

TLEdit—NXSYS Track Layout Editor

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This is the documentation for TLEdit, the NXSYS track layout editor. It is used to create and edit layouts as seen on the interlocking panel. It does not create or edit logic in any way. You have to make the interlocking work by designing the relay logic, a very nontrivial task whose support is the entire reason for the existence of NXSYS. See the accompanying document on interlocking logic design for an introduction to it.

Layouts consist of straight line **track segments** which connect **joints**, which latter appear in TLEdit as red or yellow dots (but do not appear at all in NXSYS). Tracks can only bend or join at joints. A joint can sport one, two, or three segments (“branches”) emanating from it — one is the end of a track, two is an insulated joint, or a (non-insulated) “kink” in a track, and three is a switch. **Insulated joints (IJs)** appear as yellow dots; kinks appear as red dots where two segments join, either at an angle or not.

By (left) click-and-drag, you can create segments between any two points or extant joints (making them into switches, or extending a track end), or to or from arbitrary points on extant segments, turning that point into a switch. You cannot draw a segment to or from a switch (joint already having three branches) or an insulated joint which is not the end of a track. When segments are created, they have no track circuit assigned (i.e., the segment is “unassigned”). See the section below on track circuit assignment.

Joints of one or two branches can be insulated or de-insulated from their **Properties** dialog, the **Insulate** tool of the toolbar, or the keystroke **Ctrl-I** (Mac **⌘I**). You cannot insulate a switch. You cannot de-insulate a joint which hosts a signal or an exit light, or separates differing, assigned track circuits. Saving the layout insulates all track-ends (this may change).

TLEdit three-line summary!

- **MOUSE LEFT** (click and drag) **creates new trackage**, including switches.
- **MOUSE RIGHT** (click and drag) **creates, moves, and aligns joints** on Windows,
- **but CONTROL-MOUSE** instead of **mouse right** on the Mac.

Toolbar

The TLEdit toolbar is central to all operations other than creating track. While the Mac button images are large and clear, the Windows ones are ... less so. Here is the Windows toolbar, with the labelling of each tool. Their meanings are explained below. They do have tooltips.



- | | |
|---|--|
| 1. Exit (back of a train) | 10. Place Signal, northward or eastward |
| 2. Open (an extant layout file) | 11. Place Signal, southward or westward |
| 3. Save | 12. Create Exit Light at signal |
| 4. Show Joints (nonselected ones, that is) | 13. Create Auxiliary Switch key |
| 5. Show Exit Lights | 14. Create Traffic Lever knob |
| 6. Cut | 15. Create General Panel Light |
| 7. Properties dialog | 16. Create General Panel Switch |
| 8. Insulate or de-insulate joint (toggle) | 17. Create text string |
| 9. Flip switch or IJ number side | 18. Help |

Creating and editing track

Click and drag mouse left (Windows, or Mac trackpad, single finger) to create a new track segment. Click left on either an extant joint which is not already “full” (i.e., has fewer than 3 branches), some other point on an extant segment, or elsewhere (i.e., “empty space”), and drag the mouse, left button held. You will be dragging the end of a “rubber band” from where you started. Drop the mouse on either an extant joint which is **not full**, some other point on an extant segment, or in empty space—a new segment will be created. An insulated joint with two branches (as normal) is considered “full”. To cancel, i.e., change your mind and create no new segment, drop the mouse end of the rubber band back on its stationary end. Slopes of less than 4% from the vertical or horizontal are assumed to be vertical or horizontal, and “snapped” into place.

To **move an extant joint**, click and drag it with mouse right (on Windows; control-mouse on the Mac). Clicking and dragging mouse right in the middle of an extant segment creates a joint and moves it — you can insert a “kink” this way. If you drag a joint to another joint, and there are no more than three branches among the two of them, the joints will merge into one. The rubber band lines will “click” onto a detente (and show as red) if TLEdit thinks it knows what you are trying to do. You cannot merge insulated joints.

Placing a new joint in the middle of an extant segment via either tool splits the segment in two at that point. For mouse left, the new joint will not come into existence until you actually drag the mouse. For mouse right, a new joint will come into existence immediately. If a segment with a track circuit is split, the new segments share that track circuit. Change one or the other or both only after insulating.

Any object (joint, segment, signal, exit light, or switch key) may be selected, which turns it

green, by clicking left on it. A newly-created object, or a joint just moved, is automatically selected. Pressing the **Edit Properties** tool (or typing **Ctrl+P**, both Windows and Mac) when an object is selected brings up its **Properties dialog**, which is different for each type of object, allowing detailed control of its properties. On the Mac, “secondary gesture” (right-click replacement) on any object calls up its properties dialog, too.

Cut (use the **Cut** tool or **Ctrl-X** or **Backspace**, **⌘X** or **delete** on the Mac) to delete a selected object. Loose ends of a deleted segment will vanish with it. **Cut** of a selected joint of two branches will remove the joint and collapse the two segments into one, joining the endpoints of the previous two. **You must delete all signals and exit lights at an insulated joint before the joint can be deleted. There is presently no undo or paste** (very difficult engineering challenge in the present architecture).

A joint of two branches can be made insulated by selecting it and clicking the **Insulate** tool (insulated joints appear as yellow dots.) Creating a signal at an uninsulated joint of two branches it insulates the joint automatically. Insulation can be removed with the joint's **Properties** dialog.

(3/2022) There are various joint creation and deletion scenarios which, if not caught by TLEdit, would produce invalid layouts that cannot be saved, or worse, loaded or programmed. Typical of these is attempting to create a segment between a joint and a point on a (or the) track segment already emanating from it, or deleting one of the joints of a three-joint “segment triangle”. Of course, real-life tracks do not bend at acute angles (although converging routes at a switch do), but TLEdit does not prevent you from experimenting with such. However, it is (or was) all too easy to do this by accident when editing trackage in a small space, and nearly impossible to diagnose or remedy the resultant chaos. TLEdit will now diagnose and disallow dropping nodes being created or dragged in known cases of such conditions. If you can create unloadable/uneditable trackage, please let me know.

As TLEdit now makes it virtually impossible to overlay joints on top of each other (when they cannot be merged), the one case where this overlay is necessary, to wit, the center of a double-crossover, where the two insulated joints of both crossovers coincide, requires unusual means. Adjust the exact location of both joints with their **Properties Dialogs**. It will likely be difficult or impossible to click on the “lower” one—move the “upper” one reasonably far away (with either the mouse or the dialog), set the location of the lower one, and then the upper one (both with the dialog).

Scroll down or to the right to extend layout those ways. To extend up or to the left, use **View|Shift Layout** (**Alt+S** on Windows, no accelerator on Mac). This takes much time to run. To set the default view origin that comes up in NXSYS, scroll until you are looking at it, and use **View|Set Viewport here**.

The problem of how to establish an empty space of known dimensions, or “large enough” on the Mac is non-obvious, and discussed in the [Mac-specific TLEdit help file](#).

Creating and Editing Other Objects

To create a signal: Select any joint of 1 or 2 branches (i.e., not a switch), or make one with mouse right. Choose the one of the two **Create signal** with the closer of the two orientations (If you guess wrong, cut it and try again). Signals move around as you move the joint. Click right on a signal calls up its **Properties dialog**, which allows editing or assignment of lever numbers, lenses, absence of stop, etc. **Station Number** is the decimal number that will be used to identify relays associated with the signal and from which the signal ID plate will be computed. IRT and BMT/IND conventions for choosing this differ. Select and **Cut** to delete a signal.

To create an (entrance)/exit light: Exit lights can be created by selecting a signal and clicking the **Create or Select Exit Light** tool to create an exit light for exiting at that signal. Normally, exit lights, other than a selected one, including one just created, are hidden. To show all exit lights, toggle the **Show/Don't Show Exit Lights** tool; they can only be clicked for cutting or properties (lever number) editing when lit. To create a same-direction exit (when there is no signal in the entrance direction), create such a signal, create its exit light, and delete the signal. Exit lights, when created, inherit the lever number, if any, of their signals.

Insulated joint station numbers and switch numbers can be assigned via the joint's **Properties dialog**. All insulated joints and switch joints are automatically assigned unique numbers (to facilitate reload) over 10000, which do not display on the panel. Set them as you want via the dialog. You can “flip” IJ station numbers and switch numbers between sides of the track (to address visual collisions) with the **Flip Numbers** tool.

Auxiliary switch keys, generic panel switches, and lamps are created by pressing the tools that resembles them: move the mouse to the final position, and click left to drop it there. *Do not attempt to drag* from the toolbar. Type any character or click right to abort. To edit a key's switch number or board position, click right on it or use the **Properties dialog** tool. To move one, select it first, release the mouse button, and then click and drag left to a new position. Select it and **Cut** to destroy it later.

Traffic levers and generic panel switches and lamps are created with the three tools that resemble them. Creation and property editing is identical to that for auxiliary switch keys (above). Traffic lever graphics may overlay tracks; although they will (currently) appear “behind” trackage in TLEdit, they will show in front in NXSYS. Use arbitrary text to label to taste beyond the lever number. “Normal” direction (left or right — affects relay nomenclature and initial state) is set from the **Properties Dialog**.

Arbitrary text strings of any size or font are created by pressing the tool labelled “abc”: move the mouse to the final position, click left to drop. Dragging/moving, selection, destruction, and editing is the same as for auxiliary switch keys. Click right or use the properties tool to set text content, font, size. etc. Don't use private fonts not likely to be on someone else's machine.

Assigning Track Circuit Identifiers

Track segments assemble into track **track circuits**; NXSYS generates and manages T relays and “line-o-lite”s on a per-circuit basis. Select and **Property Edit** a track segment to assign a numeric track circuit relay ID. All track segments reachable from the one being edited without passing an insulated joint will have their Circuit IDs changed as well. You can assign the default ID (0), which means “not yet assigned” (the initial state of all). As IRL (in real life, or “Interborough Rapid Life”, if you prefer). Track circuits thus spread by “wildfire”. If you make a mistake with this, many unintended segments may acquire the wrong circuit: simply type the **Undo** keystroke to revert to the previous state.

Track segments with circuits assigned light with white "line-o-lites" in TLEdit. The algorithm for managing the lighting of segments dependent on switch position, within one circuit, is a complex heuristic built into NXSYS (which occasionally fails). Individual segments are not “programmable” as they are in real life.

Switch Orientation (which route is “normal”?)

TLEdit by default assigns the three branches emanating from a switch joint the designations **stem**, **normal**, and **reverse**, based upon the angles between them. In some cases, notably for slip switches, this default is not correct. The two buttons **highlight normal** and **swap normal** on the switch’s **Properties dialog** can be used to see which branch is “normal” (selecting it) and swap the definitions of normal and reverse (highlighting the new **normal**, as it were) to facilitate manual adjustment.

Switch Consistency (A and B switches vs. singletons)

Any switch is either a “singleton” or half of an A-B pair, i.e., a crossover. You choose which from the switch’s **Properties** dialog. 15A and 15B are different switches but operated and interlocked by the same logic. Normally, A and B are two ends of a crossover; NYCT practice at double-crossovers is to group the As and Bs together on one track, although NXSYS does not require or force this. TLEdit will not let you save, and NXSYS will refuse to load, a layout in which an A or B switch exists without its other half.

Use **Ctrl-W** (or **New**) to “wipe” the drawing clear, on Windows, but **⌘N** (**New**) on the Mac.

Use the **Show joints** tool (an on/off button) to see what the panel will look like on NXSYS (i.e., no red dots).

You can save and restore your creations. The app will accept a file name as a command argument.

You can (`include "foo.trk"`) in an NXSYS `.trk` file. The outer file should contain, or co-include, all the relay definitions and the TLEdit-generated file, which latter **should not be hand-edited**; there is no provision for layouts made unloadable or uneditable by corruption

introduced by hand-editing. (There is no need to understand the layout/path graph-representation language.)