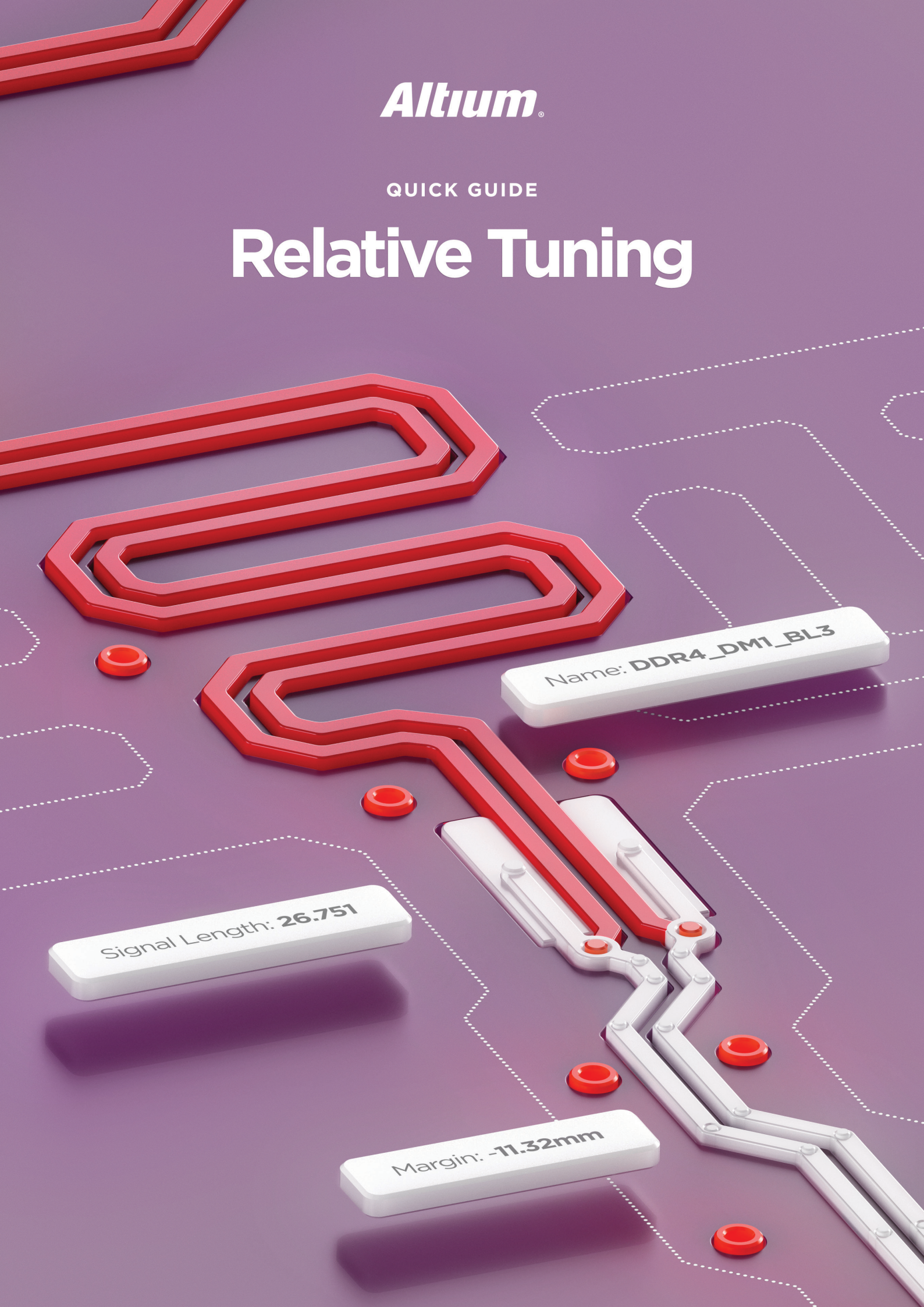
Altium

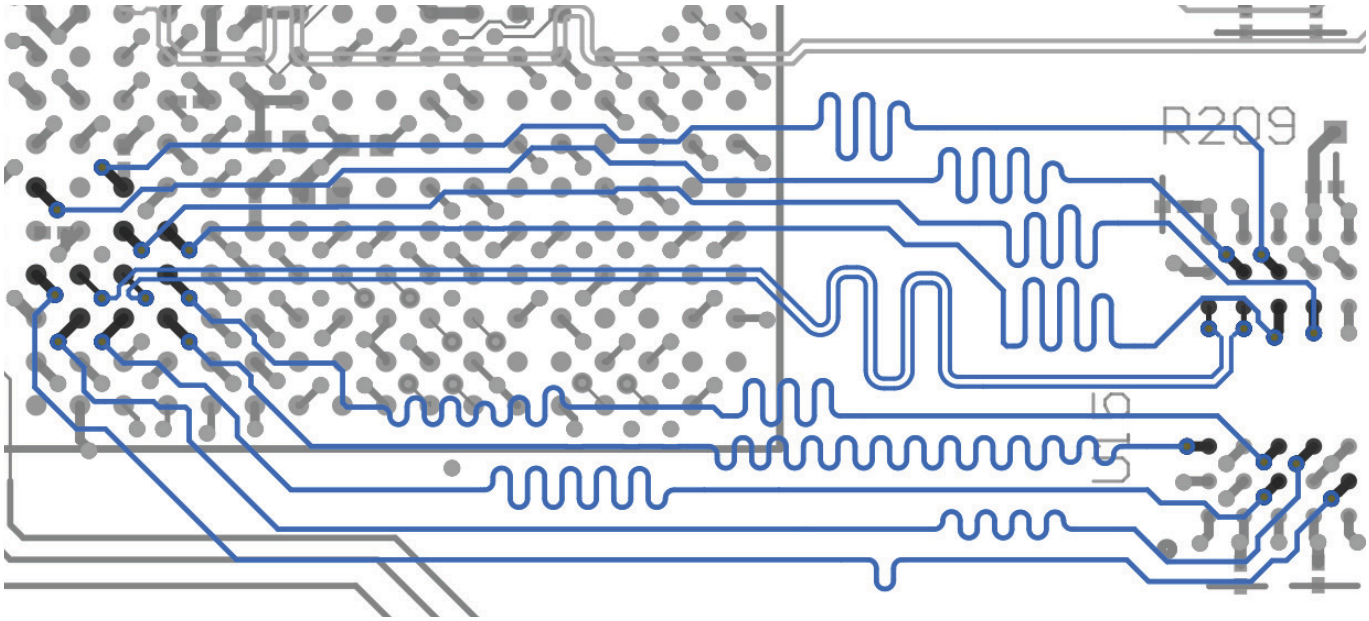
QUICK GUIDE

Relative Tuning



Why do we need relative tuning?

Most high-speed interfaces contain parallel buses that operate at high frequencies. For their proper operation, it is necessary to match lengths of the group of signals with some accuracy. Often this length matching must be associated with some timing signal. For example, DDR3/4 memory interface: each eight bits of data has an associated data strobe. Because the data is captured off the strobe, the data bits associated with the strobe must be length-matched closely to their strobe bit.

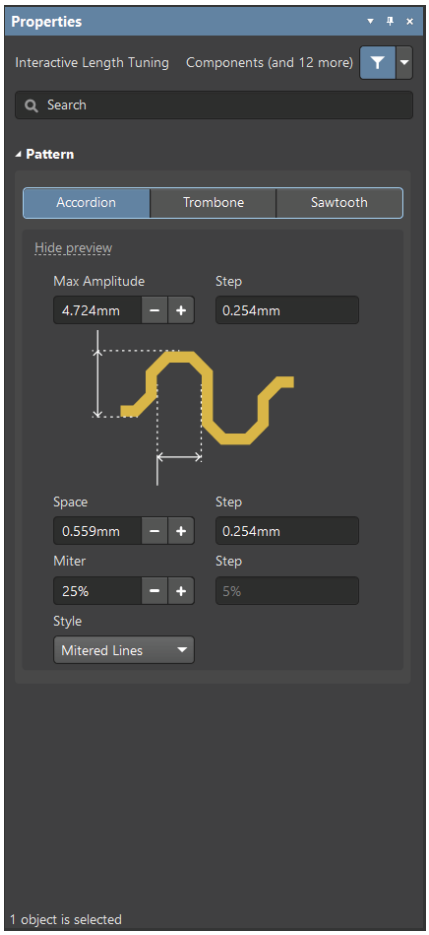


Length tuning tools

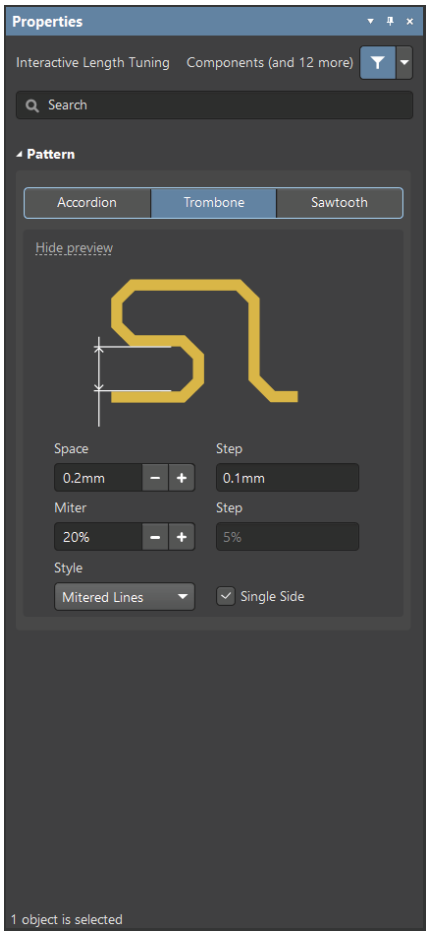
Altium Designer has two tools for tuning:

Interactive Length Tuning – for single tracks;

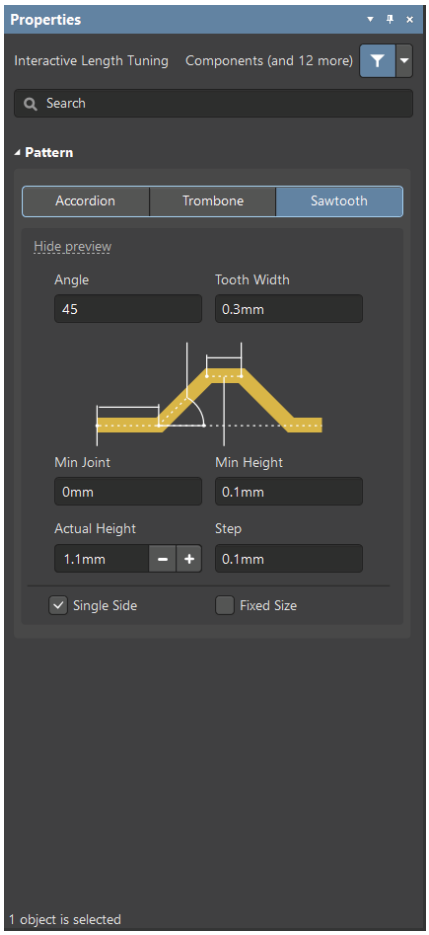
Interactive Diff Pair Length Tuning – for differential pairs.



Accordion



Trombone



Sawtooth

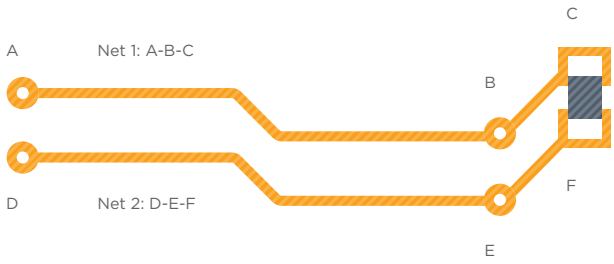
There are 3 patterns available for length tuning: Accordion, Trombone, and Sawtooth.

Xsignals for length tuning

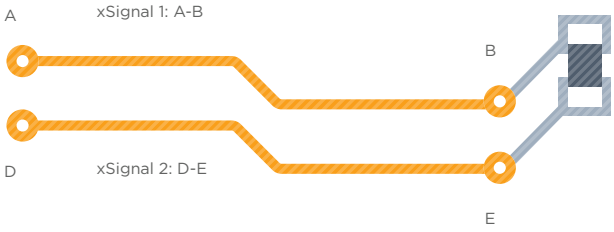
Before you start length tuning, you must create special net classes. After that, they can be used in the length tuning rules.

Both net classes and xSignals classes can be used for length tuning. But if we want to apply Relative tuning, only the xSignals classes must be used. You can create them manually or use a special wizard.

NETS

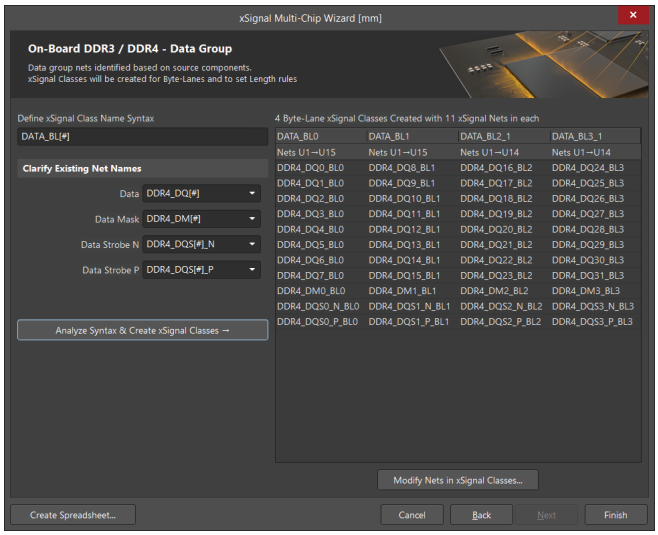


XSIGNALS



XSIGNALS MULTI-CHIP WIZARD

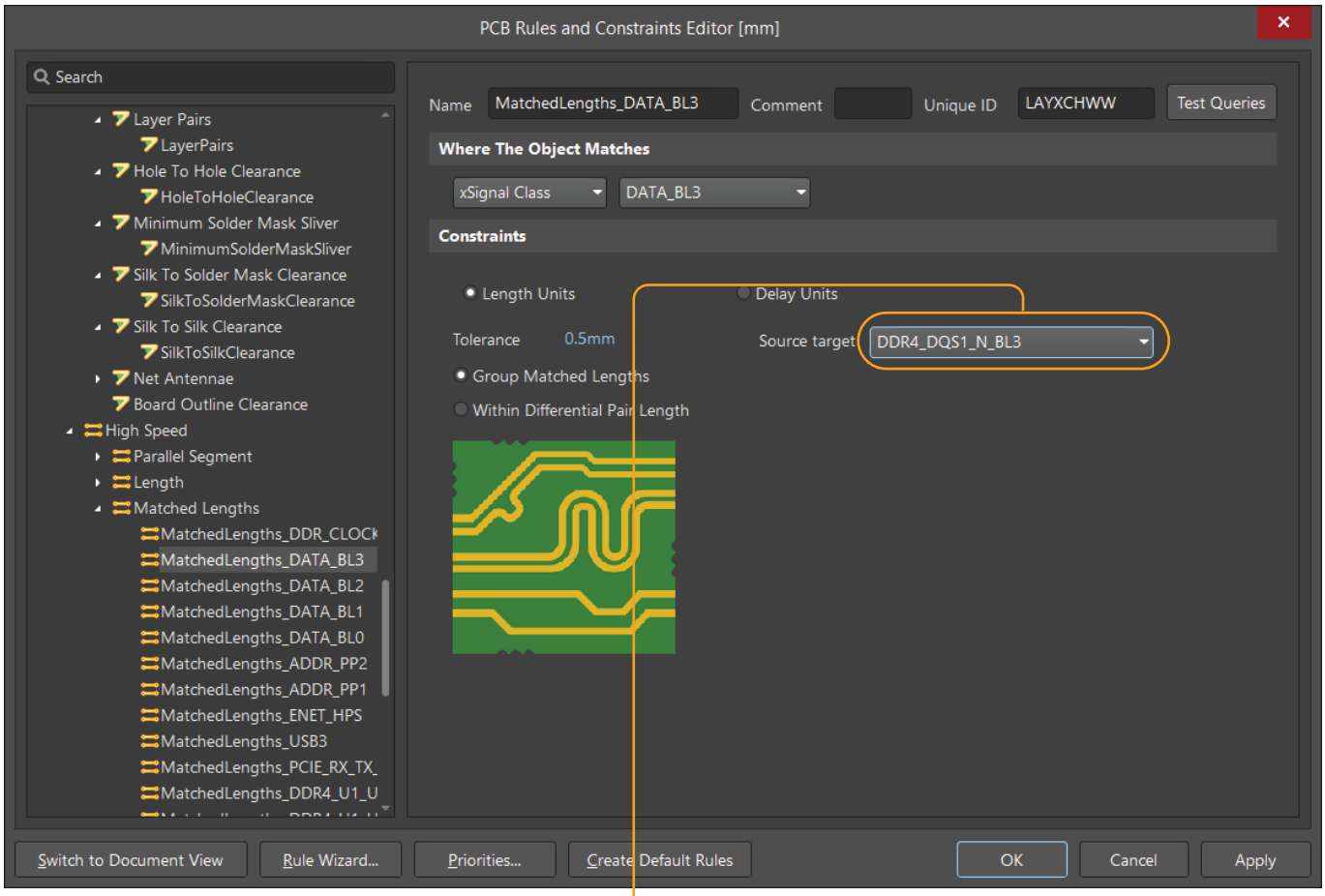
The Wizard can be used to automatically create xSignals, xSignal classes, and Matched Length rules for a number of different common interface and memory circuits.



Design > xSignals > Run xSignals Wizard

Length tuning rules

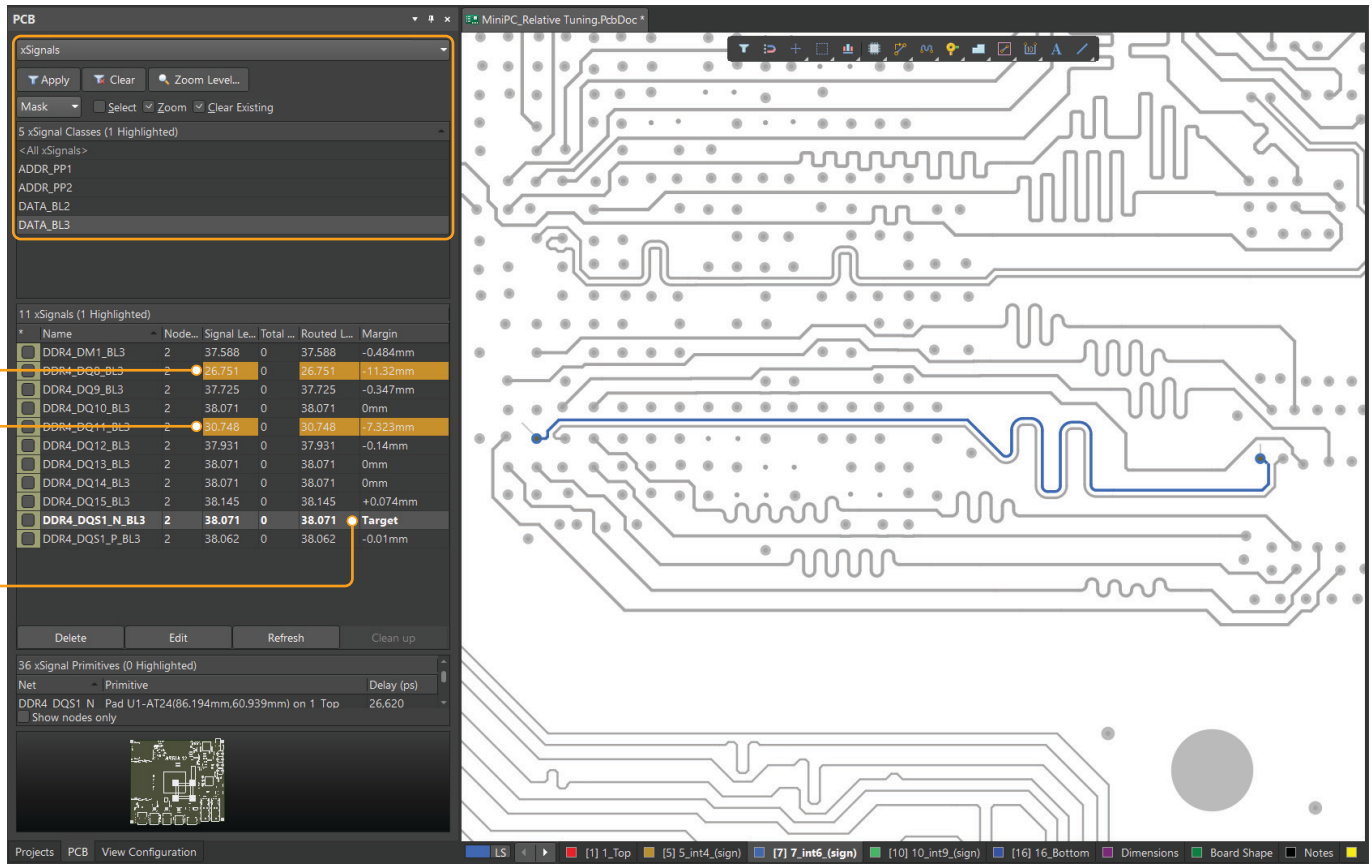
If you use the xSignals Multi-Chip Wizard, Matched Lengths rules will be created in addition to xSignals and xSignals classes.



In the Matched Lengths rules, there is a choice of source target to align track lengths of this group for a selected xSignals class.

Using the length tuning

After setting up the Matched Lengths rules, it is convenient to use the PCB panel to view the range of net lengths in the selected xSignals class.

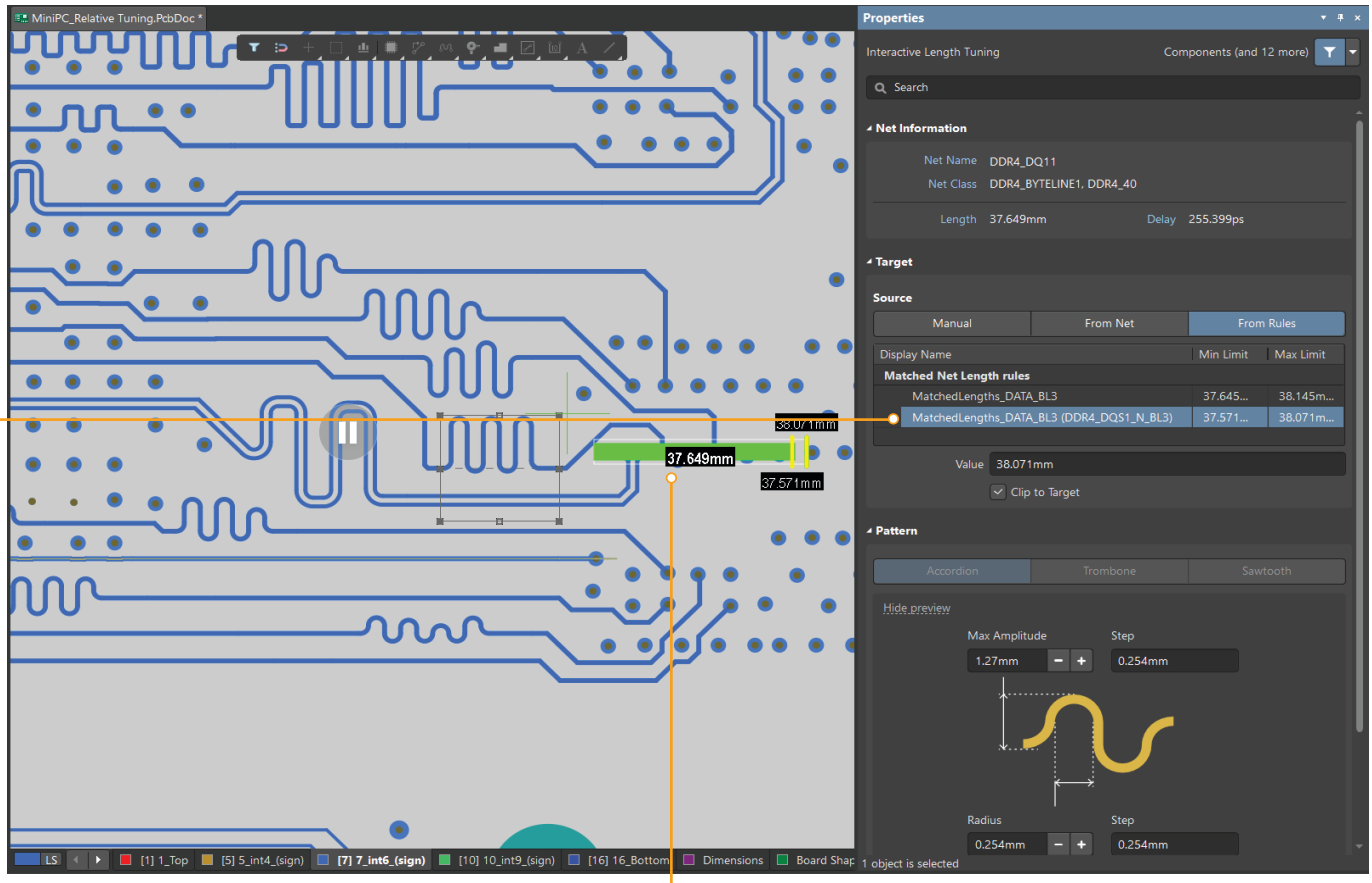


The Margin column shows the target signal, as well as the deviation of the other signals lengths.

Signals marked in color require length tuning.

Using the length tuning

Launch the **Interactive Length Tuning** tool and click on a track you want to extend.



Press **TAB** at the moment the tool is active and select the tuning rule relative to the target circuit in the **Properties** panel.

When the target length is reached, the length indicator will change color to green.