetup{
    twoside = true,
    mirror-margins = false,
    margin-left = 22mm, margin-right = 22mm,
    binding-offset = 8mm,       % gutter, when the copy will be bound
```

```
    header-anchor = content,
}
```

Parameter	Chinese key	Default	Description
`mirror-margins`	`镜像边距` / `鏡像邊距`	`true`	`false`: with `twoside = true`, read `margin-left` / `margin-right` on every page so the content area does not move; running header and page number still alternate
`binding-offset`	`装订边距` / `裝訂邊距`	`0pt`	Added on the spine side: right of odd pages, left of even pages; right of every page when `twoside = false`. Works in all three margin modes

`twoside`	`mirror-margins`	Margins read	Use
`true`	`true` (default)	`margin-inner` / `margin-outer`, mirrored	Bound facing-page books
`true`	`false`	`margin-left` / `margin-right`, same on every page	Fixed content area, alternating header
`false`	—	`margin-left` / `margin-right`, same on every page	Unbound print, screen reading

Running Headers (v0.3.2+)

vbook supports running headers that alternate between chapter name and book title.

```
\pageSetup{
    header-enabled = true,
    header-font-size = 9pt,
    header-y = 52mm,
}
```

Page	Header Content	Position
Odd (left page)	Chapter name (`\chapter{...}`)	Left (fore-edge)
Even (right page)	Book title (`\title{...}`)	Right (fore-edge)

The running header sits at the outer (fore-edge) top corner and the page number at the outer bottom corner. `header-position = inner` moves the header to the spine side (v0.4.4+).

`header-anchor = paper` (default) measures the header and page number from the paper edge with `header-y` / `page-number-x` / `page-number-y`. `header-anchor = content` (v0.4.4+) makes them follow the content area: placed `header-sep` (default `6mm`) outside its outer edge, header top aligned with the content top, page-number foot aligned with the content bottom; `header-y` / `page-number-y`, if given, become offsets from those edges.

Use `\skipHeader` (`\跳过页眉`) to suppress headers on specific pages (e.g., title pages):

```
\skipHeader
\卷名{史記卷六}
\章节名{秦始皇本紀第六}
```

Paragraph Indentation (v0.3.2+)

vbook supports first-line paragraph indentation:

```
\contentSetup{
    first-indent = 2,   % indent first line by 2 characters
}
```

The layout engine automatically detects paragraph boundaries (`\par` or a blank line) and applies indentation. It can also be set temporarily in `\Style` :

```
\Style[first-indent=0]{a paragraph without indent}
```

Volume & Chapter Title Commands (v0.3.2+)

Command	Description	Example
`\卷名{...}`	Volume title (24pt, 48pt top spacing)	`\卷名{史記卷六}`
`\章节名{...}`	Chapter title (20pt, 2-char indent)	`\章节名{秦始皇本紀}`

`\章节名` automatically calls `\chapter` to update running headers.

Footnote System

Built-in footnote support with endnote and page-bottom modes.

```
\脚注设置{number-style=lujiao, indent=2}
天地玄黄\脚注{This is a footnote}。
\输出脚注  % Output at paragraph end
```

Configuration (`\footnoteSetup` / `\脚注设置`)

Parameter	Description	Default	Values
`mode`	Mode	`endnote`	`endnote` , `page`
`number-style`	Style	`lujiao`	`lujiao` (【一】), `circled` (①)
`separator`	Gap between notes	`blank`	`blank` (1em space), `none`
`font-size`	Size	`0.8em`	Any dimension
`font-color`	Color	(inherited)	Any color
`indent`	Hanging indent (cells)	`2`	Integer
`spacing`	Spacing	`0.5em`	Any dimension
`marker-height`	Cells taken by the number	`2`	Integer

Commands

Command	Chinese	Description
`\Footnote{...}`	`\脚注{...}`	Add footnote
`\FlushFootnote`	`\输出脚注`	Output endnotes
`\FootnoteParagraph{...}`	`\脚注段落{...}`	Unnumbered footnote block
`\footnoteSetup{...}`	`\脚注设置{...}`	Configure
`\ResetFootnoteCounter`	`\重置脚注计数`	Reset counter

Page Numbers

Auto vertical page numbers at the outer (fore-edge) bottom corner, alternating on odd/even pages. Configure via `\pageSetup` :

Parameter	Default
`page-number-style`	`digits` (also: `chinese`, `arabic`, `none`)
`page-number-font-size`	`9pt`
`page-number-position`	`outer` (fore-edge; also `inner` = spine side, `center` = centred at the foot of the page; v0.4.4+)
`header-position`	`outer` (also `inner`; v0.4.4+)
`header-anchor`	`paper` (also `content`; v0.4.4+)
`header-sep`	`6mm` (gap to the content area when `header-anchor = content`; v0.4.4+)
`page-number-x`	`3mm` (distance from the page edge)
`page-number-y`	`52mm` (distance from the page bottom)
`header-y`	`52mm` (running header, distance from the page top)

`page-number-position` moves only the page number and `header-position` only the header. Since v0.4.4 inner/outer follow the real spine and the default is `outer`, which gives the same layout as before; a document that wrote `page-number-position = inner` must now write `outer` to keep its old position.

Custom Templates

Create `<name>.cfg` in the document folder (or `configs/luatex-cn-vbook-<name>.cfg` on the TEX path). It is loaded after the default configuration, so only list what you change:

```
% mytemplate.cfg
\pageSetup{
    paper-width = 148mm,
    paper-height = 210mm,
    margin-inner = 18mm,
    margin-outer = 15mm,
}
\contentSetup{ font-size = 11pt, line-spacing = 13pt }
\punctSetup{punct-style=taiwan}
```

Then use `\documentclass[mytemplate]{ltc-cn-vbook}`.

Free Column Width Mode

`ltc-cn-vbook` / `ltc-tw-vbook` use `n-column=0` by default: **free column width mode**. Unlike the fixed 8-column grid of `ltc-guji`, each column is as wide as its content; the layout engine tracks the column widths and starts a new page when the next column no longer fits.

This suits modern books where column widths vary, e.g. mixed font sizes or `\行[width=3cm]{...}` columns.

Enable it in a custom template:

```
\contentSetup{
    n-column = 0,           % free column width
    grid-width = 13pt,
    grid-height = 13pt,
    border = false,
}
```

Next: Punctuation | Features | Templates

Punctuation System (v0.2.7+)

`luatex-cn` provides a complete modern punctuation processing system with squeeze, kinsoku (line-breaking rules), vertical quote replacement, and mainland/Taiwan style support.

Punctuation System vs Judou System

`luatex-cn` has two mutually exclusive punctuation mechanisms:

System	Use Case	punct-mode	Description
Punctuation (this page)	Modern books	`normal` (default)	Squeeze, kinsoku, quote replacement
Judou	Ancient books	`judou` or `none`	Convert punct to circles/dots or remove

When `punct-mode=normal`, the punctuation system is active; when `punct-mode=judou` or `none`, the judou system takes over and the punctuation system is automatically disabled.

Punctuation Styles

Taiwan Style (Default)

All punctuation marks are centered within the grid cell.

```
\punctSetup{punct-style=taiwan}
% or
\台湾标点风格
```

Mainland Style

Period (。) and comma (，、) marks are offset toward the upper-right corner of the grid cell, matching mainland Chinese publishing conventions.

```
\punctSetup{punct-style=mainland}
% or
\大陆标点风格
```

Configuration

Configure punctuation behavior via `\punctSetup`:

```
\punctSetup{
    punct-style = taiwan,    % Style: taiwan or mainland
    punct-squeeze = true,    % Squeeze: compress punct to half-grid
    kinsoku = true,          % Kinsoku: prevent misplaced punct
    punct-hanging = false,   % Hanging punctuation at line end (default off)
}
```

Parameter	Description	Default	Values
`punct-style`	Punctuation style	`taiwan`	`taiwan`, `mainland`
`punct-squeeze`	Squeeze punctuation	`true`	`true`, `false`
`kinsoku`	Line-breaking rules	`true`	`true`, `false`
`punct-hanging`	Hanging punctuation at column end (see below)	`false`	`true`, `false`

clreq preset keys (identical to the horizontal package)

Beyond the original parameters above, `\punctSetup` (CN alias `\标点设置`) offers a set of clreq presets whose **key names and values match the horizontal pipeline exactly**, so one manuscript can keep the same conventions in vertical and horizontal mode:

Parameter	Description	Default	Values
`style`	Overall style preset; `none` is the clreq "no adjustment" preset (neither squeezed nor hugging)	per document class	`mainland`, `taiwan`, `none`
`squeeze-mode`	How punctuation width adjustment is decided: `legacy` squeezes unconditionally (the `ltc-guji` default, zero layout change); `context` is context-sensitive, triggering only on adjacent marks or column start/end (the `ltc-cn-vbook` / `ltc-tw-vbook` default)	`legacy`	`legacy`, `context`
	Consecutive-punctuation reduction, in character widths	`1.5`	

Parameter	Description	Default	Values
`adjacent-punct`			`1.5`, `1`, `natural`
`line-start-bracket`	Trim half a character from the start side of an opening bracket at column start	`trim`	`trim`, `natural`
`line-end-punct`	Trim half a character from the end side of a column-final period-type mark	`compress`	`compress`, `natural`
`western-space`	Automatic 1/4-em spacing between Han characters and Western letters/digits (see "Mixed Chinese-Western text" below)	`true`	`true`, `false`

> **Context-sensitive width adjustment** (clreq): a single mark between Han characters occupies a full character width; reduction happens only when marks run consecutively (2 → 1.5 widths with bracket marks involved, down to 1 with `adjacent-punct=1`). The direction follows the clreq principle that the side carrying the blank is the side that yields.

> **Glyph placement** is anchored by measured ink extents rather than the font's own design: mainland style hugs the upper right in vertical mode, Taiwan style is centered in both modes. Setting mainland style with a Taiwan font (or vice versa) therefore lands where the specification says it should.

Hanging Punctuation (punct-hanging)

clreq's hanging punctuation at line end: a period-type mark that lands at the **column end** moves entirely out of the column, hanging beyond the type area, so the column body is no longer compressed on its account. clreq notes that hanging suits vertical writing (in horizontal Taiwan/Hong Kong style the centered marks make it inadvisable).

```
\punctSetup{punct-hanging=true}   % CN alias: 标点悬挂
```

Off by default — hanging changes the layout of existing documents, so enabling it is a per-book style decision. Only takes effect under `squeeze-mode=context` (the `ltc-cn-vbook` / `ltc-tw-vbook` default).

Mixed Chinese-Western Text (clreq)

CJK-Western spacing

Per clreq, a **1/4 character width** of spacing is inserted automatically between Han characters and Western letters/digits, participating in line adjustment (compressible to 1/8, stretchable to 1/2). Three exceptions take no spacing: next to Chinese pause/stop marks, after an opening bracket, and before a closing bracket.

- The rules share a single source with the horizontal package (`tex/shared/luatex-cn-cjk-western.lua`), so both modes keep the same conventions.
- Digit runs remain unbreakable units (symbol-separation rules): base letter-spacing inside, normal CJK-Western spacing at both ends.
- Only takes effect under `squeeze-mode=context` ; disable with `western-space=false` (CN alias `中西间距`).

Short runs in one slot: `\CombineUpright`

The third configuration — "set horizontally within one character frame" (Japanese tate-chū-yoko) — is provided by `\CombineUpright` (CN aliases `\中横排` / `\中橫排`): two- or three-character numbers and very short Western strings are set horizontally inside a **single character slot**, ideal for dates and volume numbers:

```
今年\CombineUpright{12}月\CombineUpright{8}日刊行。
第\CombineUpright{365}回。
```

The group occupies exactly one character advance and can never be split across columns; glyphs inside share one baseline and run left to right; when the total width exceeds 1 em the group is compressed horizontally only (glyph height and vertical stroke weight unchanged); the usual 1/4 em CJK-Western spacing applies on both sides. For longer words and phrases use `\Sideways` instead.

Sideways Western text: `\Sideways`

Of clreq's three configurations for Western text in vertical writing, "rotated 90° clockwise" is provided by `\Sideways` (CN aliases `\横置` / `\橫置`) — suited to longer Western words and phrases; single letters and acronyms usually just sit upright, one per cell (the engine default):

```
引用\Sideways{LuaTeX}之名继续排版。
年份\Sideways{2026}与长词\Sideways{Typography}混排。
```

Letters in a sideways run join into a word (no inner letter-spacing, never stretched apart by justification), share one vertical baseline, are centered horizontally in the column, and get the usual 1/4-em CJK-Western spacing against surrounding Han characters.

Extended punctuation classes

Connector marks (～ - –), interpuncts (· ・ ·) and solidi (/ ／) are now classified: all three obey the line-start prohibition rules, and the **mainland-style interpunct `・` is fixed at half a character width** (clreq Appendix A, GB style — as in the name divider of 爱新觉罗·玄烨), while the Taiwan style takes a full width.

Punctuation Squeeze

When enabled, periods, commas and other marks are compressed to half the grid cell height, producing a tighter, more elegant layout.

Kinsoku (Line-Breaking Rules)

Follows Chinese typesetting standards (CLREQ) to prevent marks from appearing in inappropriate positions:

- **Line-start forbidden**: Closing brackets, periods, commas, middle marks cannot appear at column start
- **Line-end forbidden**: Opening brackets cannot appear at column end

Vertical Quote Replacement

The system automatically replaces horizontal bracket/quote forms with Unicode Vertical Presentation Forms (e.g., 「→﹁, 」→﹂, （→︵, ）→﹀, 《→︽, 》→︾, —→｜, …→⋮).

Using with cn-vbook / tw-vbook

The `ltc-cn-vbook` / `ltc-tw-vbook` document classes enable the punctuation system by default, with different default styles:

```
% Mainland style (default punct-style=mainland)
\documentclass{ltc-cn-vbook}
```

```
% Taiwan style (default punct-style=taiwan)
\documentclass{ltc-tw-vbook}
```

Using with guji

The `ltc-guji` class also supports the punctuation system. When `punct-mode=normal`, it activates automatically:

```
\documentclass[四库全书]{ltc-guji}
\正常标点模式  % Use modern punctuation (not judou)
\punctSetup{punct-style=mainland}
```

Switching Between Modes

You can dynamically switch between the punctuation and judou systems:

```
\正常标点模式    % Modern punctuation
\句读模式        % Judou mode (circles/dots)
\无标点模式      % Plain text (no punctuation)
```

Technical Details

Implemented via `luatex-cn-core-punct.lua` in three stages:

1. **Flatten**: Classify punctuation characters and replace with vertical forms
2. **Layout**: Apply squeeze and kinsoku processing
3. **Render**: Apply mainland/Taiwan style position offsets

☞ Next: Judou | Modern Vertical | Features

Judou (Punctuation Modes)

Judou (jù dòu) refers to the traditional Chinese system of punctuation and pausing marks. `luatex-cn` can automatically convert modern punctuation into traditional styles suitable for ancient book typesetting.

Punctuation Mode Overview

`luatex-cn` provides three punctuation modes (`punct-mode`), switchable via `\judouSetup` or convenience commands:

Mode	Description	System
`normal` (default)	Modern full-width punctuation with squeeze/kinsoku	Punctuation
`judou`	Convert to traditional Ju/Dou marks (circles/dots)	Judou system
`none`	Remove all punctuation (plain text / "Baiwen")	None

Note: The punctuation system and judou system are **mutually exclusive**. When `punct-mode=normal` , the punctuation system handles squeeze/kinsoku; when `punct-mode=judou` or `none` , the judou system takes over.

What is Judou Mode?

Traditional ancient books typically do not use modern full-width punctuation marks. Instead, they use small circles ("Ju") or dots ("Dou") attached to the characters.

- **Ju (句)**: Corresponds to periods (.), question marks (?), and exclamation marks (!). Rendered as a small circle (○).
- **Dou (读)**: Corresponds to commas (,), semicolons (;), and enumeration commas (、). Rendered as a small dot or tick (●).

Supported Punctuation (v0.2.1+)

Since v0.2.1, the range of supported punctuation has been extended to include:

- Basic punctuation: periods, commas, enumeration commas, semicolons, colons
- Paired punctuation: quotation marks (「」 『』 """), book title marks (《》 〈〉), parentheses
- Special punctuation: dashes, ellipses, interpuncts, etc.

Usage

1. Switching Punctuation Modes

```
% Enable judou mode
\开启句读模式
\句读模式

% Return to modern punctuation
\关闭句读模式
\正常标点模式

% Plain text mode (no punctuation)
\无标点模式
\开启无标点模式
```

2. Using with Different Document Classes

guji (Ancient Books)

```
\documentclass[四库全书]{ltc-guji}
\开启句读模式  % Use traditional judou

\begin{document}
\begin{正文}
人之初，性本善。
% Commas become dots, periods become circles at bottom-right
\end{正文}
\end{document}
```

cn-vbook / tw-vbook (Modern Books)

```
\documentclass{ltc-cn-vbook}
% cn-vbook defaults to modern punctuation (punct-mode=normal)
```

```
\begin{document}
\begin{正文}
天地玄黄，宇宙洪荒。  % Modern punct with squeeze/kinsoku

\句读模式
寒来暑往，秋收冬藏。  % Switch to judou
\end{正文}
\end{document}
```

3. Dynamic Switching

```
\句读模式
人之初，性本善。        % Judou marks

\正常标点模式
现代文：他说："一二三。"  % Modern punctuation

\无标点模式
子曰学而时习之不亦说乎  % Plain text (Baiwen)
```

Parameters

Fine-tune Judou appearance via `\judouSetup`:

Key	Description	Default
`punct-mode`	Punctuation mode	`normal`
`judou-color`	Color of the marks (aliases: `color`, `font-color`, `句读颜色`, `句讀顏色`)	`red`
`judou-size`	Size of the marks	`1em`
`judou-pos`	Position relative to character	`right-bottom`

```
\judouSetup{
    punct-mode = judou,
    judou-color = black,
    judou-size = 0.8em,
}
```

Command Reference

Command	Chinese Alias	Description
`\NormalPunctuationMode`	`\正常标点模式`, `\关闭句读模式`, `\正常標點模式`	Switch to modern punct
`\JudouPunctuationMode`	`\句读模式`, `\开启句读模式`, `\句讀模式`	Switch to judou mode
`\NonePunctuationMode`	`\无标点模式`, `\开启无标点模式`, `\無標點模式`	Switch to plain text
`\judouSetup{...}`	`\句读设置`, `\句讀設置`	Configure judou parameters

Technical Details

Implemented via `luatex-cn-guji-judou.lua`:

1. **Identification**: Scans node stream for punctuation Unicode code points.
2. **Conversion**: In `judou` mode, punctuation nodes are removed and replaced by a decorate marker node attached to the preceding CJK character.
3. **Rendering**: The renderer draws the circle/dot at the specified anchor point (usually bottom-right) of the character.

☞ Next: Punctuation | Features

Interlinear & Side Notes

`luatex-cn` offers a comprehensive annotation system, including in-text interlinear notes and marginal side notes.

Interlinear Notes (Jiazhu / 夹注)

Commonly seen in ancient books as double-line small characters between main body text.

Usage

```
Main text\\夹注{This is interlinear note content. If it is long, it will automatically split into two columns and balance the
```

Key Features

- **Auto-Balancing Algorithm**: The system calculates the remaining space in the current column and splits the note content evenly into right and left sub-columns.
- **Cross-Column/Page Flow**: When a note doesn't fit in one column, it flows to the next column or page automatically.
- **Alignment Control**: Supports `left`, `right`, `center`, `inward`, and `outward` (default) alignment modes.
- **Balance Control (v0.2.6+)**: Use `auto-balance=false` to disable the automatic balancing algorithm. Useful for manual line breaks or replicating specific historical manuscript styles.

Jiazhu Configuration

```
\jiazhuSetup{
  font-size = 12pt,
  font = {FandolSong-Regular},
  font-color = red,
  auto-balance = true, % Whether to auto-balance sub-column lengths
  align = outward,     % Alignment mode
  n-char-per-col = 20  % Characters per sub-column (v0.4.4+, see below)
}
```

A Different Character Count for Notes v0.4.4+

Traditional books often set 15 characters per body column and 20 per note sub-column. `n-char-per-col` (`每行字数`) derives the note grid height as *body column height ÷ N*; set the font size separately with `font-size` :

```
\contentSetup{ n-char-per-col = 15 }                % 15 characters per body column
\jiazhuSetup{ n-char-per-col = 20, font-size = 22pt } % 20 per note sub-column, book-wide
Text...\夹注[n-char-per-col=15]{back to 15 for this note}⋯
```

- A note that starts at the top of a column holds exactly N characters per sub-column; a note that starts mid-column only has the remaining cells, so fewer than N is expected there.
- When `grid-height` is also given it takes precedence; an inner `\样式[grid-height=...]` inside the note still overrides locally.
- The older `\夹注[grid-height=22.5pt]` form still works but requires computing the height by hand.

Side Notes (Sidenote / 侧批)

Small annotations placed between text columns or at page margins.

Usage

Three syntax options:

```
% Basic usage
Main text\\侧批{This is the side note content}continued text.

% Positional parameter (auto-converts to em)
Main text\\侧批[5pt]{Note with adjusted height}continued text.
Main text\\侧批[0.5]{Equivalent to 0.5em}continued text.

% Named parameters
Main text\\侧批[yshift=10pt, color=red]{Both color and position}continued text.
```

Parameters

- `yshift` : Vertical offset with positional parameter support. Pure numbers auto-convert to em units (e.g., `0.5` → `0.5em`).
- `xshift` v0.3.5+: Horizontal offset (default: 0pt).
- `color` : Annotation color (default: red).

- `font-size` : Font size for the note (default: 10pt).
- `grid-height` : Custom grid height for the note block (default: equals font size).
- `border-padding-top` : Top border padding (default: 0pt).
- `border-padding-bottom` : Bottom border padding (default: 0pt).
- `background-color` v0.3.8+: Side note background color, masks the underlying column borders. CN aliases `底色` / `背景色`. Special values `page` / `inherit` / `继承` / `页面` inherit the current page background (falls back to white if not configured). Default empty, preserving legacy behavior (no background drawn).

Global Configuration

```
\sidenoteSetup{
  color = red,
  font-size = 19pt,
  grid-height = 20pt,
  xshift = 0pt,   % Horizontal offset (v0.3.5+)
  yshift = 0em,
  border-padding-top = 0.5em,
  border-padding-bottom = 0.5em
}
```

Side Note Toggle v0.3.6+

Use `sidenote=false` to globally disable side note rendering (content is preserved but not drawn), useful for viewing body text layout only:

```
\sidenoteSetup{sidenote=false}  % Globally disable side notes
```

Component-Level Punctuation Mode v0.3.5+

Side notes can use a different punctuation mode independent of the global setting:

```
% Side note uses judou mode (while global may be normal)
\Sidenote[punct-mode=judou]{note content}
```

The document-wide mode is switched with `\JudouPunctuationMode` / `\NormalPunctuationMode` / `\NonePunctuationMode` (see Judou).

Aliases

- Setup command: `\sidenoteSetup` / `\侧批设置` (Simplified) / `\側批設置` (Traditional)

- Vertical shift parameter: `yshift` / `纵移` (Simplified) / `縱移` (Traditional)
- Horizontal shift parameter: `xshift` / `横移` (Simplified) / `橫移` (Traditional)

Cross-Page Color Preservation (v0.2.1+)

v0.2.1 introduced the style registry mechanism. Side note color settings now persist correctly across pages. Even when side note content spans multiple pages, colors remain consistent.

Jiazhu Shortcut v0.3.4+

The `\jiazhuShortcut` command registers a bracket pair so that matching brackets in source code are automatically replaced with `\夹注{...}`, simplifying input when there are many interlinear notes.

Usage

```
% Default: 【...】 becomes \夹注{...}
\jiazhuShortcut

% Custom bracket pair
\jiazhuShortcut{ (}{) }

% With style parameters: all shortcuts use the specified style
\jiazhuShortcut[font-color=red, font-size=9pt]{ (}{) }
```

Effect

After registration, this source code:

```
Main text【annotation content】continued text
```

is equivalent to:

```
Main text\夹注{annotation content}continued text
```

Aliases

English	Simplified	Traditional
`\jiazhuShortcut`	`\夹注捷径`	`\夾注捷徑`

Notes

- Based on `process_input_buffer` preprocessing (text replacement before TEX parsing)
- Multiple bracket pairs can be registered simultaneously
- Optional parameters support all jiazhu parameters (font-size, font, color, align, etc.)

Technical Implementation (For Developers)

- **Interlinear Notes**: Uses LuaTEX attributes to mark nodes. During layout, the system detects these attributes, pauses normal typesetting, and calls `core_textflow.lua` for column splitting and re-mapping to the grid. Migrated to style stack architecture since v0.2.1.
- **Side Notes**: Managed by `core_sidenote.lua`. It captures the content as an independent box and calculates the offset based on the current reference character's coordinates. Supports Phase 2 style registry for color preservation since v0.2.1.
- **Style Registry**: `luatex-cn-style-registry.lua` provides multi-attribute style storage, supporting deduplication and cross-page preservation for color, font_size, grid_height, and other attributes.

☞ Next Steps: Check Annotations or Judou.

Annotations (PiZhu / 批注)

The `\批注` command allows placing floating annotation boxes anywhere on the page, simulating post-publication notes or commentaries in ancient manuscripts.

Usage

```
\批注[x=5cm, y=2cm, height=6, color={1 0 0}]{Annotation content}
```

Parameters

- `x` : Horizontal position of the top-left corner (relative to page center).
- `y` : Vertical position of the top-left corner (relative to page center).
- `height` : Number of grid rows (height) allocated for the box.
- `color` : Color in RGB format (e.g., `{1 0 0}` for red).
- `font-size` : Font size inside the annotation.
- `grid-width` : Custom grid cell width for the box.
- `grid-height` : Custom grid cell height for the box.

Toggle Control v0.3.6+

Both PiZhu and MeiPi support `pizhu=false` / `meipi=false` toggles in Setup or per-call to disable rendering:

```
\pizhuSetup{pizhu=false}  % Globally disable PiZhu
\meipiSetup{meipi=false}  % Globally disable MeiPi
```

Features

- **Absolute Positioning**: Does not occupy main body space; overlaid directly at specified coordinates.
- **Auto-Columnizing**: If content exceeds the set `height` , it automatically starts a new column within the box.

- **Clip Prevention**: Position calculations account for Banxin (page center) to prevent content being cut off by borders.
- **Multi-column Support**: Internal columns can be precisely controlled via `n-cols`.
- **Independent Indentation** (v0.2.2+): Annotation content no longer inherits paragraph indentation from main text (fix #37).

Technical Implementation

Under the hood, annotations are based on `core_textbox.lua`. Content is rendered into an independent vertical grid system. This produced box is then overlaid during the page rendering stage using `shipout` logic in `render_page.lua`.

Marginal Notes (MeiPi / 眉批) v0.2.3+

The `\眉批` command places annotations at the top of the page (above the main text), a common format in traditional Chinese book annotations. Unlike `\批注`, MeiPi automatically calculates positions, arranging from right to left to avoid overlap.

Usage

```
% Auto-positioning (recommended)
\眉批[height=5]{Marginal note content}

% Manual Y coordinate
\眉批[height=5, y=50pt]{Marginal note content}

% Fully manual positioning
\眉批[height=5, x=100pt, y=50pt]{Marginal note content}
```

Parameters

- `height`: Number of grid rows (height) for the note, **required**.
- `x`: Horizontal position. Auto-calculated if not specified, arranging right-to-left.
- `y`: Vertical position. Auto-calculated if not specified, aligning bottom edge to main text top.
- `color`: Color, default red `{1 0 0}`.
- `font-size`: Font size, default 18pt.
- `grid-width`: Grid width, default 20pt.
- `grid-height`: Grid height, default 19pt.

Features

- **Auto-arrangement** (v0.2.3+): Multiple MeiPi notes automatically arrange right-to-left. Spacing configurable via `\meipiSetup{spacing=...}`.
- **Smart Positioning**: Y coordinate auto-calculated so bottom edge aligns with main text top.
- **Cross-page Support** (v0.2.3+): MeiPi correctly appears on the page where its anchor is located, not the previous page.

- **Independent Indentation**: MeiPi content does not inherit paragraph indentation from main text.

Configuration

```
\meipiSetup{
  spacing = 10pt,  % Spacing between MeiPi notes
  gap = 0pt        % Gap between MeiPi bottom and main text top
}
```

Technical Implementation

MeiPi is based on `guji/luatex-cn-guji-meipi.lua`. It inserts anchor nodes into the node list to record positions, then during layout phase determines which page the MeiPi should appear on based on the **first node with layout information after** the anchor.

☞ Next Steps: Check Seals or Judou.

Correction & Decoration

`luatex-cn` provides tools for classical text correction and decoration, including correction marks, emphasis marks, and underlines (proper name marks / book title marks).

Correction (GaiZi)

The `\fix` (or `\改`) command marks corrections in classical text editing. It retains the original character with a deletion mark (、) and places the replacement character at the bottom right.

Usage

```
\fix{replacement}
% or Chinese alias
\改{替换字}
```

Example

```
This has a \fix{correct}wrong text.
```

In this example, "wrong" is marked with a deletion symbol, and "correct" is placed at its bottom-right corner at 60% size.

Technical Details

- **Deletion Mark**: Automatically overlays a deletion point (、) on the character.
- **Replacement Text**: Placed at bottom-right corner at 60% of original font size.
- **Non-destructive**: Does not affect the original grid layout.

Text Decoration

Preset commands for marking text according to classical or modern standards.

1. Underline Marks

Command	Alias	Description	Use Case
`\Underline`	`\下划线`	Straight line on the left	General highlighting
`\专名号`	-	Straight line on the left	Proper names (Person, Place)
`\WavyUnderline`	`\波浪线`	Wavy line on the left	General highlighting
`\书名号`	-	Wavy line on the left	Book/Article titles

Options (`[options]`):

- `color` : Line color (default: `red`).
- `offset` : Distance from text (default: `0.6em`).

Example:

```
\专名号[color=black]{Confucius}
\书名号{The Analects}
```

Technical Improvement (v0.2.6+): Underlines have been migrated from glyph-based (`|`) to **PDF Graphics** implementation. This solves:

- Line discontinuity at the end of columns/pages.
- Strong coupling between line thickness/position and specific fonts.
- Support for use within sidenotes, jiazhu, and textboxes.

Elevation (Taitou / 抬头) v0.2.6+

`luatex-cn` provides full support for "Taitou" (Elevation/Rising). See: **Elevation**.

---

2. Emphasis Marks

Command	Alias	Description
`\EmphasisMark`	`\着重号` / `\著重號`	Add an emphasis mark to the right of each character

Command	Alias	Description
`\emphasisMarkSetup`	`\着重号设置` / `\圈点设置`	Global setup

Parameter	CN alias	Default	Description
`char`	`字符`	`◯`	Mark character
`scale`	`缩放`	`0.3`	Mark scale factor
`color`	`颜色`	`black`	Mark color
`skip-punct`	`跳过标点`	`false`	No emphasis marks on punctuation (clreq 5.3.1)

Per-class defaults (since v0.4.0): `ltc-guji` keeps the traditional quandian convention — hollow circle `◯` on every character including punctuation; `ltc-cn-vbook` / `ltc-tw-vbook` preset `char=●, skip-punct=true`, i.e. the solid dot with no marks on punctuation as specified by clreq 5.3.1.

> Taiwan note: the Ministry of Education's Punctuation Guidance (2008 revision) does not include this mark, though it still appears in publishing practice; `ltc-tw-vbook` takes clreq's generic form (●), changeable per book via `\着重号设置{char=…}`.

Example:

```
\EmphasisMark{Very Important}
\EmphasisMark[skip-punct=false]{标点，也加。}   % per-call override
\emphasisMarkSetup{char=●, color=red}          % change the convention globally
```

3. FaSheng / Tone-Mark Circles v0.3.8+

Per Song-dynasty Yue Ke's《九经三传沿革例》: "音有平上去入之分，则随圈发". Places tone-mark circles at the four corners of a character.

Command	Alias	Description
`\faSheng`	`\发圈` / `\圈发` / `\發圈` / `\圈發`	Single-character tone mark
`\fashengBatch`	`\发圈批` / `\發圈批`	Parallel batch (tone string + char string)

Command	Alias	Description
`\fashengSetup`	`\发圈设置` / `\發圈設置`	Global setup
`\平声` / `\上声` / `\去声` / `\入声`	—	Tone shorthand commands

Corner convention: Ping (level) = bottom-left, Shang (rising) = top-left, Qu (departing) = top-right, Ru (entering) = bottom-right.

Usage:

```
% Bare tone shortcut: tone in brackets
\faSheng[平]{字}
\faSheng[上]{字}
\faSheng[去]{字}
\faSheng[入]{字}

% Explicit key=value (English keys also work)
\faSheng[tone=qu, color=red]{字}

% Shorthand commands
\平声{字}\上声{字}\去声{字}\入声{字}

% Parallel batch: tone string + main char string (1:1 mapping)
\发圈批{平上去入}{春夏秋冬}
```

Parameters:

Key	CN Alias	Default	Description
`tone`	`声` / `聲`	`ping`	Tone, one of `ping` / `shang` / `qu` / `ru`, or `平` / `上` / `去` / `入`
`color`	`颜色` / `顏色`	`black`	Circle color
`char`	`字符`	`◯`	Circle character
`scale`	`缩放` / `縮放`	`0.3`	Circle scale
`offset`	`偏移`	`0.45em`	Offset from character center

Generic Decoration

The `\decorate` (or `\装饰`) command allows overlaying arbitrary content on **each character**.

Usage

```
\decorate[options]{content}
```

Parameters

Key	Description	Default
`char`	Decoration character	`。`
`color`	Color	`red`
`xoffset`	Horizontal offset (xshift)	`0pt`
`yoffset`	Vertical offset (yshift)	`0pt`
`scale`	Scale factor	`1.0`
`font-size`	Force specific font size	auto

Example

```
% Add a red circle on each character in "important"
\decorate[char=○, scale=0.8, color=red]{important}
```

☞ Next: Textbox or Features.

Elevation (Taitou / 抬头) v0.2.6+

`luatex-cn` provides full support for "Taitou" (Elevation/Rising), a traditional formatting used in ancient Chinese texts to show respect by starting a new line and raising the text height.

Usage

Command	Effect	Description
`\抬头[N]`	New line, raised by N cells	Core command, N can be pos/neg
`\平抬`	New line, top-aligned	Equivalent to `\抬头[0]`
`\单抬`	New line, 1 cell higher	Equivalent to `\抬头[1]`
`\双抬`	New line, 2 cells higher	Equivalent to `\抬头[2]`
`\三抬`	New line, 3 cells higher	Equivalent to `\抬头[3]`
`\相对抬头[N]`	Raise by N cells relative to indent	Used in indented contexts like Jiazhu

Automatic Border Wrapping

Taitou is deeply integrated with the Banxin (page frame) system. When text "breaks out" of the normal layout into the margin, `luatex-cn` automatically draws stepped border lines to ensure the silk frames correctly wrap the elevated text.

Example

```
The Great\单抬 Sage Confucius
```

Technical Details

The Elevation feature is defined in `luatex-cn-core-paragraph.sty` and implemented across `luatex-cn-core-textflow.lua` and `luatex-cn-layout-grid.lua`. When an elevation command is

invoked, the layout engine adjusts the starting row (`cur_row`) for the current column and records the elevation height. The rendering layer in `luatex-cn-core-render-border.lua` then uses this data to draw the stepped border lines.

☞ Next: Templates & Format or Features.

Textbox

`luatex-cn` provides powerful vertical text box capabilities with grid alignment.

Basic Textbox

The `\TextBox` (or `\文本框`) command creates an independent vertical text area.

Usage

```
\TextBox[options]{Content}
```

Options

Key	Description	Default
`height`	Height in grid units. 0 for auto-extension.	`0`
`n-cols`	Number of columns.	`0`
`border`	Show border.	`false`
`background-color`	Background color.	None
`fill`	Spread the content evenly (same as `box-align=fill`).	—
`floating`	Enable floating mode (needs x, y).	`false`
`transparent`	Whether background is transparent (v0.3.6+). When false, fills with page background color.	`true`

Features

- **Auto-Extension**: If `height` is 0, the box extends naturally.
- **Compression (Flat Text)**: If `height` is fixed and content is too long, text is vertically compressed (v0.1.5).

- **Independent Indentation** (v0.2.2+): Textbox content no longer inherits paragraph indentation from main text, ensuring layout independence (fix #37).

Border Shortcut Commands (v0.3.2+, extended in v0.3.4)

Quick commands for adding borders and/or inverted (white-on-black) effects to inline labels. Size is automatically calculated based on content.

Command Overview

Command	English	Traditional	Effect
`\墨围{text}`	`\bordered`	`\墨圍`	Rectangular black border
`\反白{text}`	`\inverted`	—	White text on black (no border)
`\墨围反白{text}`	`\borderedInverted`	`\墨圍反白`	Rectangular border + inverted
`\八角墨围{text}`	`\octagonBordered`	`\八角墨圍`	Octagonal border
`\八角墨围反白{text}`	`\octagonBorderedInverted`	`\八角墨圍反白`	Octagonal border + inverted
`\带圈{text}`	`\circled`	`\帶圈`	Circular border

Usage

```
\墨围{集解}裴駰曰……
\反白{正義}張守節曰……
\八角墨围{校勘}此字疑誤……
\带圈{一}
```

Inverted text across columns (v0.4.4+)

`\反白` / `\墨围反白` / `\八角墨围反白` are now laid out inline: when a column runs out of cells the text continues character by character in the next column (or the next sub-column inside a jiazhu), instead of the whole block jumping to the next column and leaving a gap. The background and border are drawn per contiguous run in each column.

Key	Chinese key	Description
`break`	`断口` / `斷口`	Corner shape where a run is cut by a column break: `square` (default; only the ends of the whole run are octagonal) or `octagon` (every run is a full octagon)
`inline`	`可断行` / `可斷行`	`false` falls back to the old single-textbox implementation
`border-shape`	`边框形状` / `邊框形狀`	`none` / `rect` / `octagon` keep the inline implementation and can break across columns (v0.4.5+, #210); `circle` falls back to the single textbox

The inline implementation also accepts `font-color` (`color` / `字体颜色` / `顏色`), `background-color` (`底色`), `border-color` (`边框色`) and `border-width` (`边框宽`).

Passing textbox-only keys (`高度` , `填充` , `padding-top` , …) falls back to the single textbox (which cannot break across columns), e.g. `\八角墨围反白[高度=3，填充]{...}` . Since v0.4.5 the fallback writes a warning to the log naming the key that caused it; write `inline=false` when you really want the single box and the warning goes away.

Scaling with the font size (v0.4.4+)

Inside a jiazhu or at a temporarily smaller size, the circle of `\带圈` and the frames of `\墨围` / `\八角墨围` / `\反白` scale with the current font size and are centred vertically in their row, instead of being drawn at body-text height and running into neighbouring characters.

Border Padding Control

Use `border-margin-x` / `border-margin-y` for separate horizontal and vertical padding:

Parameter	Description	Default
`border-margin`	Unified border padding	`0pt`
`border-margin-x`	Horizontal border padding	*(follows border-margin)*
`border-margin-y`	Vertical border padding	*(follows border-margin)*
`outer-margin`	External textbox margin	`0pt`

Fill Textbox

`\FillTextBox` (or `\填充文本框`) is a variant of `\TextBox` with default fill alignment.

```
\FillTextBox[17]{......}           % a bare integer means height=17 (grid cells)
\FillTextBox[height=17]{......}    % same, key-value form
\FillTextBox[height=120pt]{......} % absolute height
\FillTextBox[height=4]{天地玄黄宇宙}洪荒   % 6 characters squeezed into 4 cells
```

- **Flat text**: when the content exceeds the cell count the glyphs are compressed vertically as a whole, keeping their width; ratio = cells ÷ characters (83 characters in 17 cells is about 1/5 and nearly a line, so reduce `font-size` or add cells). Shorter content is spread out evenly.
- A bare integer in the brackets is `height=N`; use the key-value form to add other keys (`font-size`, `border`, …).
- Unlike `\TextBox[height=N]`, which never compresses and only top-aligns in N cells.
- Equivalent to `\TextBox[height=..., box-align=fill]{content}`.
- Works directly inside `正文`, `列表` and `段落`; no extra package needed.

Floating Box

With `floating=true` a text box is placed at absolute page coordinates, typically for **annotations**. `\FloatingTextBox[…]{…}` (`\悬浮文本框`) is short for `\TextBox[floating=true, …]`.

```
\FloatingTextBox[
  x=2cm, y=3cm,
  height=5,
  border=true
]{a floating note}
```

The simpler `\PiZhu` (`\批注`) command does the same for annotations. For every key see Command Reference; `\textboxSetup` (`\文本框设置`) sets defaults.

☞ Next: Features.

Seals (YinZhang / 印章)

The `\印章` command adds images like collection marks or personal seals to the page, supporting absolute positioning and opacity.

Usage

```
\印章[page=1, xshift=2cm, yshift=5cm, opacity=0.8, width=3cm]{seal.png}
```

Parameters

- `page` : Page number where the seal appears (default: 1).
- `xshift` / `yshift` : Offsets from the page center or margin.
- `opacity` : Opacity (0.0 to 1.0). For ancient books, 0.7-0.9 is recommended to simulate ink absorption.
- `width` : Display width of the seal image.
- `color` : (Optional) Color for vector-based seals.

Features

- **Layer Management**: Seals are rendered during the `shipout/background` hook by default, appearing below the text. This can be customized if foreground placement is needed.
- **Multi-point Layout**: Multiple seal commands can be used on the same page; they are positioned independently based on their coordinates.
- **Absolute Positioning**: Uses TikZ's coordinate system for pinpoint accuracy on the page.

Technical Implementation

Seals leverage LaTeX `shipout` hooks. Each call to `\印章` registers a `tikzpicture` block inside the appropriate hook, wrapped in an `\ifnum\value{page}=N` conditional to ensure images are output on the correct page and at the correct layer.

☞ Next Steps: Check Judou or Features Overview.

Debug Mode

`luatex-cn` provides comprehensive debugging features to help troubleshoot layout issues.

Enable/Disable Debug

```
\LtcDebugOn    % or \开启调试
\LtcDebugOff   % or \关闭调试
```

Module-level Debug

Enable debugging for specific modules:

```
\LtcDebugModuleOn{vertical}   % or \开启调试模块{vertical}
\LtcDebugModuleOff{vertical}  % or \关闭调试模块{vertical}
```

Display Helper Tools

Show Page Frame

```
\LtcShowFrame   % or \显示边框
```

Show Grid Coordinates

Overlay grid coordinates on the page for element positioning:

```
% Show grid (default unit: cm)
\LtcShowGrid              % or \显示网格

% Specify unit
\LtcShowGrid[measure=cm]  % or \显示网格[measure=cm]
\LtcShowGrid[measure=pt]
\LtcShowGrid[measure=mm]

% Hide grid
\LtcHideGrid              % or \隐藏网格
```

Supported units: `cm` (default), `pt`, `mm`

Show Coordinates

`\显示坐标` is an alias for `\显示网格`:

```
\显示坐标[measure=pt]
\隐藏坐标
```

Debug Color Settings

Set different debug colors for different modules:

```
\LtcDebugColor{vertical}{blue}
\LtcDebugColor{banxin}{red}
```

Usage Example

```
\documentclass[四库全书彩色]{ltc-guji}

% Enable debug mode
\LtcDebugOn
\LtcShowGrid[measure=cm]

\begin{document}
\begin{正文}
Debug content...
\end{正文}
\end{document}
```

Debug Output

When debug is enabled, the compilation log outputs detailed layout information including:

- Grid position calculations
- Character positioning
- Banxin rendering process
- Plugin invocation order

☞ Back to: Features | Home

Changelog

All notable changes to this project will be documented here.

[0.4.5] - 2026-11-18

- ✨ **Book ear**: `\banxinSetup{书耳=true}` draws a small box outside the top-left corner of the frame with the current chapter title set vertically (follows `\chapter`), or `书耳=<text>`; position left / right / both; width, height and font size adjustable (fix #87)
- ✨ **Centred pages**: new body key `horizontal-align = right | center | left` (`横对齐`) and environment `CenteredPage` (`居中页`) for title and part-title pages. Ignored with a warning on fixed-grid guji layouts (fix #175)
- ✨ **Chinese values**: every choice and boolean key accepts Chinese values, e.g. `对齐=顶`, `页码位置=内侧`, `显示=是`; see Command Reference (fix #85)
- ✨ **Override warnings**: a warning when keys that override each other are both set: n-char-per-col vs grid-height, n-column vs grid-width, page-columns vs banxin, font size larger than the cell, banxin upper + middle ratio > 1; see Command Reference (fix #195)
- 📖 **Layout diagrams**: new Anatomy page with annotated page elements and parameter diagrams (fix #195)
- ♻️ **Template setup**: `\gujiSetup` / `\defineGujiTemplate` accept layout keys such as `n-column`, font size and margins; `template=` accepts Chinese template names and an unknown template now warns instead of erroring
- 🐛 **Judou in jiazhu**: punctuation marks no longer drift off their character when jiazhu sets `n-char-per-col` or `grid-height` (fix #216)
- 🐛 **Jiazhu in indented paragraphs**: jiazhu with `n-char-per-col` no longer runs past the frame after wrapping (fix #212)
- 🐛 **Inverted text with border-shape**: `\反白[border-shape=none]` no longer falls back to a whole text box; other fallbacks now warn (fix #210)
- 🐛 **Split pages**: no more double-width spread between two `正文` blocks
- 🐛 **Banxin font size**: `\版心设置{font-size=12pt}` no longer aborts; `\LineMark[color=gray]` colours work
- ♻️ **Cleanup**: dead code removed, duplication extracted, luacheck in CI; output unchanged

[0.4.4] - 2026-11-16

- ✨ **Jiazhu characters per column**: `\夹注[n-char-per-col=20]` — a jiazhu sub-column can hold a different number of characters from the main text; cell height = body column height ÷ N; `\夹注设置{n-char-per-col=20}` sets the book-wide default (fix #82)
- ✨ **Facing-page padding**: `\pageSetup{facing-pages=true}` (`对页补页`) — when a chapter starts at the top of an even page, a blank page is inserted so every chapter starts on an odd page; `\InsertBlankPage` (`\补空白页`) forces one anywhere; `blank-page-style=blank` makes the added pages completely blank. Off by default (fix #176)
- ✨ **Fixed content area on facing pages**: `mirror-margins = false` keeps `margin-left/right` on every page under `twoside = true` ; `binding-offset` adds a gutter on the spine side; vbook classes add `header-anchor = content` , `header-sep` and `header-position` so the running header and page number follow the content area (fix #198)
- ✨ **vbook page-number position**: `page-number-position = outer | inner | center` , default outer (fix #193)
- ♻️ **Inner/outer follow the spine in vertical books**: vertical books bind on the right, so an odd page is the left page. `margin-inner` and `page-number-position=inner` used to land on the fore-edge; they now follow the spine, and the vbook defaults were swapped to inner 24mm / outer 16mm so the default layout is unchanged. Documents that set `margin-inner ≠ margin-outer` or `page-number-position` flip left/right — swap the two values (fix #198)
- 🐛 **Inverted text across columns**: `\反白` / `\墨围反白` / `\八角墨围反白` now break character by character across columns instead of jumping as a block; new `break=square|octagon` (fix #201)
- 🐛 **Premature page break in vbook**: after `\include` of several files, or `\clearpage` / `\换页` , the next page no longer breaks after only a few columns (fix #199)
- 🐛 **Decorations scale with font size**: circles and frames of `\带圈` , `\墨围` , `\八角墨围` , `\反白` scale with the current font size inside jiazhu or small text (fix #196)
- 🐛 **Fallback fonts loaded on demand**: the `\设置字体族` fallback chain is loaded per size only when actually needed, so long books with many sizes no longer run out of memory; output unchanged (fix #197)
- 🐛 **Facing-page margins**: a `正文` block starting on an even page no longer uses the wrong side's margins for the whole block; the last column in free column-width mode no longer overruns the left margin (fix #198)
- 🐛 **vbook header/page-number keys**: `page-number-x` , `page-number-y` , `header-y` now take effect through `\pageSetup` , with Chinese keys `页码横移` / `页码纵移` / `页眉纵移`
- 🐛 **guji templates with twoside**: guji templates now set `margin-inner` / `margin-outer` defaults, so `twoside = true` no longer gives zero margins

- ☑️ **Tests**: end-to-end unit tests for pagination of float-only pages (fix #98); new `test/margin_test.py` margin measurement assertions
- 📖 **Docs**: `\填充文本框` flat-character usage and example (fix #79)

[0.4.3] - 2026-10-28

- ✨ **Thread-bound book cover**: `\线装书封面[keys]{title}` (`\ThreadBoundCover` / `\線裝書封面`) — the modern blue thread-bound cover used by Zhonghua Book Company, Guangling Press and other facsimile publishers (after CY/T 247—2021 fig. 1–2): navy cover with a cream title label at the top left, double rules (thick outer, thin inner) inside the label; the label has a minimum height and grows with a long title, shrinking the type when it would overflow the page; `册次` (volume) and `卷次` (juan) run in small type at the bottom of the label or right after the title with `小字位置=随后`; `订线` draws the binding thread for preview. Example in `示例/线装书封面/` (#170)
- 🐛 **Reversed-text colour**: `\反白` / `\墨围反白` / `\八角墨围反白` no longer draw a black box with dark text in the body of the Siku Quanshu colour template, nor inside interlinear notes under any template (#187)
- 🐛 **Side-note wrap indent**: a long side note in an indented paragraph now stays level with the body text after wrapping to the next column, instead of sitting `indent` rows higher (#188)
- 🐛 **Nested paragraph indent**: the inner indent of nested `段落` no longer falls back to the outer indent (#168)
- 🐛 **Floating-only pages**: a page holding only floating text boxes / seals is no longer dropped together with every page after it (#98)
- 🐛 **Floating text box z-order**: several floating boxes on one page are now drawn in registration order instead of a random order
- 🐛 **Judou with `vert` substitutions**: when the `vert` feature maps `，` `。` to vertical glyphs without a Unicode code point (e.g. Windows SimSun), judou still classifies them instead of leaving the mark below the text (PR #186)
- ♻️ **Margin selection (breaking)**: `twoside=true` reads only `margin-inner` / `margin-outer` (mirrored on odd/even pages); `twoside=false` reads only `margin-left` / `margin-right`; setting the ignored pair emits a warning; with `twoside=false` the vbook running-header page number is fixed on the left. The old `twoside=false` + `margin-inner/outer` combination no longer takes effect — use `margin-left/right` (#174)

[0.4.2] - 2026-09-30

- 🐛 **Annotations after taitou**: notes following `\抬头` / `\平抬` / `\单抬` no longer jump to the column head or fall into the top margin; the forced taitou indent no longer leaks into later annotations. `\单抬` *inside* an annotation still protrudes into the top margin (#165)
- 🐛 **Two consecutive body blocks**: two `正文` environments on the same page no longer overprint each other (no more 「一」 and 「二」 in the same banxin) and no longer raise `\prevdepth` errors; two-column parallel layouts using `分栏` + `\换栏` still share one page (#165)
- 🐛 **Banxin page-number style**: `\pageSetup{页码样式=digits}` (`digits` / `chinese` / `arabic` / `none`) now takes effect on banxin page numbers, sharing one formatter with vertical page numbers; the initial value is now "unset", so `\pageSetup{纸宽=...}` no longer switches banxin page numbers off as a side effect (#161)
- 🐛 **`\pageSetup` after `\disableSplitPage`**: the paper width is no longer halved and the page count no longer doubled; no extra blank page when called after `\begin{document}`. `\pageSetup` no longer sets `\topskip` unconditionally, so a `\topskip` set in the body is kept (#166)
- 🐛 **Horizontal CJK–Western spacing**: Western-only lines in fonts whose space is narrower than 1/4 em (e.g. Source Sans 3) no longer overflow the text block (#171); `/` `-` `·` `–` in strings like `1/4 em` or `a/b` are treated as Western half-width punctuation and no longer get 1/4em on both sides (#160)
- 🐛 **Judou color**: judou marks are no longer drawn in the body-text color in the colored Siku Quanshu template; `\句读设置{句读颜色=...}` now actually works (#157)
- 🐛 **Color key aliases and warnings**: `color` / `颜色` and `font-color` / `字体颜色` are interchangeable across jiazhu, textflow, line, textbox, judou, pizhu, meipi and sidenote; `\夹注设置{color=red}` no longer does nothing or recolors the whole text. Unknown keys now raise a warning instead of being silently dropped (#163)
- ♻️ **Faster large books**: scaled fonts for banxin vertical text are cached by (font, size). 《欽定儀象考成》(875 pages): 170s → 141s, output PDF byte-identical (fix #167, #172)
- ✅ **Tests**: new color-key self-check `test/color_test.py`, extra clreq assertions for CJK–Western spacing

[0.4.1] - 2026-08-07

- 🐛 **No more hyphenated Western words in annotations/TextBox**: TextBox no longer lets TEX pre-break collected content (the old logic split English in annotations into S-/tate and misaligned columns); column breaking is now entirely handled by the grid engine. In

grid mode (fixed cell height, e.g. `ltc-guji`), `\Sideways` now sizes glyphs by their advance width so rotated words set contiguously (fix #50)

- 📦 **CTAN packaging fixes** per CTAN review: upload renamed to `luatex-cn-v<version>.zip`, single top-level directory `luatex-cn/` on unpack, `README.md` at the package top level with an English abstract; the local build, CI release asset and CTAN upload are now one and the same file
- 📖 **Slimmer wiki PDFs**: example previews downsampled to 300 dpi and embedded as 64-color indexed images, emoji embedded as a monochrome vector font subset — zh 4.8→2.7 MB, en 4.3→1.8 MB

[0.4.0] - 2026-08-06

Major clreq release: unified entry point `\usepackage{luatex-cn}`, a complete horizontal clreq pipeline, vertical clreq conformance (P1-P3), a shared rules kernel for both directions, a conformance declaration matrix backed by 119 metric assertions, and installation-free fonts.

Added:

- ✨ **Unified entry point**: `\usepackage{luatex-cn}` is now the single entry for everything - by default it loads the horizontal clreq pipeline (options pass through, e.g. `[style=taiwan]`); `[vertical]` or banxin-style keys load the vertical bundle (0.3.x semantics unchanged); under an ltc-* class it automatically takes the vertical branch (#148)
- ✨ **Horizontal clreq pipeline** (luatex-cn-hori): CJK-Western spacing of 1/4 em (compressible to 1/8, stretchable to 1/2, with the three clreq exceptions), punctuation width adjustment with Mainland/Taiwan/none presets, quote style conversion, four-level line-break prohibition plus inseparability rules, second-pass intra-line compression/stretch in clreq priority order, half-width line-end punctuation, hanging punctuation, and even distribution (#127-#131)
- ✨ **Horizontal interlinear marks**: `\专名` / `\书名号甲` / `\着重` (adjacent marks shrink 1/16 em on each side; no emphasis dots on punctuation), and `\拼音` / `\对照` word-aligned ruby (#129)
- ✨ **Horizontal paragraph and page level**: avoidance of single-character last lines, widow/orphan control, hanging-indent and indent environments, four last-line alignments, and traditional type sizes via `\字号` (shared with vertical) (#131)
- ✨ **All three vertical mixed-script configurations** (clreq P3): 1/4 em CJK-Western spacing wired into the solver; `\横置` rotates a Western string 90 degrees clockwise into the column; `\中横排` squeezes a short string (two-to-three digits etc.) horizontally into a single character cell (tate-chu-yoko) (#146, #147, #149)

- ✨ **Vertical hanging punctuation** (clreq 6.1.3): `\标点设置{punct-hanging=true}` hangs a column-final stop outside the text area; off by default
- ✨ **Vertical emphasis dots per clreq 5.3.1**: the two vbook classes default to solid dots `●` with no dots on punctuation; `\着重号设置` gains `char` / `scale` / `skip-punct` keys; ltc-guji keeps the classical circle convention
- ✨ **Shared clreq rules kernel** `tex/shared/`: the full punctuation table, the intra-line space allocation solver, four-level prohibition rules, and ink anchors - a single data source for both directions, pure Lua, unit-testable with texlua (#125)
- ✨ **clreq conformance matrix** docs/CLREQ-CONFORMANCE.md: per-clause status for both directions with evidence, documented intentional deviations, and not-implemented items with rationale
- ✨ **clreq assertion tests**: 119 metric assertions parsed from PDF content streams (per-glyph x coordinates horizontally, per-column baseline distances vertically), running in CI (#128)
- ✨ **Installation-free fonts**: `\设置字体族` accepts registry aliases and file paths; `download_fonts.py --user/--dest` installs without admin rights; SHA-256-pinned font manifest (#109, #122, #123)
- ✨ **Geometry self-check tests**: assert equal baseline spacing per column straight from the PDF, catching whole-glyph offsets without baseline images (#113)
- ✨ **Example "论辩的魂灵"** (Lu Xun): a real-world document for the horizontal clreq pipeline

Changed:

- ♻️ **Vertical layout now uses the shared intra-line solver** (clreq P2): 7 compression levels / 2 stretch levels plus a fallback, prohibition resolution by lexicographic comparison; digit runs, Western words and two-width punctuation locked as rigid units; all three ltc-guji baselines unchanged (#143)
- ♻️ **Context-sensitive vertical punctuation width**: a lone punctuation mark keeps its full cell; only consecutive marks compress. vbook classes default to `squeeze-mode=context`; ltc-guji keeps legacy unconditional squeezing
- ♻️ **Metrics-driven punctuation ink placement**: glyph bounding boxes anchor the ink to the style's canonical position (Mainland/Taiwan x horizontal/vertical), so the font's own glyph design no longer shifts layout
- ♻️ **`\标点设置` unified with the horizontal backend**: new `style` / `squeeze-mode` / `adjacent-punct` / `line-start-bracket` / `line-end-punct` keys

Fixed:

- 🐛 **Vertical inline-note bracket ink in the correct half-cell** (clreq 6.3.2.1), anchored by ink-center offset and consistent across four fonts (fix #105)
- 🐛 **Em dashes / ellipses as rigid two-cell units**: never split across columns, zero internal spacing so consecutive dashes join into one stroke; ccmp ligatures decomposed back to em dashes (fix #119)
- 🐛 **Footnote label geometry**: labels excluded from punctuation width adjustment; brackets scaled and centered on real ink; Chinese numerals up to thousands
- 🐛 **In-cell vertical centering now uses the em-box baseline**, fixing whole-glyph offsets for characters like 一 and 丶 whose ink does not cross the baseline (#113)
- 🐛 Others: decoration mark misplacement (#118), digital-mode empty left sub-column (#120), column-break guard (#108), `os.name` platform detection (#100), `run_all.lua` swallowing failures (#121)

Maintenance:

- ✅ Tests and examples moved entirely to verifiably-licensed open fonts; pixel-exact zero-tolerance regression baselines; CI runs unit + regression tests on every PR (#101, #106-#117)

[0.3.8] - 2026-05-09

New gongche notation commands, tone-mark decorations, side note background color, and multiple sidenote/layout fixes.

- ✨ **Gongche Notation**: New `\音[ban/yan/high/low/kunlow]{note}` main commands, `\拖音` sustain/continuation unit, judou and gongdiao annotations, supporting full traditional Chinese musical notation layout (#90)
- ✨ **Tone-Mark Circles**: New `\发圈` / `\圈发` commands, adding tonal corner-circle decorations based on level/rising/departing/entering tones (fix #92)
- ✨ **Side Note Background**: `\侧批` adds `background-color` parameter (CN alias `底色` / `背景色`) to mask underlying column borders; special values `page` / `inherit` / `继承` / `页面` inherit the page background (#93)
- 🐛 **Side Note Wrapping & Taitou Alignment**: Fixed reverse-flow wrapping, taitou column alignment with body text top, and bottom-anchor auto-wrap (fix #91)
- 🐛 **Reverse-Flow Boundary**: page 0 / banxin column fallback fixes; extracted `wrap_to_next_column` helper to eliminate duplicated wrap logic (review #97)
- 🐛 **Floating Textbox Empty Page**: anchor marks `page_has_content` , preventing pages with only floating textboxes from being misidentified as empty (fix #98)

- 🐛 **Page-Fill Table Inner Border**: Lost left inner border on starting page — fixed by distinguishing `actual_band_cols` per page
- 🐛 **Illustration Page Full-Page Suppression**: Silk-frame suppression extends to both half-pages when no real text content exists on the entire page

[0.3.7] - 2026-04-25

Table enhancements, sidenote API redesign, and multiple jiazhu/textbox fixes.

- ✨ **Table Enhancements**: Cross-page tables, customizable column rules; new `row-fill=half-page` mode
- ✨ **Sidenote API Redesign**: `\旁注{main}{right}{left?}` — supports `\文本框` content, spacing adapts to main character size (fix #94)
- ✨ **Guji `ignore-spaces` Option**: New option, default ignores source spaces
- ✨ **Banxin Page Number Toggle**: Added display toggle
- 🐛 **Textbox in Jiazhu**: Octagon size/alignment/vertical/sub-column x offset issues (fix #96)
- 🐛 **Parallel Mode Cross-Page Table**: Preserves band structure and horizontal rules, tight cell layout, cell-level column borders don't leak to overflow page
- 🐛 **Textbox Line Height & Space**: Inner line height uses outer grid height, fixes body `\octagon{}` overflow; trailing space after textbox occupies wrong row count
- 🐛 **Judou Column Wrap Position**: Marker mislocated to old column when wrapping
- 🐛 **Style Font Application**: `\样式[字体=X]` without size now applies font to TEX layer
- 🐛 **Fill Mode Padding**: Double-application of `padding_top`
- ♻️ **Chapter Manual Newline**: Switched to `\夹注` to adapt to TextBox rendering mode

[0.3.6] - 2026-03-20

New illustration page, colophon, annotation toggles, and Banxin TextBox overhaul.

- ✨ **Illustration Page**: New `\IllustrationPage` / `\插图页` command with half-page granularity silk frame suppression, defaults to half-page break first (fix #29)
- ✨ **Colophon**: New `\colophon` / `\牌记` command — opaque double-border floating text box (fix #58)
- ✨ **Annotation Toggles**: Side notes/MeiPi/PiZhu support `sidenote=false` / `meipi=false` / `pizhu=false` on/off switches in Setup or per-call (fix #89)
- ✨ **Half-Page Break**: New `\NewHalfPage` / `\换半页` command

- ✨ **Banxin TextBox**: Banxin upper/lower/middle sections now rendered through TextBox pipeline, supporting compact layout, jiazhu, and fill-padding
- ✨ **TextBox Transparency**: New `transparent` boolean parameter (default: true) to control text box background transparency
- 🐛 **Side Note Punctuation**: Fixed vertical punctuation conversion not applied in normal mode for side notes (fix #89)
- 🐛 **Table Fixes**: Fixed auto-width cell column overlap, fixed-width empty cell ineffective, vertical alignment not accounting for padding
- 🐛 **Illustration Page Silk Frame**: Fixed `\IllustrationPage` causing all pages to lose silk frames due to style stack pollution
- 🐛 **Table Cross-Page**: Fixed parallel mode cross-page table subsequent bands rendering at wrong position
- 🐛 **Underline Position**: Fixed `\Underline` position offset in Free Mode
- ♻️ **Parallel Default**: Table banding now defaults to parallel mode (page break when band full, not band switch)
- ♻️ **Padding Unification**: Unified `padding-top` / `padding-bottom` parameters, replacing multiple naming schemes
- ♻️ **Parameter Rename**: Banxin parameters renamed from content-oriented to position-oriented, `x` / `y` aliases updated

[0.3.5] - 2026-03-14

Component-level settings system and multi-level heading support.

- ✨ **Setting Stack**: New setting stack module for component-level punctuation mode configuration in side notes, annotations, header notes, and text boxes (fix #84)
- ✨ **Global Settings Command**: New `\GlobalSettings` / `\全局设置` command for unified management of punct-mode, punct-style, and other global parameters; new xshift parameter for side notes (fix #86)
- ✨ **Multi-level Headings**: New `\chapter` / `\section` / `\subsection` commands with `\chapter[banxin title]{body title}` optional parameter to distinguish banxin vs body display; new `\sectionSetup` configuration command (fix #64)
- ✨ **Unified Style Parameters**: All components accept style parameters via .unknown double-forwarding (settings → style)
- 🐛 **Seal Fix**: Fixed multiple `\YinZhang` commands overwriting each other, showing only the last one (fix #80)
- 🐛 **Alias Unification**: Unified Chinese aliases: Column→行, SideNode→Sidenote (fix #83)

- 🐛 **Line Break Spacing**: Fixed source line breaks in BodyText producing extra spaces (fix #86)
- 🐛 **Layout Fixes**: Fixed auto_balance sub-column overflow, textflow band height constraint, banxin font matching, banxin_ratio=1 horizontal line crossing, and table column border edge line issues

[0.3.4] - 2026-03-12

New table and genealogy typesetting (experimental).

- ✨ **Table Environment**: Table environment with cell grouping, multi-band layout, band height/column parameters, fine-grained border control
- ✨ **Band (Horizontal Section)**: Band feature for horizontal sectioning in vertical pages with border rendering
- ✨ **Ouyang-style Genealogy**: Initial implementation of Ouyang Xiu-style genealogy typesetting, see examples
- ✨ **Jiazhu Shortcut**: New `\夹注捷径{open}{close}` for custom bracket auto-replacement to `\夹注{}` (fix #76)
- 🐛 **Taitou Line Break**: Fixed line break failure after taitou when character count ≤ taitou count (fix #78)
- 🐛 **Jiazhu Key Forwarding**: Fixed jiazhu key system forwarding unknown keys to textflow (fix #81)
- 🐛 **Footnote Marker**: Fixed inconsistent centering of footnote markers like【一】【二】(fix #77)
- 🐛 **Table Fixes**: Fixed table cell vertical alignment, band separator position, column border inheritance, multi-table parameter override
- 🐛 **Layout Fixes**: Fixed extra row in page break/jiazhu/taitou, fixed textflow pending state leak
- ♻️ **Coordinate System Refactor**: pos.x/pos.y use absolute coordinates, render stage applies unified RTL→LTR conversion

[0.3.3] - 2026-03-04

Multiple typesetting bug fixes.

- 🐛 **Proper Name Underline**: Fixed proper name mark breaking at every character in natural mode (fix #74)

- 🐛 **Decoration Symbol Offset**: Fixed horizontal offset for Noto CJK fonts, compatible with different rawdata.descriptions key formats (fix #73)
- 🐛 **Correction Command**: Fixed `\改` command adding extra spacing and comma position offset in jiazhu (fix #72)
- 🐛 **Punctuation Detection**: Fixed certain font punctuation marks not being recognized (fix #71)

[0.3.2] - 2026-03-02

Full implementation of modern vertical typesetting (Zhonghua Shuju style).

- ✨ **Paragraph Indentation**: Paragraph detection and vbook first-line indent, indent style merged into StyleEnv
- ✨ **Running Headers**: Alternating odd/even page headers showing chapter/book name, page numbers on inner margin
- ✨ **Two-side Mirror Margins**: Added twoside mirror margin support, enabled by default in vbook
- ✨ **Footnote Enhancement**: Hanging indent for footnote continuation, `\FootnoteParagraph` for unnumbered footnote blocks, footnote numbering alignment
- ✨ **Moquan (Ink Border) Command**: Added `\墨围` command with separate border padding control
- ✨ **Column Spacing**: Free Mode column spacing, near-full column justification in natural mode
- ✨ **Overlay Compare Tool**: Added `overlay_compare.py` red-blue overlay comparison tool
- 🐛 **Kinsoku Rules**: Fixed natural mode kinsoku rules applying across all layout paths
- 🐛 **Footnote Fix**: Fixed footnote paragraph indent loss after cross-column continuation
- 🐛 **vbook Fix**: Fixed Lua number format error and Taiwan traditional Chinese command aliases
- 🐛 **Annotation Color**: Fixed pizhu default color RGB parsing error from expl3 space eating
- 🐛 **Character Spacing**: Unified natural mode spacing strategy, changed to 0.1em proportional spacing
- 🐛 **Column Stretch**: Footnote numbering and moquan excluded from column stretch

[0.3.1] - 2026-02-26

Focus on optimizing guji-digital document class for facsimile typesetting.

- ✨ **Document-level Style System**: New `\ConfigDocument` command for document-level style presets and attribute passing
- ✨ **Digitization Toolchain**: Bidirectional conversion tools (`semantic_to_digital.py` / `digital_to_semantic.py`)
- ✨ **Layout Export**: Export layout JSON via `ENABLE_EXPORT=1` environment variable for automated validation
- ✨ **PDF Page Mapping**: Simplified spread page semantics, correct single/double page mapping
- 🐛 **Indent System Refactor**: Split taitou and suojin indent types, fixed attribute passing bugs
- 🐛 **Textflow Layout**: Fixed taitou indent being incorrectly cleared in textflow
- 🐛 **Decoration Symbols**: Changed circle dot/emphasis mark character from `。` to `○` for better visuals
- 🐛 **Page Break Fix**: Fixed `\双列` typesetting after `\换页`
- 🐛 **Flat Taitou Fix**: Fixed `\平抬` not working inside jiazhu
- 📦 **Template Updates**: Added Wuliang Quanzhi template, restructured Siku Quanshu template folder

[0.3.0] - 2026-02-18

Project is now stable for full-book typesetting.

- ✨ **User Experience Improvements**: Organized parameter naming conventions, updated Wiki and README documentation
- ✨ **Template System**: Added templates folder with ready-to-use typesetting templates
- 🐛 **Paragraph Fix**: Fixed `bottom-indent` default value setting (fix #xx)
- 🐛 **Banxin Fix**: Fixed banxin chapter alignment handling

Note: Before v1.0, commands and parameters may change. Please keep your installation up to date.

[0.2.9] - 2026-02-18

Complete typesetting of *Qinding Siku Quanshu Jianming Mulu (Volume 1)*. Added "digitization" mode for classical text OCR and proofreading.

- ✨ **Helper Commands**: Added `\臣`, `\xshift` and other typesetting auxiliary commands
- ✨ **Page Processing**: Added cover page, collation page, and blank page processing
- ✨ **Digital Mode**: New `ltc-guji-digital` document class for OCR-based classical text digitization and proofreading (experimental)
- ✨ **SideNote Enhancement**: `\SideNode` now supports positional parameters and numeric auto-conversion (`\SideNode[5pt]` = `\SideNode[0.5]` auto-converts to em)
- ♻️ **Parameter Renaming**:
  - Renamed: `font-color` Chinese alias `字色` → `字体颜色` (`\Style`, `\Paragraph`, `\SideNode`, etc.)
  - Renamed: `yoffset` → `yshift` (`\SideNode`, Chinese alias `纵偏` → `纵移`)
  - Renamed: `distribute` → `fill` (`\TextBox`, Chinese alias `均分` → `填充`)
  - Renamed: `font-name` → `font` (`\Content`, Chinese alias `字体名` → `字体`)
  - Improved: Paragraph `first-indent` / `bottom-indent` defaults to empty, automatically follows `indent` parameter
- 🐛 **Taitou Fixes**: Fixed numerous taitou indentation and line-breaking issues
- 🐛 **Judou Fix**: Fixed judou mode behavior inside jiazhu (interlinear notes)
- 🐛 **Banxin Fix**: Fixed single-page banxin processing
- 🐛 **Background Color Fix**: Fixed background color inheritance and override logic

[0.2.8] - 2026-02-14

- ✨ **Free Layout Mode**: New automatic column width and flexible column spacing support
- ✨ **Style Command**: Added `\样式` command and `Style` environment for inline style overrides (font size, color, grid height, etc.)
- ✨ **Cover Feature**: Added `Cover` environment and volume/chapter name commands for ancient book covers
- ✨ **Command Renaming**: Document classes unified to `ltc-guji`, `ltc-cn-vbook`, `ltc-tw-vbook`; commands fully support English/simplified/traditional Chinese names
- 🐛 **Bug Fixes**: Improved modern traditional Chinese vertical typesetting; fixed footnote and heading layout issues
- ♻️ **Refactoring**: Major refactoring of layout-grid module, unified grid/natural engines, rewrote unit tests

[0.2.7] - 2026-02-09

- ✨ **Modern Punctuation System**: Full modern punctuation support (squeeze, kinsoku line-breaking, vertical quote replacement) with mainland/Taiwan style options
- ✨ **ltc-book Document Class**: New `ltc-book` class for modern vertical Chinese book typesetting with template system (default/zhonghuashuju)
- ✨ **Footnote System**: Added `\Footnote` command with endnote and page-bottom modes, lujiao/circled numbering styles
- ✨ **Natural Layout Mode**: Added `layout-mode=natural` for non-uniform character spacing with half-grid punctuation and bottom-aligned columns
- ✨ **Flexible Column Widths**: `\Column` now supports `width` parameter for variable-width column layouts
- ✨ **Title Page Column Widths**: TitlePage supports `column-widths` parameter for flexible layouts
- 🐛 **Bug Fix**: Fixed content loss when `\newpage` follows auto-pagination at column end (fix #63)
- 🐛 **Bug Fix**: Fixed `\Space` command being skipped at column start (fix #62)
- 🐛 **Bug Fix**: Fixed `\挪抬` command trailing spaces producing extra whitespace
- ♻️ **Refactoring**: Split render-page.lua into two modules, reorganized regression tests into three suites

[0.2.6] - 2026-02-07

- ✨ **Taitou Support**: Added `\抬头[N]` system (Single/Double/Triple/Flat/Relative Taitou) with automatic border wrapping
- ✨ **Proper Name/Book Title Marks**: Re-implemented using PDF graphics, solving connectivity and font compatibility issues (fix #53, #56, #57)
- ✨ **Jiazhu Balance Control**: Added `auto-balance` option for non-balanced layouts
- 🐛 **Glyph Rotation Fix**: Added automatic 90° rotation for ellipsis and em dash when font lacks vertical forms
- 🐛 **Bug Fix**: Fixed sidenote color leakage across page boundaries (fix #44)
- 🐛 **Bug Fix**: Fixed jiazhu column switching logic

[0.2.5] - 2026-02-05

- ✨ **Catalog Entry Command**: Added `\条目` command with hierarchical indentation for table of contents

- ✨ **Column Control Commands**: Added `\列` (Column) and `\末列` (LastColumn) commands for better layout control (fix #30)
- 🐛 **Bug Fix**: Fixed decoration underlines (专名号/书名号) not drawn on last character at column end (fix #54)
- 🐛 **Bug Fix**: Fixed character centering offset for some characters (e.g., "漢"), main text now uses width-based centering (fix #55)
- 🐛 **Bug Fix**: Fixed sidenote color leakage to banxin when crossing page boundaries (fix #48)

[0.2.4] - 2026-02-03

- ✨ **Underline Support**: Added `\Underline` / `\下划线` commands, implemented with the `｜` character (fix #5)
- ✨ **Book Title & Proper Name Marks**: Added `\书名号` (wavy line) and `\专名号` (straight line) commands (fix #16)
- 🐛 **Bug Fix**: Fixed sidenote column alignment when switching columns (fix #47)
- 🐛 **Bug Fix**: Fixed sidenote going to second column when crossing pages (fix #49)
- 🐛 **Bug Fix**: Fixed jiazhu alignment issue (fix #51)
- 🐛 **Bug Fix**: Fixed `\newgeometry` not supporting paperwidth/paperheight (fix #52)
- 🐛 **Bug Fix**: Fixed sidenote color leakage causing banxin to turn red when crossing pages

[0.2.3] - 2026-02-01

- ✨ **MeiPi (Marginal Notes)**: Added `\眉批` command with auto-positioning and manual coordinate support (fix #46)
- ✨ **Special TextBox**: TextBox frame feature with border shape customization (fix #25)
- ✨ **Publisher Display**: Added publisher display below banxin with customizable font (fix #26)
- 🐛 **Bug Fix**: Fixed annotation and textbox incorrectly inheriting paragraph indentation (fix #37)
- 🐛 **Bug Fix**: Fixed MeiPi appearing on wrong page when crossing page boundaries
- 🐛 **Bug Fix**: Fixed font detection support for simplified/traditional Chinese names (fix #35)
- ♻️ **Refactoring**: Refactored border style system with style stack management for border, outer_border attributes

[0.2.2] - 2026-01-31

- 🐛 **Bug Fix**: Fixed preamble chapter display on first page (fix #45)
- 🐛 **Bug Fix**: Fixed jiazhu column jumping at column end (fix #42)
- ✨ **Judou Enhancement**: Support for more Chinese punctuation symbols (fix #40)
- 🐛 **Bug Fix**: Fixed TextBox and annotation inheriting paragraph indent (fix #37)
- ✨ **Debug Feature**: Added debug ruler showing page grid coordinates (fix #31)
- ✨ **Font Detection**: Support simplified/traditional Chinese font names (fix #35)
- ♻️ **Refactoring**: Consolidated banxin text rendering logic
- ♻️ **Refactoring**: Moved title/publisher commands to metadata.sty
- ✅ **Module Cleanup**: Cleaned up banxin, guji, yinzhang module dependencies

[0.2.1] - 2026-01-31

- ✨ **Color Preservation**: Sidenote color preservation across pages (fix #38, #44)
- ✨ **Style Stack Architecture**: Implemented Phase 3 style stack for multi-attribute support
- ✨ **Style Registry**: Phase 2 multi-attribute style storage (color, font_size, grid_height)
- 🐛 **Bug Fix**: Fixed sidenote rendering order, now correctly displays above silk columns (fix #38)
- 🐛 **Bug Fix**: Punctuation mode now correctly applies to sidenote content (fix #39)
- ♻️ **Jiazhu Migration**: Migrated jiazhu functionality to style stack architecture
- ♻️ **Refactoring**: Unified color registration mechanism

[0.2.0] - 2026-01-31

- ✨ **Plugin Architecture**: Refactored to standardized plugin API for consistent component behavior
- ✨ **Global State Management**: Unified configuration via global tables for all modules
- ✨ **Metadata System**: Centralized book metadata management (title, publisher, chapter markers)
- ♻️ **Module Namespace**: Clear separation of core/, guji/, banxin/, util/, decorate/
- ♻️ **Major Refactoring**: Plugin system refactoring with standardized module interfaces

[0.1.5] - 2026-01-28

- ✨ **Multi-font Support**: Added multi-font fallback chain and Chinese font setting commands (fix #23).
- ✨ **New Features**: Implemented `\decorate` and `\fix` functionalities, supporting vertical typesetting correction marks (fix #12).
- ✨ **Textbox Enhancements**: Textbox supports vertical compression (flattening) to fit grid positions (fix #24).
- 🐛 **Bug Fixes**: Fixed layout bugs including 0pt dimension parsing error, Judou positioning offsets, and long title squeezing (fix #19, #20).
- ✅ **Regression Tests**: Introduced automated regression testing program based on PDF rendering comparison.
- ♻️ **Refactoring**: Refactored core rendering logic and improved overall code stability.

[0.1.4] - 2026-01-27

- ✨ Added Judou (punctuation marks) functionality
- 🐛 Fixed paragraph indentation and side note column switching issues
- ♻️ Major code refactoring for better readability and maintainability
- ✅ Added more test files

[0.1.3] - 2026-01-25

- 🐛 Fixed inaccurate page breaks and page number positioning
- ✨ Annotation coordinates now more accurate, skipping page center to prevent clipping
- 📚 Completely typeset Dream of the Red Chamber (Jiaxu manuscript) Chapter 1
- ♻️ Better compliance with Expl3 syntax
- ✅ Added l3build test files for regression testing
- ✅ Established comprehensive Lua unit testing framework with `l3build test` command support
- 🐛 Completely fixed Mock logic and API inconsistency issues in unit tests

[0.1.2] - 2026-01-22

- ♻️ Renamed src to tex
- 🐛 Completely fixed CRLF and BOM character issues on Windows

- 📦 Adopted l3build, see build.lua
- 🐛 Fixed package require paths to ensure release version works out of the box

[0.1.1] - 2026-01-19

Features

- ✨ Added annotation command, still using floating text box underneath

Fixes

- 🐛 Fixed CRLF and BOM character issues on Windows

Documentation

- 📖 Updated documentation with bilingual support

[0.1.0] - 2026-01-18

Major Features

- **Native Geometric Vertical Typesetting Engine**: Deep Lua customization with grid layout system designed for ancient book typesetting
- **Traditional Book Core Elements**: Complete support for Banxin (page center), Yuwei (fishtail), and traditional silk frames
- **Comprehensive Annotation System**: Flexible interlinear notes and side note functionality
- **Ready-to-use Template System**: Preset visual styles including Siku Quanshu and Dream of the Red Chamber manuscripts
- **Cross-platform Font Auto-detection**: Smart recognition of Windows, macOS, and Linux system fonts
- **Electronic Scroll/Traditional Page Support**: Traditional "tube page" logic and electronic reading adaptation
- **Absolute Positioning Seal System**: Support for placing collection seals anywhere on the page

Project Infrastructure

- Automated CTAN packaging and release workflow
- Comprehensive bilingual user manuals and multiple classic ancient book reproduction examples

Development Documentation

This document summarizes the core design philosophy, modular architecture, and the complete development workflow for the `luatex-cn` typesetting engine.

1. Core Architecture: Three-Layer Design

`luatex-cn` utilizes a three-layer architecture to decouple layout logic from rendering:

1. **LaTeX Interface Layer (`.sty`, `.cls`)**: Defines user commands; sets attributes and parameters via `luatexbase`.
2. **Coordination Layer (`core_*.lua`)**: Manages logic flow. For instance, `core_main` orchestrates the main process, while `core_textflow` handles interlinear note splitting.
3. **Processing Layer (`layout_*.lua`, `render_*.lua`)**:
    - **Flattening**: Converts TeX node lists into linear Lua tables.
    - **Layout**: Calculates grid coordinates for each character and its associated elements.
    - **Rendering**: Reassembles content based on coordinates and outputs PDF instructions.

Module Directory Structure (v0.2.0+)

```
tex/
├── core/              # Core vertical engine (26 files)
├── guji/              # Ancient book specific features (6 files)
├── banxin/            # Page center system (5 files)
├── splitpage/         # Tube page splitting (2 files)
├── fonts/             # Font auto-detection
├── util/              # Utility modules (including style registry)
├── decorate/          # Text decoration
├── debug/             # Debug tools
└── configs/           # Preset configuration files
```

Plugin System (v0.2.0+)

v0.2.0 introduced a standardized plugin API where each module implements a three-phase interface:

```
plugin = {
  initialize = function(params, engine_ctx) end,  -- Initialization
  layout = function(list, layout_map, engine_ctx, context) end,  -- Layout
```

```
  render = function(head, layout_map, params, context, ...) end   -- Rendering
}
```

Style Registry (v0.2.1+)

`luatex-cn-style-registry.lua` provides multi-attribute style storage:

```
-- Register a style, returns unique ID
local style_id = style_registry.register({
  color = {1, 0, 0},
  font_size = 19,
  grid_height = 20
})

-- Retrieve style by ID
local style = style_registry.get(style_id)
```

Supported attributes: `color`, `font_size`, `grid_height`, `font`, etc.

2. Participating in Development

We welcome contributions and Pull Requests (PRs).

2.1 Fork & Workflow

1. **Fork the Repo**: Click the Fork button on GitHub.
2. **Clone**: Clone your forked repository locally.
3. **Coding**: Main source code is located in the `tex/` directory.

> [!TIP] VS Code with LaTeX Workshop is recommended for development.

2.2 Testing

Please ensure all tests pass before submitting a PR.

1. **Install Dependencies**: You need `l3build` installed.
2. **Unit Tests**: Run Lua unit tests:

   ```
   l3build test
   ```

This invokes `test/run_all.lua`.

3. **Regression Tests**: We use automated regression testing based on PDF rendering comparison to prevent layout regressions.

   ```
   l3build check
   ```

   This compiles `.lvt` files in `testfiles/` and compares the output logs (`.tlg`) against baselines. If your changes affect layout, ensure these pass. If layout changes are intentional, update baselines:

   ```
   l3build save test-name
   ```

2.3 Release

For release procedures, please refer to Release.

3. Key Technical Details

Vertical Direction (RTT)

Leverages LuaTEX's `dir RTT` attribute. In RTT mode, text flows top-to-bottom, and lines stack right-to-left.

Attribute Management

Uses LuaTEX attributes to pass metadata across languages (e.g., "this glyph belongs to an interlinear note").

> [!WARNING] \selectfont clears all active attributes. Ensure attributes are reset AFTER setting the font size.

Node Ownership

Passing nodes to TEX via `tex.box[n] = node` transfers ownership. Use `node.copy_list()` if you need to reuse nodes.

4. Development Lessons (LEARNING)

- **Color Commands**: Must use normalized RGB (e.g., `0 0 0 rg`), not names.
- **Rendering Order**: PDF follows the "painter's model"—later content overlays earlier content. Insert backgrounds at the head of the list to ensure they are at the bottom.
- **Module Loading**: Standardize on `require()` and utilize `package.loaded` for caching.

Release Process

`luatex-cn` follows an automated release workflow to ensure compliance with CTAN (Comprehensive TEX Archive Network) standards.

Development Workflow

Building and testing are powered by `l3build`:

```
# Run all Lua unit tests
l3build test

# Install to local TEXMFHOME
l3build install

# Create release bundle (.zip)
l3build bundle
```

Automated Publishing (CI/CD)

GitHub Actions handles the packaging:

1. **Source Sync**: The `main` branch is used for active development.
2. **Packaging**:
    - Extracts `src/`, `文档/` (docs), and `示例/` (examples).
    - Translates folders and filenames to English as required by CTAN, using `scripts/file_name_translation.json`.
    - Generates the standardized directory structure (doc, example, tex).
3. **Release Branch**: The packaged content is pushed to the `ctan` branch and published via GitHub Releases.

Versioning

- Version numbers are stored in the root `VERSION` file.
- Significant changes are recorded in the Changelog.
- We follow Semantic Versioning (SemVer) principles.

☞ Next Steps: Check Development Documentation.