Quadra Solutions Limited

People. Knowledge. Innovation.

Save Time & Money with an Integrated Design Flow

Bob Sadowski
Applications Consultant
Quadra Solutions

quadra solutions

Save Time & Money with an Integrated Design Flow

For many years it has been acceptable to use individual point tools to analyse and verify your high speed layouts and critical nets, but today's high performance FPGAs, DSPs and Micro-Processors require a more sophisticated approach

The **CADSTAR High Speed Design Suite** lets you adopt an integrated design flow to create, implement, analyse, verify and document all of your constraints in one seamless environment

Who cares about Integration?

- You and your colleagues
  - Design, Layout, Production, Test
    - Fast, Accurate, Secure, Repeatable
- Your Partners
  - Consultants, Fabrication, Assembly, Test
    - Accurate, Timely, Complete
- Management
  - Internal, External (customers)
    - On schedule, to Budget

Why is Integration important?

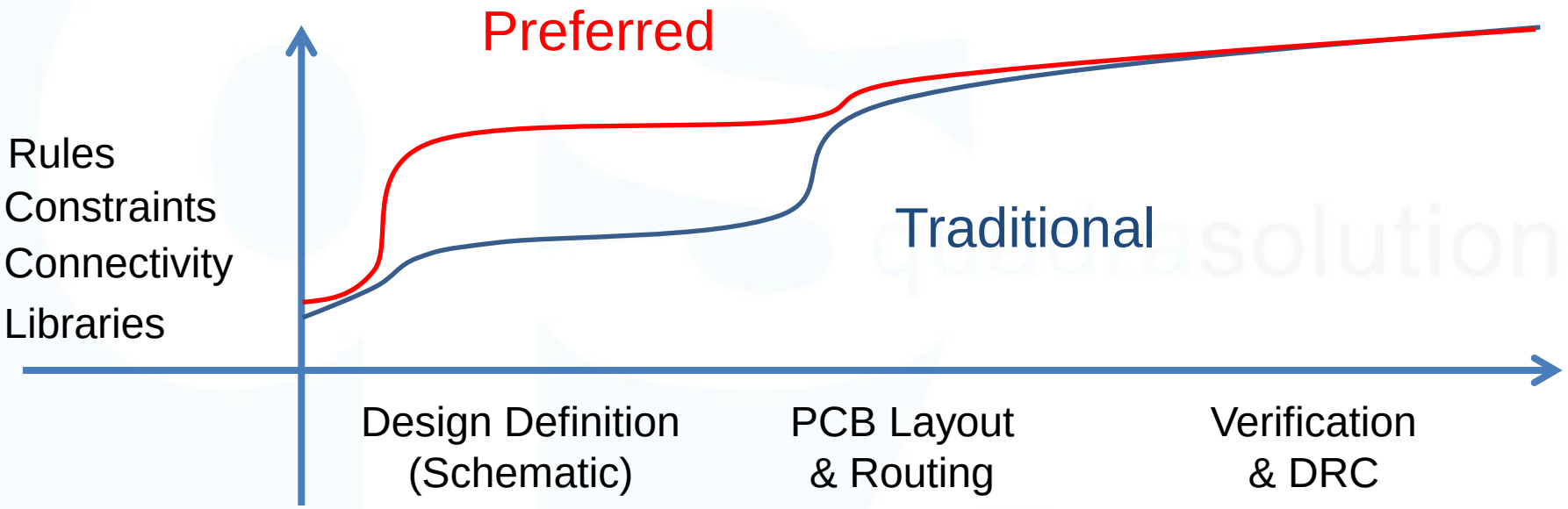
- Integration:
  - Enables a single repository for all critical data in the design flow
  - Eliminates the need for data translation between tools
  - Reduces risk and potential for error
  - Saves time!

What data can you share?

- Libraries
  - Electrical (Symbol, Component, Part)
  - Mechanical (3D)
  - Simulation & Modelling (Spice, IBIS, etc.)
- Electronic Design Data
  - Schematic, PCB Layout, ReUse blocks, etc.
- Rules & Constraints
  - Manufacturing, Electrical

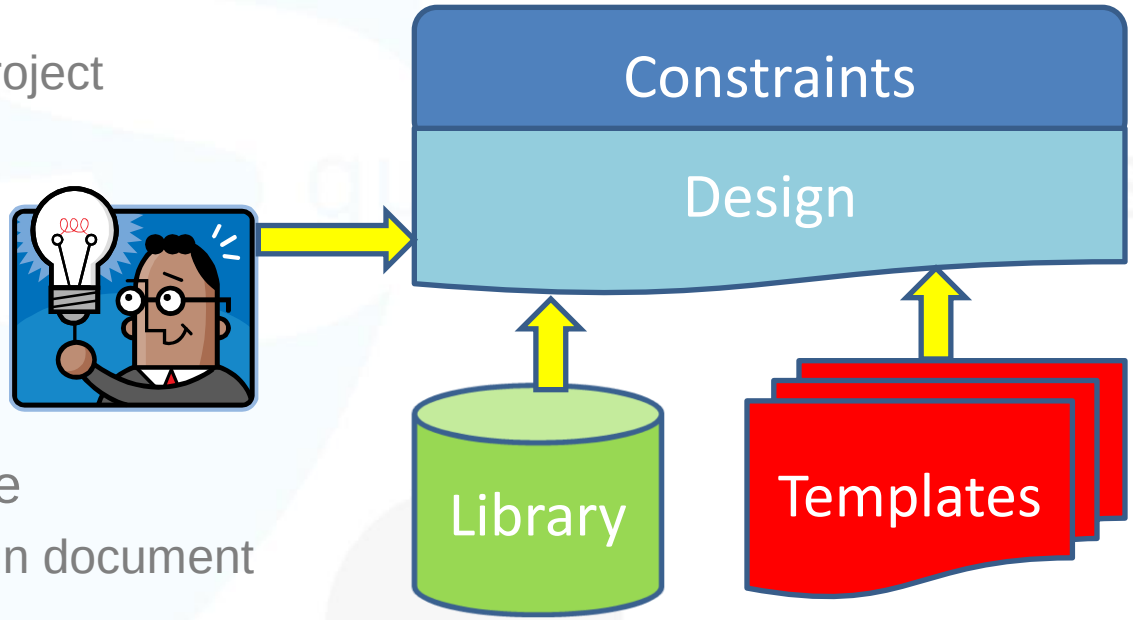
When is Data Required?

> Builds up during the design process

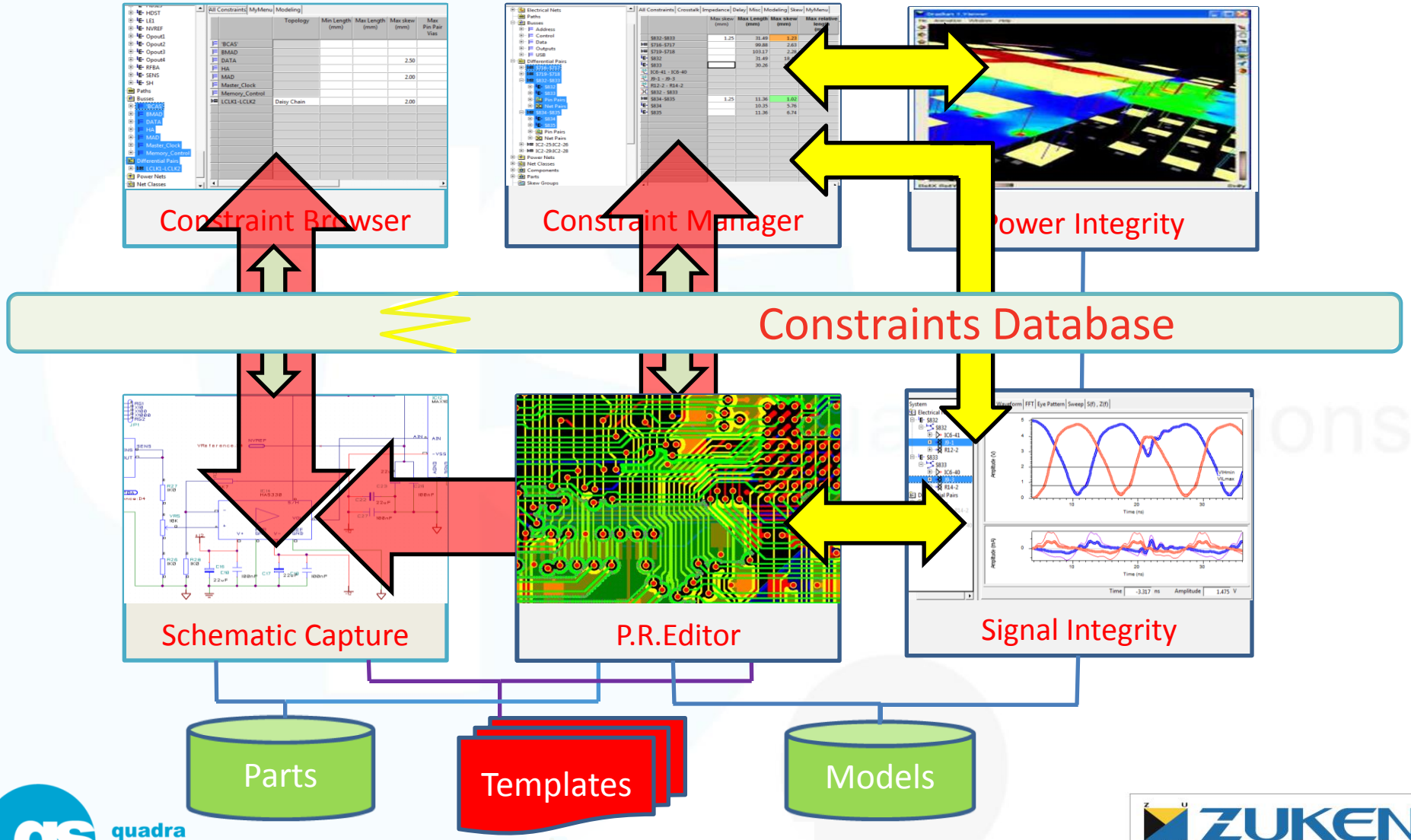


Where does the data reside?

- Libraries
  - CAD Library or Database
    - Company, User, Project
- Rules
  - Templates
    - Company, User, Project
- Design Data
  - Project folder
  - Variants
- Constraints
  - Constraints database
    - Linked to the design document

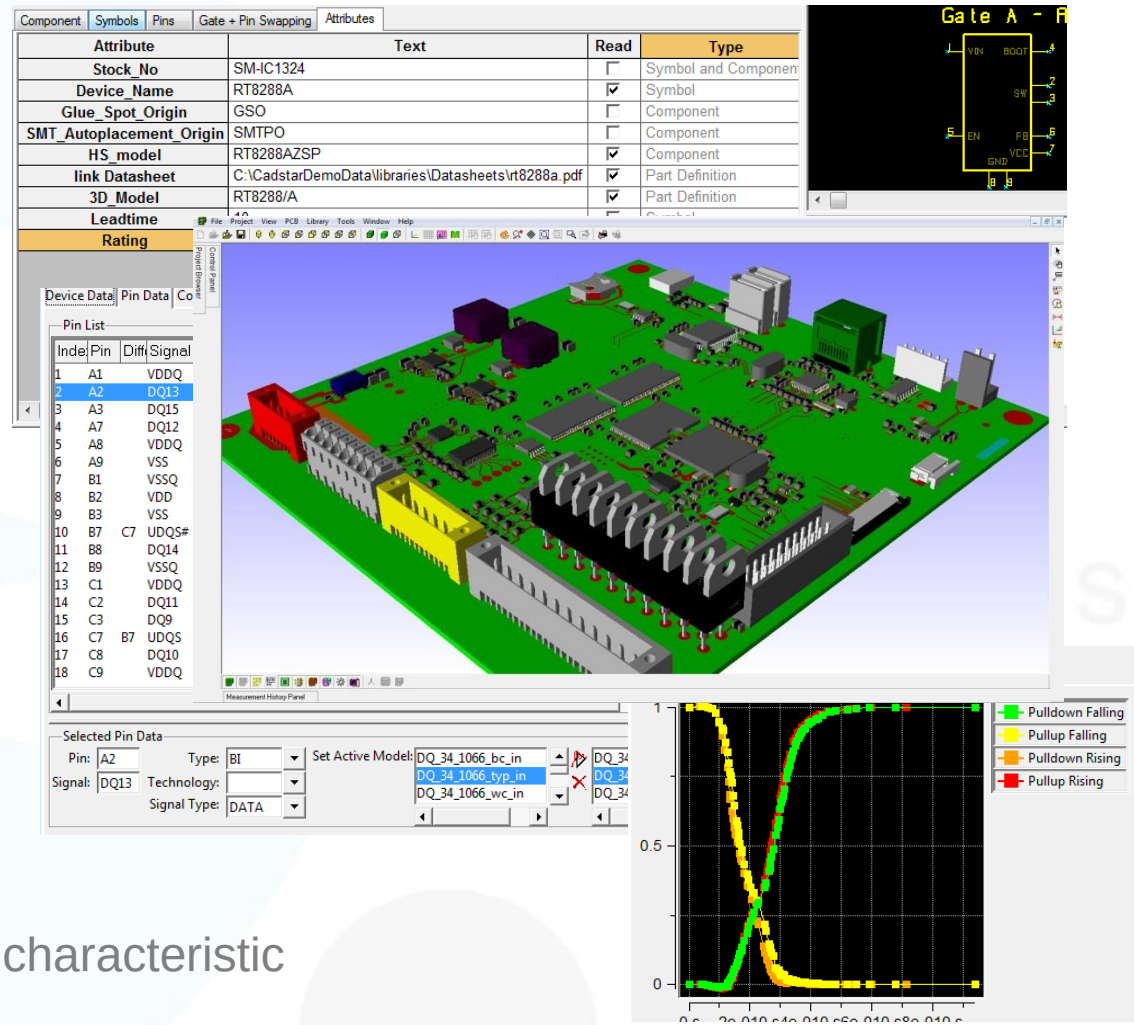


How integration works in the CADSTAR design flow



Libraries

- CAD
  - Electrical
    - Design
    - Selection
  - Data-centric
    - Information
  - Lifecycle
    - History
    - Versioning
- Models
  - Simulation
    - Packaging
    - Pin types and characteristic
  - 3D



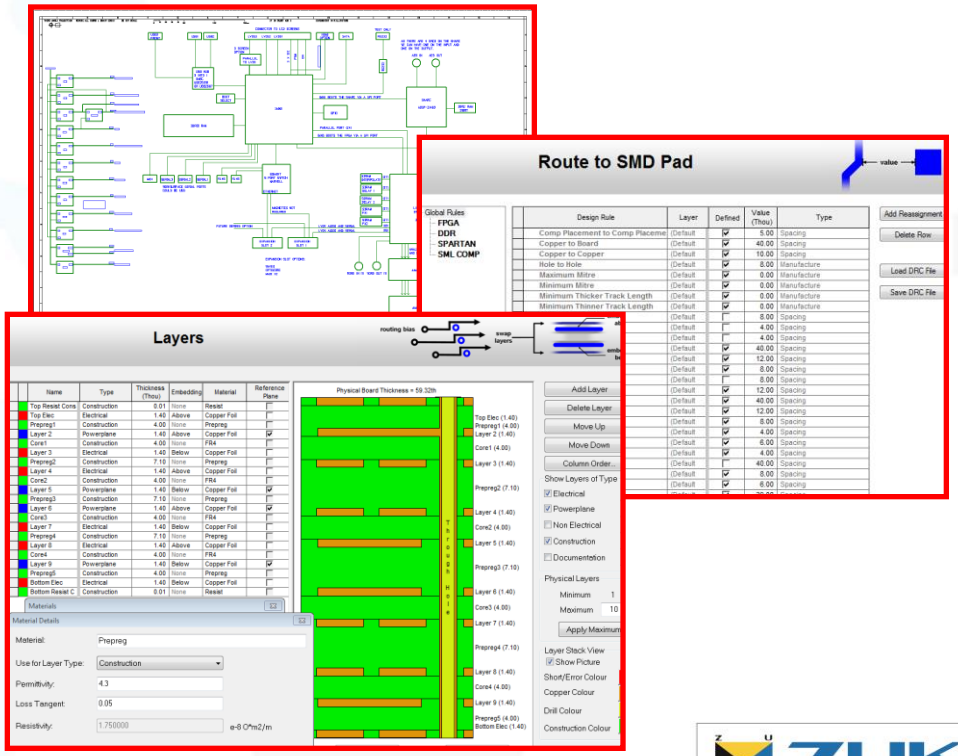
quadra solutions

AUTODESK. Gold Partner

ZUKEN CADSTAR Distributor

Templates

- Library creation
  - Symbols, Footprints, Documentation
    - Standards (Corporate, National, External)
    - Attributes
- Schematic
  - Structure
  - Conventions
- PCB
  - Layer Stack
  - Rules set
  - Manufacturing



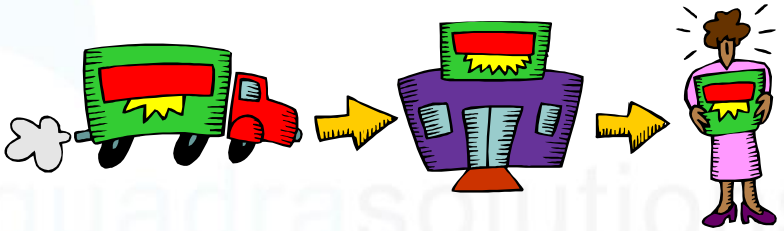
quadra solutions

AUTODESK. Gold Partner

ZUKEN CADSTAR Distributor

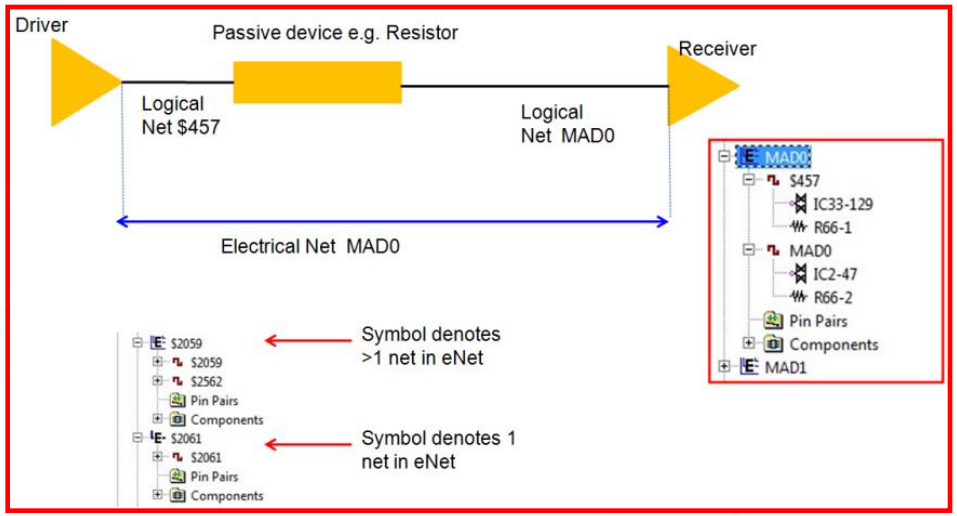
Constraint Definition Process

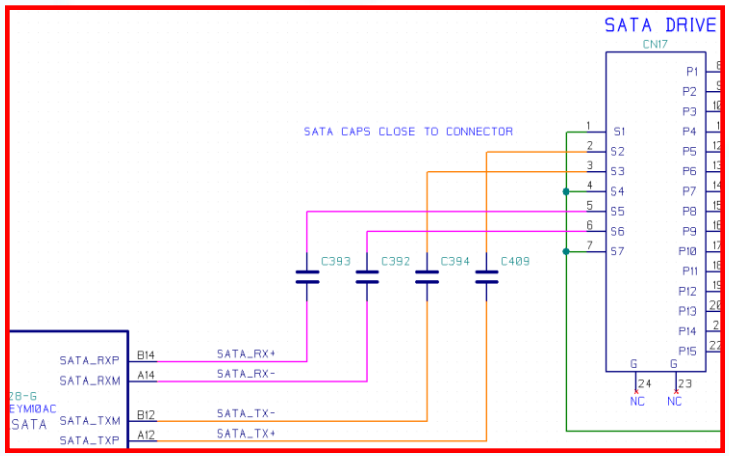
- Automation
  - Net conversion from Logical to Electrical
  - Classification
- Organisation
  - Organisation
  - Structure
- Constraint Entry
  - Group
  - Net
  - Pin-Pair

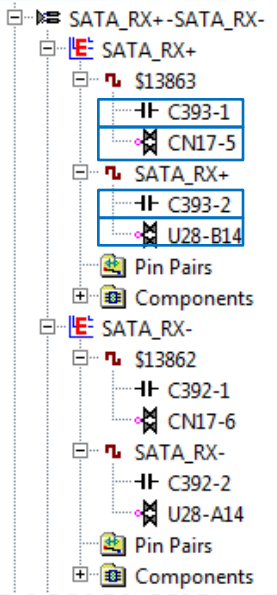


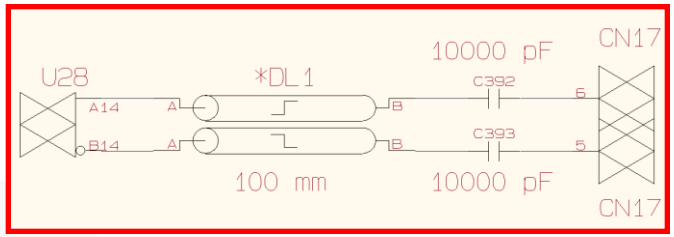
Automation - eNet Conversion

- Concatenation of nets to include
  - terminators
    - Serial or Differential
  - exclude power connections
    - Pull up/down
    - filtering







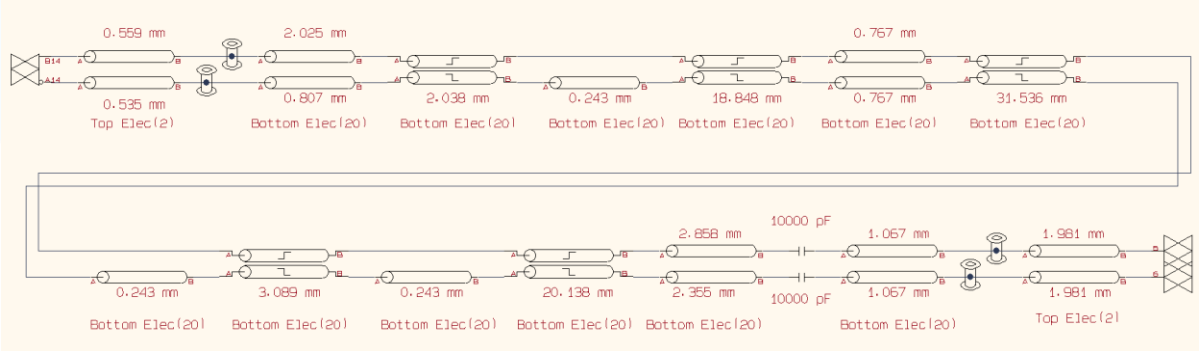


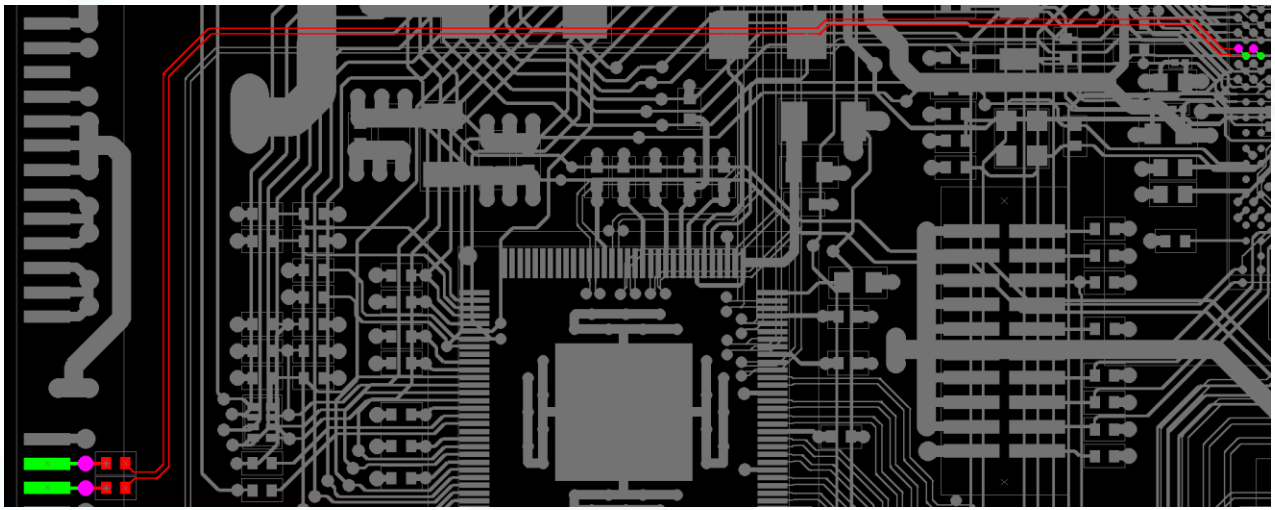
quadra solutions

ZUKEN CADSTAR Distributor

eNet Physical Results - Example

- Results
  - Topology
  - Routing





quadra solutions

AUTODESK. Gold Partner

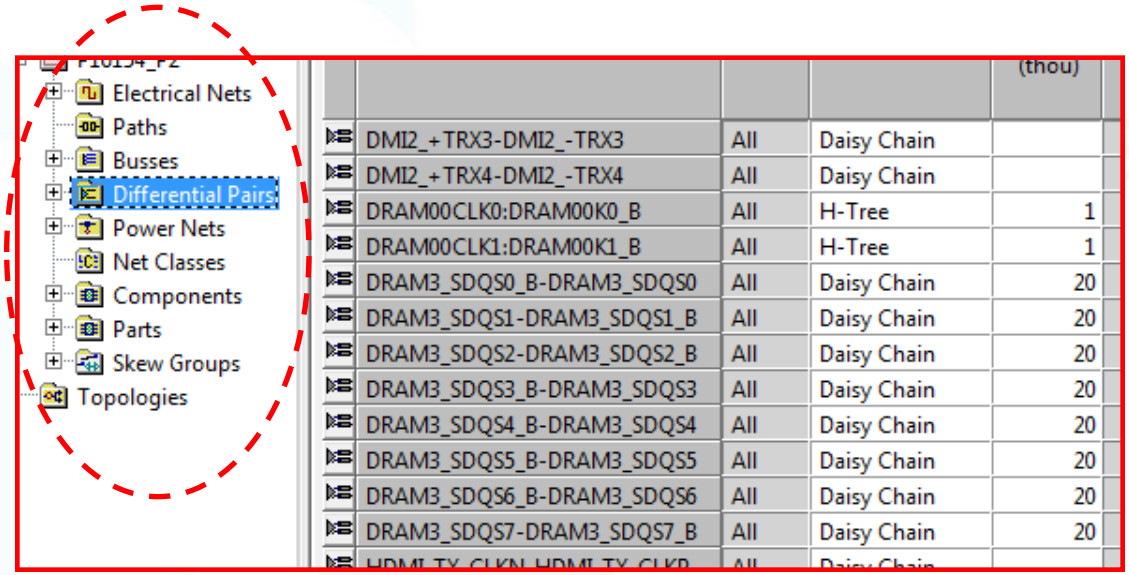
ZUKEN CADSTAR Distributor

High Speed Design - Engineering Process

- Identify critical nets
  - Busses, Diff Pair, Clocks....
- Establish constraint values
  - Datasheet, Calculation, Signal Integrity Verification, other
- Implement net constraints
  - Length, Delay, Skew, Topology
- Build constraint groups
  - Busses, Groups, Nets, Pins
- Action Place & Route
  - To physical design rules
  - To Constraints
- Extend Analysis and Verification
  - Measure, analyse and simulate
    - HighSpeed Router
    - Signal Integrity
    - Power Integrity
    - 3D
- Document Results
  - Verify conformance of the design to initial objectives
    - Statistics
    - Reports

Constraints - Classification

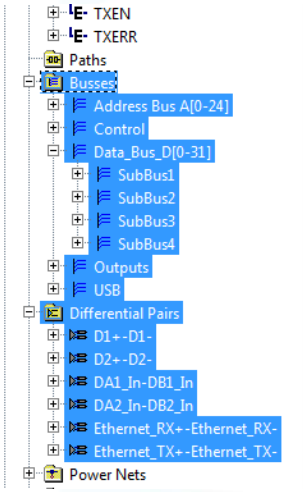
- Automatic extraction
  - Power Nets
  - Component Types & Values
  - Busses
  - Differential Pairs



Start>

Constraints - Organisation

- Create structure in the design with:
  - Net Class
  - Bus
  - Sub-Bus
  - Diff Pair
  - Pin Pair
  - Path



					Vias		
D2+-D2-	All	Daisy Chain				63	77
D1+-D1-	All	Daisy Chain				63	77
DA1_In-DB1_In	All	Daisy Chain				63	77
DA2_In-DB2_In	All	Daisy Chain				63	77
Ethernet_RX+-Ethernet_RX-	All	Daisy Chain				63	77
Ethernet_TX+-Ethernet_TX-	All	Daisy Chain				63	77
Address Bus A[0-24]	All					63	77
Control	All					63	77
Data_Bus_D[0-31]	All					63	77
Outputs	All					63	77
USB	All					63	77
SubBus1	All					63	77
SubBus2	All					63	77
SubBus3	All					63	77
SubBus4	All					63	77

Start>

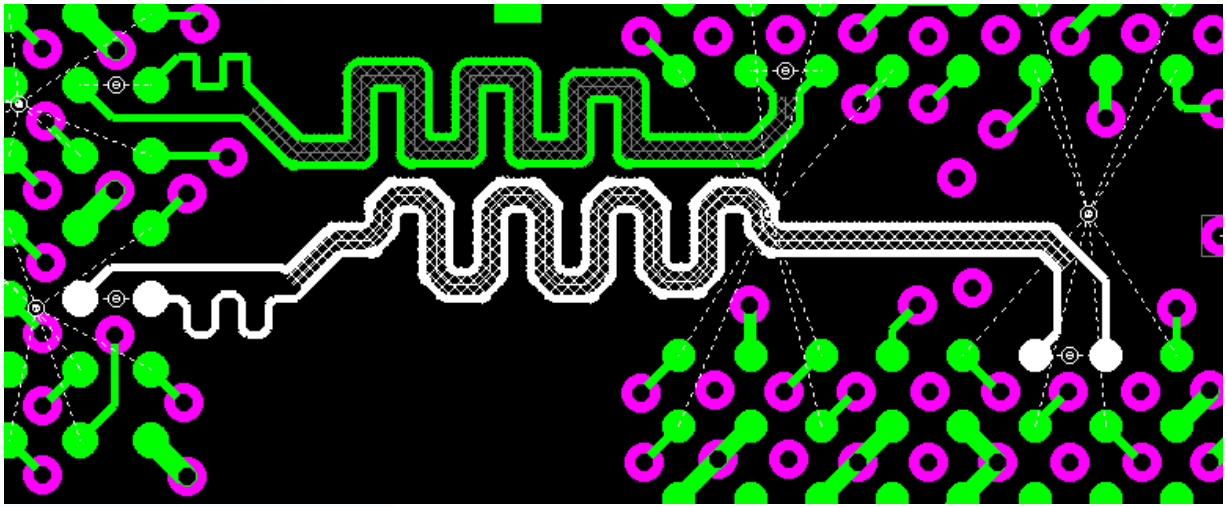
Constraint – Assigning Values

- Topology
- Impedance Profile
- Skew Groups
  - Simple
  - Relative
- Intra-Net Skew
  - Virtual Branch Point
- Length v. Delay Mode

Start>

Constraint Implementation

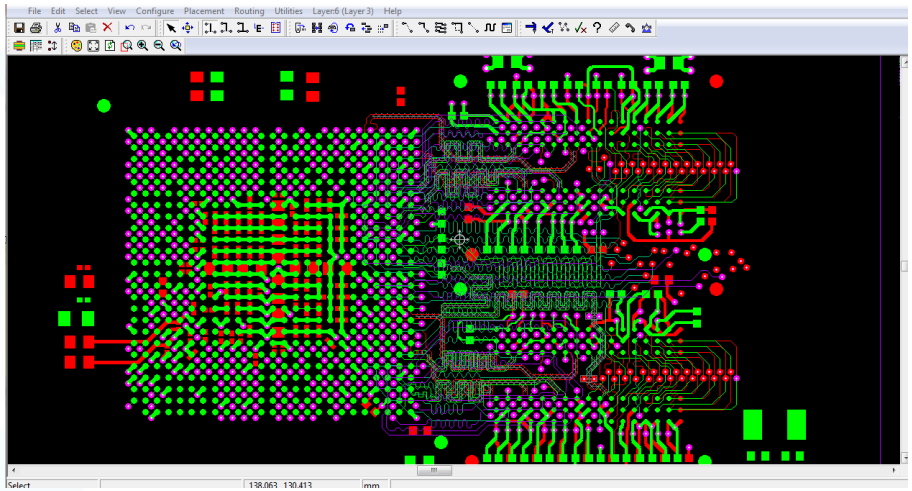
- Place and Route
  - Dynamic DRC
    - Clearance
    - Length
    - Delay



Start>

Constraint Verification

- Dynamic
  - Length / Delay markers
  - Pop-up
- Signal Integrity
- Power Integrity
  - EMC
  - Power distribution
  - Decoupling

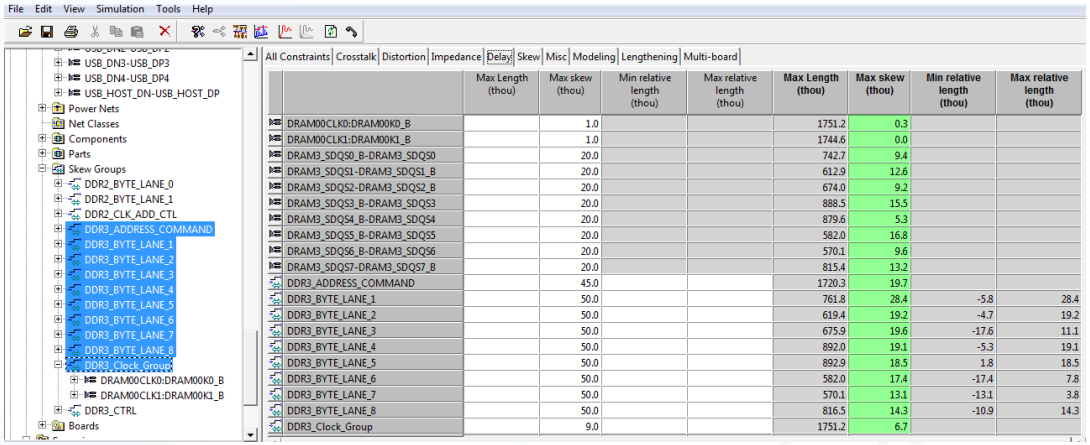


Start>

Start>

Constraint Documentation

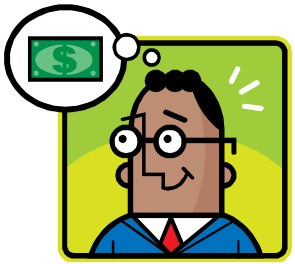
- Spreadsheet
- Reports
  - DRC
  - Skew
  - Length
  - Delay
- Embed links in Schematic and PCB



Start>

Benefits of Integration - summary

- For you and your colleagues
  - Design, Layout, Production, Test
    - Fast, Accurate, Secure, Repeatable
- For your partners
  - Consultants, Fabrication, Assembly, Test
    - Accurate, Timely, Complete
- For your management
  - Internal, External (customers)
    - On schedule, to Budget



Quadra Solutions Limited

People. Knowledge. Innovation.

quadra solutions