# Canonical Behavior Specification

### For 2D Vector Design Applications
### Based on Figma, Sketch, Adobe Illustrator, and Adobe XD

### DesignLibre Project

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## Contents

# 1   Introduction

This document defines the canonical user interface behaviors expected in modern 2D vector design applications. These patterns have been established through decades of refinement in applications like Adobe Illustrator (1987), Sketch (2010), Figma (2016), and Adobe XD (2017).

Adhering to these conventions ensures users can transfer their existing mental models and muscle memory to DesignLibre with minimal friction.

## 1.1   Design Principles

1. **Predictability**: Actions should have consistent, predictable results

2. **Reversibility**: All actions should be undoable

3. **Direct Manipulation**: Objects respond immediately to user input

4. **Progressive Disclosure**: Advanced features don't clutter basic workflows

5. **Safe Harbor**: Users can always return to a known, safe state (Select tool)

# 2   The Select Tool as Home Base

The **Select tool (V)** is the canonical "rest state" of all 2D design applications. It is:

- The default tool when the application launches

- The tool users return to after completing most operations

- The safest state—it only selects, never creates or destroys

## 2.1   Select Tool Capabilities

- Click on object → Select single object

- Click on empty canvas → Deselect all

- Shift+Click → Add/remove from selection (toggle)

- Cmd/Ctrl+Click → Select through groups (deep select)

- Click+Drag on empty area → Marquee selection

- Click+Drag on object → Move object

- Double-click on group → Enter group (drill down)

- Double-click on text → Enter text editing mode

# 3   Escape Hatch Behavior

The **Escape key** is the universal "get me out of here" mechanism. Its behavior follows a priority hierarchy:

### 3.1  Escape Key Priority (First Press)

1. **Cancel active operation**: If currently drawing, dragging, or in a modal state, cancel it

2. **Exit text editing**: If editing text, commit changes and exit edit mode

3. **Exit group editing**: If inside a group/frame, exit to parent level

4. **Deselect**: If objects are selected, deselect all

5. **Return to Select tool**: If using another tool with nothing selected, switch to Select

### 3.2  Escape Key (Second Press)

If Escape is pressed when already in the "cleanest" state (Select tool, nothing selected, not inside a group):

- No-op (do nothing)—user is already at home base

### 3.3  Escape Behavior by Context

| Context | Escape Behavior |
|---|---|
| Drawing a shape | Cancel drawing, return to Select tool |
| Moving objects | Cancel move, restore original positions |
| Resizing objects | Cancel resize, restore original size |
| Rotating objects | Cancel rotation, restore original angle |
| Editing text | Commit text, exit edit mode, keep selection |
| Inside a group | Exit group, select the group itself |
| Pen tool (drawing path) | Complete/cancel path, return to Select |
| Modal dialog open | Close dialog (Cancel action) |
| Dropdown/popup open | Close dropdown/popup |
| Context menu open | Close context menu |
| Objects selected | Deselect all objects |
| Nothing selected, other tool | Switch to Select tool |
| Select tool, nothing selected | No-op (already at home base) |

## 4  Tool Behavior Patterns

### 4.1  Tool Activation

- Single-key shortcuts (V, R, O, F, T, etc.) instantly activate tools

- No modifier keys required for primary tools

- Tool remains active until explicitly changed ("sticky" tools)

### 4.2  After Creating an Object

The canonical behavior after successfully creating an object:

1. The new object is automatically selected

2. The tool switches back to **Select tool**

3. User can immediately move, resize, or modify the new object

**Exception**: Some tools offer "rapid creation" mode where the tool stays active for creating multiple objects. This is typically:

- Opt-in via preference or modifier key

- Indicated by holding Shift or a toolbar toggle

### 4.3 Tool-Specific Shortcuts

| Key | Tool | Description |
|-----|------|-------------|
| V | Select | Default selection and move tool |
| F | Frame | Create frame/artboard container |
| R | Rectangle | Create rectangle shape |
| O | Ellipse | Create oval/circle shape |
| L | Line | Create line segment |
| T | Text | Create text layer |
| P | Pen | Create vector paths |
| H | Hand | Pan canvas (temporary: hold Space) |
| Z | Zoom | Zoom tool (rare; most apps use scroll) |
| I | Eyedropper | Sample color from canvas |
| K | Scale | Scale tool (proportional resize) |

## 5   Modifier Key Behaviors

Modifier keys provide consistent behavior across all tools:

### 5.1   Shift Key

| Context | Shift Behavior |
|---------|----------------|
| Drawing shapes | Constrain to square/circle (1:1 aspect ratio) |
| Drawing lines | Constrain to 45° increments |
| Moving objects | Constrain to horizontal/vertical axis |
| Resizing objects | Maintain aspect ratio |
| Rotating objects | Constrain to 15° or 45° increments |
| Selecting objects | Add to / toggle selection |

### 5.2   Alt/Option Key

| Context | Alt/Option Behavior |
|---------|---------------------|
| Drawing shapes | Draw from center (not corner) |
| Moving objects | Duplicate while moving (Alt+Drag) |
| Resizing objects | Resize from center |
| Clicking object | Deep select (select through groups) |

| Context | Alt/Option Behavior |
|---|---|
| With arrow keys | Duplicate in direction |

## 5.3  Cmd/Ctrl Key

| Context | Cmd/Ctrl Behavior |
|---|---|
| With any tool | Temporarily switch to Select tool |
| Clicking object | Deep select (alternative to Alt) |
| Dragging | Disable snapping temporarily |
| With shortcuts | Triggers menu commands (Cmd+C, etc.) |

## 5.4  Space Key

- **Hold Space**: Temporarily activate Hand tool for panning

- **Release Space**: Return to previous tool

- Works regardless of current tool (except text editing)

# 6  Selection Behaviors

## 6.1  Selection Methods

1. **Click**: Select single object (replaces selection)

2. **Shift+Click**: Toggle object in selection

3. **Cmd/Ctrl+A**: Select all objects on current page/artboard

4. **Marquee drag**: Select all objects intersecting rectangle

5. **Shift+Marquee**: Add intersecting objects to selection

## 6.2  Selection Hierarchy

When clicking on overlapping objects:

1. Topmost object in z-order is selected

2. Cmd/Ctrl+Click cycles through objects under cursor

3. Double-click enters groups/frames

## 6.3  Select All Behavior

**Cmd/Ctrl+A** selects:

- All objects on current page (if at page level)

- All objects in current frame (if inside a frame)

- All objects in current group (if inside a group)

- All text (if in text editing mode)

# 7 Canvas Navigation

## 7.1 Panning

| Input | Action |
| --- | --- |
| Space + Drag | Pan canvas |
| Middle mouse drag | Pan canvas |
| Two-finger drag (trackpad) | Pan canvas |
| H key | Activate Hand tool |
| Scroll wheel (no modifier) | Vertical scroll/pan |
| Shift + Scroll wheel | Horizontal scroll/pan |

## 7.2 Zooming

| Input | Action |
| --- | --- |
| Cmd/Ctrl + Scroll | Zoom in/out (centered on cursor) |
| Cmd/Ctrl + Plus (+) | Zoom in |
| Cmd/Ctrl + Minus (-) | Zoom out |
| Cmd/Ctrl + 0 | Zoom to 100% |
| Cmd/Ctrl + 1 | Zoom to fit selection/all |
| Cmd/Ctrl + 2 | Zoom to selection |
| Pinch gesture (trackpad) | Zoom in/out |
| Z + Click | Zoom in at click point |
| Z + Alt + Click | Zoom out at click point |

## 7.3 View Shortcuts

| Shortcut | Action |
| --- | --- |
| Cmd/Ctrl + \ | Toggle UI (distraction-free) |
| Cmd/Ctrl + ' | Toggle pixel grid |
| Cmd/Ctrl + ; | Toggle layout grid |
| Cmd/Ctrl + Shift + 4 | Toggle guides |

# 8 Object Manipulation

## 8.1 Moving Objects

| Input | Action |
| --- | --- |
| Drag | Move object(s) |
| Arrow keys | Nudge 1px |
| Shift + Arrow keys | Nudge 10px |
| Alt + Drag | Duplicate while moving |
| Shift + Drag | Constrain to axis |

## 8.2   Resizing Objects

| Input | Action |
|---|---|
| Drag corner handle | Resize freely |
| Shift + Drag corner | Maintain aspect ratio |
| Alt + Drag corner | Resize from center |
| Shift + Alt + Drag | Both constraints |
| Drag edge handle | Resize single dimension |

## 8.3   Rotating Objects

- Hover outside corner handles to see rotation cursor

- Drag to rotate freely

- Shift + Drag to constrain to 15° increments

- Rotation pivot defaults to object center

## 8.4   Z-Order (Layering)

| Shortcut | Action |
|---|---|
| Cmd/Ctrl + ] | Bring forward (one level) |
| Cmd/Ctrl + [ | Send backward (one level) |
| Cmd/Ctrl + Shift + ] | Bring to front |
| Cmd/Ctrl + Shift + [ | Send to back |

# 9   Grouping and Hierarchy

## 9.1   Groups

| Shortcut | Action |
|---|---|
| Cmd/Ctrl + G | Group selection |
| Cmd/Ctrl + Shift + G | Ungroup |
| Double-click group | Enter group (edit children) |
| Escape (inside group) | Exit group |

## 9.2   Frames vs Groups

- **Groups**: Logical grouping, no visual bounds, children can extend outside

- **Frames**: Container with bounds, can clip children, supports auto-layout

## 9.3   Component System

| Shortcut | Action |
|---|---|
| Cmd/Ctrl + Alt + K | Create component from selection |
| Cmd/Ctrl + Shift + B | Detach instance from component |

# 10   Clipboard Operations

| Shortcut | Action |
|---|---|
| Cmd/Ctrl + C | Copy |
| Cmd/Ctrl + X | Cut |
| Cmd/Ctrl + V | Paste (at original position) |
| Cmd/Ctrl + Shift + V | Paste at cursor / paste in place |
| Cmd/Ctrl + D | Duplicate (paste with offset) |
| Delete / Backspace | Delete selection |

## 10.1   Paste Behavior

- **Paste (Cmd+V)**: Paste at center of viewport, or original position if same frame

- **Paste in Place**: Paste at exact same coordinates

- **Paste into**: Paste as child of selected frame/group

# 11   History and Undo

| Shortcut | Action |
|---|---|
| Cmd/Ctrl + Z | Undo |
| Cmd/Ctrl + Shift + Z | Redo |
| Cmd/Ctrl + Y | Redo (alternative) |

## 11.1   Undo Granularity

Each of these should be a single undo step:

- Creating an object

- Deleting object(s)

- Moving object(s) (entire drag operation)

- Resizing object(s)

- Changing a property (color, stroke, etc.)

- Grouping/ungrouping

- Text editing session (commit on blur/Escape)

## 12 Text Editing

### 12.1 Entering Text Edit Mode

- Double-click on text layer

- Press Enter/Return with text layer selected

- Start typing with text layer selected

### 12.2 Exiting Text Edit Mode

- Press Escape (commits changes)

- Click outside the text box

- Press Cmd/Ctrl + Enter

### 12.3 Text Selection

- Double-click word → Select word

- Triple-click → Select paragraph/all

- Shift + Arrow → Extend selection

- Cmd/Ctrl + A → Select all text (in edit mode)

## 13 Snapping and Alignment

### 13.1 Smart Guides

When moving objects, guides appear showing:

- Alignment to other object edges/centers

- Equal spacing between objects

- Distance measurements

### 13.2 Disabling Snapping

- Hold Cmd/Ctrl while dragging to disable snapping temporarily

- Toggle snapping in View menu or preferences

### 13.3 Alignment Shortcuts

With multiple objects selected:

| Shortcut | Action |
| --- | --- |
| Alt + A | Align left |
| Alt + D | Align right |
| Alt + W | Align top |
| Alt + S | Align bottom |
| Alt + H | Align horizontal center |

| Shortcut | Action |
| --- | --- |
| Alt + V | Align vertical center |

## 14   Boolean Operations

With two or more shapes selected:

| Operation | Result |
| --- | --- |
| Union | Combine all shapes into one |
| Subtract | Remove top shape from bottom |
| Intersect | Keep only overlapping area |
| Exclude | Keep only non-overlapping areas |
| Flatten | Destructively merge paths |

## 15   Summary: The Golden Rules

1. **V is home**: The Select tool is always one keypress away

2. **Escape is safety**: Press Escape to cancel, deselect, or return home

3. **Shift constrains**: Squares, straight lines, aspect ratios

4. **Alt modifies**: Draw from center, duplicate, deep select

5. **Space pans**: Hold Space to temporarily pan with any tool

6. **Double-click enters**: Enter groups, text edit, component edit

7. **Cmd+Z forgives**: Everything is undoable

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*This specification should be implemented in DesignLibre to ensure users familiar with industry-standard design tools feel immediately at home.*