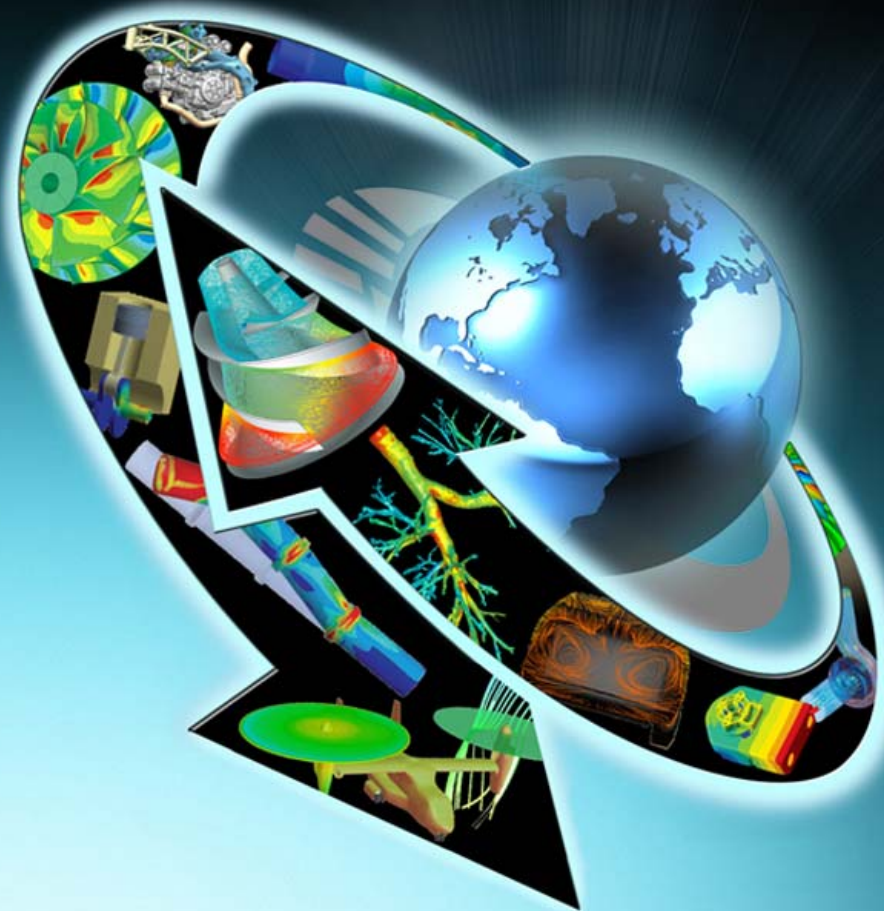




HFSS Application Modeling Connectors in HFSS

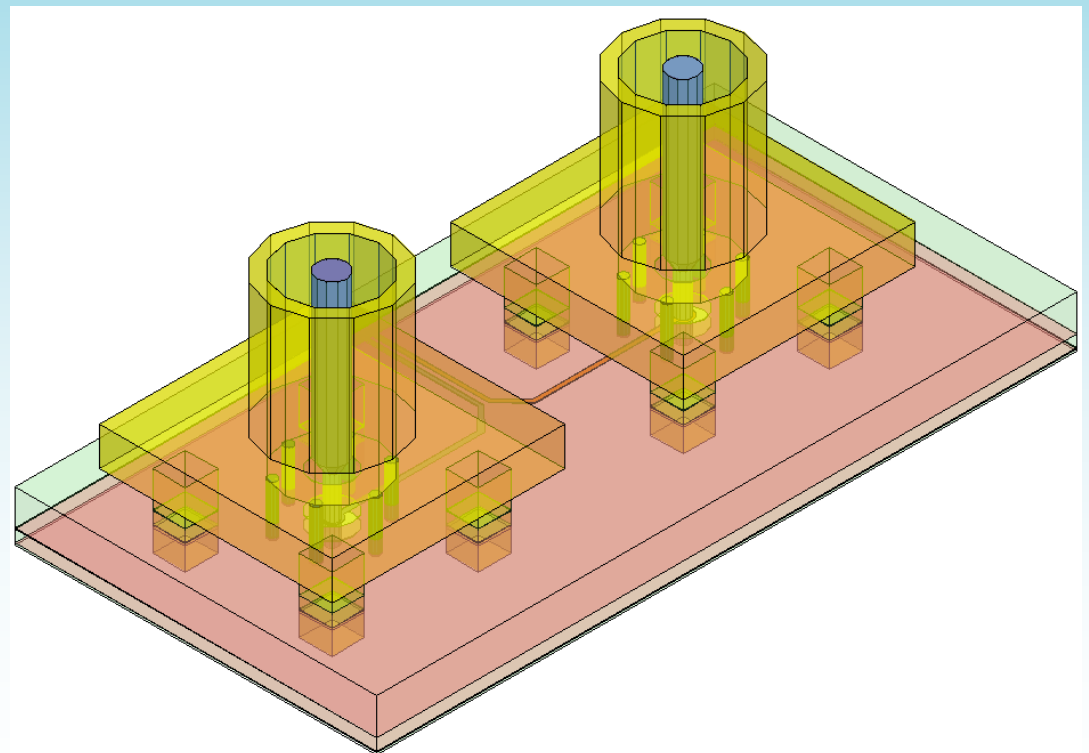


- **Connector Modeling in HFSS**
 - Draw your own
 - SMA
 - Portion of a multi-pin connector
 - Import
 - RJ45

SMA Connector

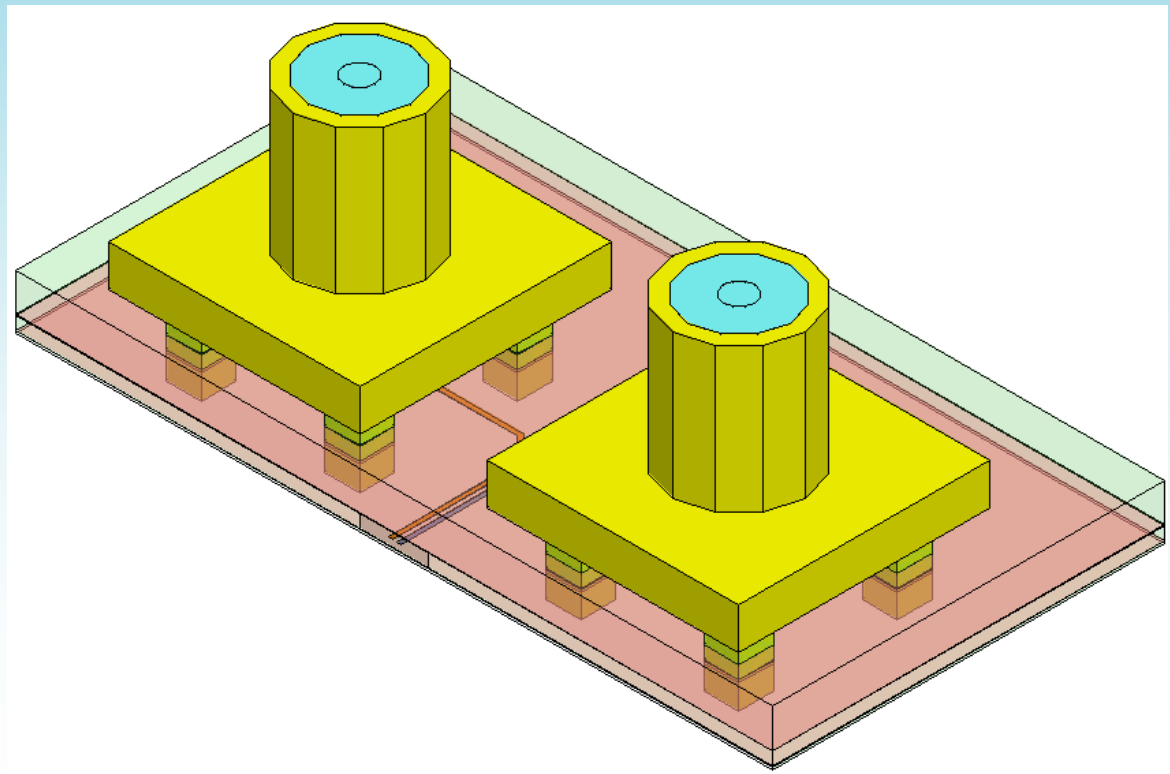


- Commonly used in measurements
- Relatively easy to draw
- Can be reused



- **Fixed Parameters**

- Board manufacturing technology
- Connector geometry
- Board stack-up
 - Signal Layers
- Materials

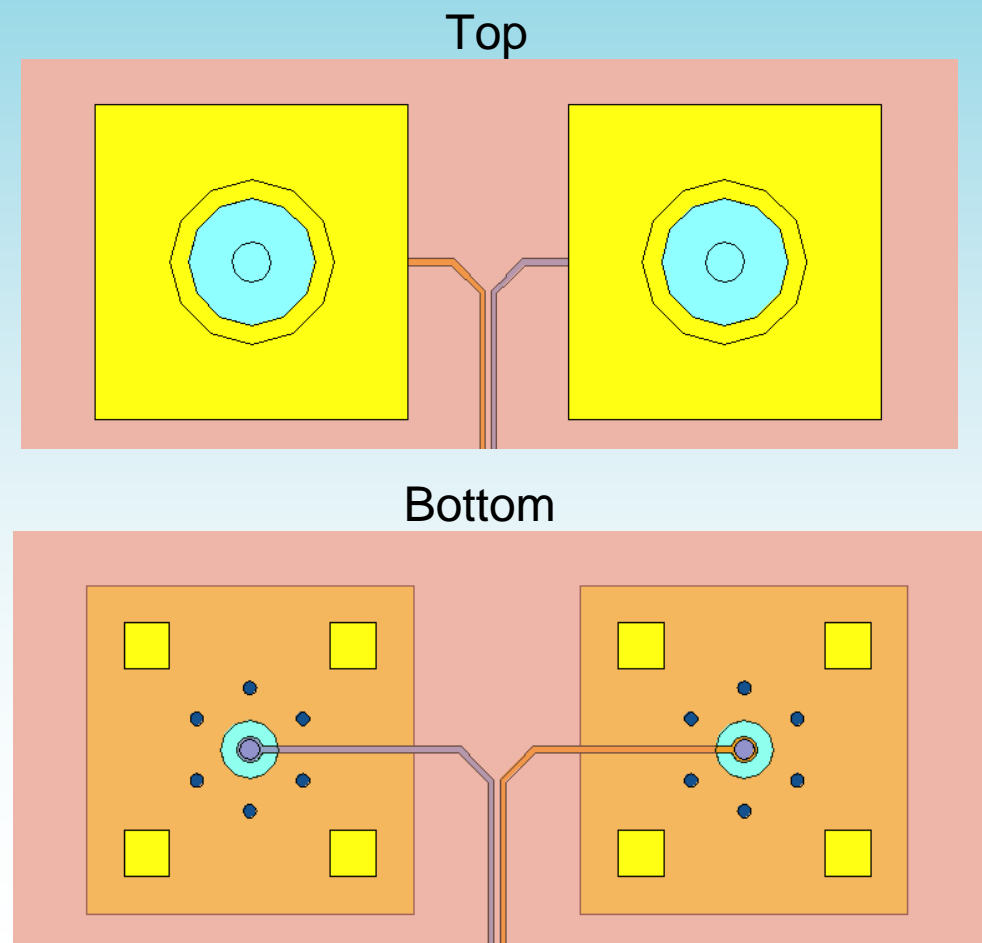


SMA Connector



- **Variable Parameters**

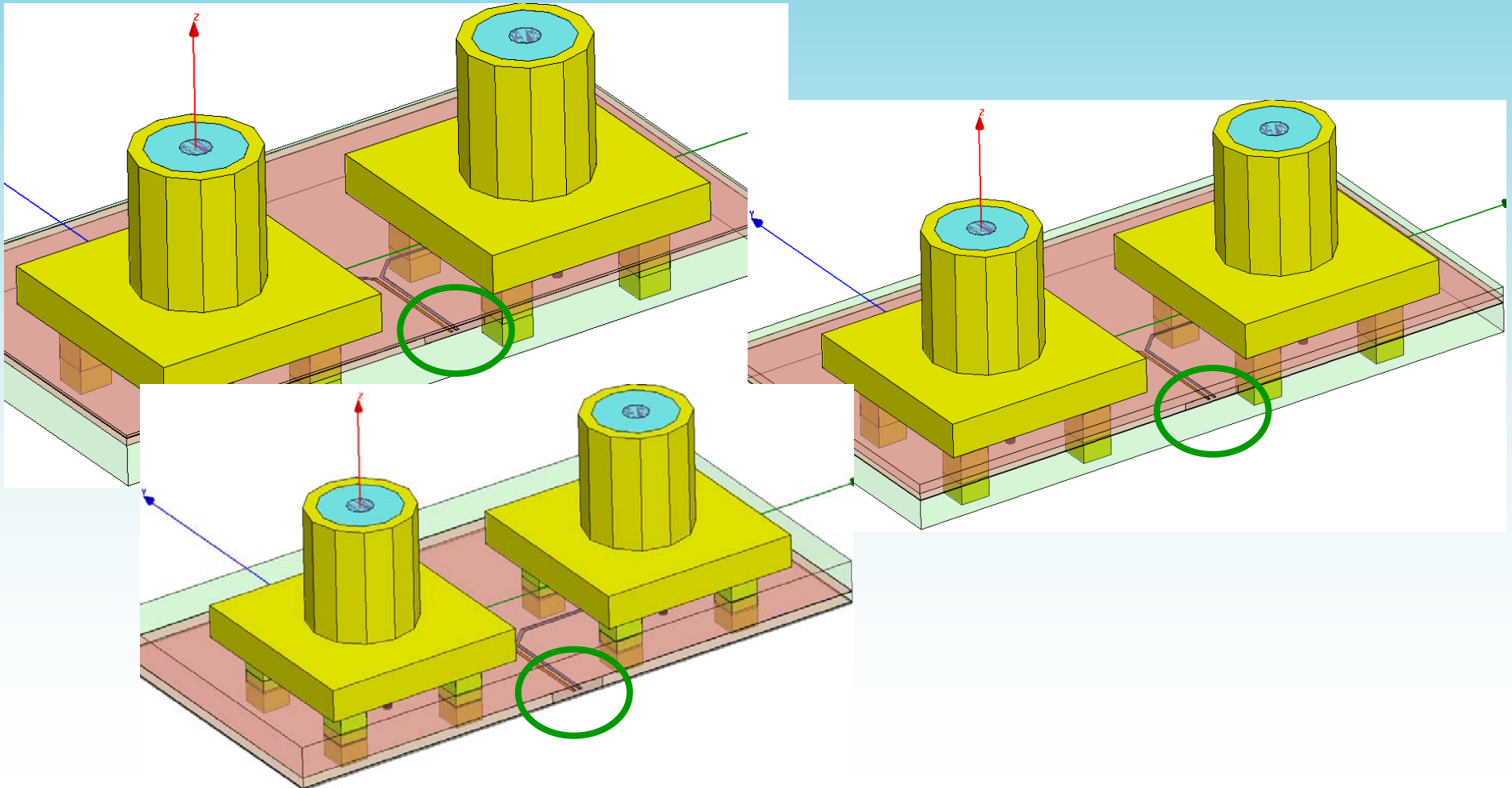
- Distance from ground via to signal via
- Radius of ground via
- Radius of antipads
- Radius of signal pad
- Layer Routing
- Trace Spacing
- Trace Thickness



SMA Connector



- **Parametric Example**
 - Z_route Variable

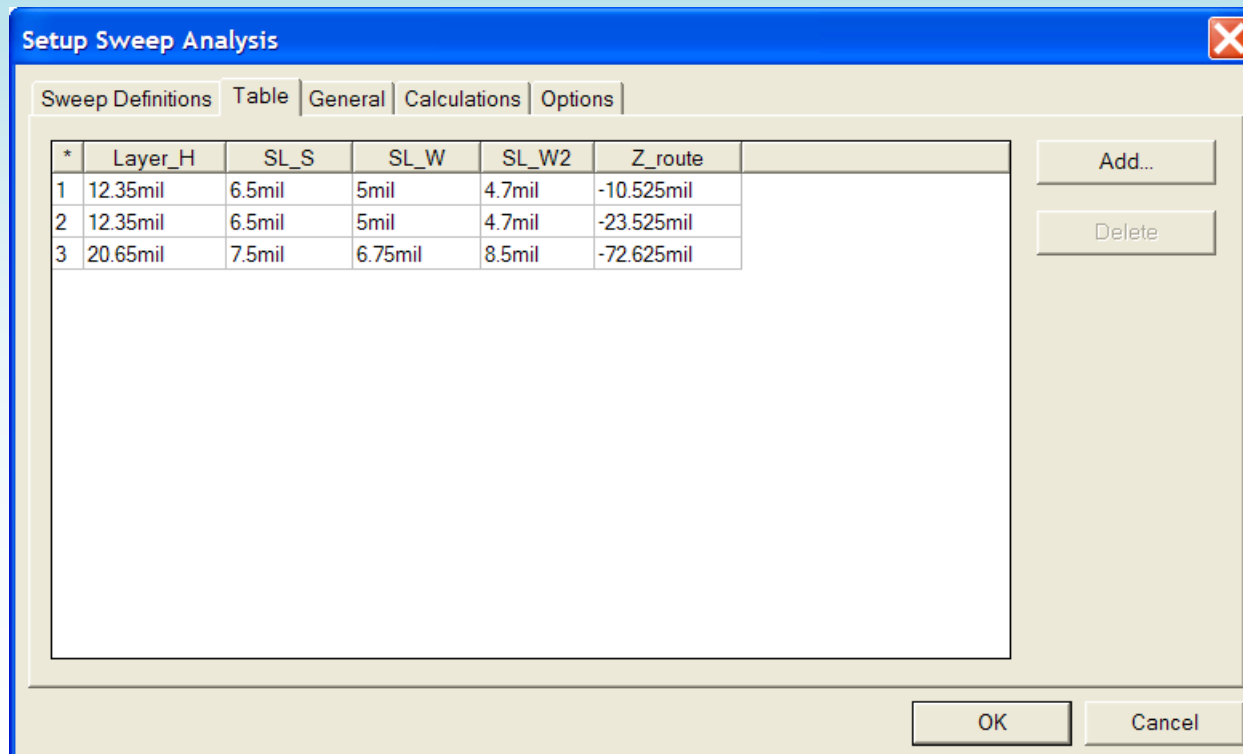


SMA Connector



- **Parametric Sweep Variables**

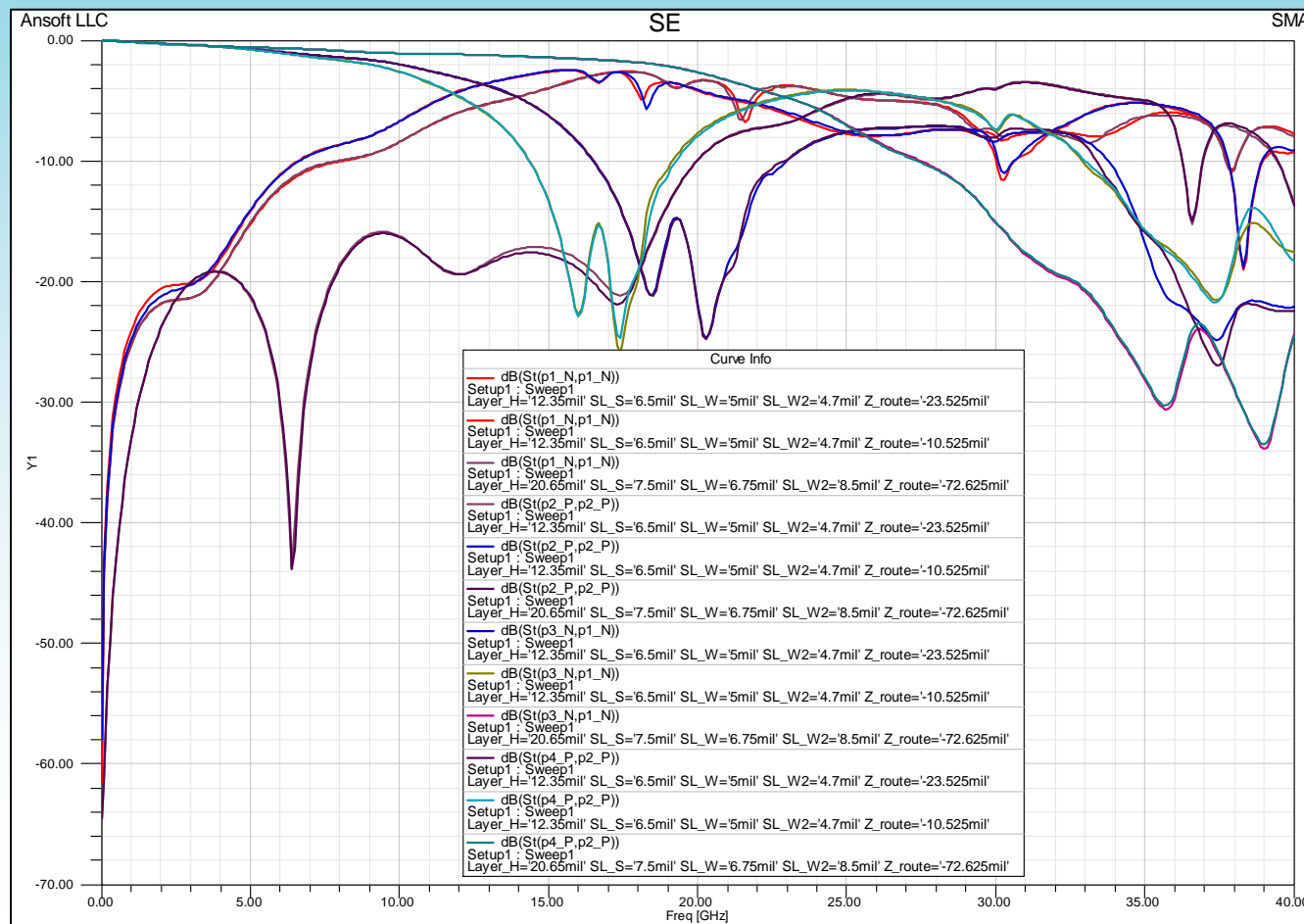
- Layer_H – Corresponds to substrate thickness
- SL_S – Stripline Trace Spacing
- SL_W – Stripline Trace Width
- Z_route – Routing Layer



SMA Connector



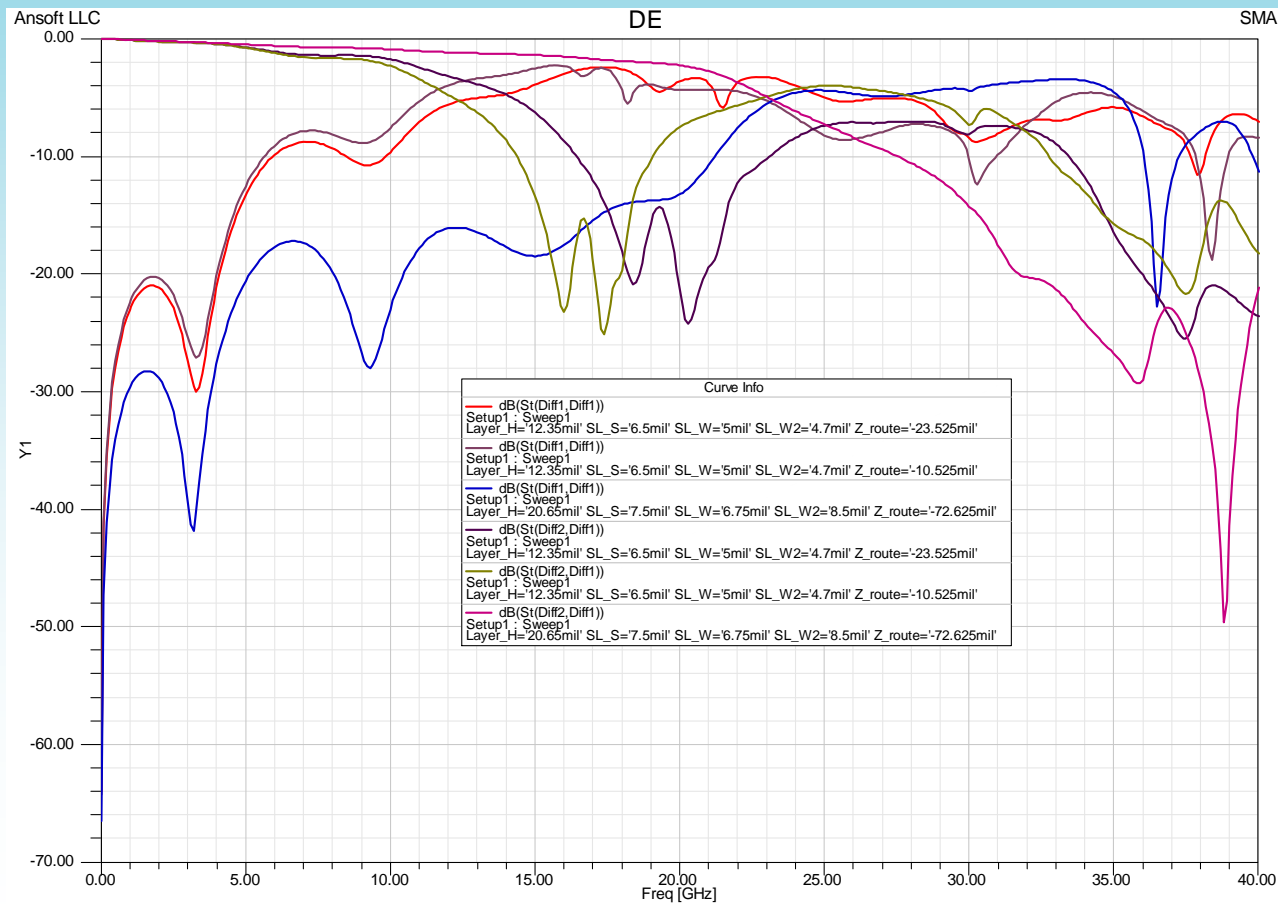
- Results
 - Single-ended S-parameters



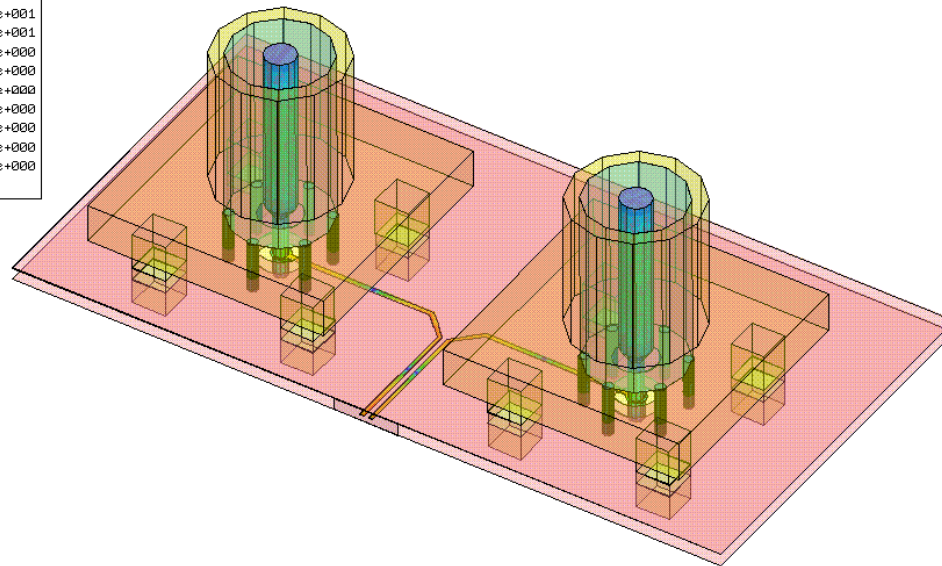
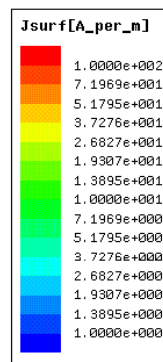
SMA Connector



- Results
 - Differential S-Parameters



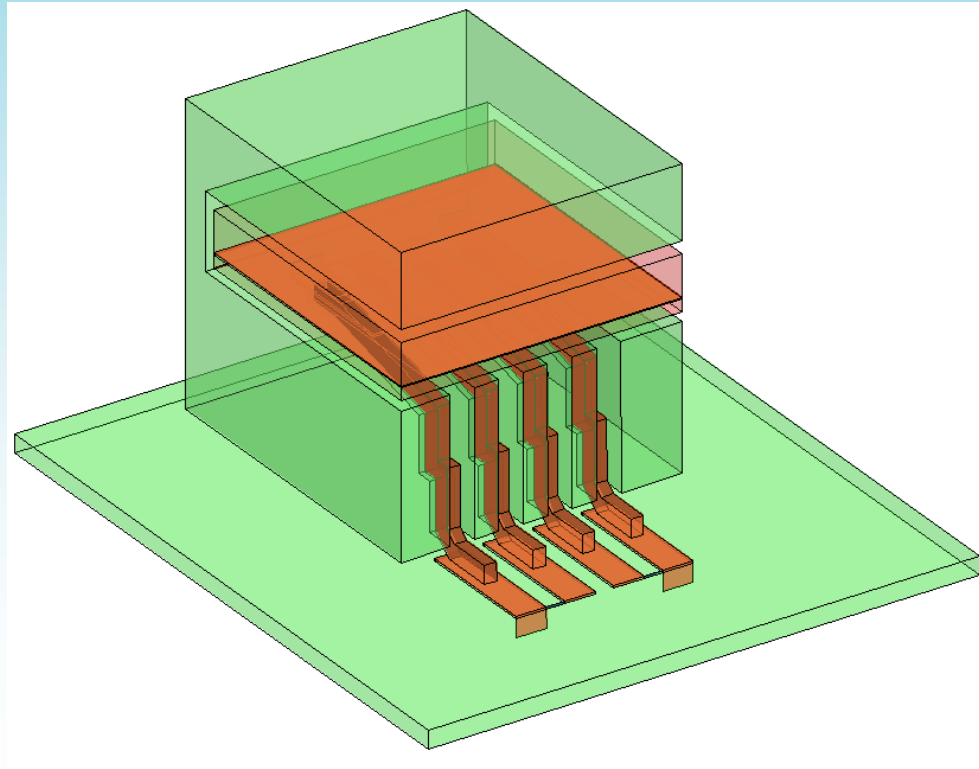
- Results
 - Mag JSurf



Multi-pin Connector



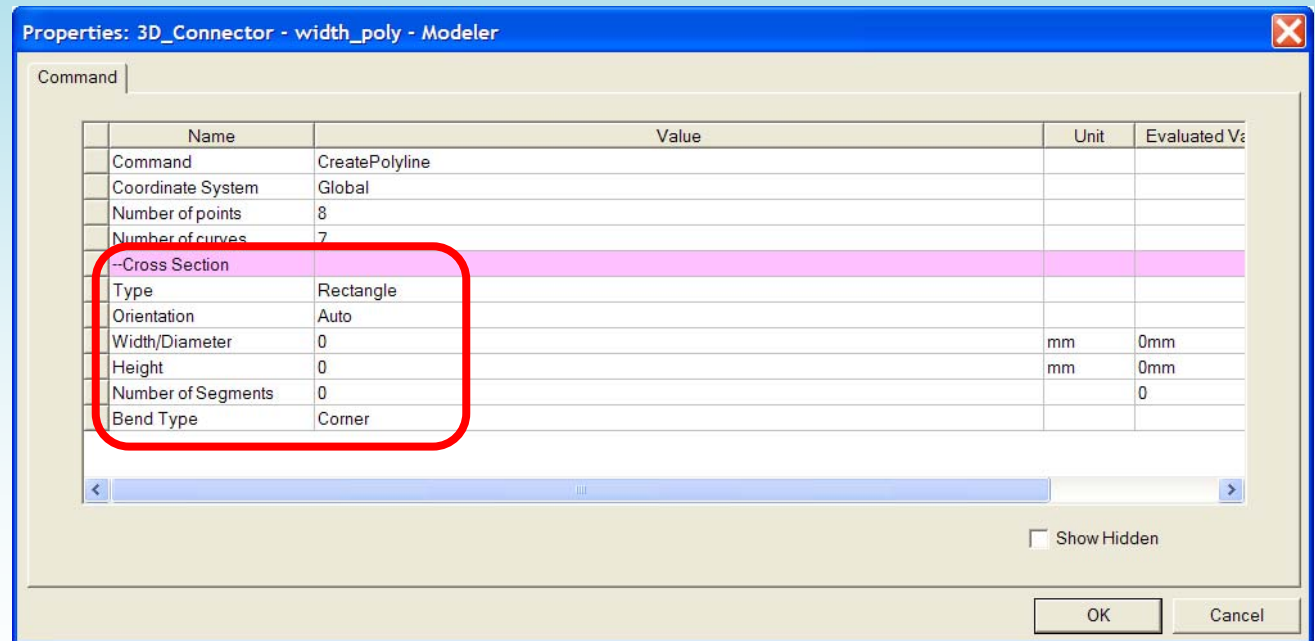
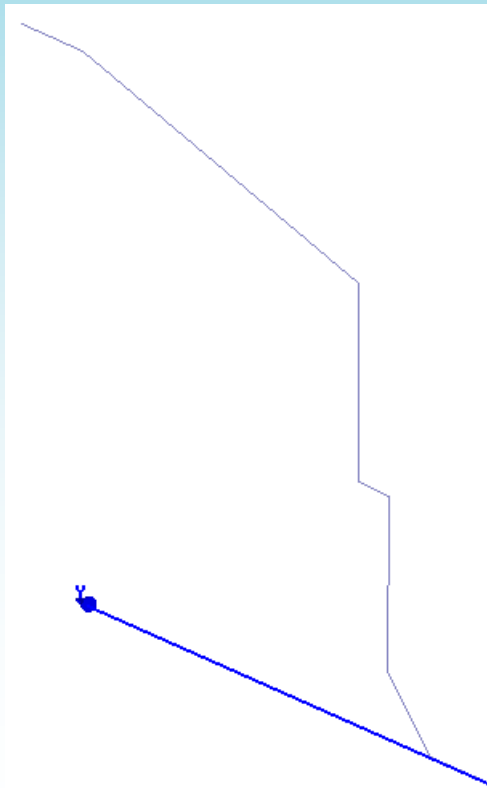
- **Create complex shapes from polylines**
 - Finished Model



Multi-pin Connector



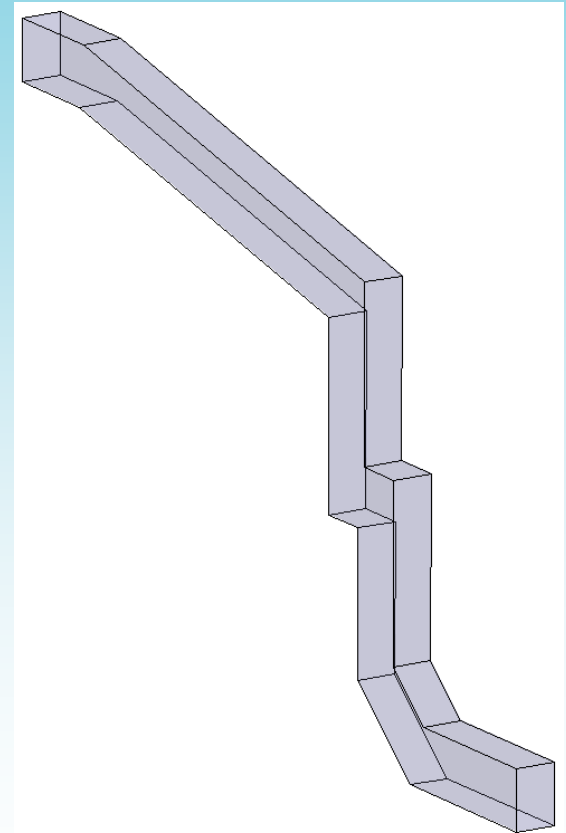
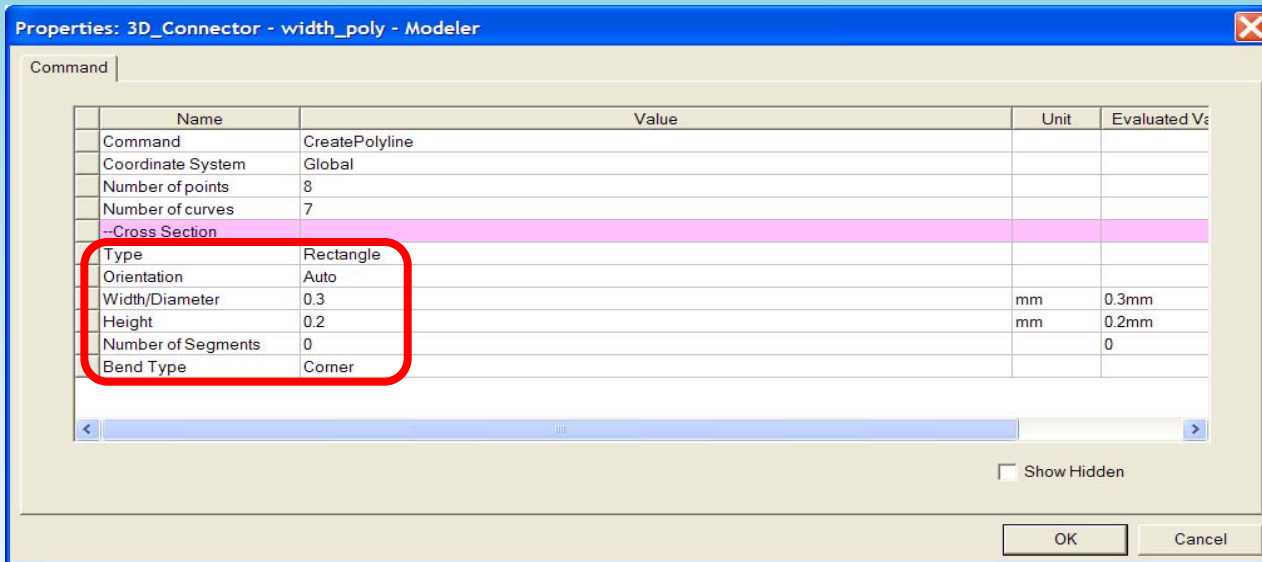
- **Create complex shapes from polylines**
 - Create polyline
 - Define Properties



Multi-pin Connector



- 3D Object from 1D Polyline

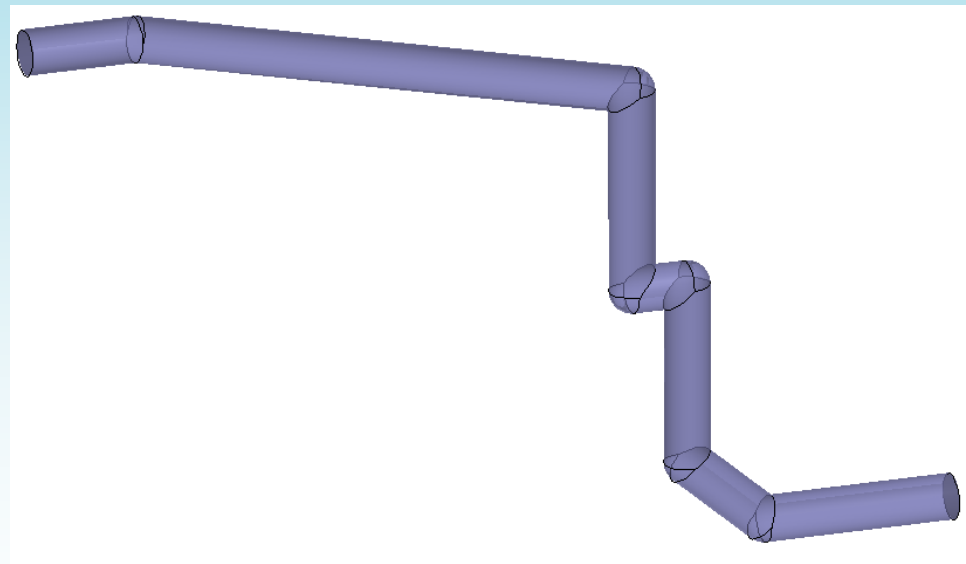
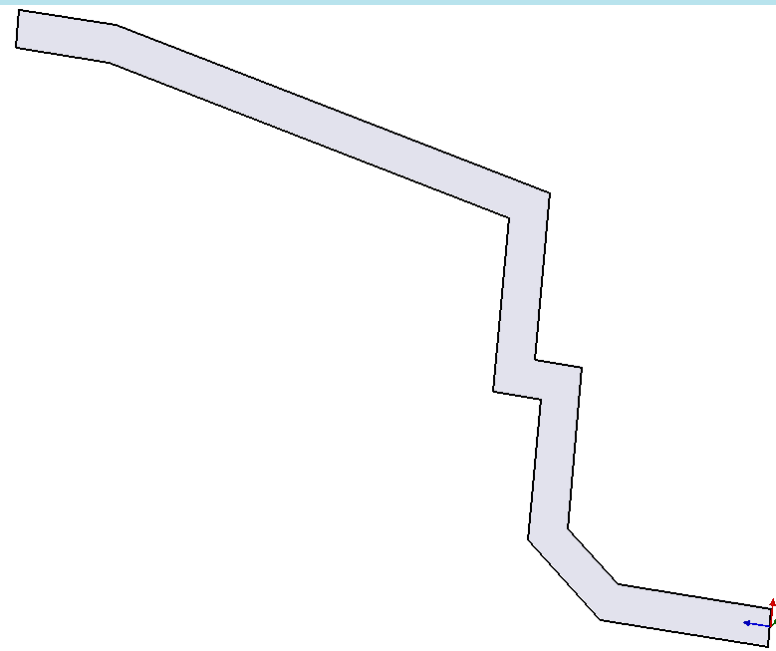


Multi-pin Connector



- **Other Cross-sections**

- Line
- Circle



- **Import from Mechanical CAD options**

- **.sat** – up to ACIS 19
- **.dxf, .dwg .tech** – AutoCAD Drawing Interchange Format files
- **.model** - CATIA 4.1.9 to 4.2.4
- **.CATPart** - CATIA V5 R2 through R16
- **.gds** – GDSII files.
- **.iges, .igs** – Initial Graphics Exchange Specification files up to 5.3
- **.nas** – NASTRAN format files
- **.x_t, .x_b** – Parasolid Files
- **.prt*, .asm*** – Pro/E model files
- **.sab** – Standard ACIS binary
- **.step, .stp** – AP203 STEP files and AP214 (geometry only)
- **.stl** – Stereolithography format files
- **.prt** – Unigraphics file (Windows only)

RJ45 Connector



- **RJ45 8 Pin connectors**

- Most commonly used with Ethernet cables and networks for 10Base-T (10 MBPS) and 100Base-TX (10 MBPS)

- Also used in

- Rocket Port – Alternate Pinout
- ISDN – Alternate Pinout



Pinout for Ethernet

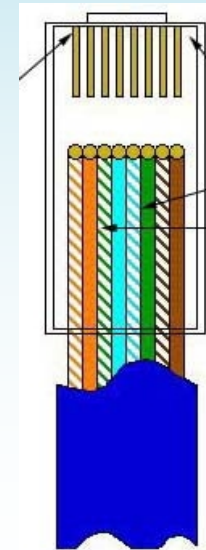
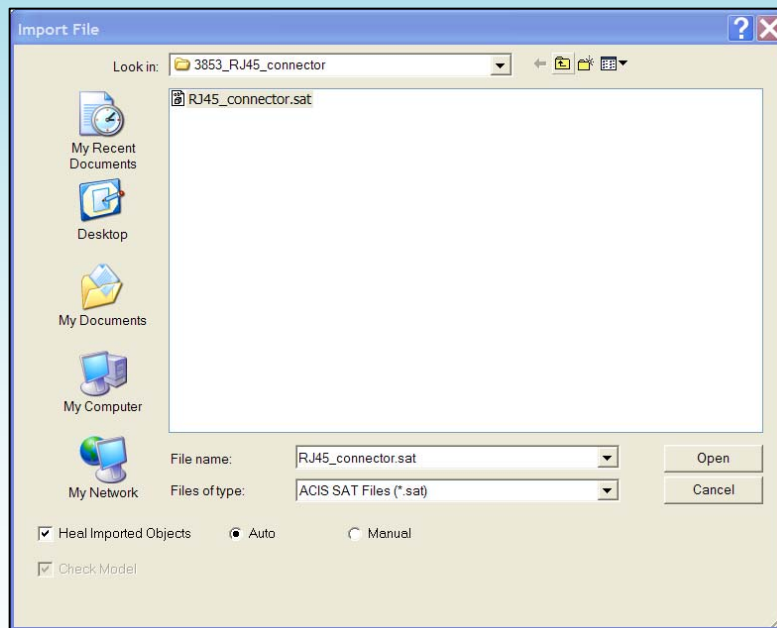


Diagram from
<http://www.jimprice.com/>

RJ45 Connector



- **Import *.sat**
 - Do Auto Healing
 - Geometry Errors (if any)will be reported



Objects | Objects Misalignment | Surface Mesh (Single/Pairs) | Last S

Name	Last Analysis Status
L5	Good
L8	Good
L4	Good
L1	Good
L2	Good
L6	Good
L3	Good
L7	Good
strip1	Good
strip1_1	Good
strip1_2	Good
strip1_3	Good
strip1_4	Good
strip1_1_1	Good
strip1_1_2	Good
strip1_1_3	Good
gnd	Good
Part1	Good
Part2	Good
board	Good
kabel	Good

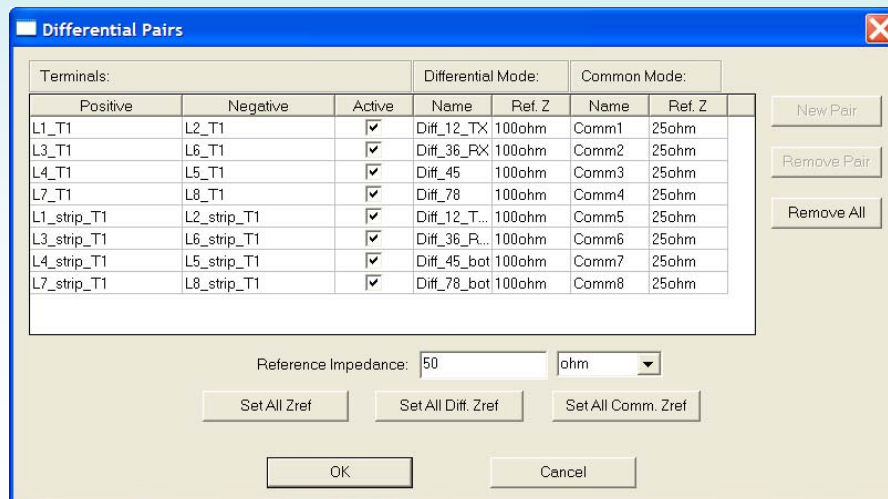
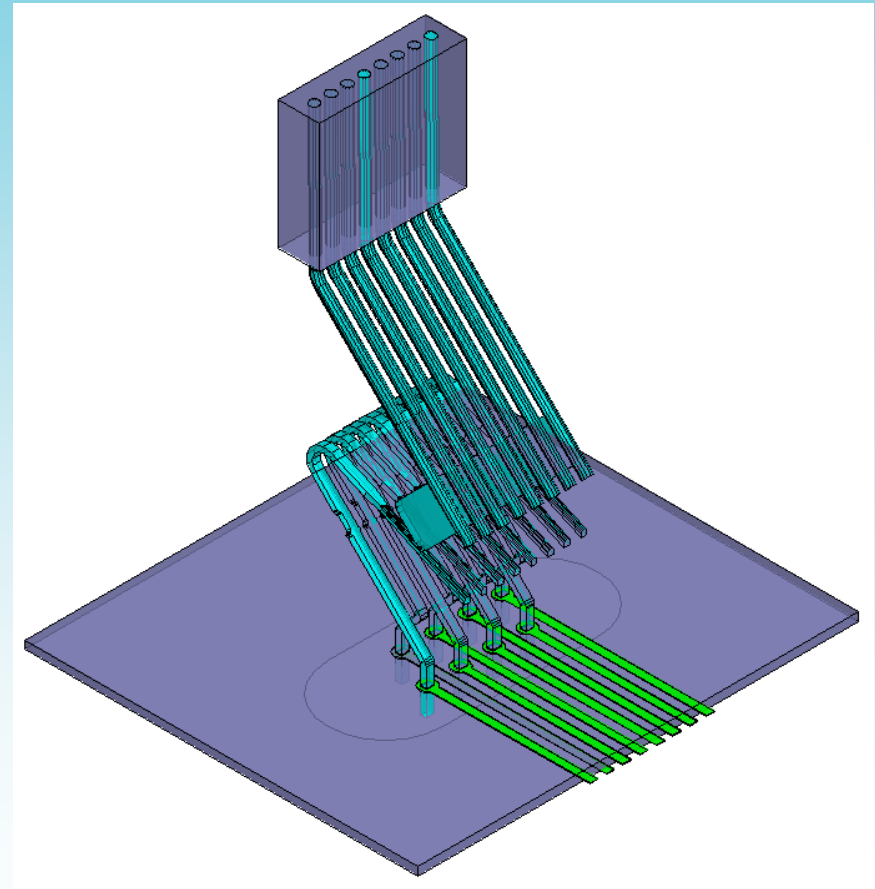
Display Object Healing Log

Perform ↓

RJ45 Connector



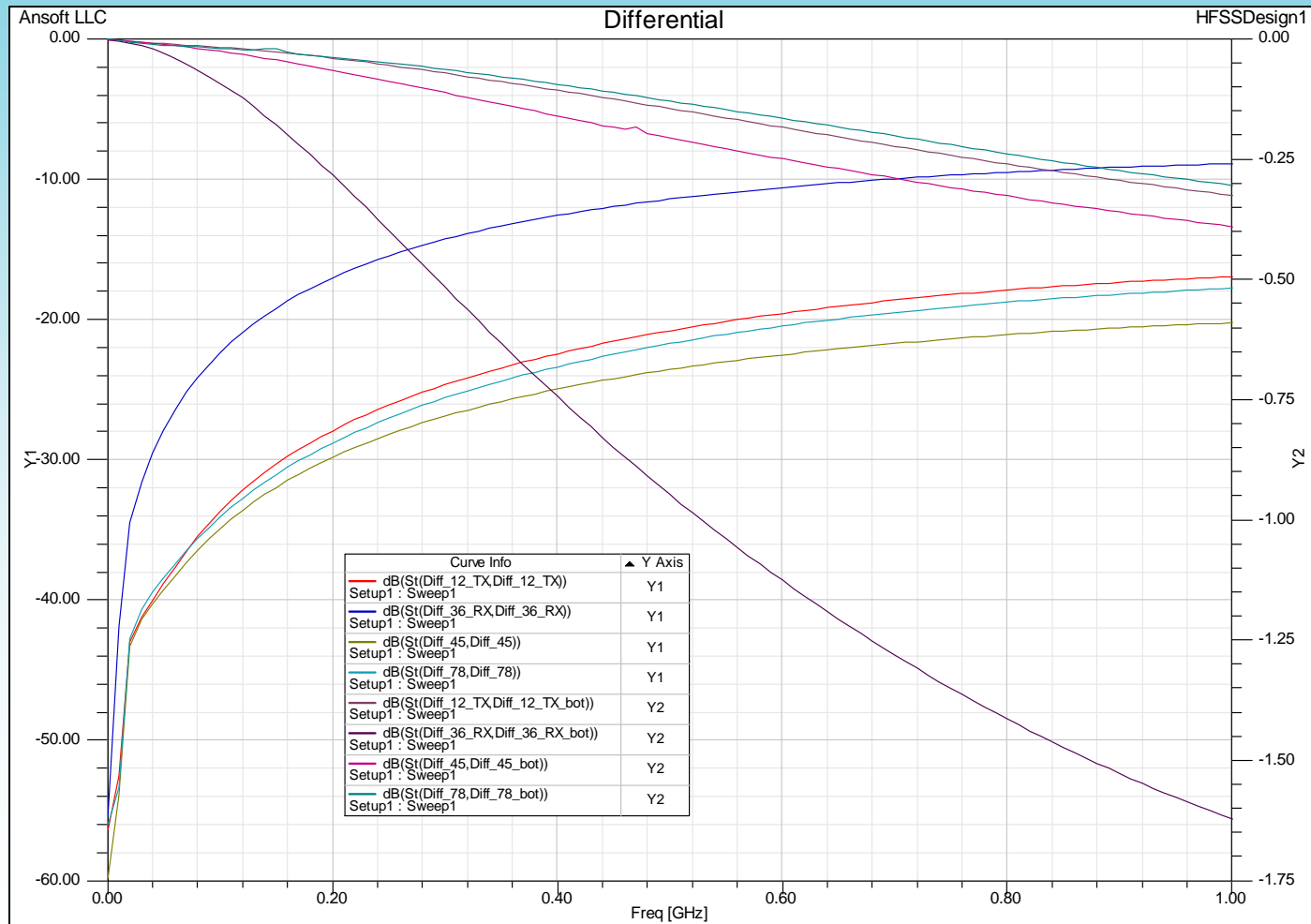
- Imported Model
 - Assign
 - Materials
 - Ports
 - Diff Pair Setup
 - Boundaries
 - Analysis Setup



RJ45 Connector



- Results



RJ45 Connector



- Results

