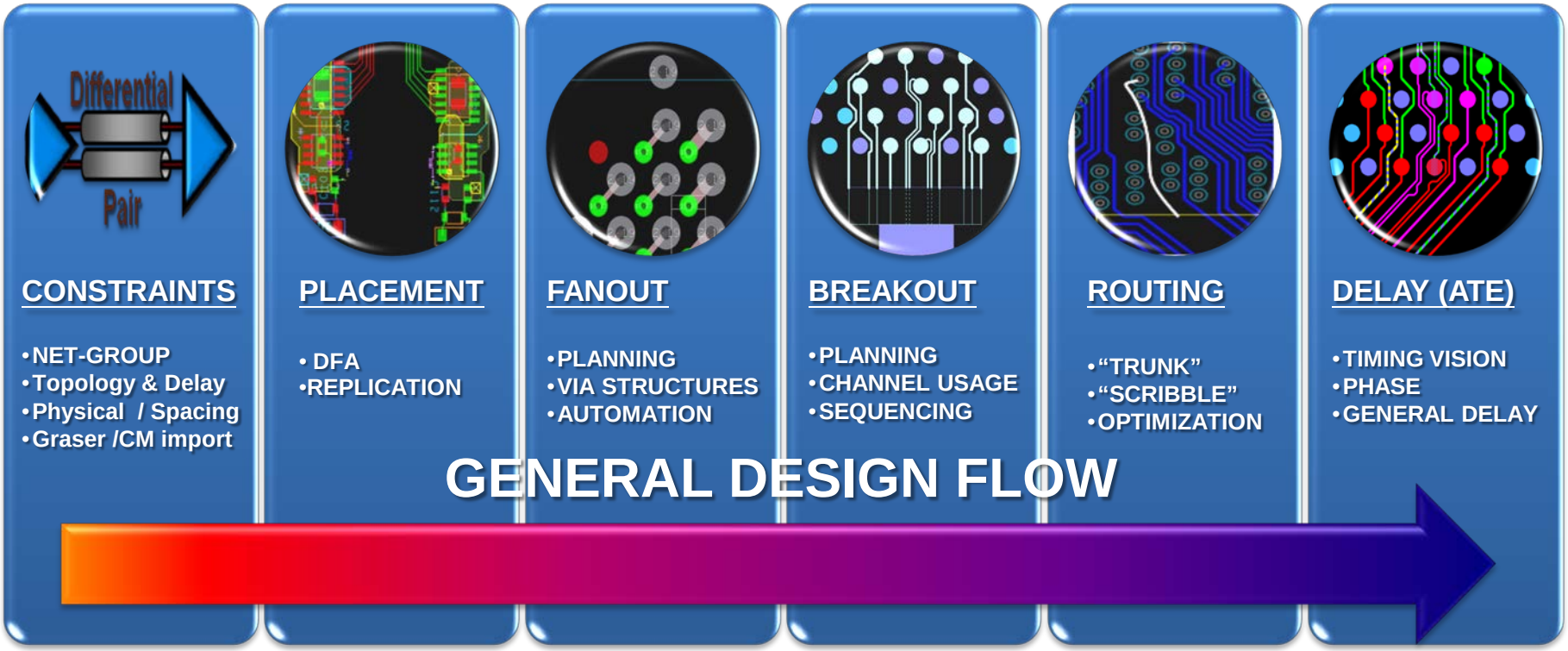
Taipei 10.16 2015 User Conference Graser

Increase Productivity and Quality by New Layout Flow

Jonathan / Graser

16 / Oct / 2015

Design Process Introduction

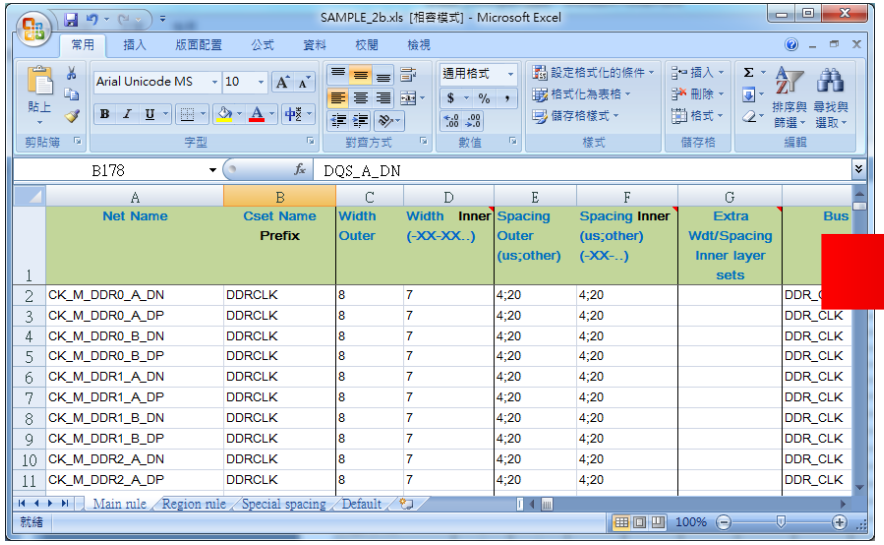


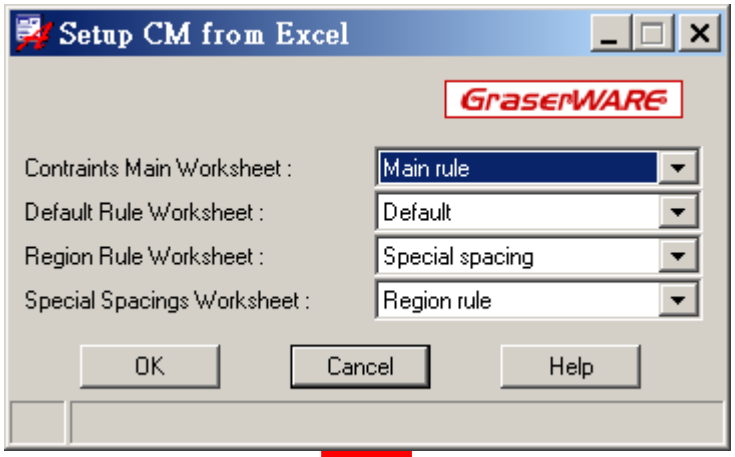
Productivity Enhancements

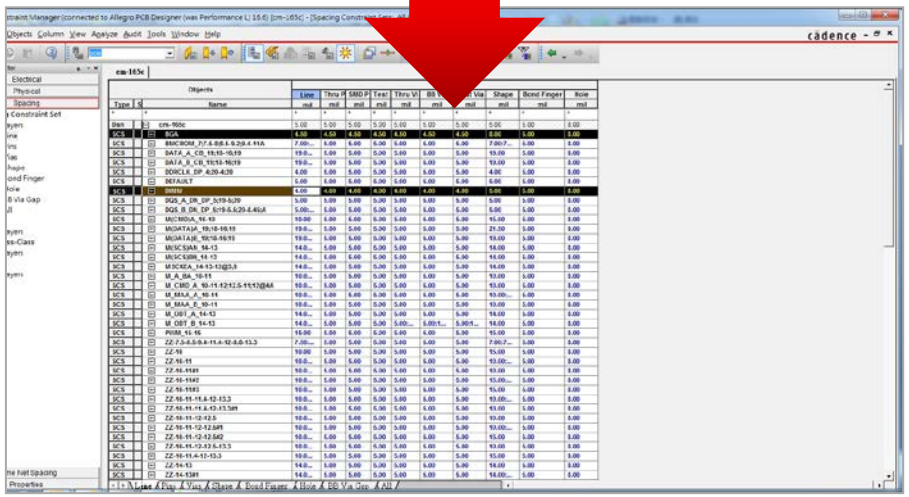
- Constraints
  - Graser / CM import
- Routing
  - Auto Connect
  - Create Flow
  - Compress Route
  - Auto-Routing Enhancements / Flow Routing Adherence
  - Auto-Interactive Adjust Spacing
  - Trim to Breakout
  - Delete Breakout
  - Add Differential Pair Return Path Vias During Add Connect
  - Fiber Weave Off - Angle Routing
  - Integrate Snake Router into Add Connect Now
- Delay
  - Allegro TimingVision Environment

Graser / CM Import

- Easy to import the design rule



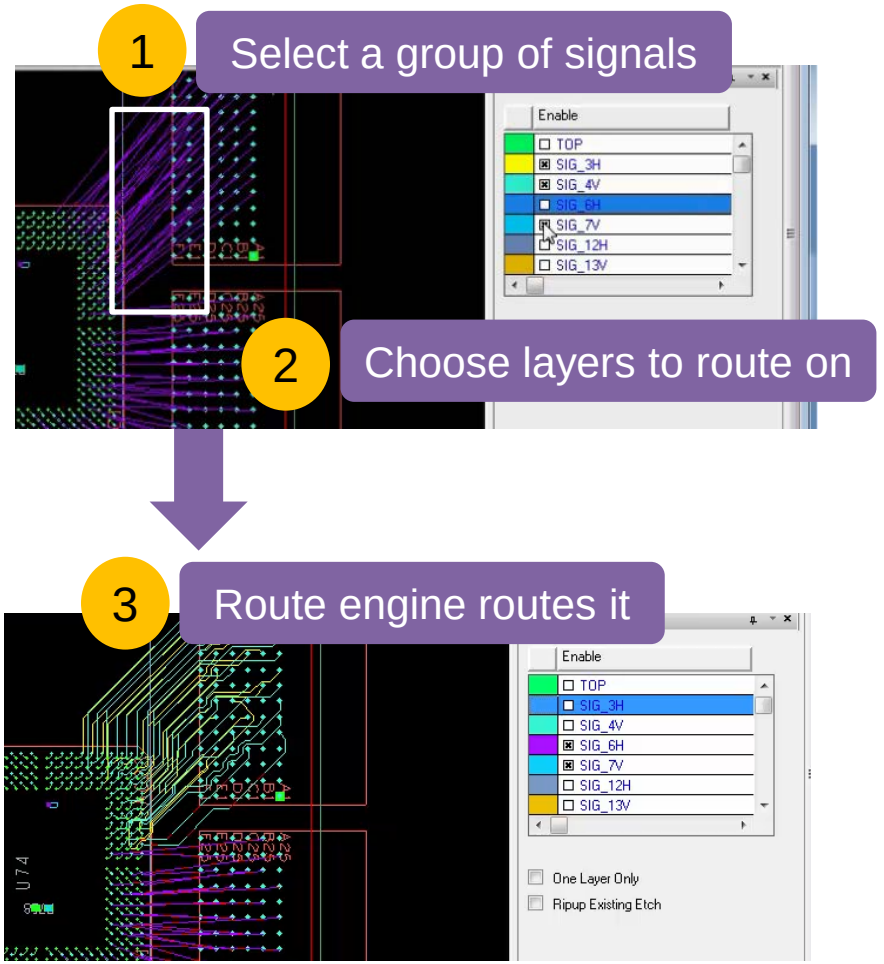




Auto Connect

Direct to etch auto-routing

- Fast routing of selected set of signals
  - No planning required
- Out of the box technology leverage underlying route engine
- User selects rats, adjusts layer settings and system routes it
- Results are very similar to “hand routed” efforts but in a fraction of time
- Rip up and retry option

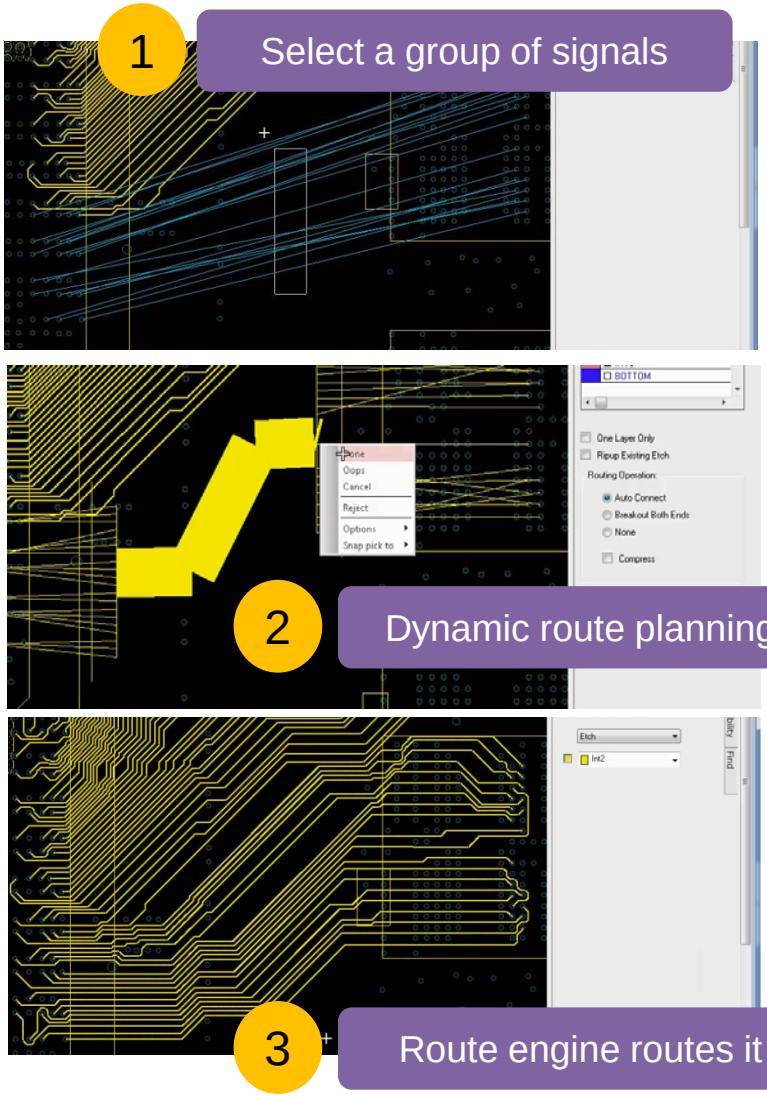


(Design Planning Option)

Create Flow

Dynamic flow creation with routing

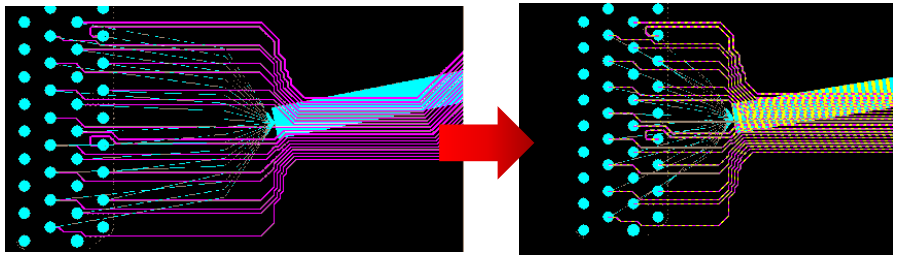
- Fast routing with route intent preserved
  - Rerouting signals is easy with changing layers if necessary
  - Route intent is reused in future revisions
- User selects a group of signals
- System creates the bundle dynamically
- User continues defining route plan / path to guide route engine
- Route engine routes it by using Auto connect
- Option to route in sections
  - Breakout
  - Trunk

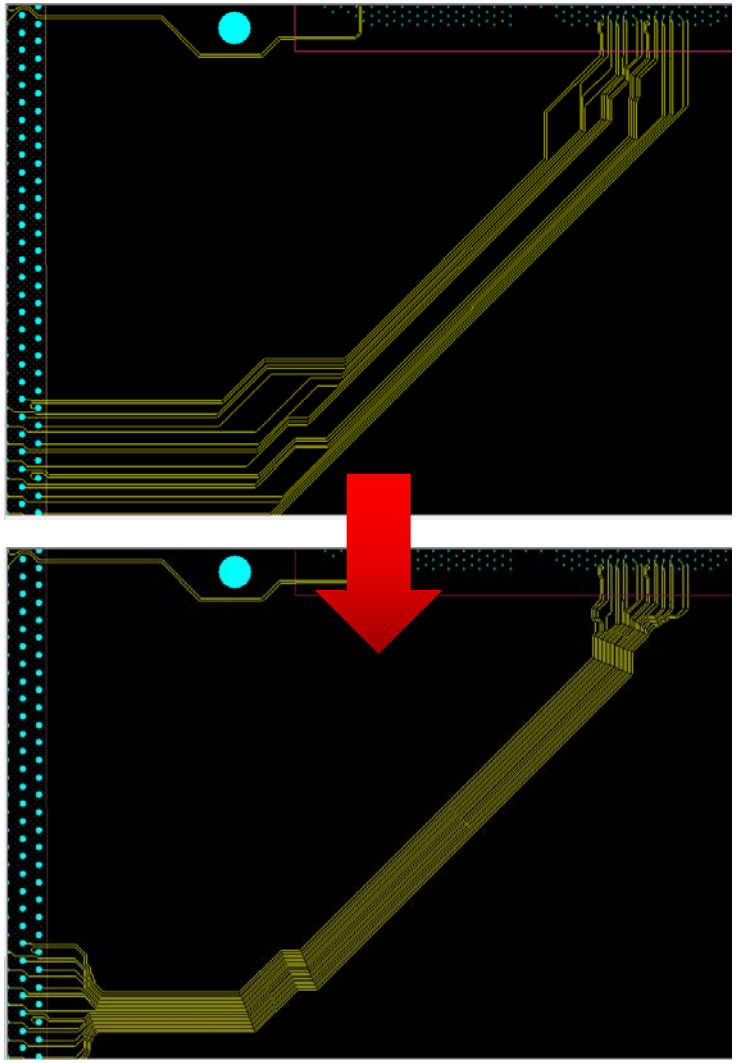


Compress Route

User controlled compression

- Compress routing to MIN DRC Gap
- Compress routes are attached to a bundle
- User can control compression area
- Location of bundle end point controls the compression around break out
- Faster clean up

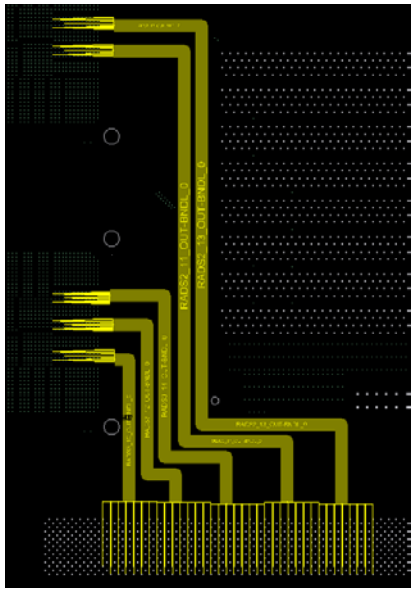




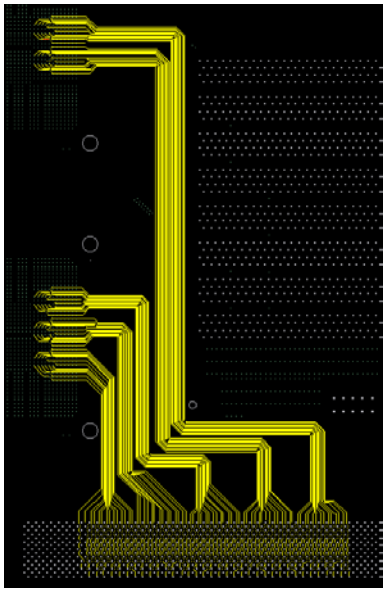
(Design Planning Option)

Auto-Routing Enhancements
Flow Routing Adherence

- Auto-router will follow bundle path more “strictly”
  - User draws flow path for each net group
  - Auto - Breakout both ends of bundle (AiBT)
- Generate route results that match hand routing



Flow Bundles

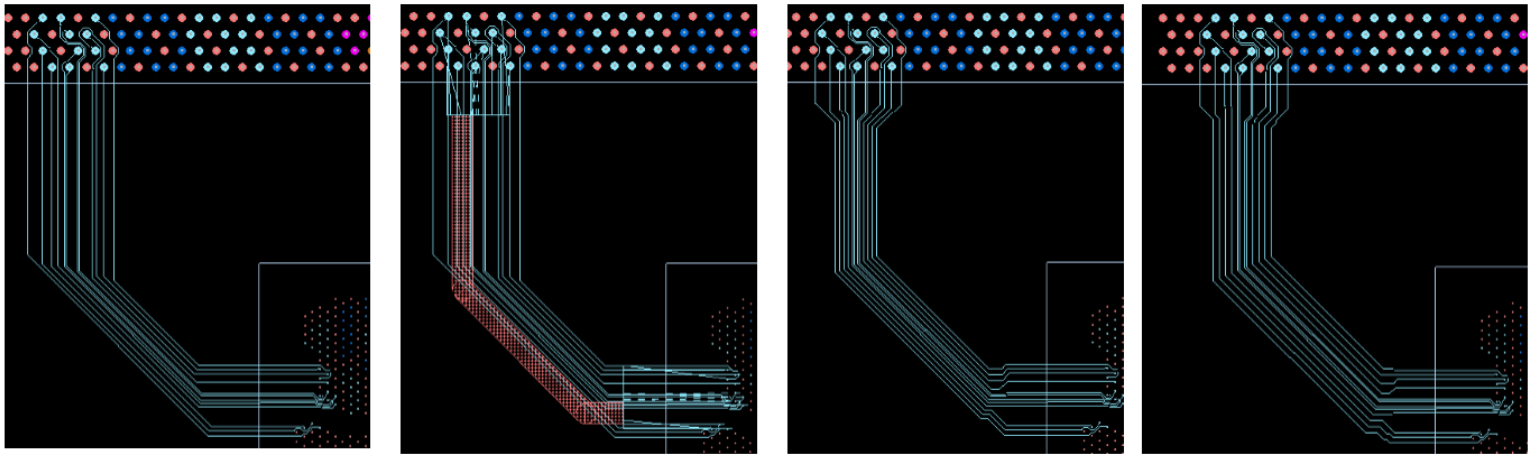


Router Results

(Design Planning Option)

Auto-Interactive Adjust Spacing

- Allow users to compress / expand line to line spacing within signal group
- Use RMB on bundle → Adjust Spacing
  - Enter spacing (constraint or user value)
- Adjust spacing for tuning or plan other routes



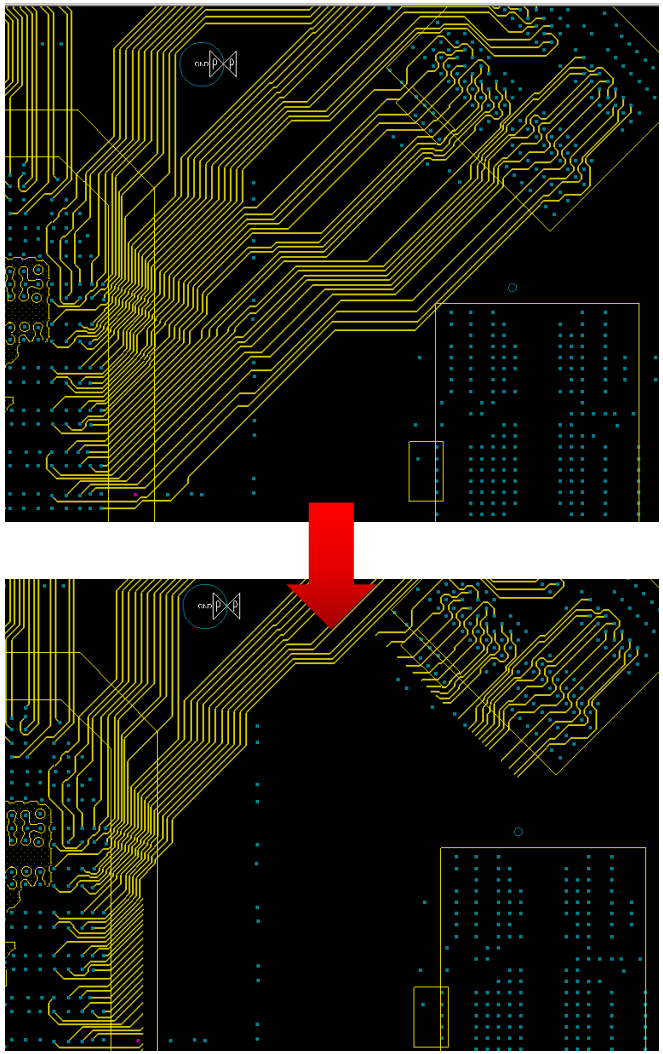
Initial Routes | Display Flow Bundle | Adjust Spacing to Min Constraint | Increased Line to Line Spacing

(Design Planning Option)

Trim to Breakout / Delete Breakout

Multi-stage routing / changes

- Trim to Breakout
  - Removes trunk of routed bus
  - Trims or extends dangling etch
  - Bundle defines cut line
- Delete Breakout
  - Deletes breakout etch on the selected side of bundle
- Work with groups of signals
- Handle breakout / component changes

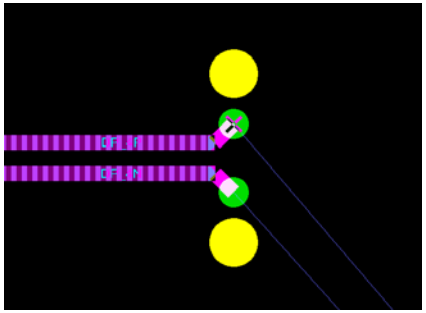


(Design Planning Option)

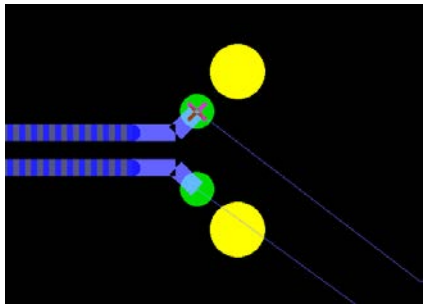
Add Differential Pair Return Path Vias During Add Connect

- Choose 1 of 6 pre-defined configurations when routing Diff Pairs
  - Single shared via
  - In line
  - Equidistant
  - Offset
  - Diamond
  - Rectangular

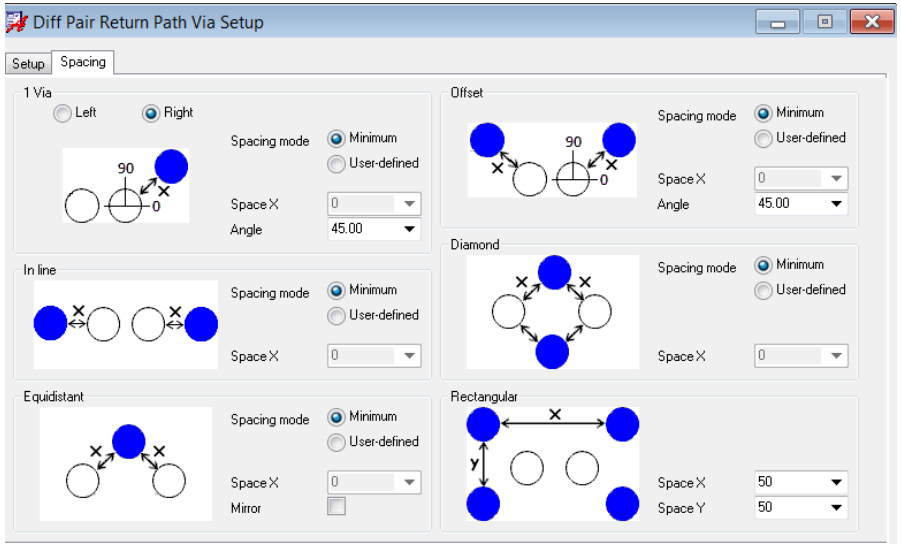
- User selectable
  - Assignment of netname (GND etc)
  - Padstack or via structure



In Line



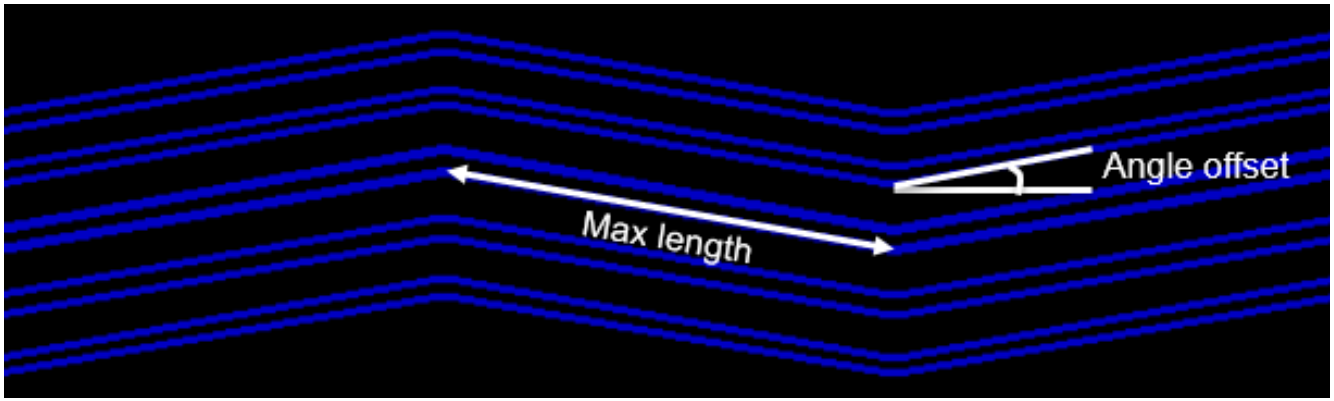
Offset



(High-Speed Option)

Fiber Weave Off – Angle Routing

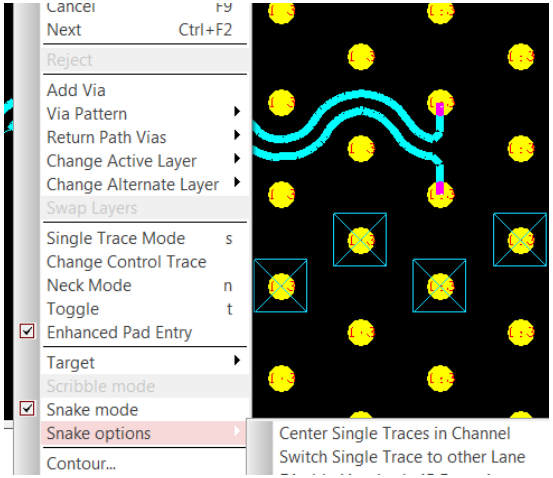
- Change a group of parallel segments to a Zig-Zag pattern
- Support for Diff Pairs and Single Ended Nets
- Convert full segments or user defined start/end points
- Options
  - Angle offset (defaults to 10 degrees)
  - Max Length of legs (user entry)

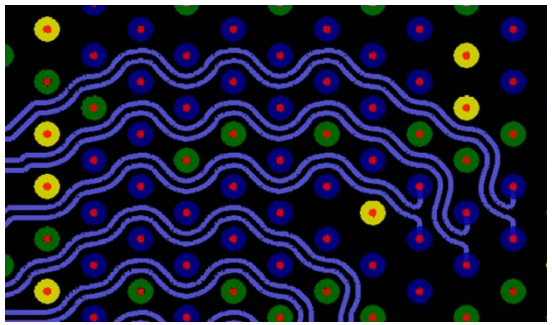


(High-Speed Option)

Integrate Snake Router into Add Connect Now

- User doesn’t have to enter line width and gap any more
- Resume snake routing from partially routed path
- Natural line angle transition when routing into open space
- Single line centering option

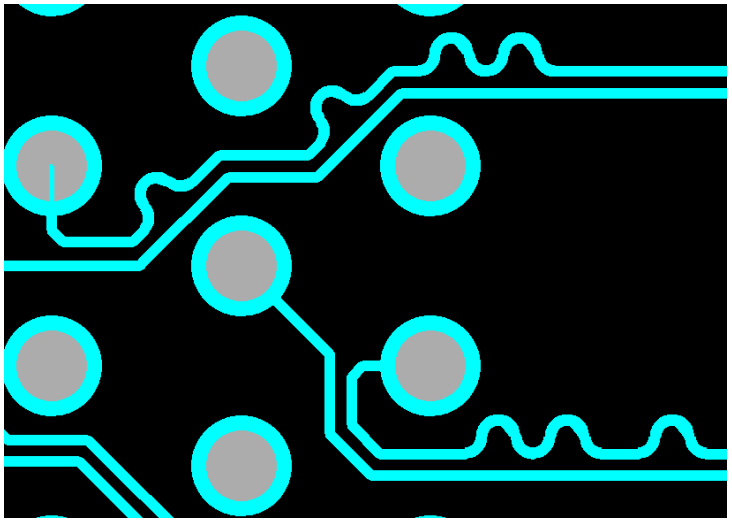


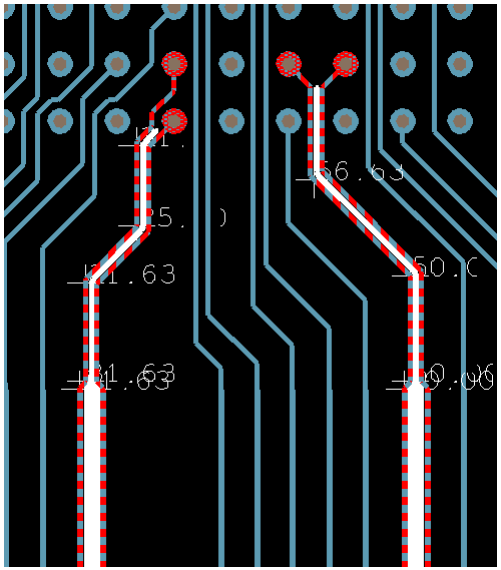


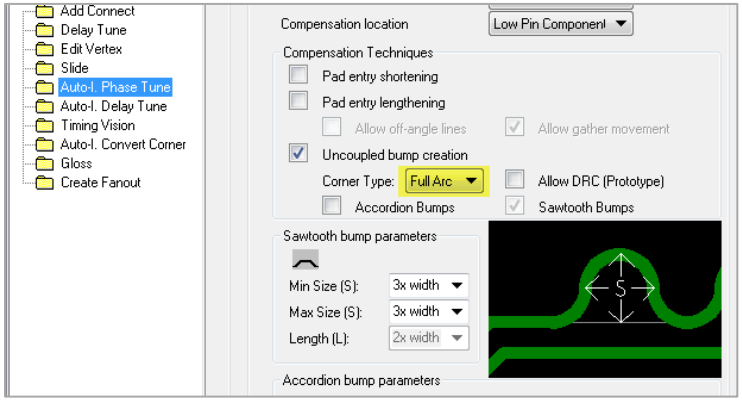
Snake Routing

Allegro TimingVision Environment

- AiPT : Arc phase bumps
- AiDT : Arc delay tuning bumps
- Timing Vision - Diff Pair dynamic phase support



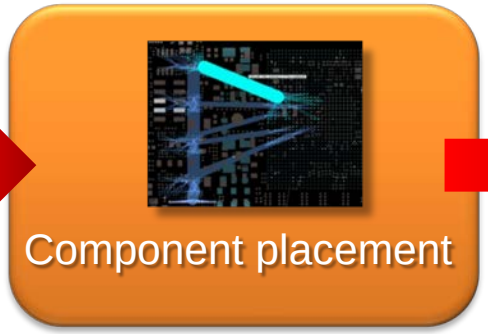




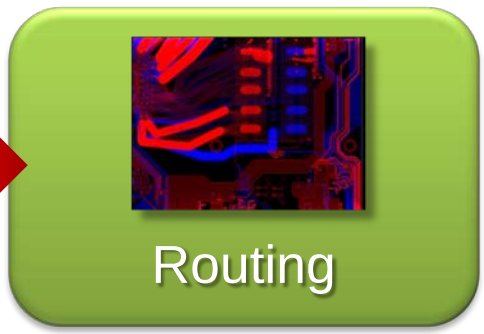
(High-Speed Option)

Design Productivity and Predictability with Interface – aware PCB Design

- Accelerate design intent creating with Interfaces
- Constraint interfaces

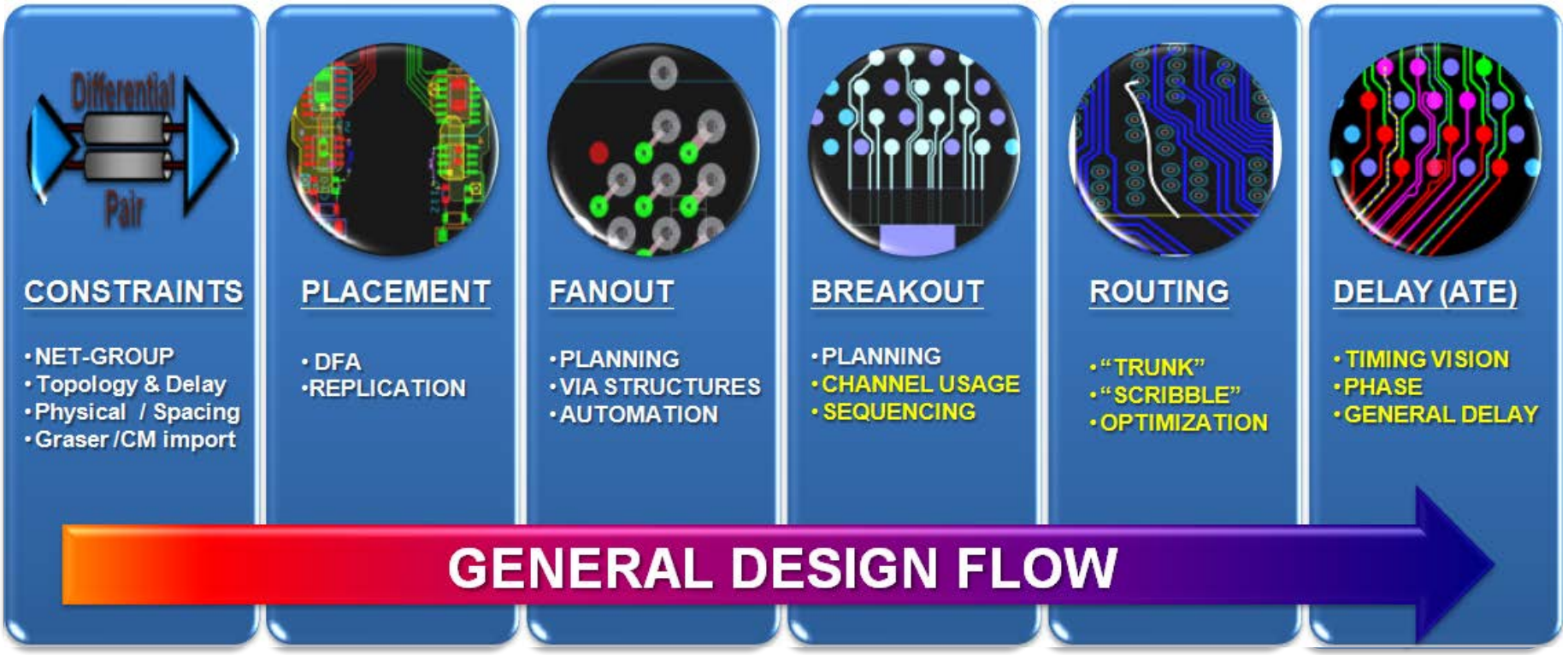


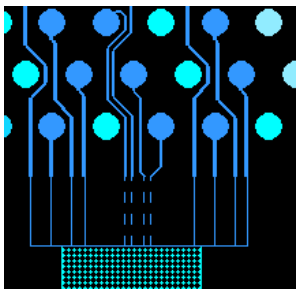
- Finalize critical component placement
- Route planning
- Perform Feasibility analysis

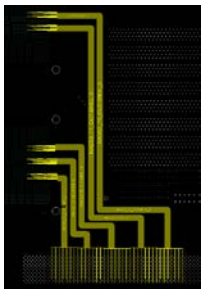


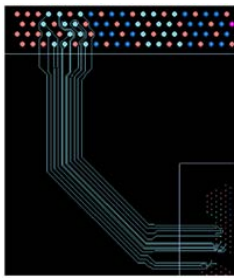
- Refine Route plan
- Auto-interactive Breakout Tuning
- Auto-interactive Trunk Routing
- Auto Connect
- Auto-Interactive Phase Tune
- Auto-Interactive Delay Tune

Design Process (Outsourcing)









Increase Productivity and Quality!

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PAL-PILOT
Experience Sharing

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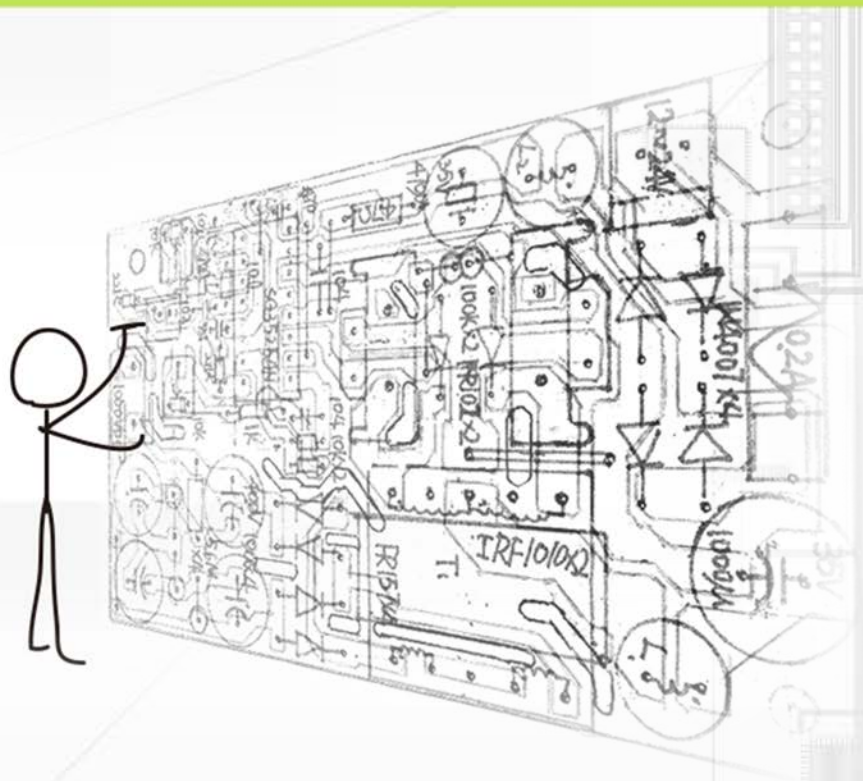
未來の進行式

INTEGRITY, QUALITY, SPEED



PCB Design for maximum productivity

Edward Lai & Jason Jiang

16/Oct/2015

PAL-PILOT Your long term partner in PCB Design and Fabrication

Agenda

- PCB Estimate in Allegro
- Allegro 16.6 Enhancement
- Experience Sharing
- Improve Productivity
- Improve Quality

PCB Estimate in Allegro

- 主要目標

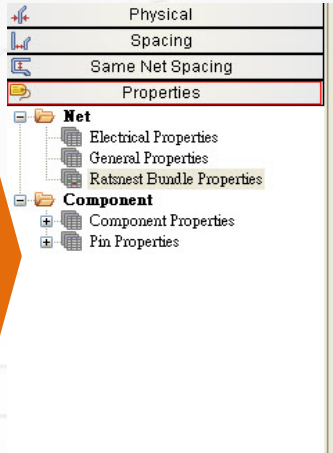
  減少Layout與EE間的評估時間，加速專案開發。

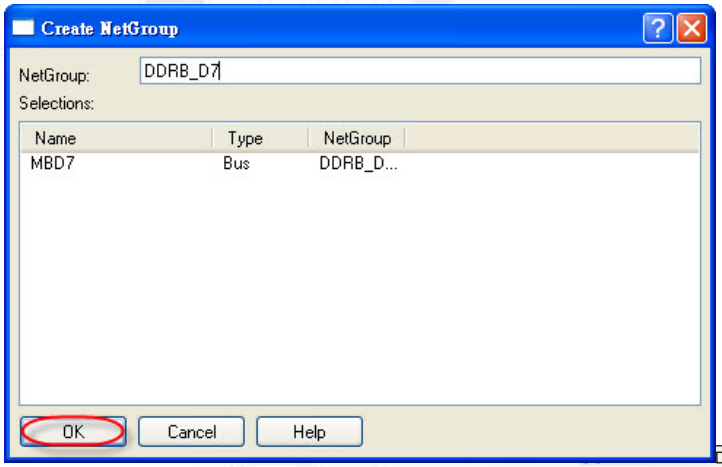
- 使用功能

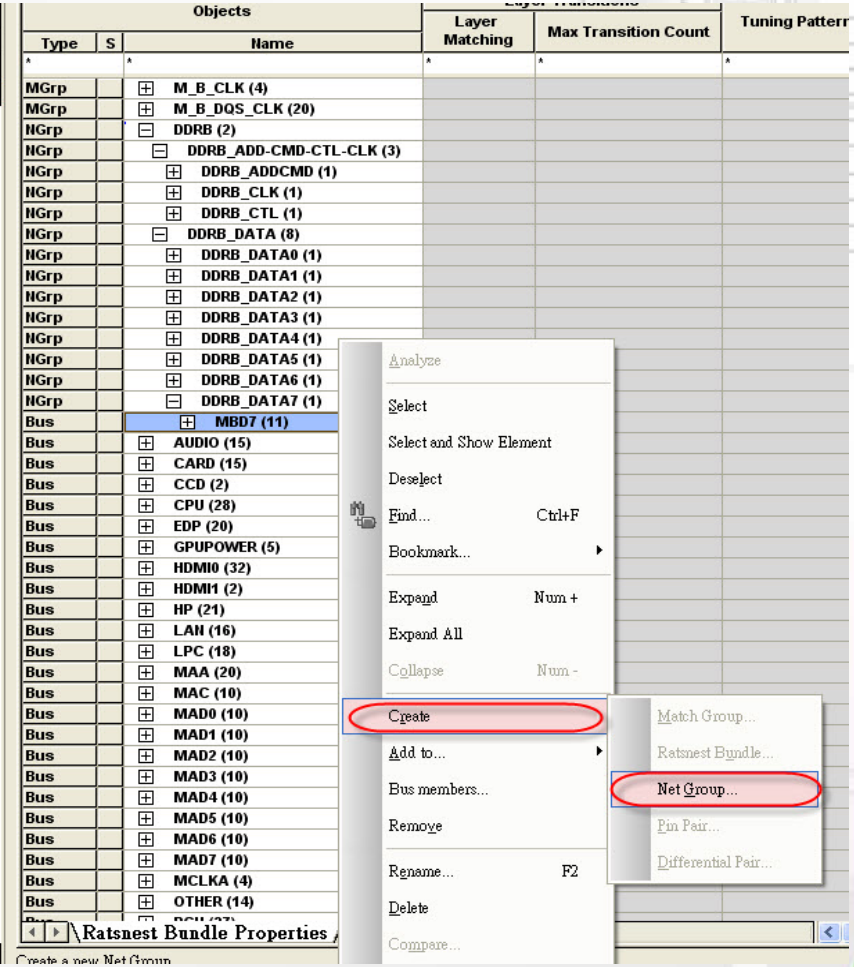
  Net Group

  Bundle Operation

Create Net Group







Create Net Group

階層如下：

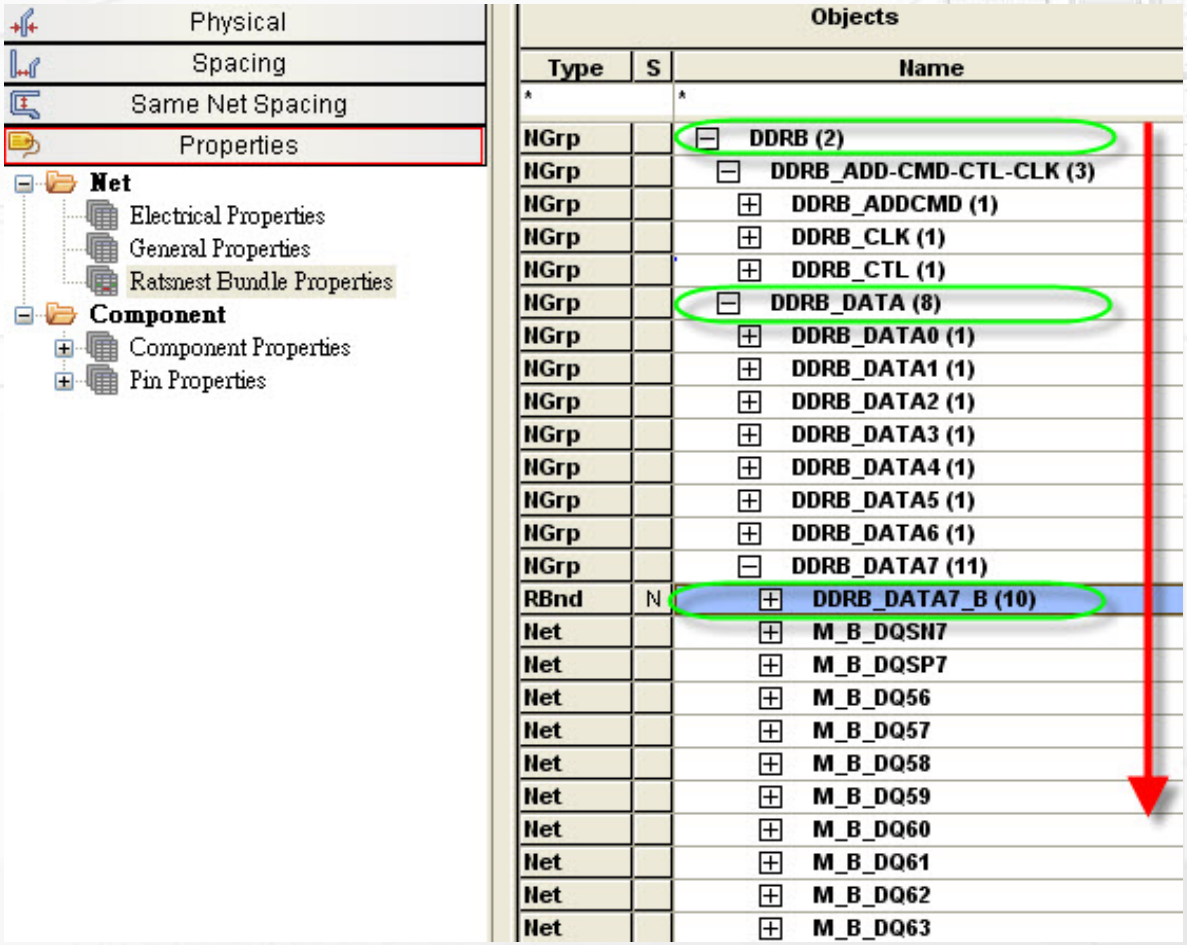
Net Group

↓

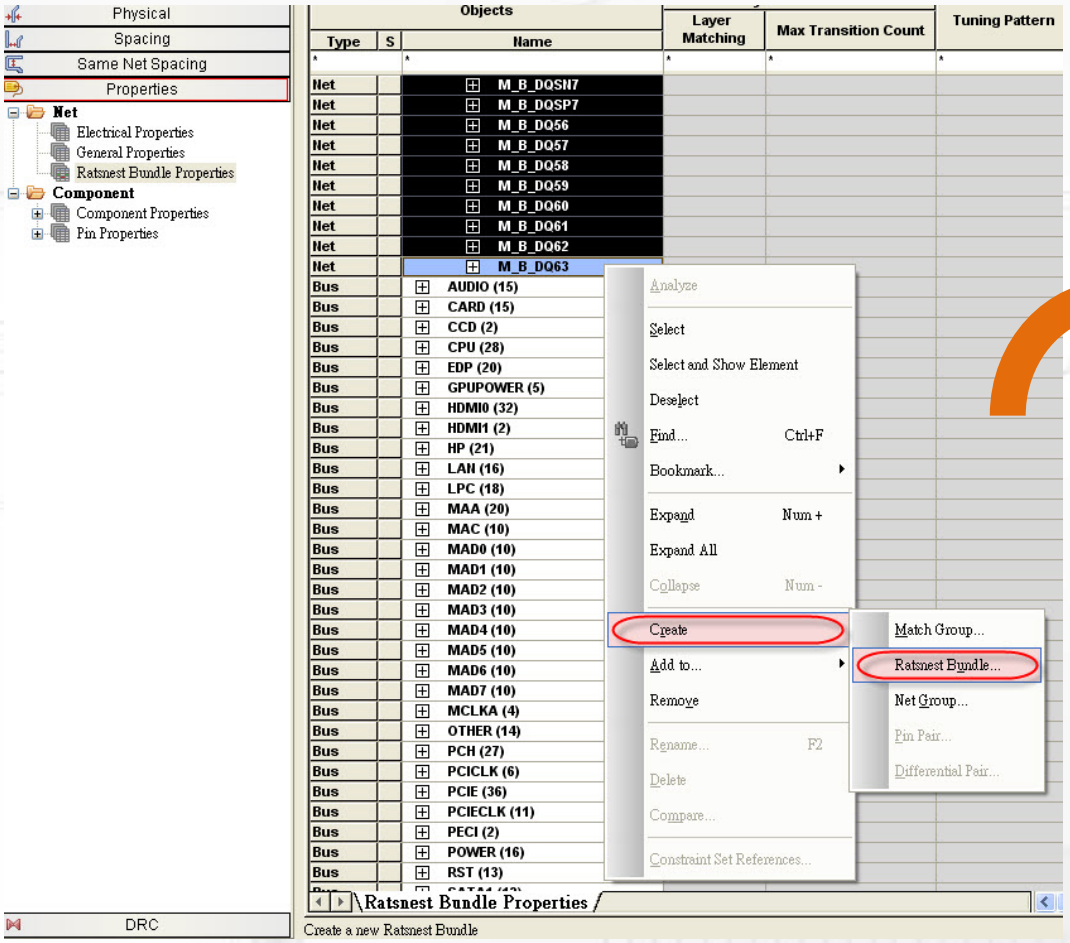
Net Group

↓

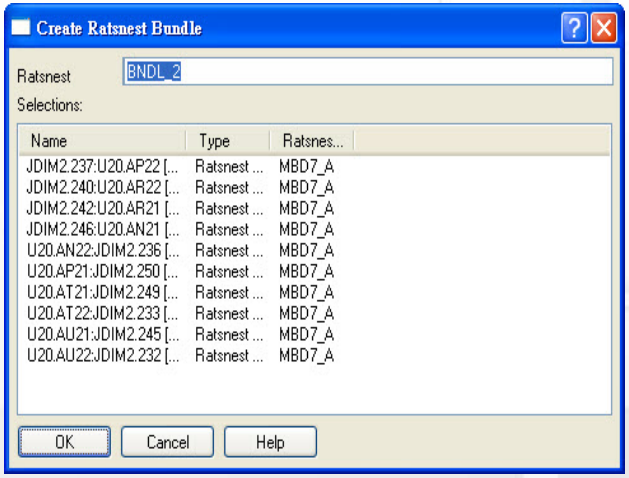
RBnd



Create Ratsnest Bundle

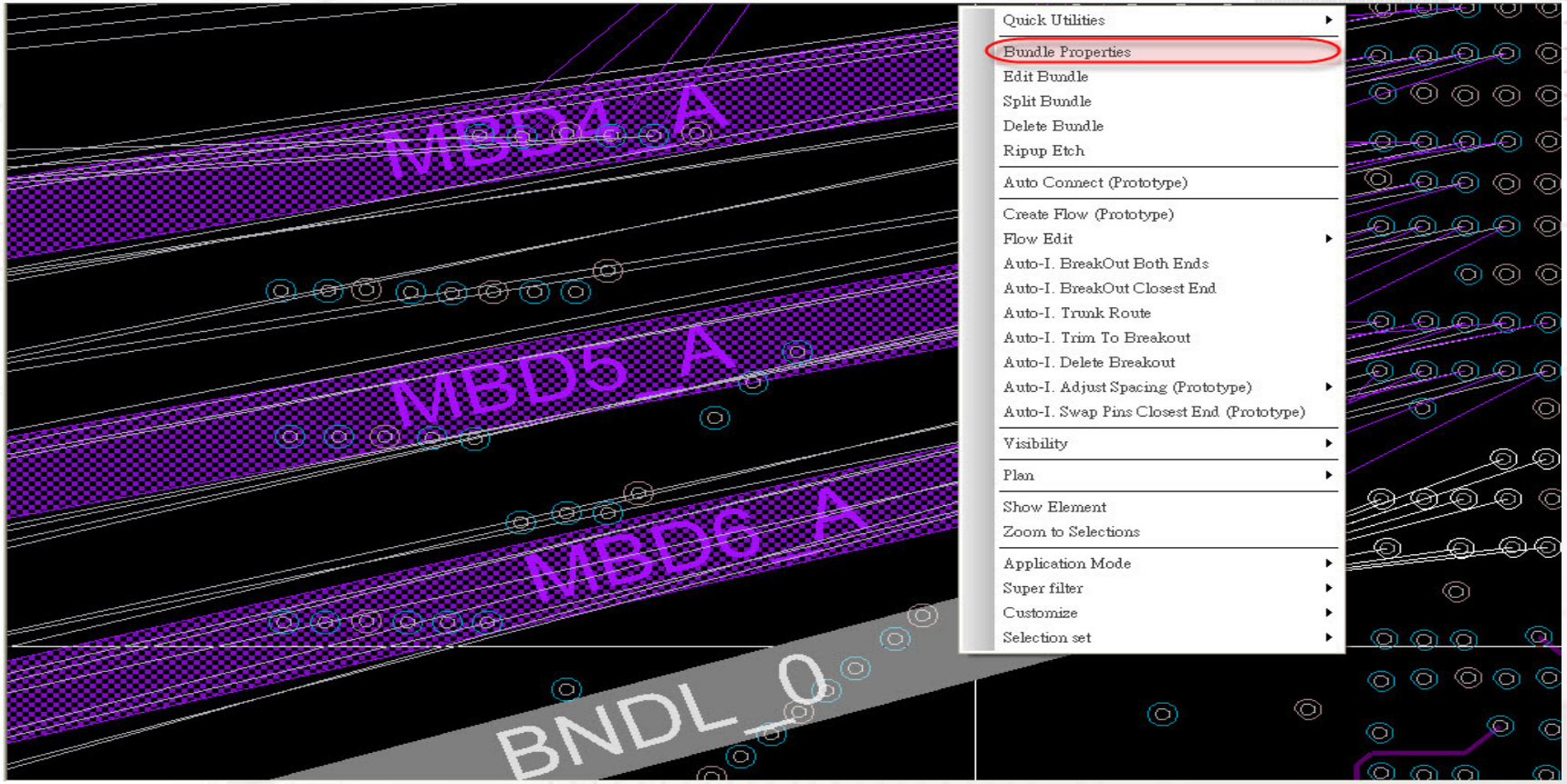


◎直接選擇Net



Bundle Properties

◎右鍵選單→Bundle Properties

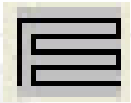


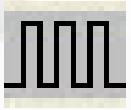
Routing Controls

◎Allow in constraint area

允許在constraint area處理

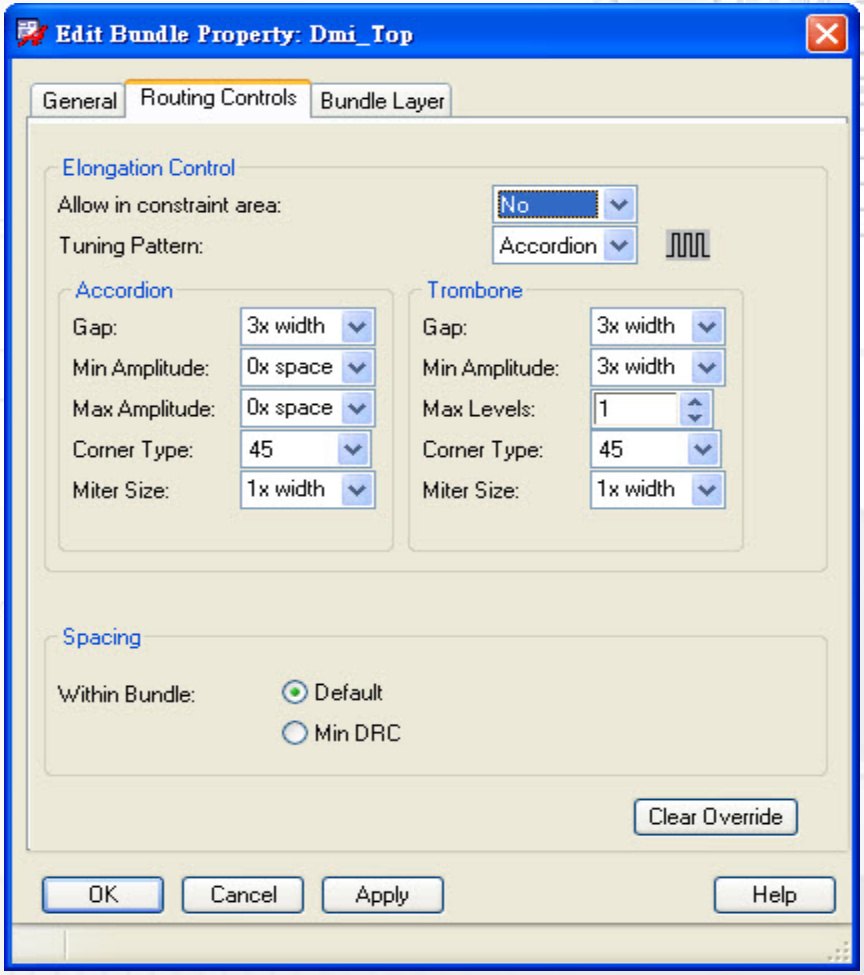
◎ Tuning Pattern

Accordion 

Trombone 

◎Within Bundle

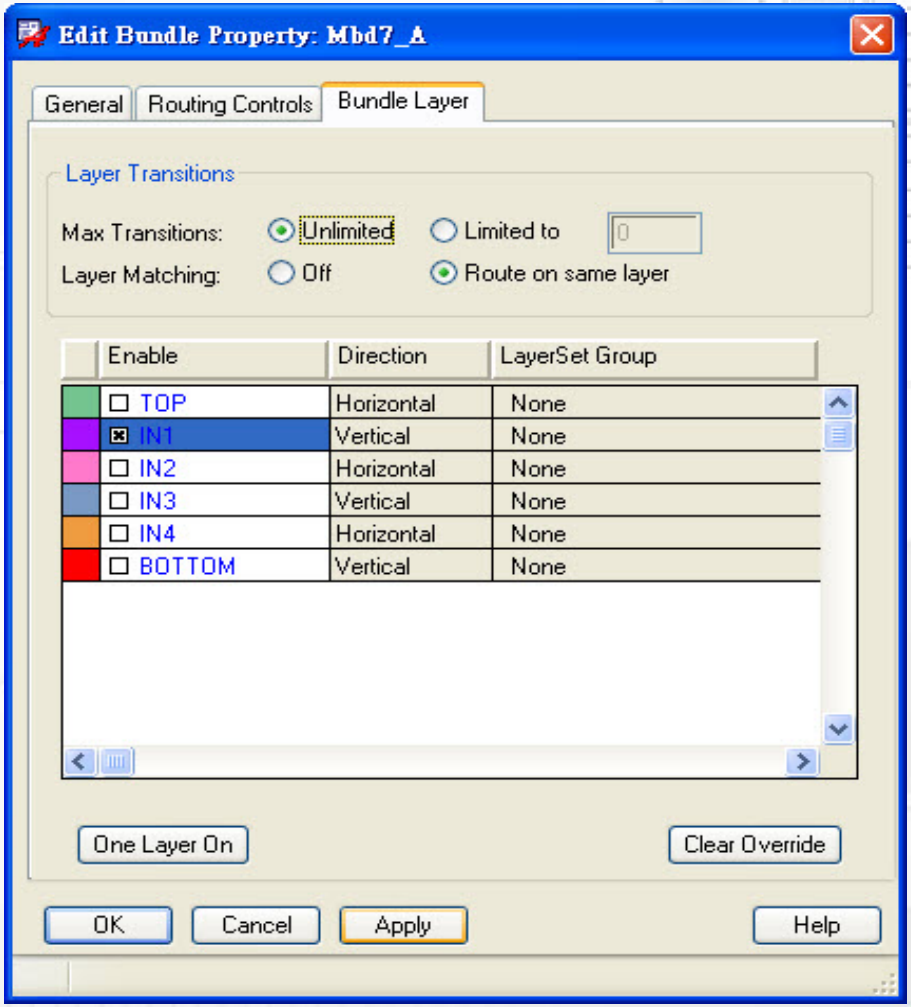
在Bundle內部spacing選項



Bundle Layer

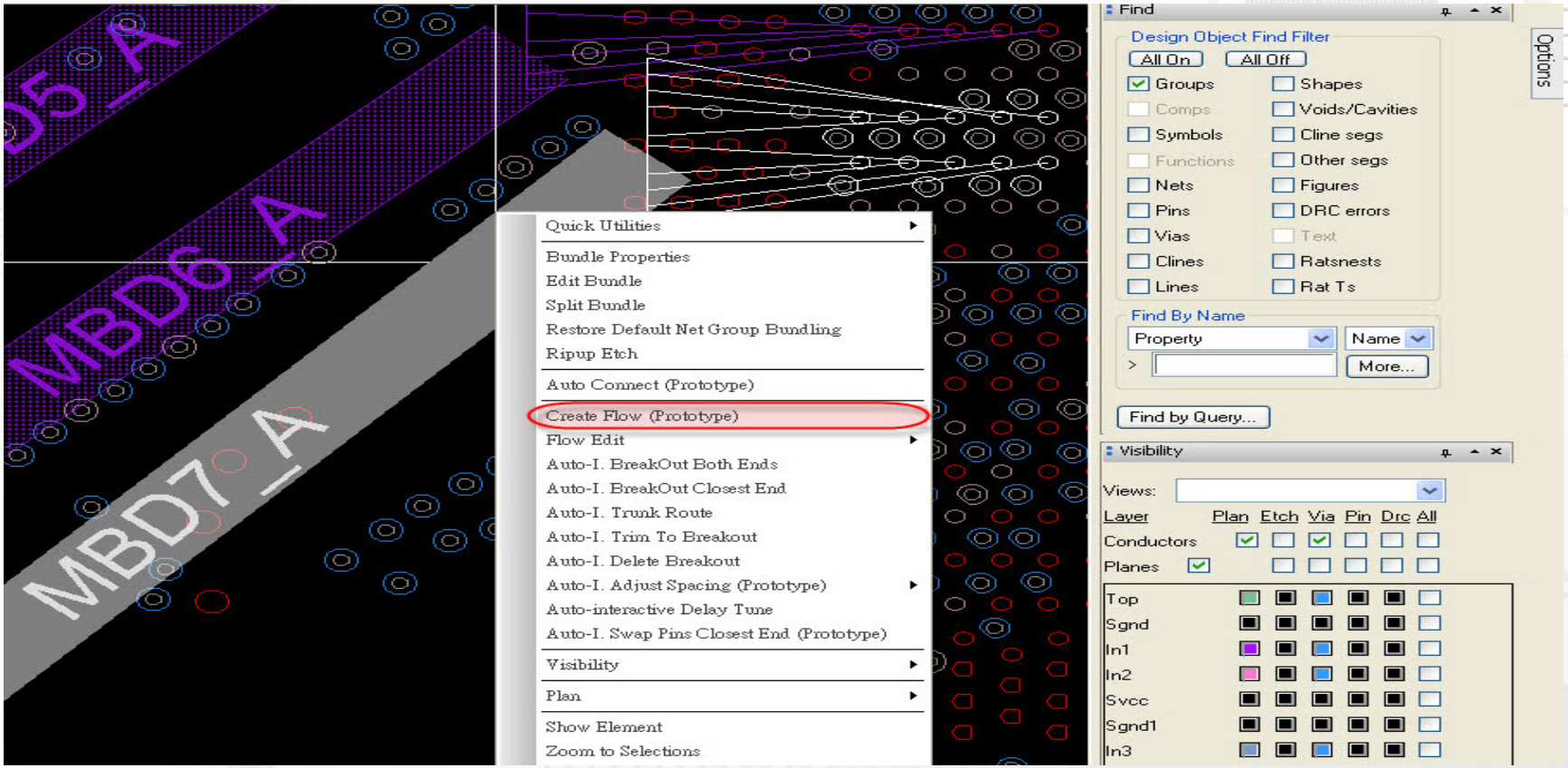
◎ One Layer On

先點選再選擇層面



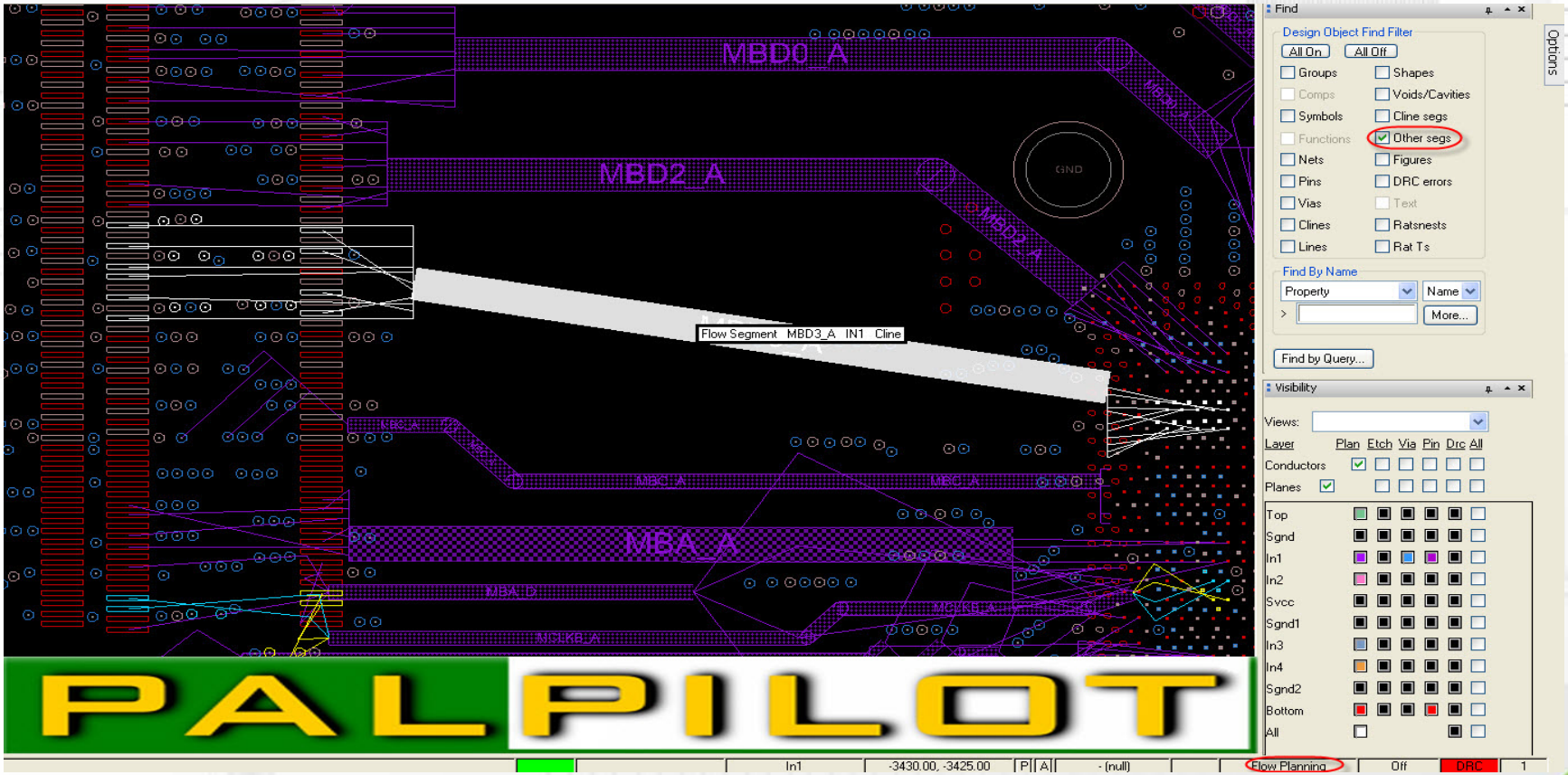
Create Flow

◎點選後操作如一般走線



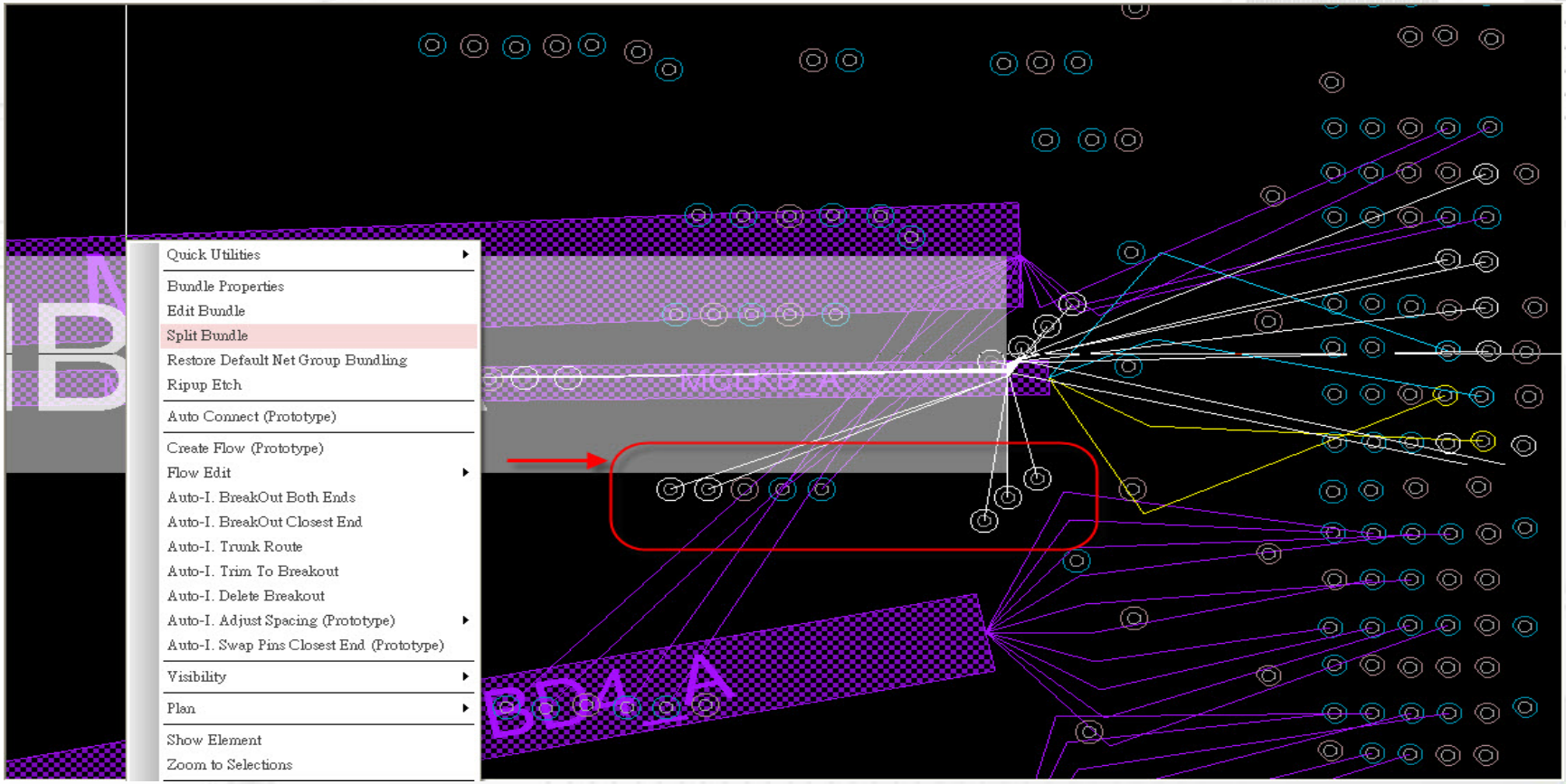
Vertex Bundle

◎Flow Planning→Other segs→滑鼠左鍵長按



Split Bundle

◎點選欲分離的信號



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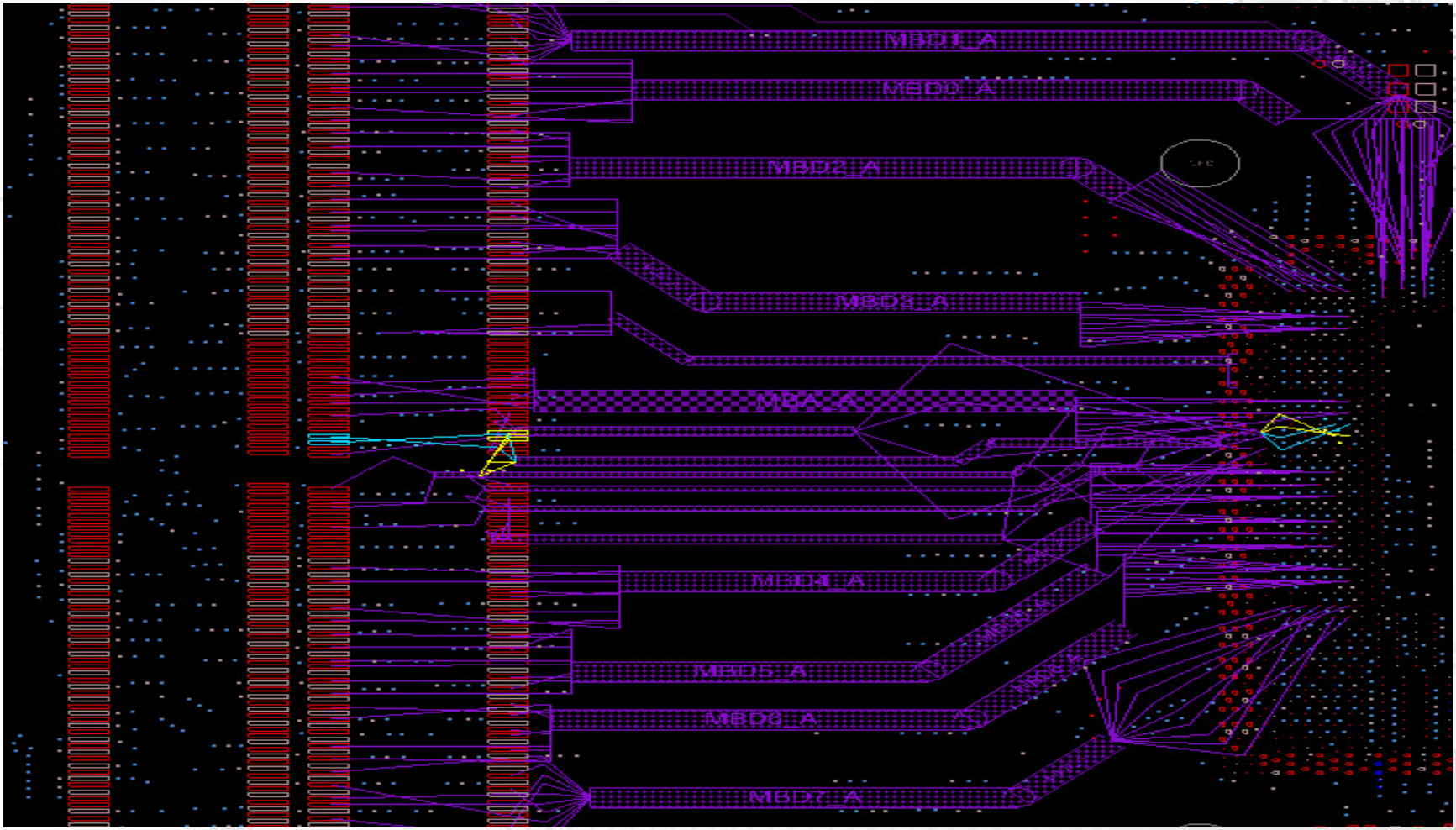
Bundle Finish



Allegro 16.6 Enhancement

- Auto Connect
- Flow Edit
- Auto-I. BreakOut Both Ends/ Closest End
- Auto-I. Trunk Route
- Auto-I. Adjust Spacing
- Auto-I. Delay Tune
- Auto-I. Phase Tune

Auto Connect-DDR

◎ 滑鼠右鍵→Auto Connect

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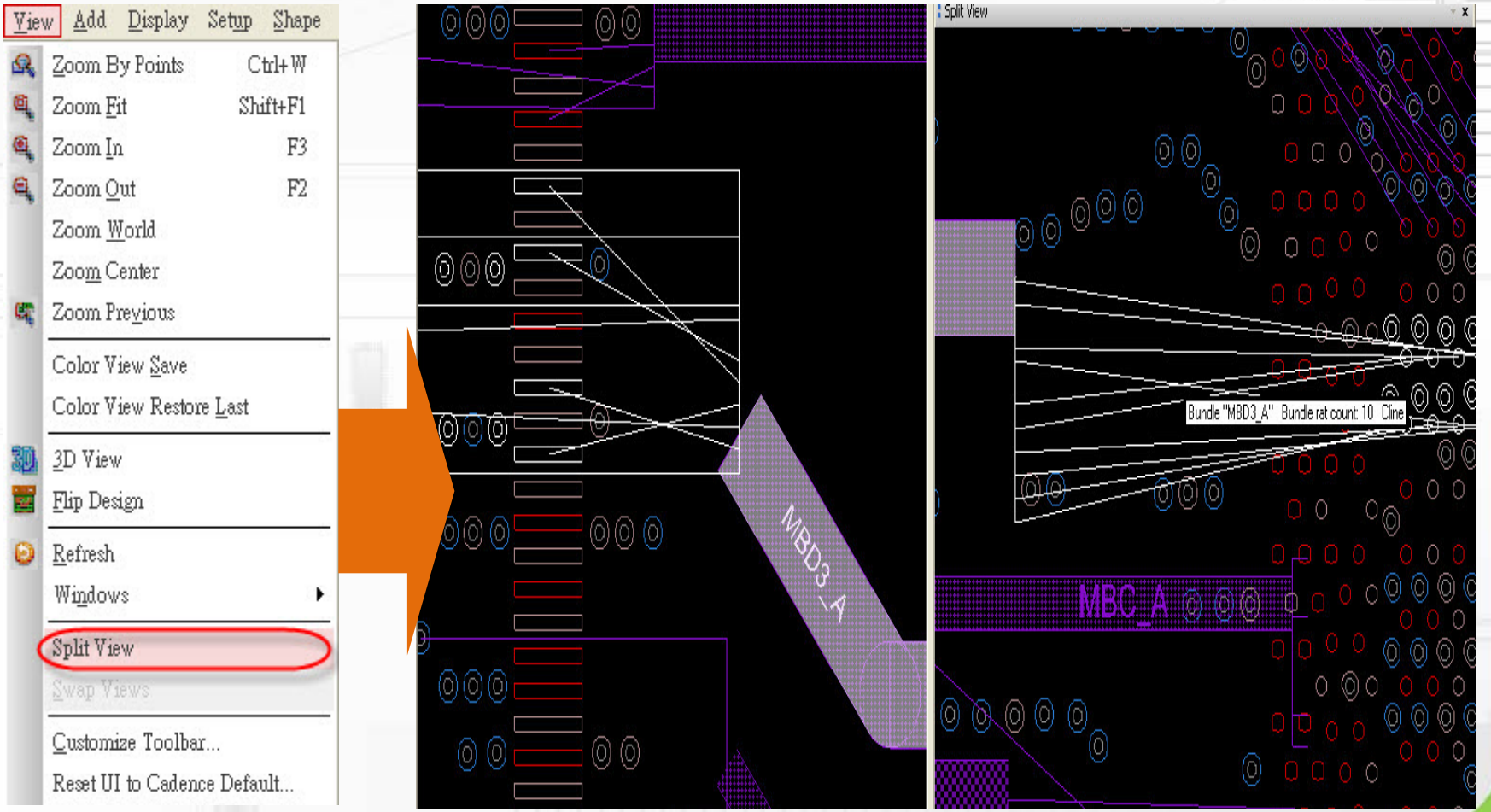
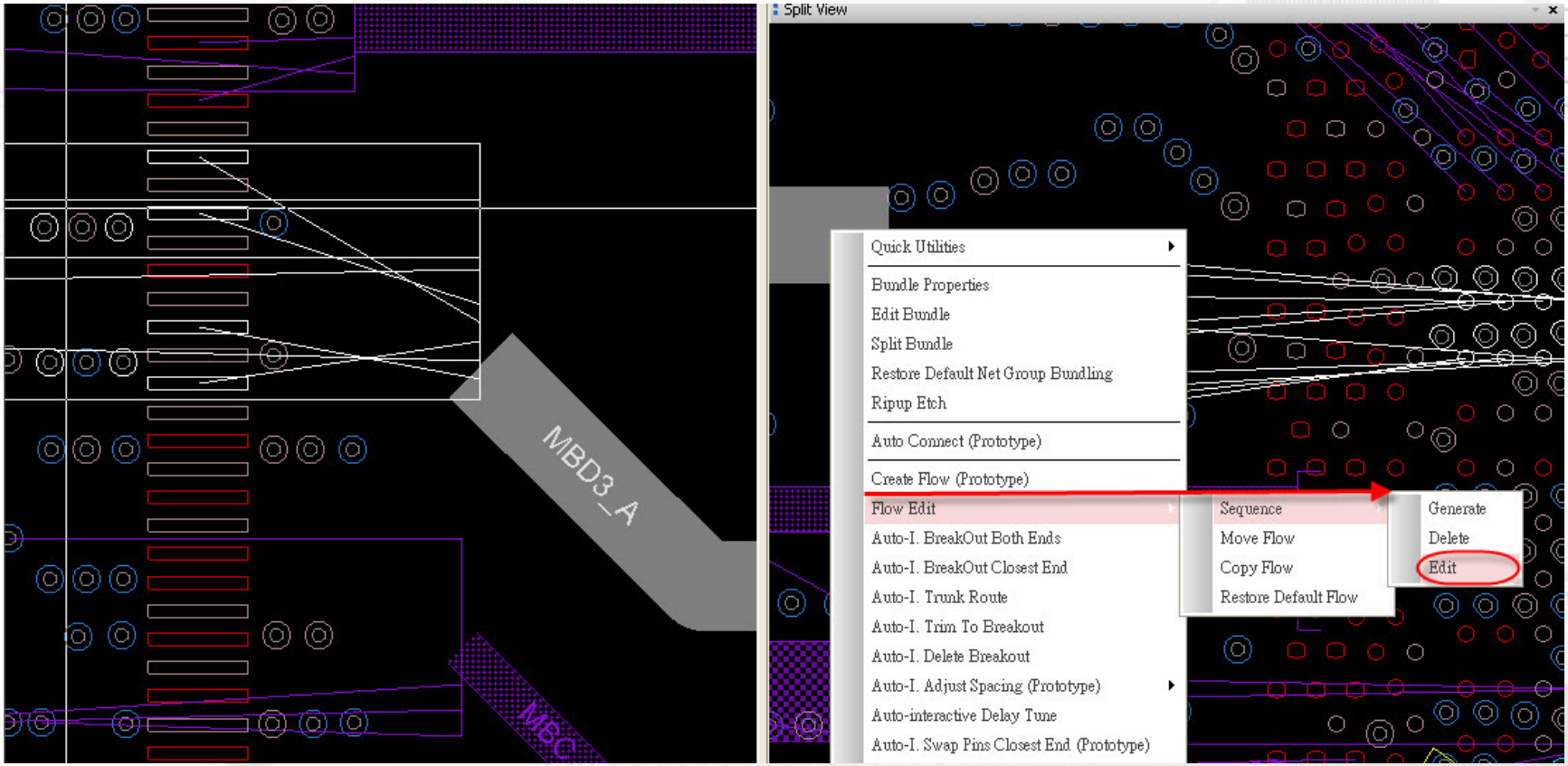
Split View



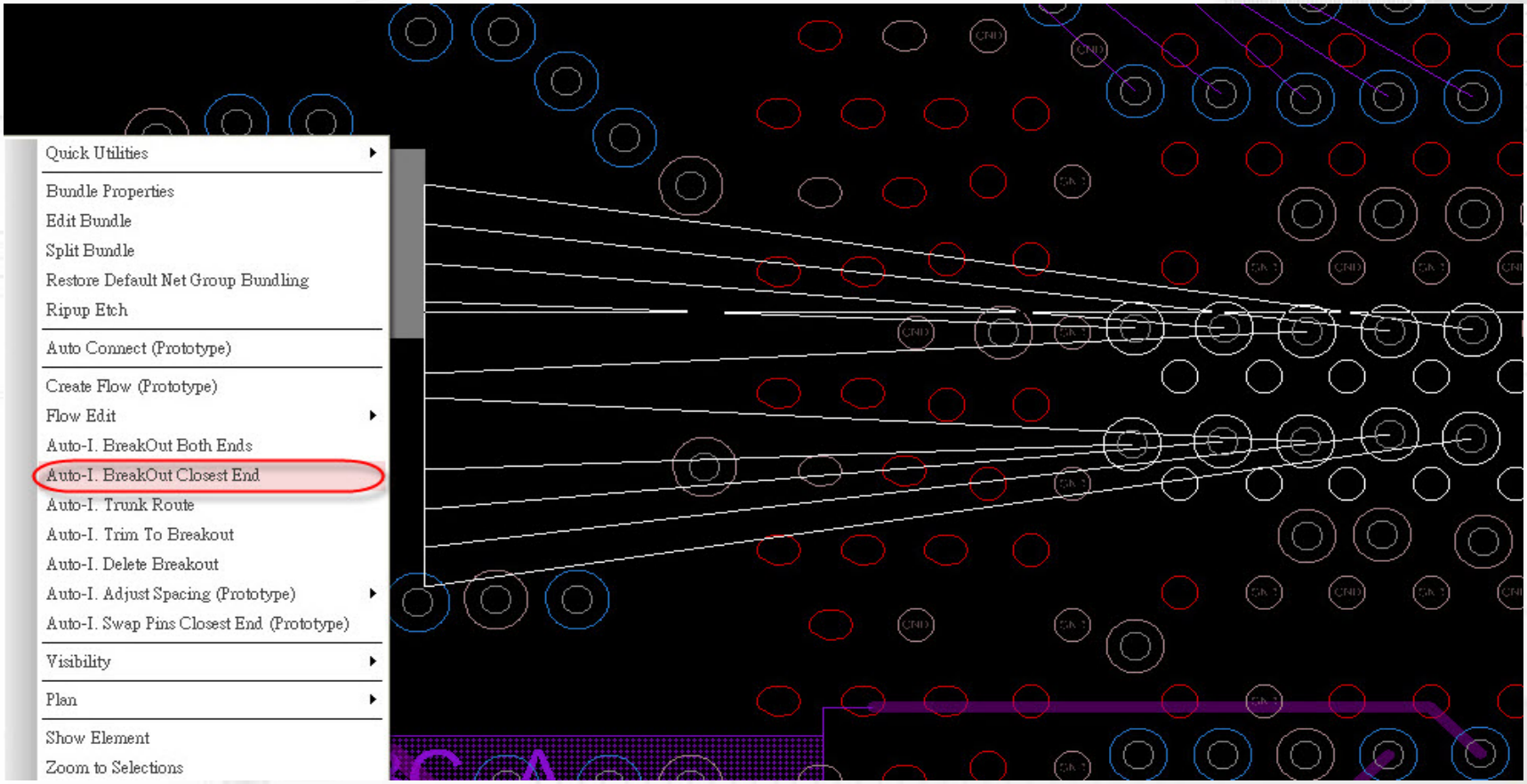
Flow Edit

◎ 用於調整走線順序



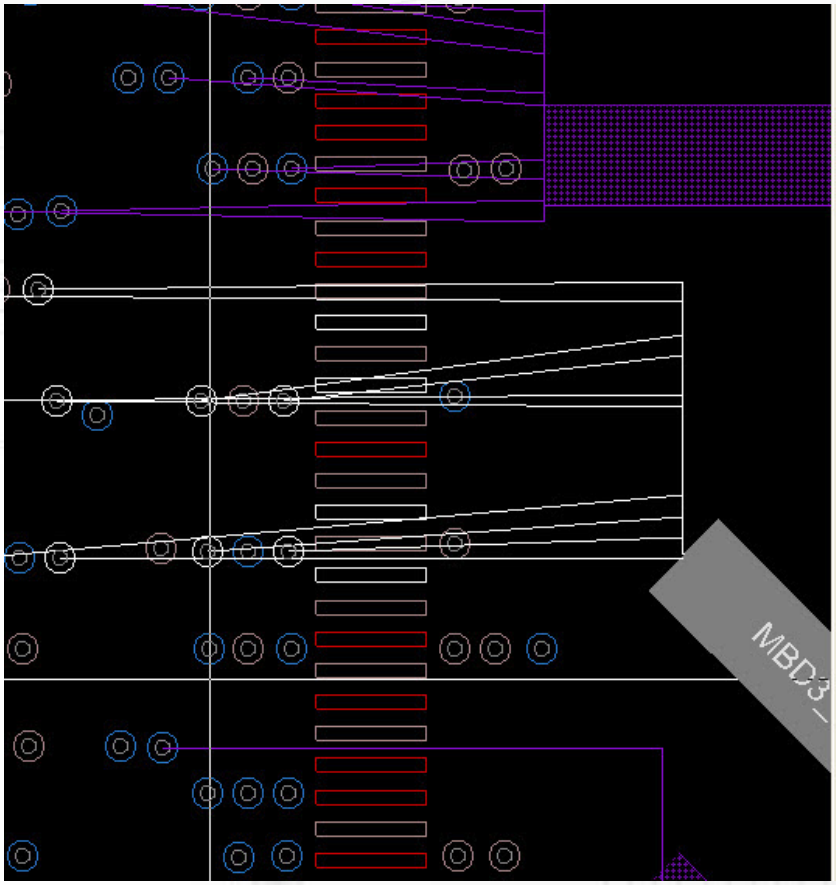
Auto-I. BreakOut Closest End

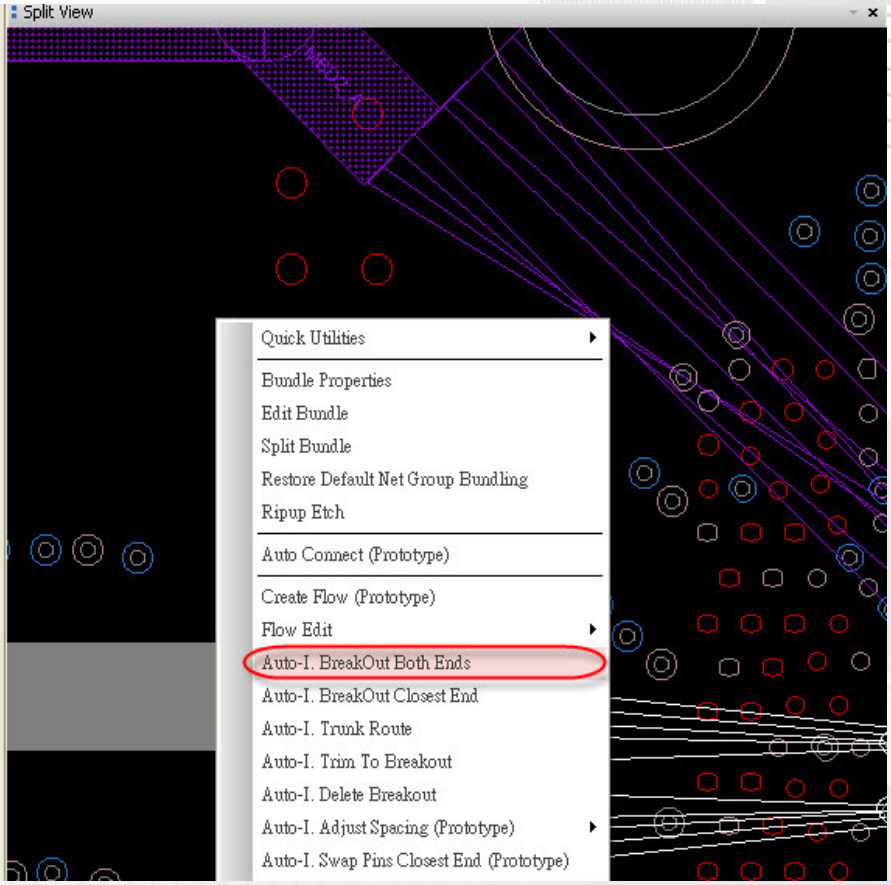
◎ BreakOut接近點選處出Pin



Auto-I. BreakOut Both Ends

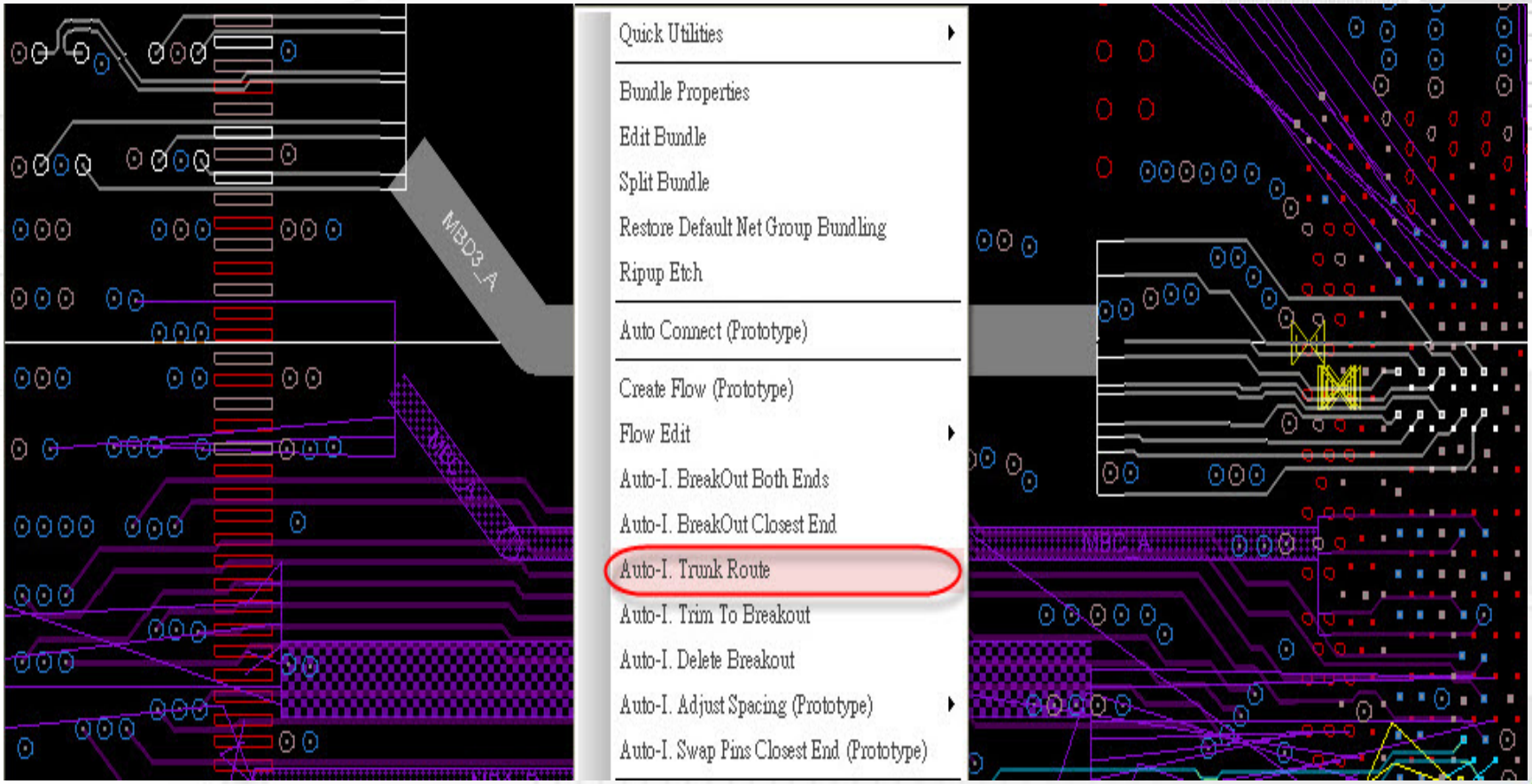
◎ BreakOut兩側同步出Pin





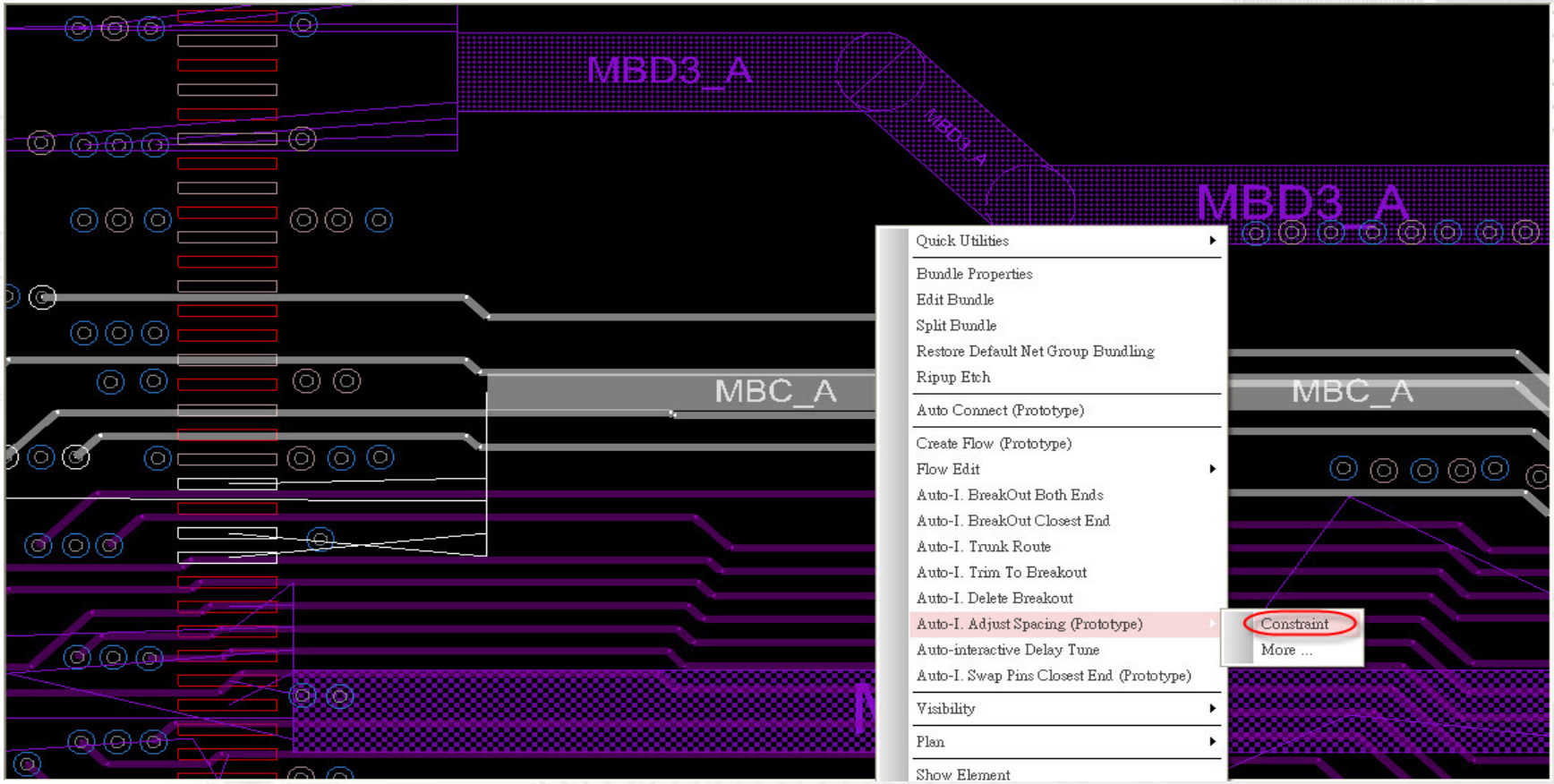
Auto-I. Trunk Route

◎ 連接中間未接上部分



Auto-I. Adjust Spacing

◎Default→Constraint



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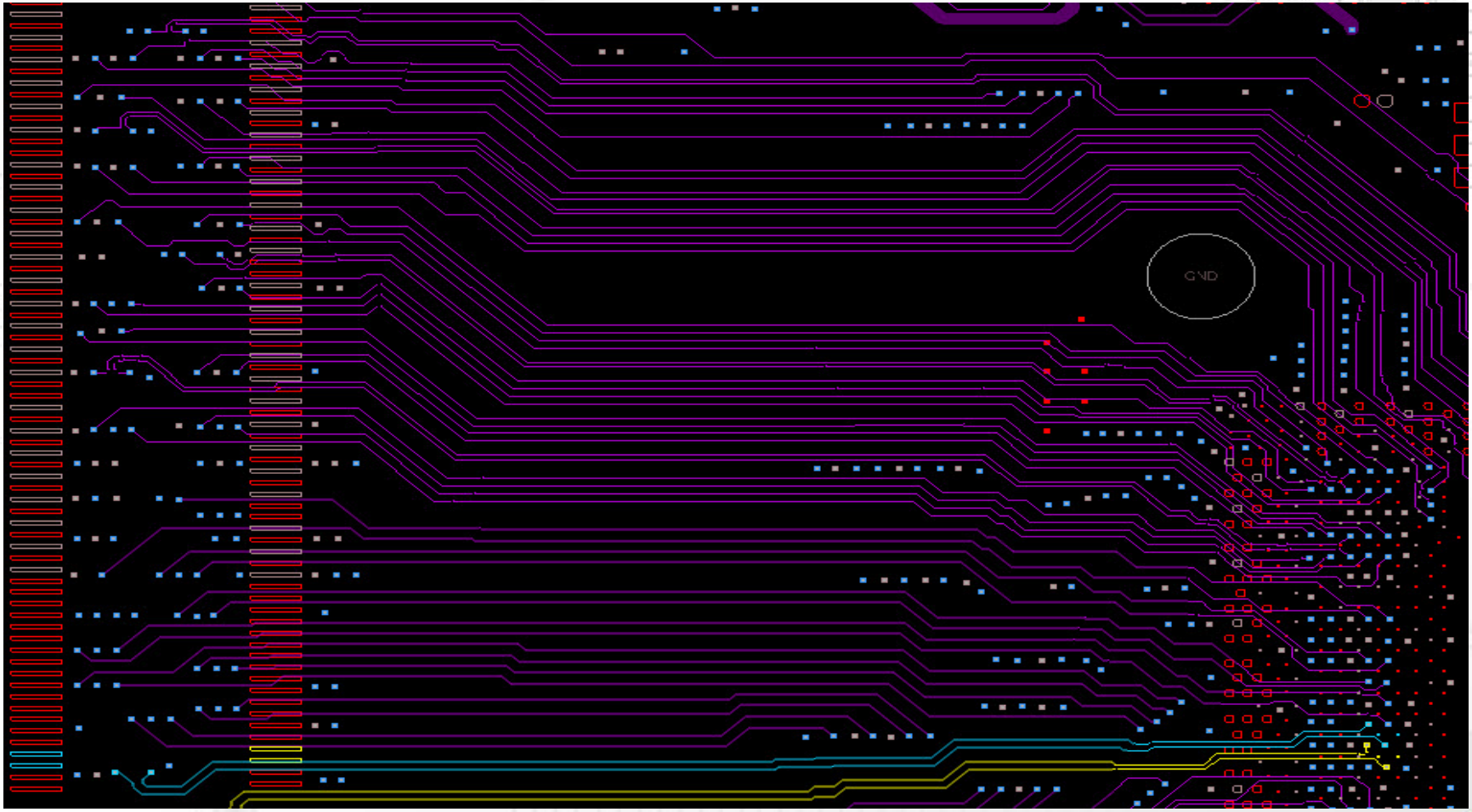
Route Finish

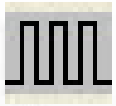


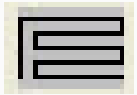
Auto-I. Delay Tune

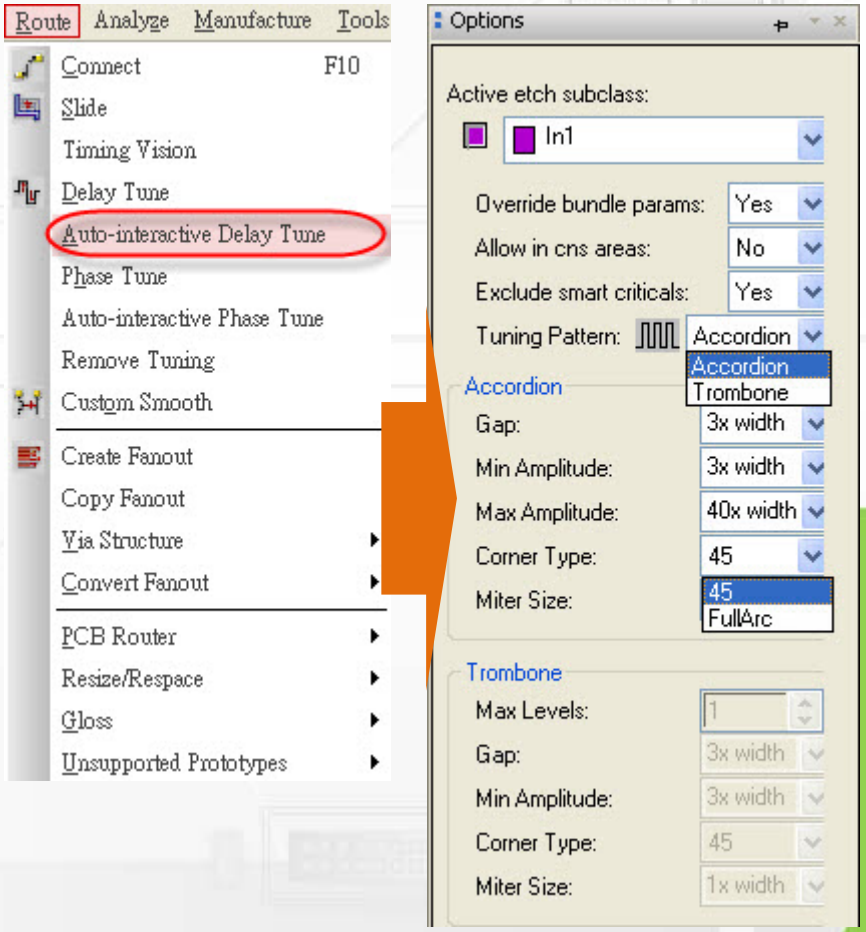
◎Override bundle params

優先於bundle的設定→建議勾選

◎Tuning Pattern

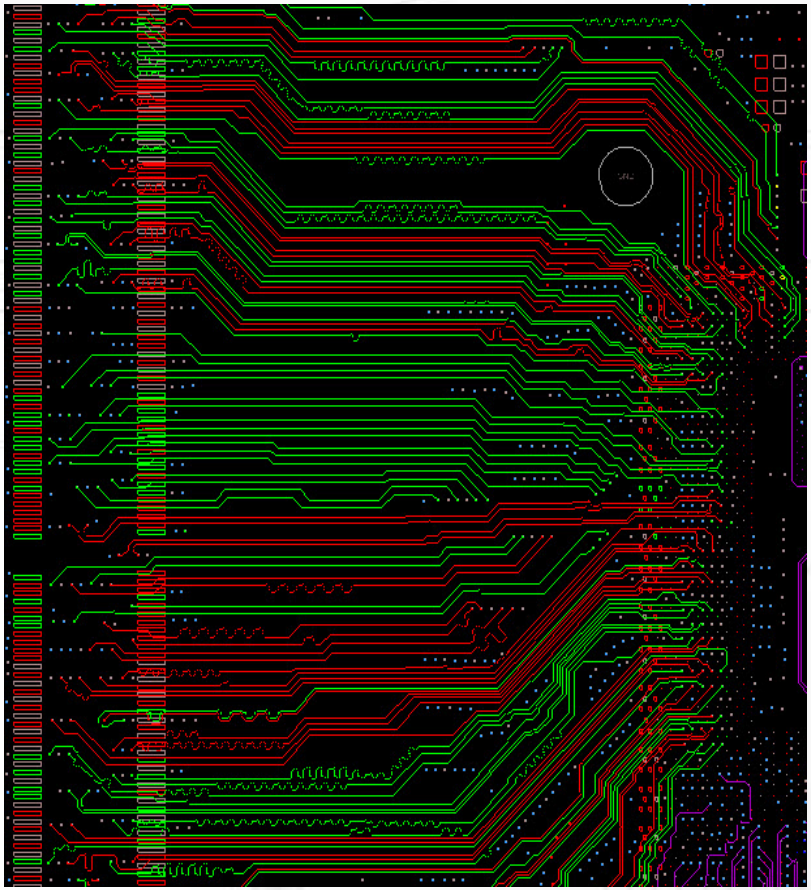
Accordion 

Trombone 

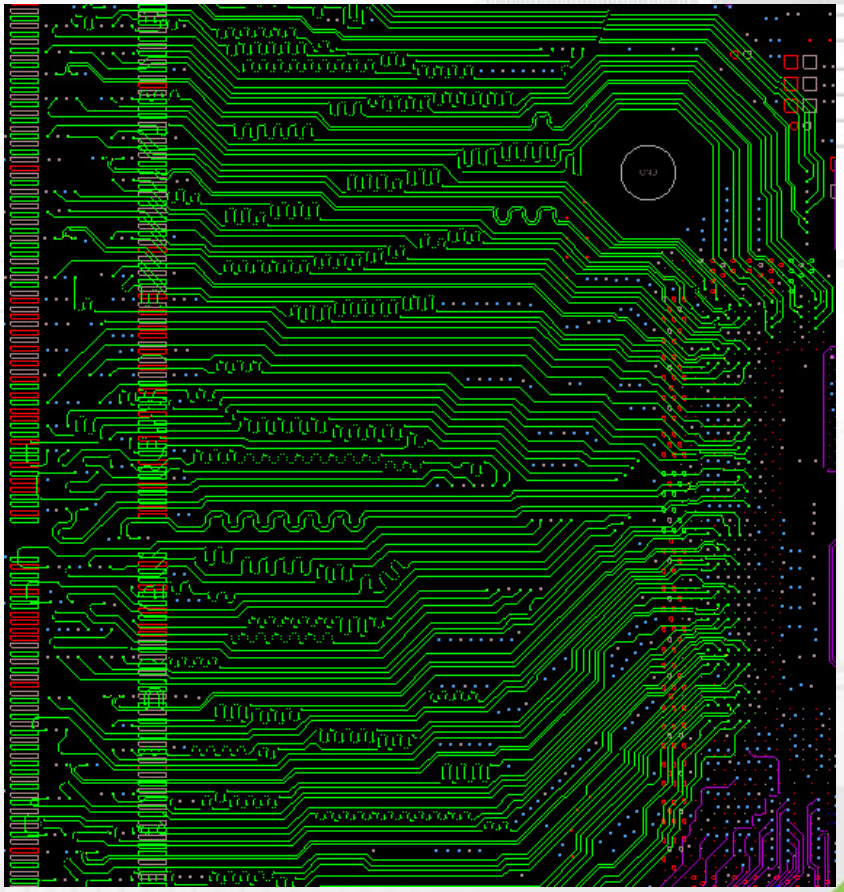


AiDT Finish

AiDT



Manual after AiDT

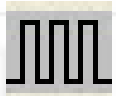


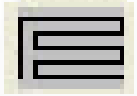
Auto-I. Delay Tune

◎Override bundle params

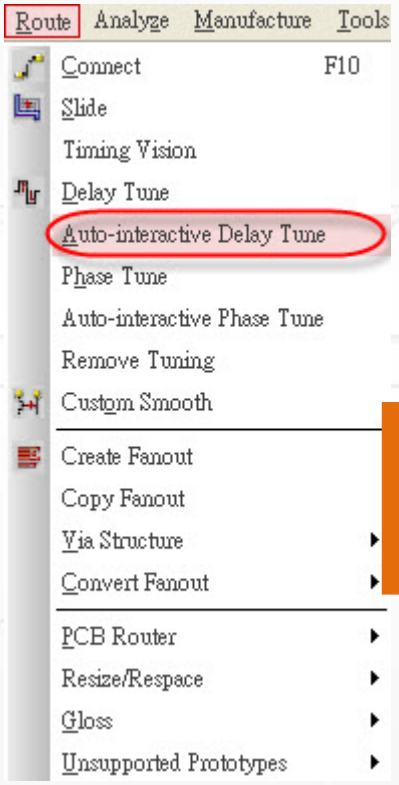
優先於bundle的設定

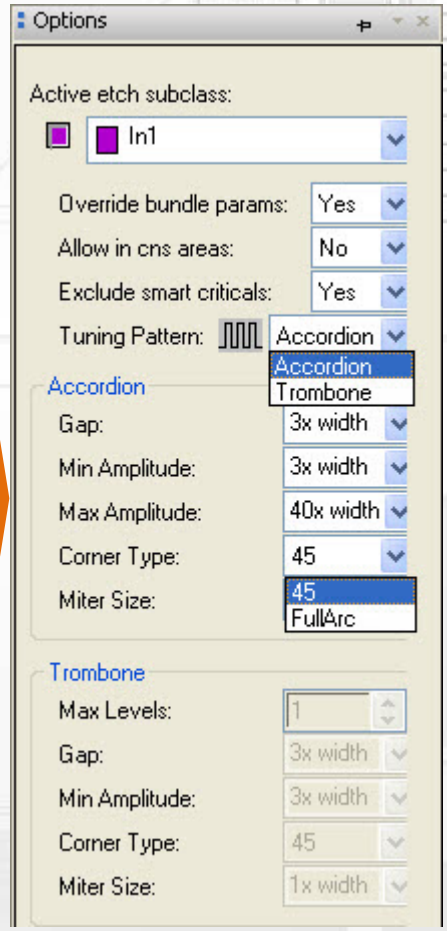
◎Tuning Pattern

Accordion 

Trombone 

Corner Type FullArc





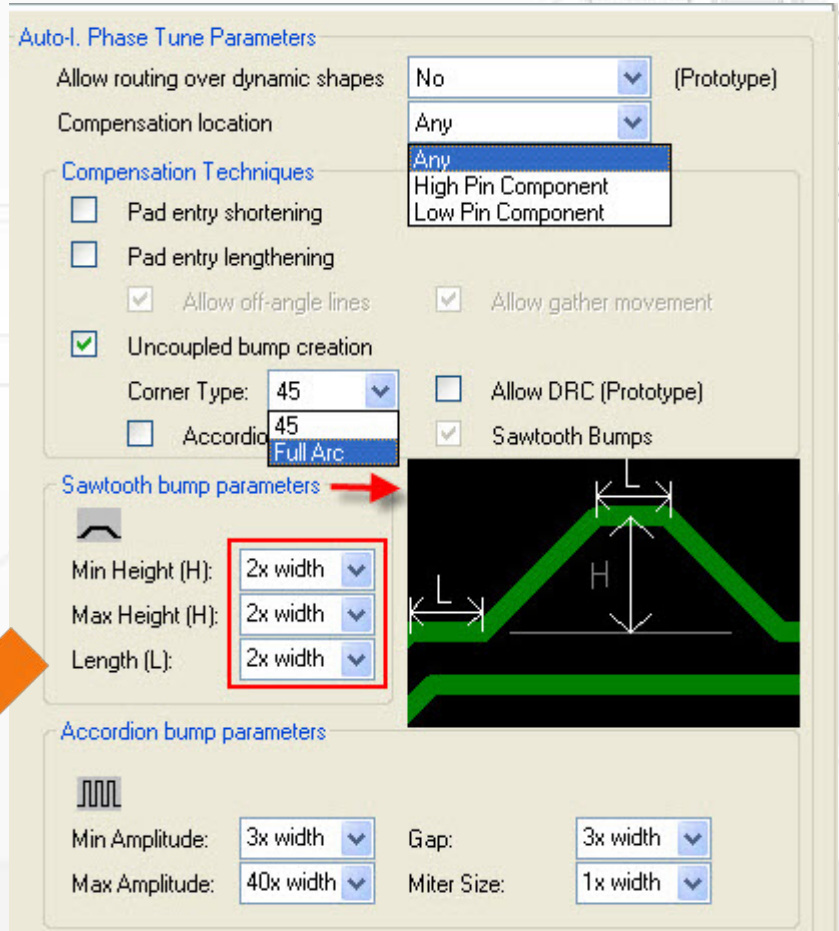
Auto-I. Phase Tune

◎Compensation Location

走線等長補償位置

◎Corner Type

可選擇45度角及圓弧線



Experience share

- 如Net Group內有設置Bus,Bundle會鎖定Bus name
- 如果使用新流程,可由Net Group 自動產生Bundle
- 若CM已設置Net Group,則可自動顯示Plan
- Breakout處或瓶頸區不規劃Bundle較能提高出線率
- AiDT: Accordion比Trombone有更高的繞線成功率
- AiDT: 建議先完成target,再對其他走線執行AiDT
- AiPT:建議視狀況勾選Compensation Techniques

Improve Productivity

NB/DDR SODIMM

Case	Operation mode	Time
Case1	• Manual	28hr
Case2	• Flow Edit • Auto-I. BreakOut Both Ends • Auto-I. Trunk Route • Auto-I. Adjust Spacing • Auto-I. Delay Tune • Auto-I. Phase Tune • Manual edit after AiDT	19hr 67%

Improve Quality

ERC

- Impedance
- Coupling
- Reference

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Thank you