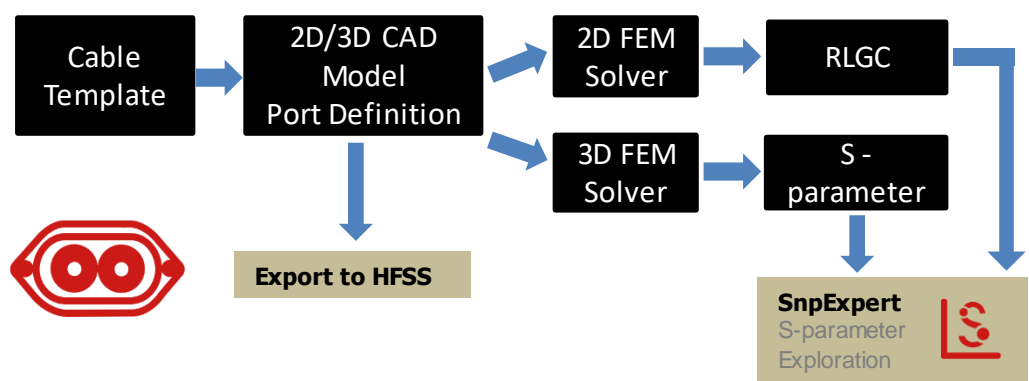# XPEEDIC
ACCELERATE YOUR IC DESIGN

CableExpert

Fast and Accurate Cable Modeling and Simulation

Highlights

1 Cable is commonly seen in high-speed systems. Accurate modeling and simulation is necessary for signal integrity purpose. It is a challenge to build accurate model and simulate it in an efficient way.

2 CableExpert offers a quick way to build 3D model with its built-in templates
- Various drain types including center drain and dual drain
- Various twine shielding including longitudinal and wrapping
- Auto port generation to simplify EM setup
- Parametric sweep for easy what-if analysis

3 The tool offers both 2D and 3D simulation for different application usage. 2D FEM solver to generate RLGC model. 3D FEM solver to generate S-parameter model. Both of them adopt distributed processing and multi-core parallelization which adds another level of speedup.

4 The tool has a built-in algorithm treating a long cable as simulating it as a whole is impossible

5 The tool offers users a quick way to export to HFSS for benchmark purpose.
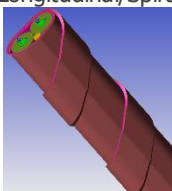
6 Python script automation

Cable modeling & simulation flow with CableExpert

```
Cable          2D/3D CAD        2D FEM
Template  -->   Model      -->  Solver   -->  RLGC
               Port Definition
                            -->  3D FEM   -->  S -
                                 Solver        parameter
```

Export to HFSS

SnpExpert
S-parameter
Exploration

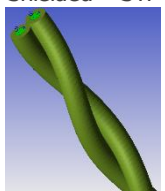### Built-in Templates to Create Complex Cables

Twinax with different drain/wrapping types
- Center/dual drain
- Longitudinal/Spiral wrapping

Twisted pair
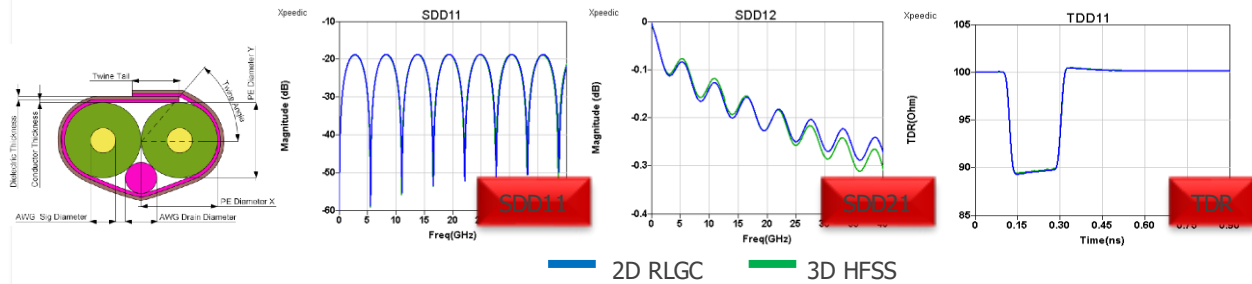- Unshielded - UTP
- Shielded - STP

Parametric Support

- CableExpert supports parametric sweep for twine style with different twine gap locations for longitudinal or wrapping angles for wrapping style. The tool makes it easy for users to optimize cables' performance.
- For a spiral wrapped twinaxial cable, the resonant frequency increases with the wrapping angle and more ripples in TDR appear.

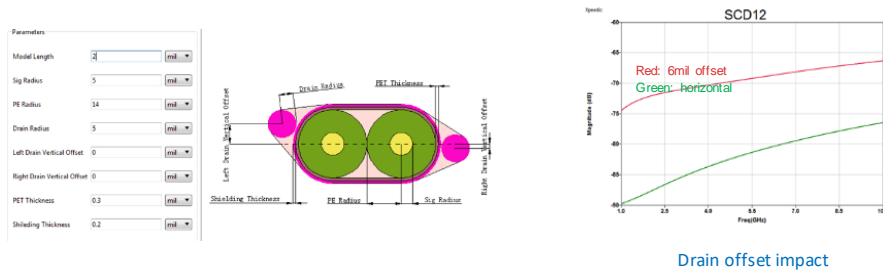Insertion Loss

Plot3

30deg
35deg
40deg

Twinax with Center Drain & Longitudinal Twine Shielding

Twinax with center drain and longitudinal shielding can be simulated using either 2D or 3D solver
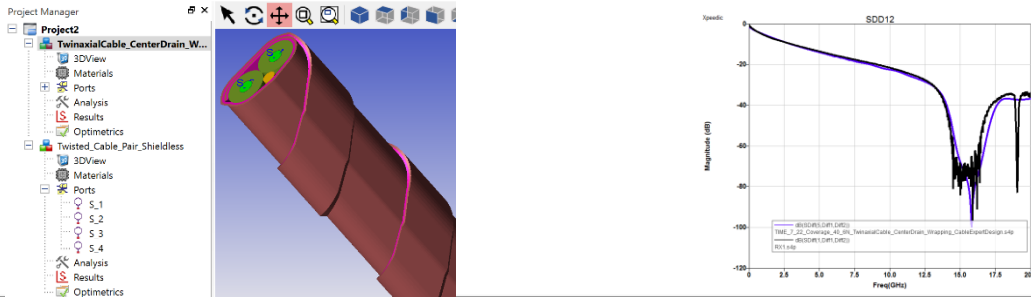

2D RLGC — **3D HFSS**

Twinax with Dual Drain & Longitudinal Twine Shielding

Twinax with dual drain and longitudinal twine shielding is used for high frequency (up to 25G) application. It is difficult to make drains and signals in the same horizon that determined the SCD performance. CableExpert provides a flexible way to adjust the offset of each drains.

Red: 6mil offset
Green: horizontal

Drain offset impact

Twinax with Center Drain & Spiral Wrap &Benchmark

Twinax with center drain and spiral wrap is popular but its 3D model is difficult to create. CableExpert has a template to do it. Plus, simulation agrees excellently with measurement.

Unshielded Twisted Pair & Benchmark

Unshielded twisted pair (UTP) is frequently used in high-speed applications. Because of the twisted structure, it is difficult to create its 3D model. CableExpert makes the creation easy and also provides export to other 3D simulators

Simulated by Xpeedic

Simulated by Qualcomm
Measured by Qualcomm

XPEEDIC
ACCELERATE YOUR IC DESIGN

Xpeedic Technology is a leading provider of EDA software, IP, and design service which enables semiconductor and system companies to shorten design cycle, reduce time-to-market and deliver better products. For more information, please visit
www.xpeedic.com