RAVEL Relational DRC System

The Relational Algebraic Verification Extension Language (RAVEL) enables PCB and SiP designers to rapidly develop custom DRCs on demand, utilizing current design rule manuals (DRMs). This leads to an automated and drastically reduced DRC implementation effort.

Key Features:
- Enables definition of custom PCB and SiP manufacturing and assembly DRCs
- DRCs performed on PCB or SiP design database
  - Manufacturing data export is not required
  - DRC violation markers created directly on design database objects
- Based on RAVEL language for coding of design rules
  - Optimized for expressing PCB and SiP design rules
  - Independent of SPB version and Cadence® Allegro® PCB/SiP layout design database
- Compilation and encryption of DRC source code for IP protection

Benefits
Key advantages of RAVEL are:
- Interactive DRC execution
  - Integration of custom DRC in Allegro Constraint Manager
  - Distribution of encrypted custom DRC through Allegro Constraint Manager files
- Batch DRC execution
  - Distribution of encrypted custom DRC through batch DRC file
  - Support for run-time DRC and constraint value selection, customizable reports

Case 1: 2 rules

<table>
<thead>
<tr>
<th>C/C++</th>
<th>RAVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200</td>
<td>80</td>
</tr>
</tbody>
</table>

Effort: 10 days 2 hours

Case 2: 4 rules

<table>
<thead>
<tr>
<th>SKILL</th>
<th>RAVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1540</td>
<td>470</td>
</tr>
</tbody>
</table>

Effort: 15 days 3 days

Reduced DRC maintenance effort
- RAVEL rules are independent of database
- RAVEL rules are independent of SPB software release
- All dependencies are built into RAVEL DRC engine

Target Audience
RAVEL is intended to ease the job of CAD teams responsible for providing automated DRC for current PCB and SiP technologies to designers both internally and externally. They can use RAVEL to implement singular DRCs, preventing costly but hardly detectable design errors, or to develop entire suites of DRCs to be supplied to the designers as part of the process design kits for various technologies. By utilizing encryption and integration features of RAVEL, you can enforce various levels of DRC protection, execution, and reporting at the end user to ensure compliance with the design rules.
Key Components:

RAVEL DRC language
- Description and exchange of design rules

RAVEL DRC engine licence
- Checking of design rules coded in RAVEL language in PCB Editor and SiP Layout

RAVEL DRC compiler licence
- DRC compilation, encryption, and integration in Allegro Constraint Manager
- DRC compilation and encryption to batch DRC file

With the compiler licence, CAD or central manufacturing teams can customize their DRCs against their current and future DRMs.

The engine licence enables users to automatically run checks against each step of their SiP and PCB design life cycle.

Cadence VCAD Services can provide additional expertise to ensure developments are performed in line with your DRMs.

RAVEL DRC Application Examples

Thicknless-Dependent Die Overhang

DESIGN RULE:
Maximum overhang \( d_{\text{max}} \) of the edge of the wirebond die over the edge of the component (die or spacer) directly underneath, with dependence on the thickness \( t \) of the die

\[
\begin{align*}
\text{if } t > 80 & : d_{\text{max}}(t) = 400 \\
\text{if } 40 < t \leq 80 & : d_{\text{max}}(t) = 200 \\
\text{if } t \leq 40 & : d_{\text{max}}(t) = 100
\end{align*}
\]

Staggered Bond Finger Distance

DESIGN RULE:
Distance between neighboring staggered bond fingers in the direction perpendicular to the die edge along the row of attached die pads must be at least \( d_0 \).

VCAD Productivity Packages

VCAD Productivity Packages are a set of pre-packaged generic core solutions that increase design system productivity. Productivity Packages are available within services contracts, which include the package integration and maintenance of the customized solution. Cadence VCAD services targets the development, implementation, and ongoing improvement and maintenance of productive design systems to ensure short time to market and silicon success.

RAVEL is available through Cadence VCAD Services. For more information, please contact:

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