Gowin Design Physical Constraints

User Guide

SUG935-1.6E, 12/31/2025

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Revision History

Date	Version	Description
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09/04/2020	1.1E	● FloorPlanner menu bar optimized. ● Back-annotate Physical Constraints supported.
06/10/2021	1.2E	The description of the combined use of Port Constraints and Vref Constraints added.
11/02/2021	1.3E	● Some descriptions updated. ● Document structure adjusted.
10/28/2022	1.3.1E	GW1NS-2 removed.
12/16/2022	1.3.2E	● A.10 Other Constraints added. ● VCC modified to VCCIO
03/31/2023	1.3.3E	● Slew Rate setting shielded. ● Find function removed.
05/25/2023	1.3.4E	● BUFS description updated. ● Clock Assignment updated to Clock Net Constraints. ● Quadrant Constraints updated to GCLK Primitive Constraints. ● Hclk Constraints updated to HCLK Primitive Constraints.
06/30/2023	1.3.5E	The descriptions of Primitive Group Constraints/Vref Constraints/Clock Net Constraints in Appendix A Physical Constraints Syntax Definition updated.
08/18/2023	1.4E	Timing Paths function removed.
11/30/2023	1.4.1E	● Some screenshots in Chapter 3 FloorPlanner GUI updated. ● The title description for the dialog box that pops up when "Instance" selected in "HCLK/GCLK Primitive Constraints" updated.
02/02/2024	1.4.2E	Figure 3-23 Back-annotate Port updated.
06/28/2024	1.4.3E	● Primitive Group constraints support the use of wildcards. ● Figure 3-22 Back-annotate Physical Constraints updated.
08/09/2024	1.4.4E	● The descriptions of IO attributes Drive and Vref updated. ● Reset Layout option added. ● Figure 3-23 Back-annotate Port and Figure 3-24 View Menu updated. ● Descriptions of the interface layout memory feature in 3.1 Start FloorPlanner added.
08/29/2025	1.5E	● Appendix A Physical Constraints Syntax Definition updated. ● Figure 4-6 Drag to Chip Array to Create Primitive Constraints updated.

Date	Version	Description
12/31/2025	1.6E	SARADC constraint locations added in A.3 Primitive Constraints.

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1 About This Guide

1.1 Purpose

This manual describes Gowin FloorPlanner. It introduces the GUI and syntax of FloorPlanner in order to help you add physical constraints to your design. As the software is subject to change without notice, some information may not remain relevant and may need to be adjusted according to the software that is in use.

1.2 Related Documents

The latest user guides are available on GOWINSEMI Website: www.gowinsemi.com. You can find the related documents:

- SUG100, Gowin Software User Guide
- UG290, Gowin FPGA Products Programming and Configuration User Guide
- DS102, GW2A series of FPGA Products Data Sheet

1.3 Terminology and Abbreviations

Table 1-1 shows the abbreviations and terminology that are used in this manual.

Table 1-1 Terminology and Abbreviations

Terminology and Abbreviations	Meaning
BSRAM	Block SRAM
CFU	Configurable Function Unit
CLKDIV	Clock Divider

Terminology and Abbreviations	Meaning
CLS	Configurable Logic Section
DCS	Dynamic Clock Selector
DLLDLY	DLL Delay
DQS	Bidirectional Data Strobe Circuit for DDR Memory
FloorPlanner	Physical Constraints Editor
FPGA	Field Programmable Gate Array
GCLK	Global Clock
I/O	Input/Output
IDE	Integrated Development Environment
LUT	Look-up Table
PCLK	Primary Clock
PLL	Phase-locked Loop
SCLK	Segmented Clock
SSRAM	Shadow SRAM
VREF	Voltage Reference

1.4 Support and Feedback

Gowin Semiconductor provides customers with comprehensive technical support. If you have any questions, comments, or suggestions, please feel free to contact us directly by the following ways.

Website: www.gowinsemi.com

E-mail: support@gowinsemi.com

2 Introduction

FloorPlanner is a physical constraints editor and designed in-house by Gowin. It supports reading and editing the attributes and locations of I/O, Primitive, and Group, etc. It also supports the generation of place constraints files according to your configuration. These files define I/O attributes, as well as locations of primitives and modules. FloorPlanner provides easy and fast placement and constraint editing functions to improve the efficiency of writing physical constraint files.

The functions of FloorPlanner are as follows.

- Supports the input of user design files & constraints files, editing constraints files, and the output of constraints files
- Supports the display of I/O Port, Primitive and Group constraints in user design files
- Can create, edit and modify constraints files
- Supports grid mode, macro cell mode and primitive mode of chip array
- Supports Package View
- Can display Chip Array and Package View synchronously
- Supports real-time display and differences display of constraints locations
- Can generate locations by dragging
- Supports I/O port configuration and batch configuration
- Supports display and editing function of Clock Net Constraints
- Supports constraints legality check
- Supports Back-annotate Physical Constraints

3 FloorPlanner GUI

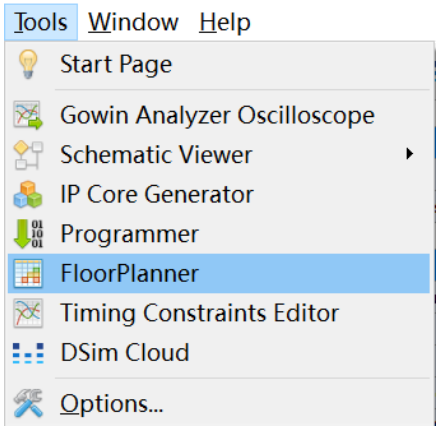
FloorPlanner can create and edit physical constraint files. It supports tabulated constraints editing and efficient netlist lookup so as to improve the efficiency of writing physical constraints files.

3.1 Start FloorPlanner

There are three methods to start FloorPlanner:

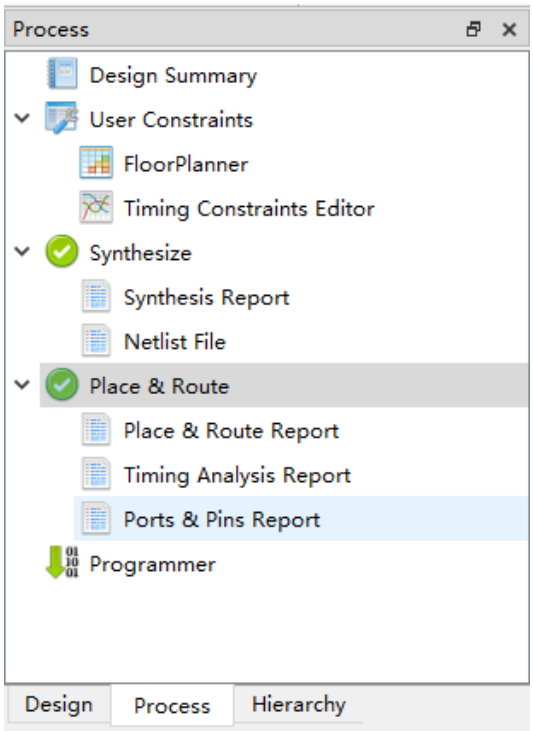
1. Click "IDE > Tools" to open "FloorPlanner", as shown in Figure 3-1.

Figure 3-1 Start FloorPlanner via Menu Bar



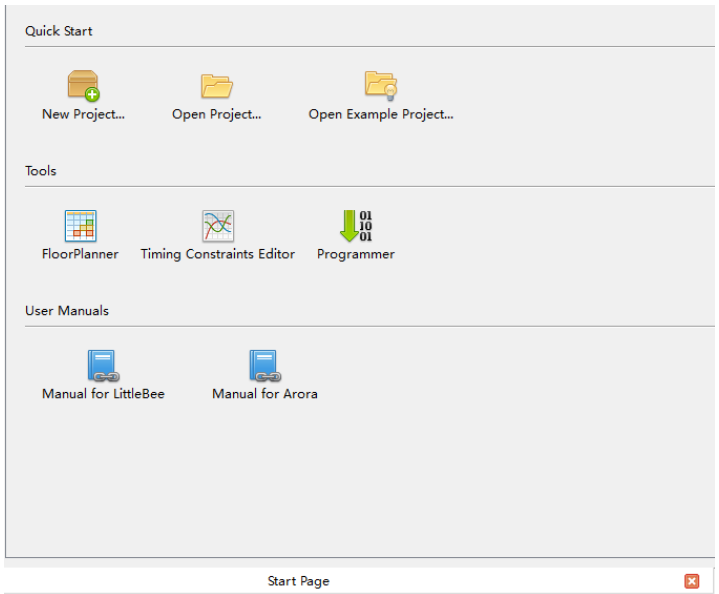
2. After synthesis, Double-click "FloorPlanner" in Process view, as shown in Figure 3-2.

Figure 3-2 Start FloorPlanner in Process View



3. Click "IDE > Start Page> Tools> FloorPlanner" to open FloorPlanner, as shown in Figure 3-3.

Figure 3-3 Start FloorPlanner via Start Page



Note!

- If you use Gowin FloorPlanner for constraints, the netlist file should be added first.
- When you choose the first or the second method to start Gowin FloorPlanner, the netlist file will be loaded automatically.

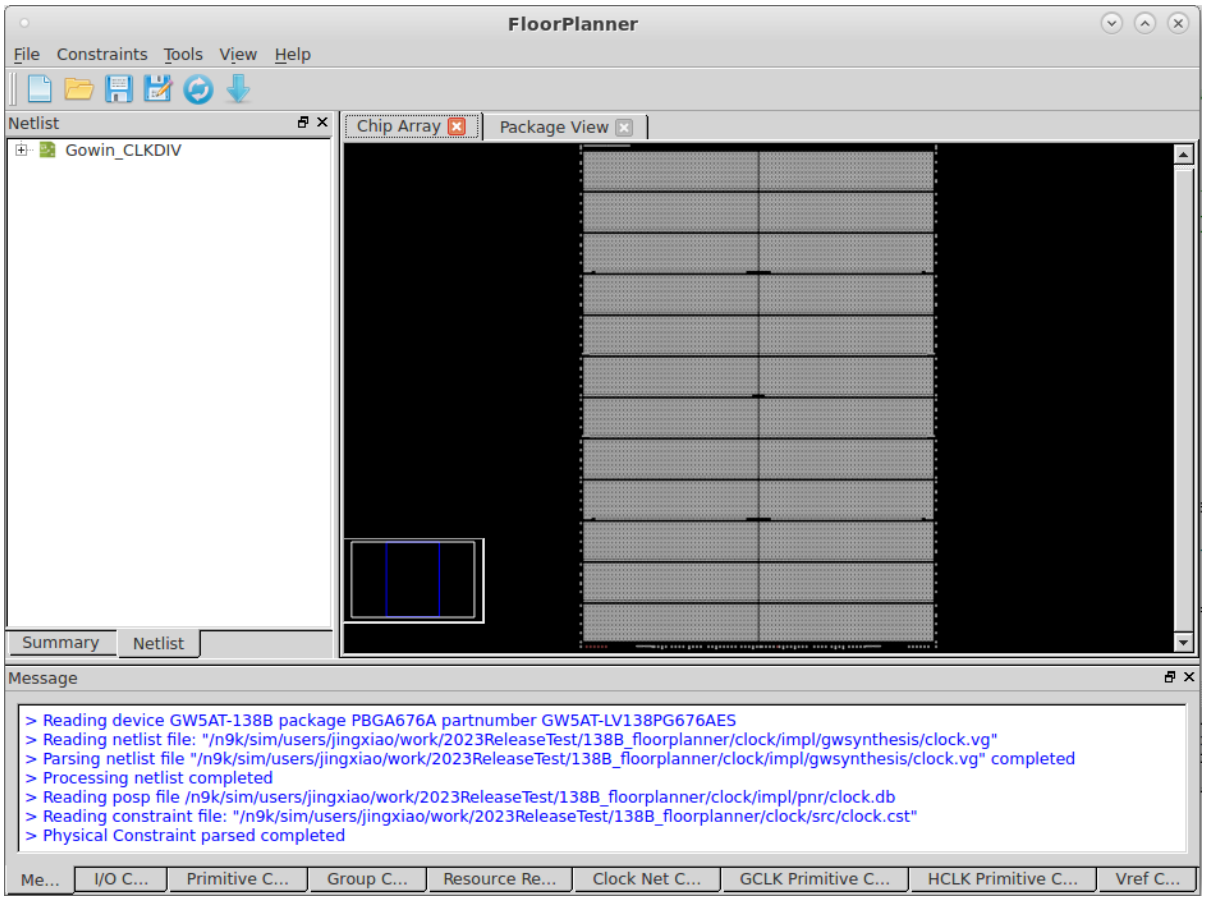
- When you choose the third method to start Gowin FloorPlanner, the netlist file is needed to be loaded via "File > New" option.
- When starting FloorPlanner using the first or second method, the interface layout from the last time FloorPlanner was closed will be remembered for the current project.

3.2 FloorPlanner Interface

Create or open FloorPlanner interface (the netlist file included), as shown in Figure 3-4.

The interface displays menu, toolbar, Netlist, Summary, Chip Array, Package View, and Message, etc.

Figure 3-4 FloorPlanner Interface



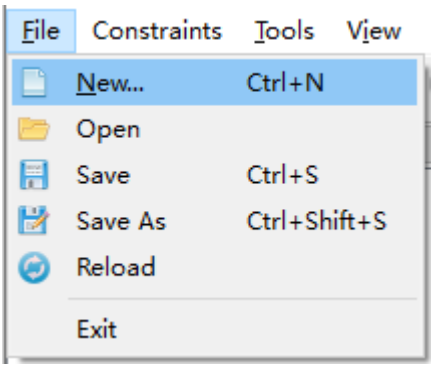
3.2.1 Menu Bar

The menu bar includes "File", "Constraints", "Tools", "View", and "Help".

File Menu

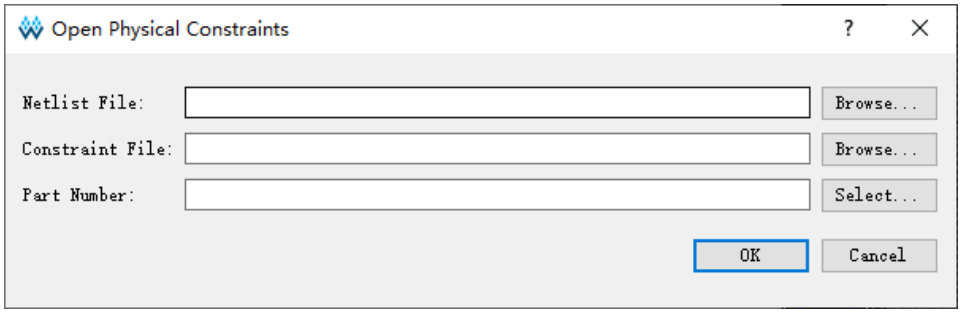
File view is shown in Figure 3-5.

Figure 3-5 File



- New: Create constraints, add user design and select device, etc.
- Open: Open to add constraints, select part number, as shown in Figure 3-6.
- Reload: Physical constraints files and place files can be reloaded after modifying.
- Save: Save the modified files.
- Save As: Save the modified file to a specified file and use the netlist name as the name of constraints file, which can be modified.
- Exit: Exit FloorPlanner.

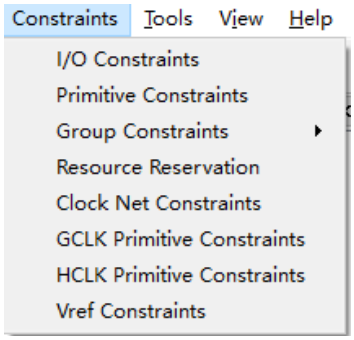
Figure 3-6 Open Physical Constraints



Constraints Menu Bar

Constraints menu bar is as shown in Figure 3-7.

Figure 3-7 Constraints



Primitive Constraints

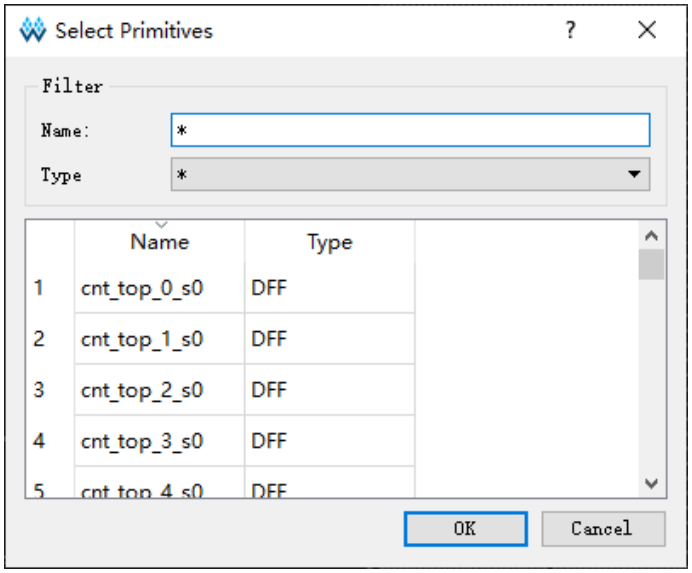
Right-click to select "Select Primitives" and a dialog box pops up, as shown in Figure 3-8.

1. You can select primitives by name or type.
2. Click "OK" to generate the constraints and the constraints are displayed in "Primitive Constraints" at the bottom of main interface.
3. You can set the location by typing or dragging in editing view.

Note!

The location is highlighted in light blue in Chip Array.

Figure 3-8 Primitive Finder



Group Constraints

Group constraints include New Primitive Group and New Relative Group.

Create Primitive Group.

1. Create primitive group. Right-click to select "New Primitive Group" and a dialog box pops up, as shown in Figure 3-9.
2. You can set Group name, Primitives locations and Exclusive. you can add and remove Primitives by clicking "" and "" buttons to create a right Primitive Group, as shown in Figure 3-10.

Note!

- Group name, Primitive, and Locations are required.
- Locations can be inputted in the following ways:
  - Manually input
  - Before creating group constraints, copy the location and paste it into "New Primitive Group > Locations" in Chip Array window.

3. After finishing configuration, click "OK", and the syntax of the locations will be checked by the tool.
   - If the location is invalid, a prompt dialog box as Figure 3-11 and Figure 3-12 will pop up. You need to change the location.
   - If there is no error, click "OK", and the available location will be displayed in Chip Array.
4. You can see the created group constraints in "Group Constraints". Double-click the group constraint, and Figure 3-10 pops up; you can edit the constraints.

Figure 3-9 New Primitive Group

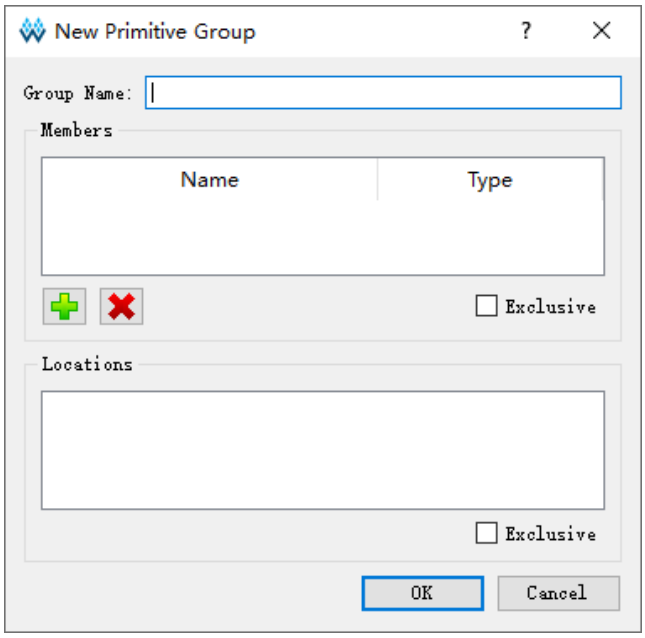


Figure 3-10 Right Primitive Group

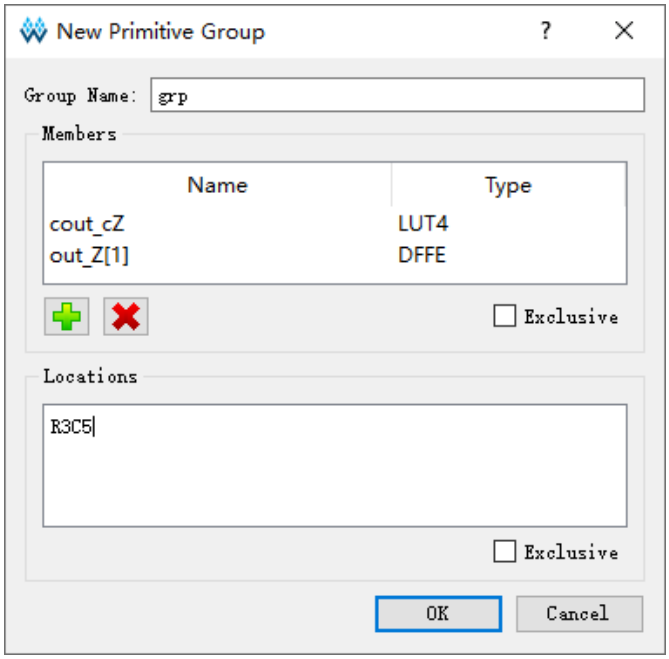


Figure 3-11 Invalid Locations

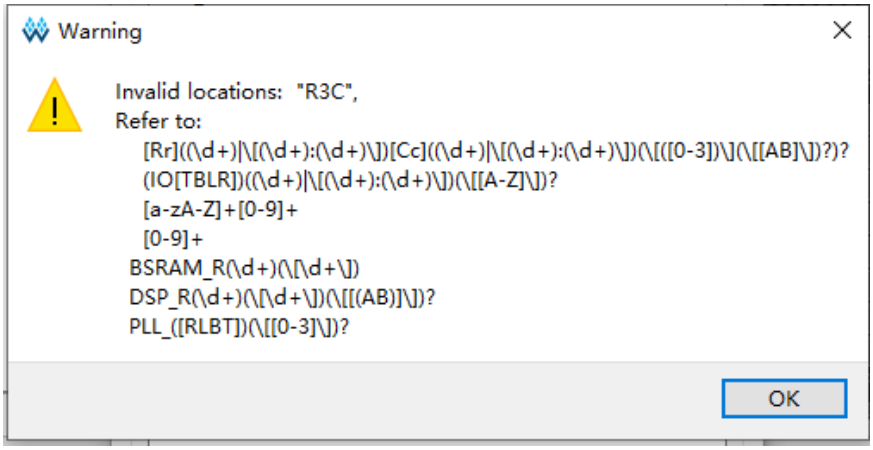
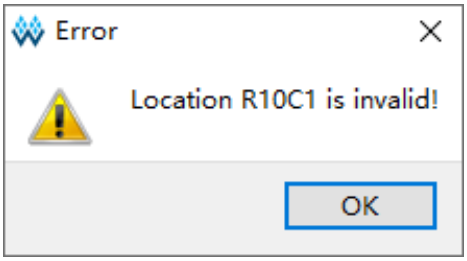


Figure 3-12 Invalid Locations



Create Relative Group.

1. Create Relative Group constraints. Right-click to select "New Relative

Group" and a dialog box pops up, as shown in Figure 3-13.

2. You can set the group name, group members, and their relative locations. You can add and remove primitives by " " and " " buttons. The created relative group constraints are shown in Figure 3-14.

Note!

- Group name, Primitive, and Relative Location are required.
- The locations can be inputted in the following ways:
  - Manually input
  - Before creating group constraints, copy the location and paste it to "New Relative Group > Relative Location" in Chip Array window.

3. Click "OK" to generate the constraints.
4. See the created constraints in "Group Constraints". Double-click the constraints, and a dialog box pops up, as shown in Figure 3-14; you can edit the constraints.

Figure 3-13 New Relative Group

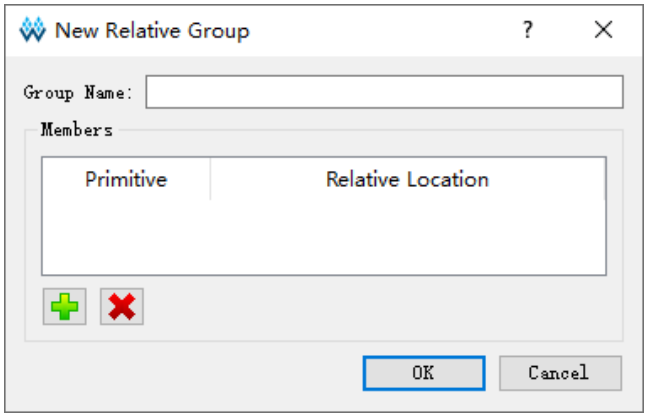
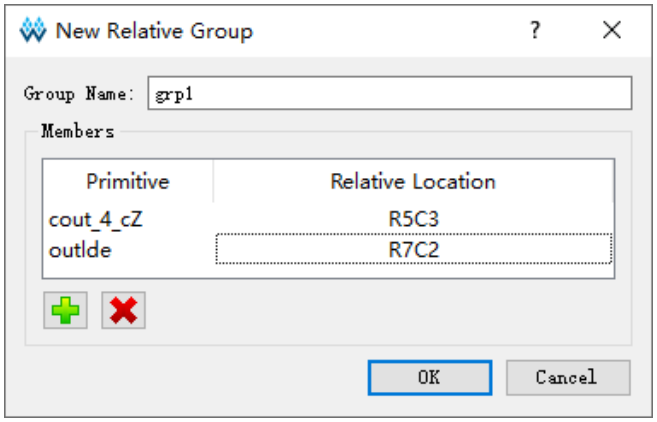


Figure 3-14 Right Relative Group



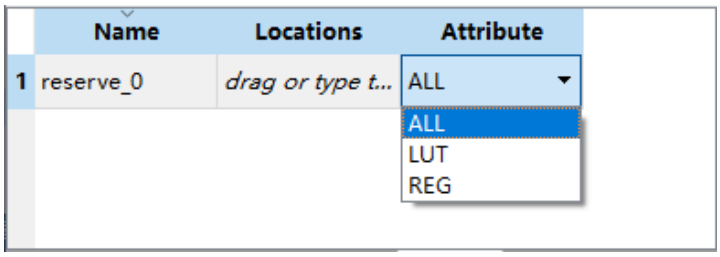
Resource Reservation

1. Create Resource Reservation constraints. Click Reserve Resources to create a new constraint in "Resource Reservation" window at the bottom of the interface.
2. You can type the locations or by dragging.
3. Double-click "Attribute" or click the "Attribute" column drop-down box to set the attribute of the reserved locations, as shown in Figure 3-15.

Note!

Name is used to distinguish reserved constraints. The name cannot be modified.

Figure 3-15 Resource Reservation



Clock Net Constraints

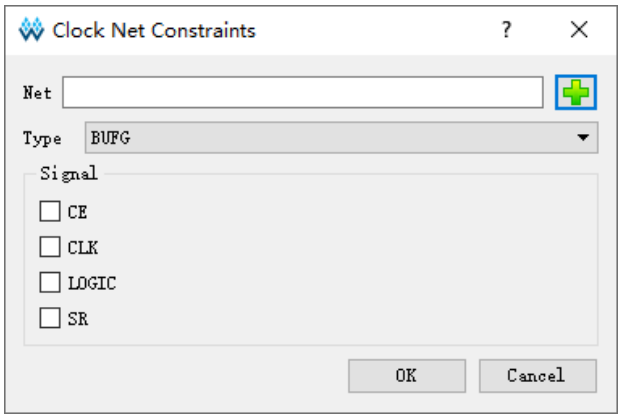
Create Clock Net Constraints and the number of constraints is limited; the constraints validity will be checked. Right-click to select "Clock Net Constraints" and a dialog box pops up, as shown in Figure 3-16. You can perform the following operations.

1. Click " " to select the corresponding Net.
2. Select "BUFG", "BUFG[0]~[7]", "BUFS" and "LOCAL_CLOCK" from "Type" drop-down list.
3. Configure Signal type through "CE" and "CLK" check box. After the configuration is complete, click "OK" to generate constraints, which are displayed in "CLOCK Net Constraints" window. Double-click to open the dialog box for editing.

Note!

When LOCAL_CLOCK is selected in "Type", the signal check box is grayed.

Figure 3-16 Clock Net Constraints



GCLK Primitive Constraints

Create global clock constraints for DCS and DQCE. Constrain the specified instance to the specific GCLK according to GCLK distribution. Right-click to select "Select GCLK Primitive" in "GCLK Primitive Constraints" window and a dialog box pops up, as shown in Figure 3-17. You can perform the following operations

1. Select a corresponding GCLK primitive by clicking "". If there are no GCLK primitives in the design, you can not add.
2. Configure global clock positions through "Position" check box.
3. Click "OK" to generate constraints, which are displayed in the "GCLK Primitive Constraints" window; you can double-click to open the dialog box for editing.

Figure 3-17 GCLK Primitive Constraints (GW1N-1)

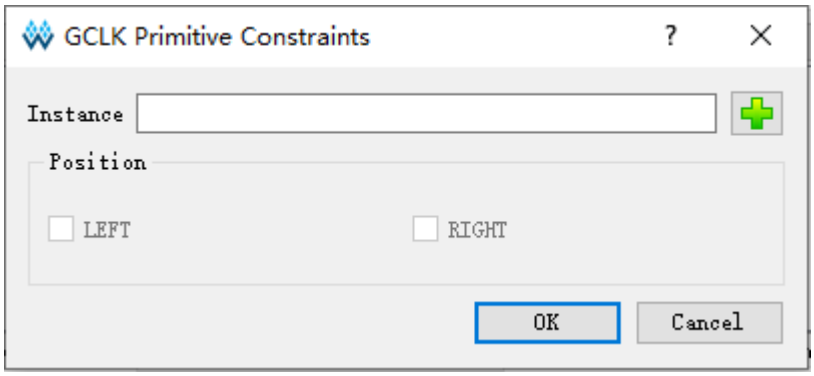
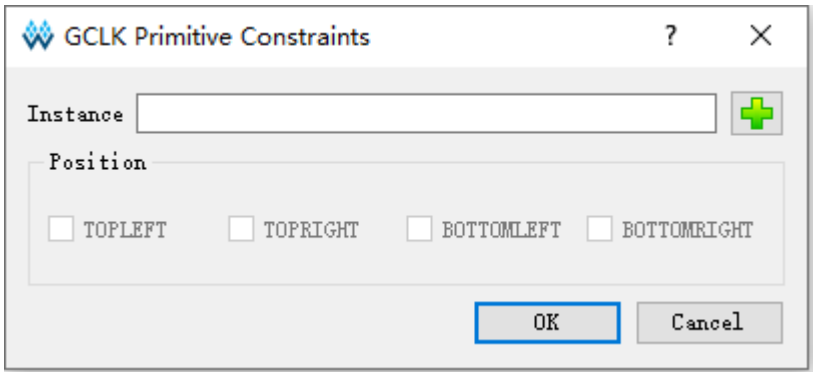


Figure 3-18 GCLK Primitive Constraints (GW2A-18)



Note!

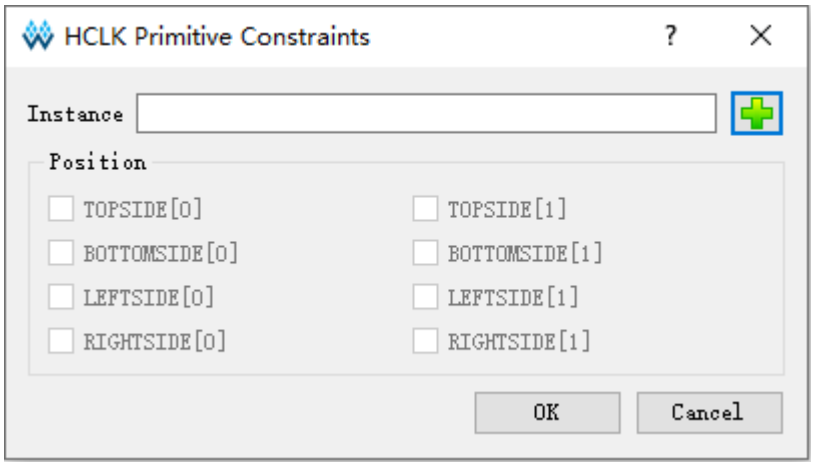
- When "Instance" is selected, "Position" is highlighted.
- The available positions vary depending on the device in the project, and the available positions for different global clock primitives also vary.

HCLK Primitive Constraints

Create HCLK primitive constraints and specify the constraint to HCLK locations. Right-click to select "Select HCLK Primitive" in "HCLK Primitive Constraints" window and a dialog box pops up, as shown in Figure 3-19. The related operations are as follows.

1. You can select a corresponding HCLK primitive by clicking " ". If there are no HCLK primitives in the design, you can not add.
2. Configure HCLK positions through "Position" check box.
3. Click "OK" to generate constraints, which are displayed in "HCLK Primitive Constraints" window, you can double-click to open the dialog box for editing.

Figure 3-19 HCLK Primitive Constraints



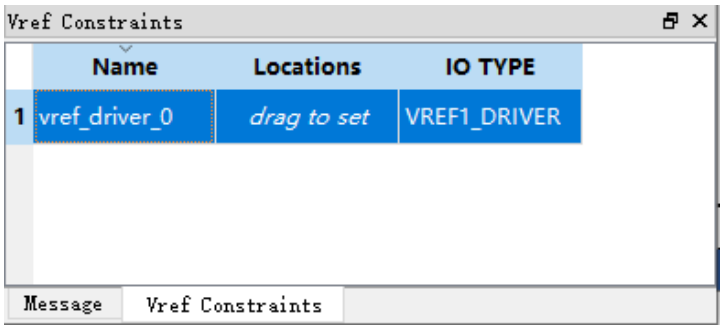
Note!

- When "Instance" is selected, "Position" is highlighted.
- The available positions are different depending on the device in the project, and the unavailable positions are greyed.

Vref Constraints

Create Vref Driver to configure IO Port Vref; right-click and select "Define Vref Driver" to create a new constraint in the "Vref Constraints" window, as shown in Figure 3-20.

Figure 3-20 Vref Constraints



Note!

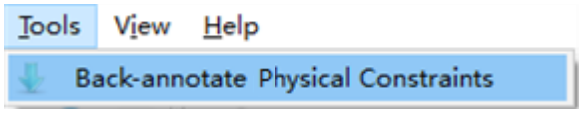
- Specify the location of Vref by dragging.
- Modify Vref name by double-clicking.

Tools Menu

Tools view is shown in Figure 3-21.

Back-annotate Physical Constraints: Back annotate each primitive and I/O place information to physical constraints file.

Figure 3-21 Tools



1. Click "Tools > Back-annotate Physical Constraints" to open a dialog box, as shown in Figure 3-22. Back-Annotate Physical Constraints is effective only when FloorPlanner is started in the project after Place & Route runs successfully.
2. You can select one or more objects in the Back-annotate Physical Constraints dialog box. Click "OK" to open the "Save as" dialog box and print the place information to the physical constraint file.

3. As shown in Figure 3-23, it is the generated physical constraints file when Port and Port Atrribute selected in Back-annotate Physical Constraints.

Figure 3-22 Back-annotate Physical Constraints

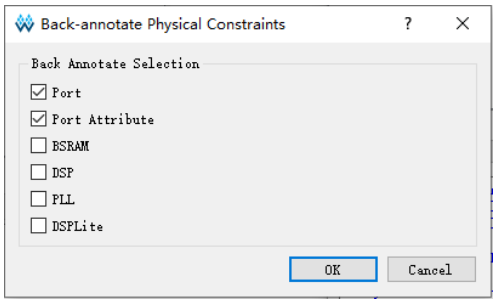


Figure 3-23 Back-annotate Port

```
1
2  IO_LOC "in1" N13;
3  IO_PORT "in1" IO_TYPE=LVCMOS33 PULL_MODE=NONE BANK_VCCIO=3.3;
4  IO_LOC "in2" G18;
5  IO_PORT "in2" IO_TYPE=LVCMOS33 PULL_MODE=NONE BANK_VCCIO=3.3;
6  IO_LOC "in3" H14;
7  IO_PORT "in3" IO_TYPE=LVCMOS33 PULL_MODE=NONE BANK_VCCIO=3.3;
8  IO_LOC "in4" J16;
9  IO_PORT "in4" IO_TYPE=LVCMOS33 PULL_MODE=NONE BANK_VCCIO=3.3;
10 IO_LOC "in5" J15;
11 IO_PORT "in5" IO_TYPE=LVCMOS33 PULL_MODE=NONE BANK_VCCIO=3.3;
```

View Menu

As shown in Figure 3-24, View includes Toolbars, Windows, Zoom In, Zoom Out and Zoom Fit. The description of these sub-menus is as follows.

- Reset Layout: Restore settings of the initial interface layout.
- Toolbars: Display shortcuts
- Windows: Display different windows, as shown in Figure 3-25
- Zoom In: Zoom in Chip Array or Package View
- Zoom Out: Zoom out Chip Array or Package View
- Zoom Fit: Zoom in/out Chip Array or Package View according to the window size.

Figure 3-24 View Menu

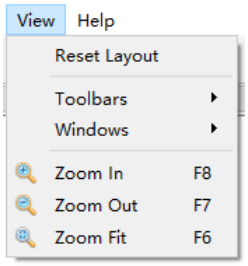
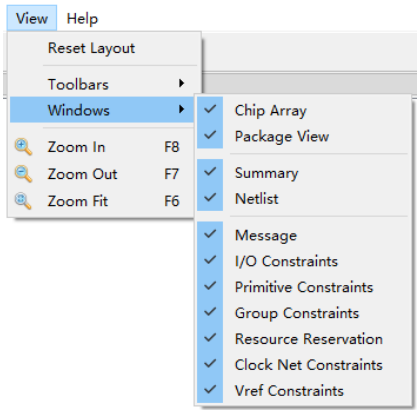


Figure 3-25 Windows Menu



Help Menu

Help is used to provide software version and copyright information.

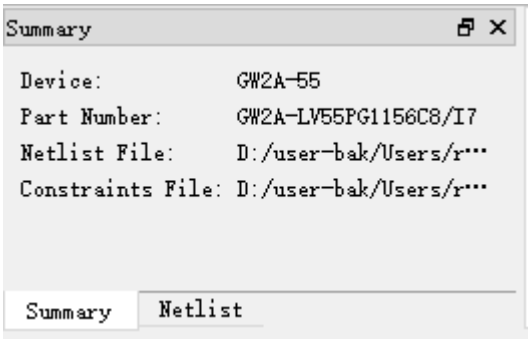
3.2.2 Summary and Netlist Windows

Summary and Netlist windows display device, part number, user design, constraints path and netlist, etc.

Summary Window

The summary window is shown in Figure 3-26. It displays the information of device, part number, design files and constraints files.

Figure 3-26 Summary Window



Netlist Window

As shown in Figure 3-27, Netlist window displays Ports, Primitives, Nets, and Module.

Note!

- The Ports and Primitives names are displayed in full path and sorted in alphabetical ascending order by default.
- Port and Net display via Bus and non-Bus, as shown in Figure 3-28.
- Modules are displayed in hierarchy and the number of instances in each module is also displayed, as shown in Figure 3-29.

Figure 3-27 Netlist Window

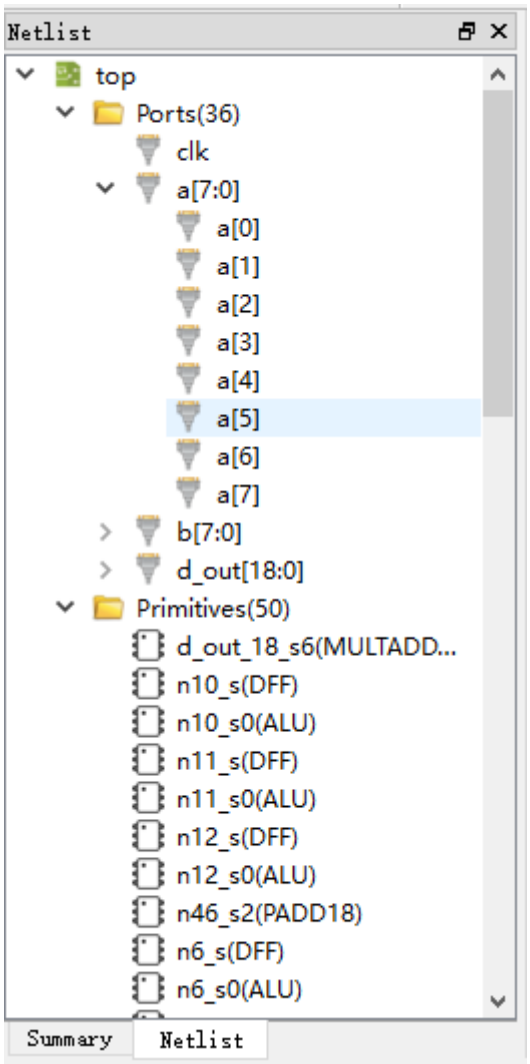


Figure 3-28 BUS and Non-Bus Display

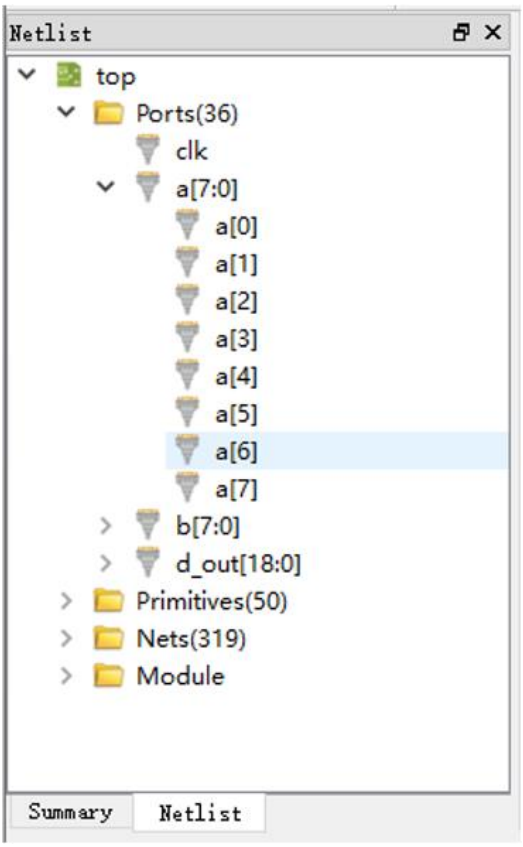
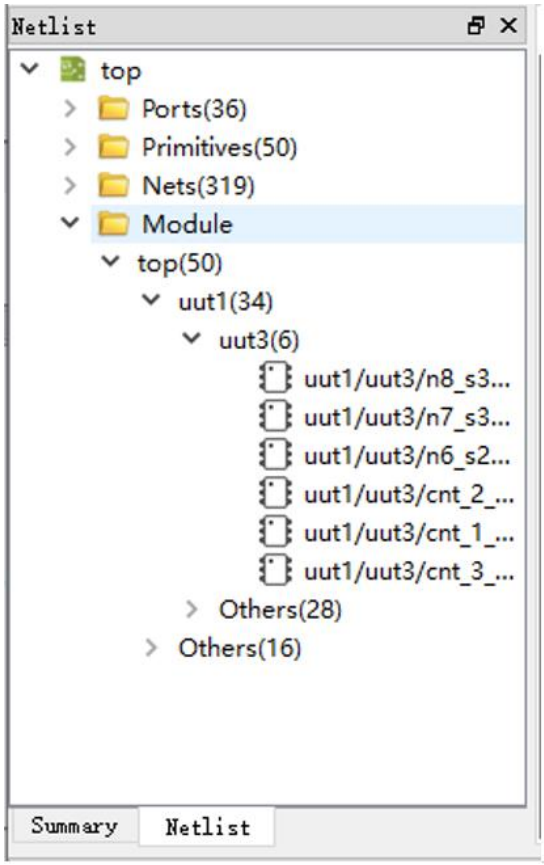


Figure 3-29 Hierarchy Display



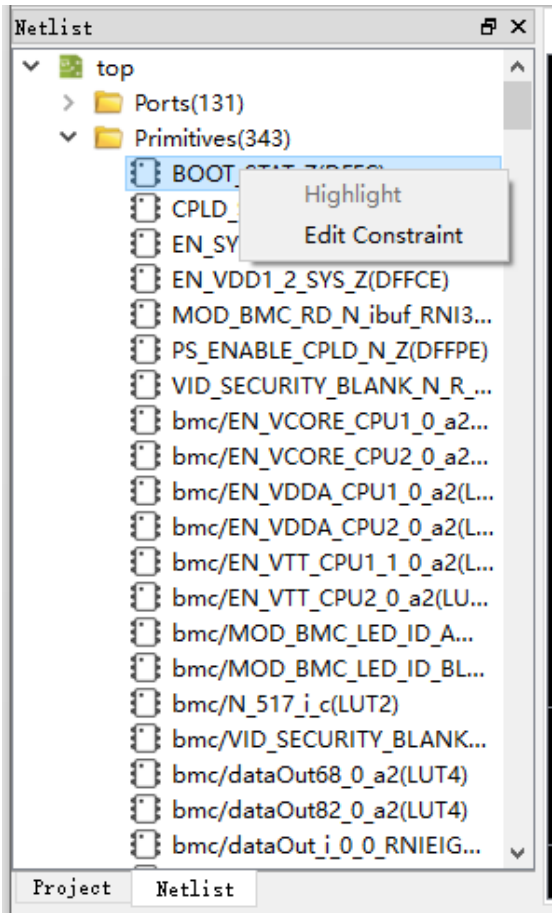
Netlist provides right-click menu as shown below.

- Highlight: Highlights the constrained locations in the Chip Array.
- Edit Constraint: Allows editing of the selected constraint.
- Edit Group Constraint: Allows editing group constraints generated for all constrainable primitives in the selected module.
- Highlight Group Constraints: Highlights the constrained locations of the primitive group constraints associated with the selected module in the Chip Array.

Note!

If the current Primitive, Port or module has no constraints locations, the highlight is not available, as shown in Figure 3-30.

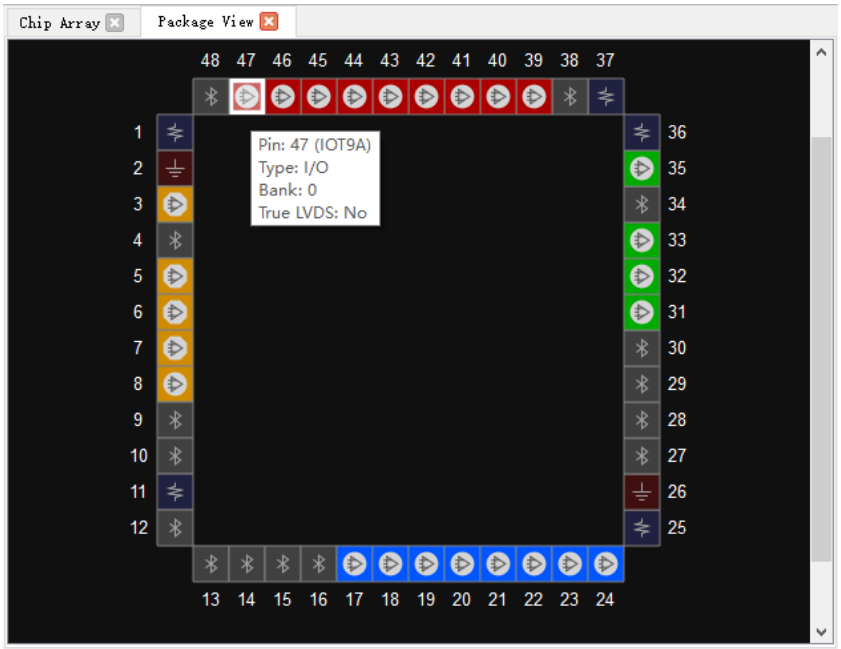
Figure 3-30 Netlist Right-clicking



3.2.3 Package View

As shown in Figure 3-31, taking GW1NRF-4B-QFN48 as an example, Package View displays I/O, supply pin, and ground pin based on chip package. When the mouse is placed on a location, the I/O type, bank, and LVDS will display.

Figure 3-31 Package View (GW1NRF-4B-QFN48)



Various symbols and colors are used to distinguish user I/Os, power supply pins and ground pin. The colors of IO pins of different BNAKS are different, as shown below.

- " ": User I/O
- " ": VCCIO
- " ": VSS
- " ": Bluetooth interface

The right-click menu supported by the Package View is shown in Figure 3-32. The descriptions are as follows.

- Zoom In: Zoom in Package View
- Zoom Out: Zoom out Package View
- Zoom Fit: Zoom in/out Package View to fit window size
- Show Differential IO Pairs: Display differential pair. As shown in Figure 3-33, a differential pair is connected by a red line.
- Top View: Package View is displayed in the top view by default. The top view of GW1N-9-WLCSP64 with coordinate origin at the top left corner is as shown in Figure 3-34; and the top view of

GW1N-9-WLCSP81M package with coordinate origin at the top right corner as shown in Figure 3-36.

- Bottom View: The bottom view of GW1N-9-WLCSP64 with coordinate original at the bottom right corner is as shown in Figure 3-35; and the bottom view of GW1N-9-WLCSP81M with coordinate original at the bottom left is as shown in Figure 3-37.

Figure 3-32 Package View Right-clicking

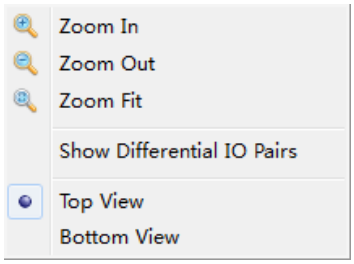


Figure 3-33 Differential Pair Display

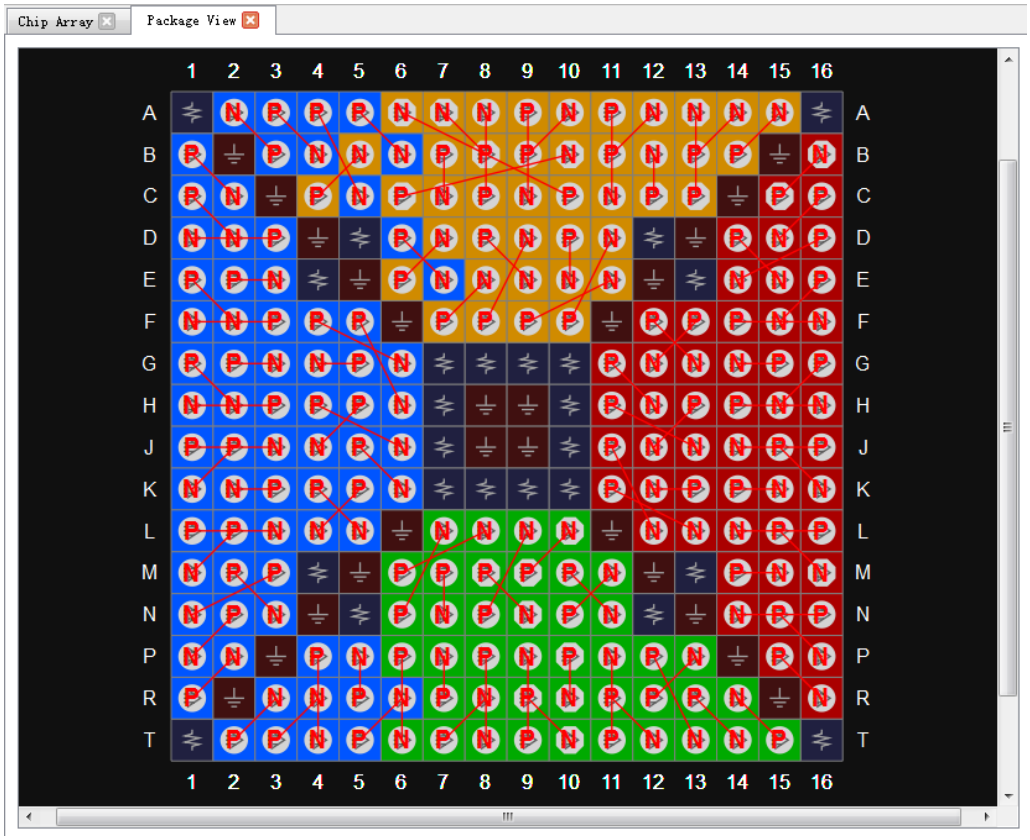


Figure 3-34 Top View

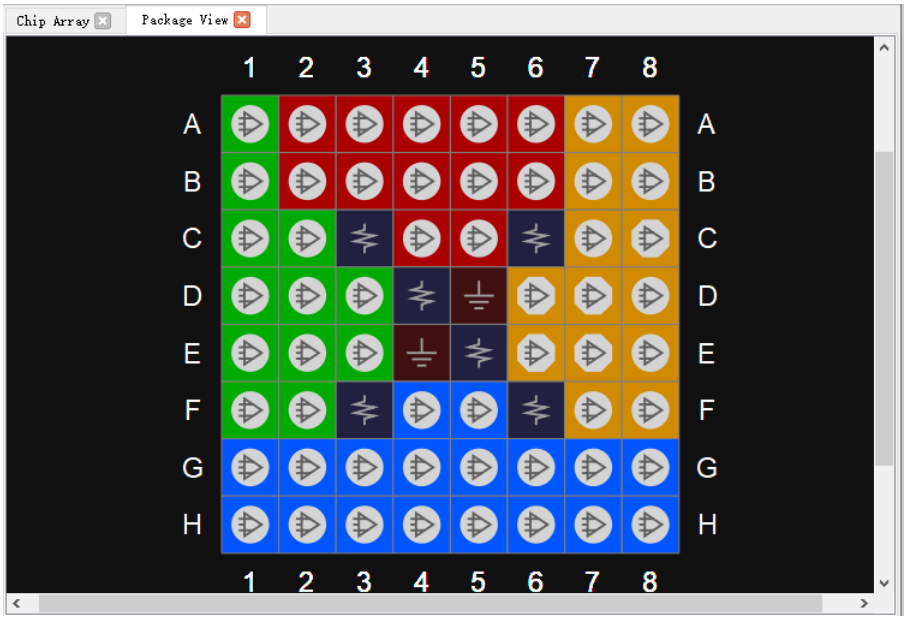


Figure 3-35 Bottom View

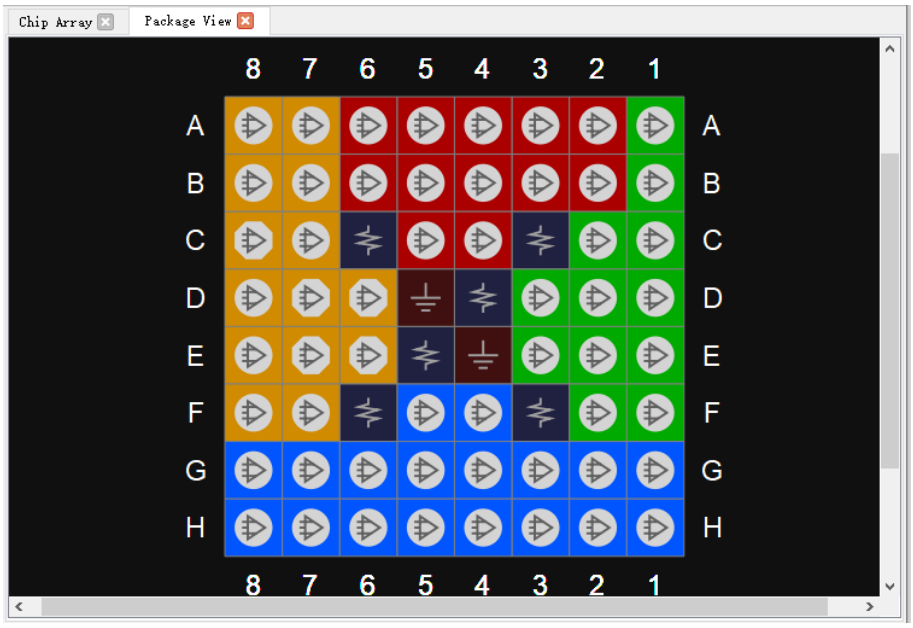


Figure 3-36 GW1N-9-WLCSP81M Top View

Figure 3-37 GW1N-9-WLCSP81M Bottom View

Package View supports the display of IO Port constraint locations, and the IO Port can be constrained by dragging from the Netlist or I/O Constraints to the Package View window. When dragged, the port name will be displayed; the unconstrained pins are grayed out and not dragged.

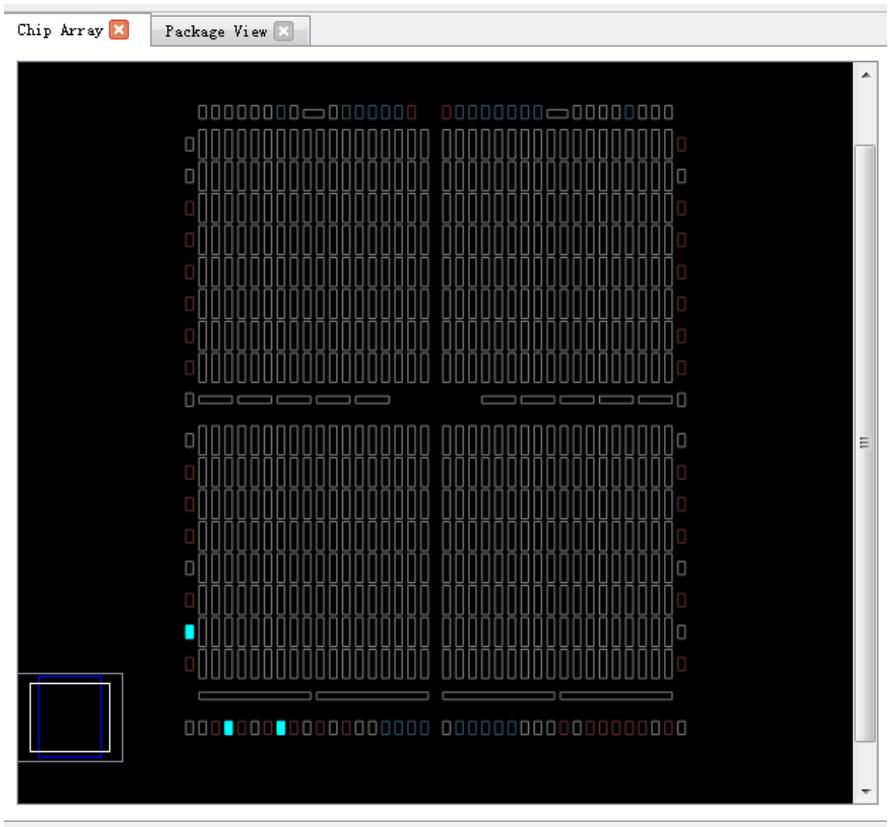
3.2.4 Chip Array Window

The Chip Array window of FloorPlanner is shown in Figure 3-38. Chip Array displays I/O, CFU, CLU, DSP, PLL, BSRAM, and DQS according to the row and column information of the chip, supports real-time display of all constraints locations, and also supports the functions of zoom in/out and dragging, etc.

I/O denotes all I/O locations of die and is distinguished with different colors.

- White: Bonded out I/O location
- Red: Unbonded I/O location
- Blue: If it is a SIP device, such as GW2AR-18, GW1NR-4, and GW1NR-9, there will be blue marked I/O.

Figure 3-38 Chip Array Window



Chip Array provides grid mode, macrocell mode, and primitive mode.

- Grid mode: Display constraints locations in grid, as shown in Figure 3-39.
- Macrocell mode: Display constraints locations in CLS, IOBLK, as

shown in Figure 3-40.

- Primitive mode: Display constraints locations in REG, LUT etc., as shown in Figure 3-41.

Figure 3-39 Constraints in Grid

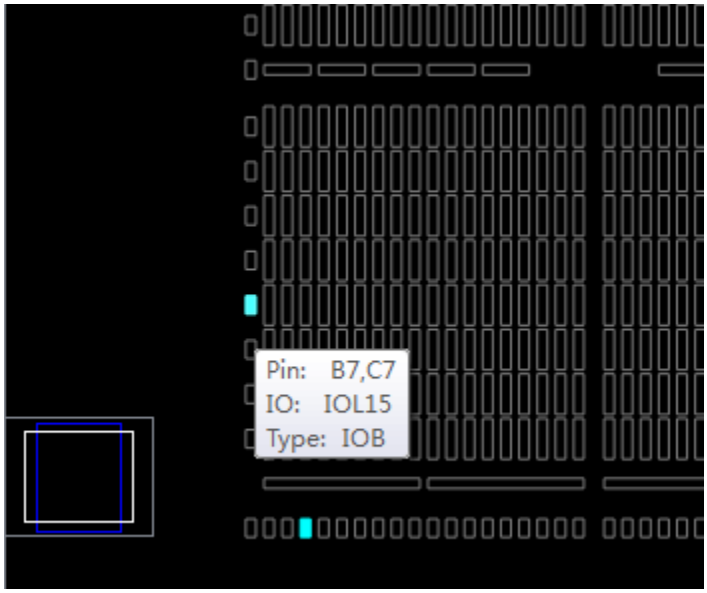


Figure 3-40 Constraints in Macrocell

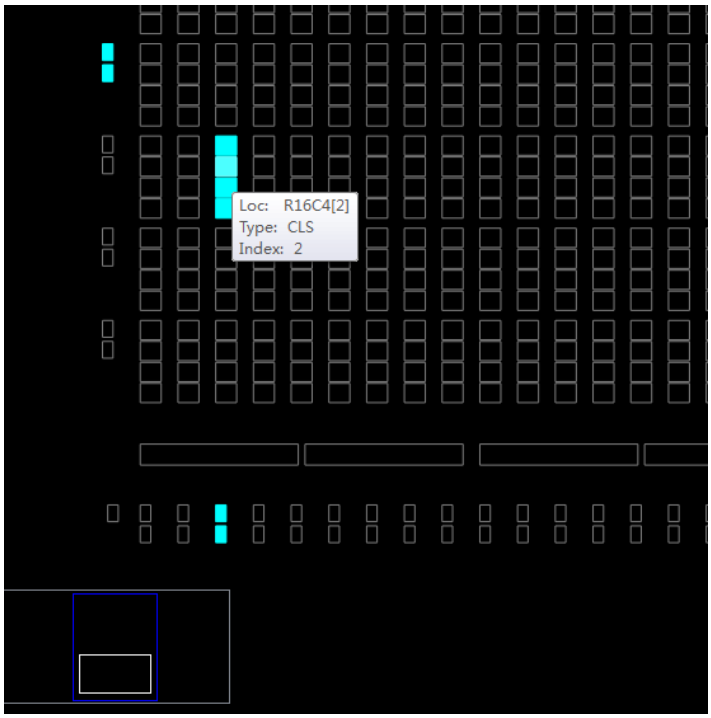
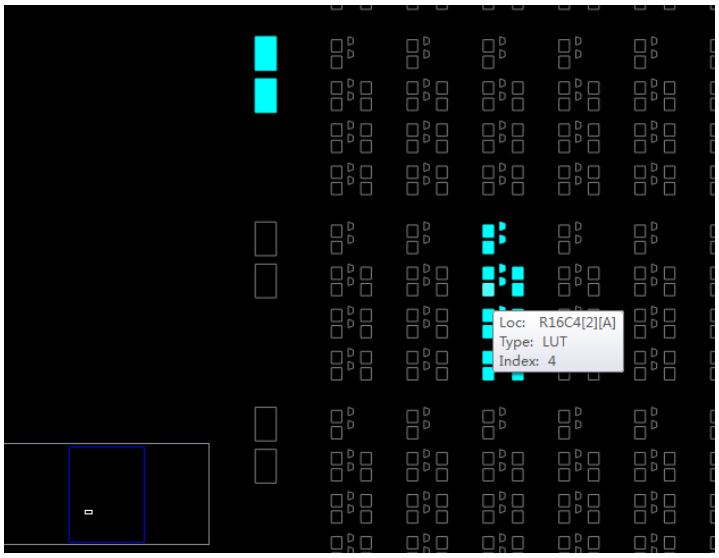


Figure 3-41 Constraints in Primitive



Chip Array supports following dragging functions.

- Drag from Netlist to Array to generate constraints and specify constraints location.
- Drag from Editing to Array to specify constraints location.

There is a chip sub-window in Chip Array for real-time display of the current view relative to the device. Drag the white frame in the chip sub-window to move Chip Array. Chip Array distinguishes constraints type and displays constraints locations in different colors. The color meaning is as follows.

- White: Display constraints location being selected or highlighted.
- Dark blue: Display reserved constraints, indicating that the location cannot be occupied again.
- Light blue: Display IO and Primitive constrained in a grid or range.

Chip Array supports right-clicking functions are as follows.

- Zoom In: Zoom in Chip Array
- Zoom Out: Zoom out Chip Array
- Zoom Fit: Zoom in/out Chip Array to fit the window size
- Show Constraints View: Show instances constraints view of Chip Array
- Show Place View: Show instances place view of Chip Array; it is only effective when FloorPlanner is started after running Place & Route. Otherwise, it is greyed out.

- Show Multi-View: Show instances constraints and place views of Chip Array; it is only effective when FloorPlanner is started after running Place & Route. Otherwise, it is greyed out.
- Show In-Out Connection: Show and select the input and output connection of the instance in the Place View; it can only be used if an instance is selected when Show Place View > All Instance view opens. Otherwise, it is greyed out.
- Show In Connection: Show and select the input connection of the instance in the Place View; it can only be used if an instance is selected when Show Place View > All Instance view opens. Otherwise, it is greyed out.
- Show Out Connection: Show and select the output connection of the instance in the Place View; it can only be used if an instance is selected when Show Place View > All Instance view opens. Otherwise, it is greyed out.
- Unhighlight All: Remove highlight.
- Copy Location: Copy the selected location or area; If GRID and Block are selected, "Copy Location" in right-click menu is available. Otherwise, it is unavailable, as shown in Figure 3-42.

Show Place View also shows Lut and Reg density, as shown in Figure 3-43.

- ALL Instance: Show place of all instances. Light green indicates less than five, green indicates six to ten, and dark green indicates more than ten.
- Only Lut: Shows place of all Lut. Light green indicates less than two, green indicates three to four, and dark green indicates more than four.
- Only Dff: Shows place of all Reg. Light green indicates less than two, green indicates three to four, and dark green indicates more than four.

You can view the place of all instances in the design by clicking Show Place View > ALL Instance.

- Hover the mouse over the instance place location in the Chip Array window to display the name of the instance, as shown in Figure 3-44.
- Select a specific instance in the Netlist window; right-click and select "Highlight", the place location of that instance will be highlighted, as shown in Figure 3-45.

Note!

You can select an area by "Ctrl" + left mouse button; right click and select "Copy Location", you can copy the location and paste it to any constraint editing window.

Figure 3-42 Chip Array Right-clicking

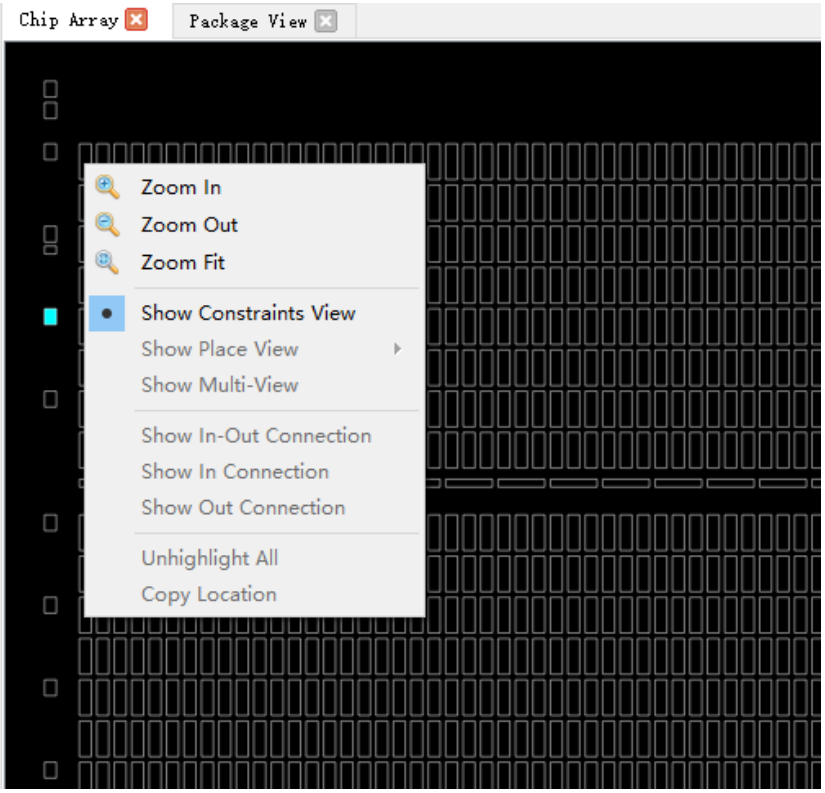


Figure 3-43 Show Place View

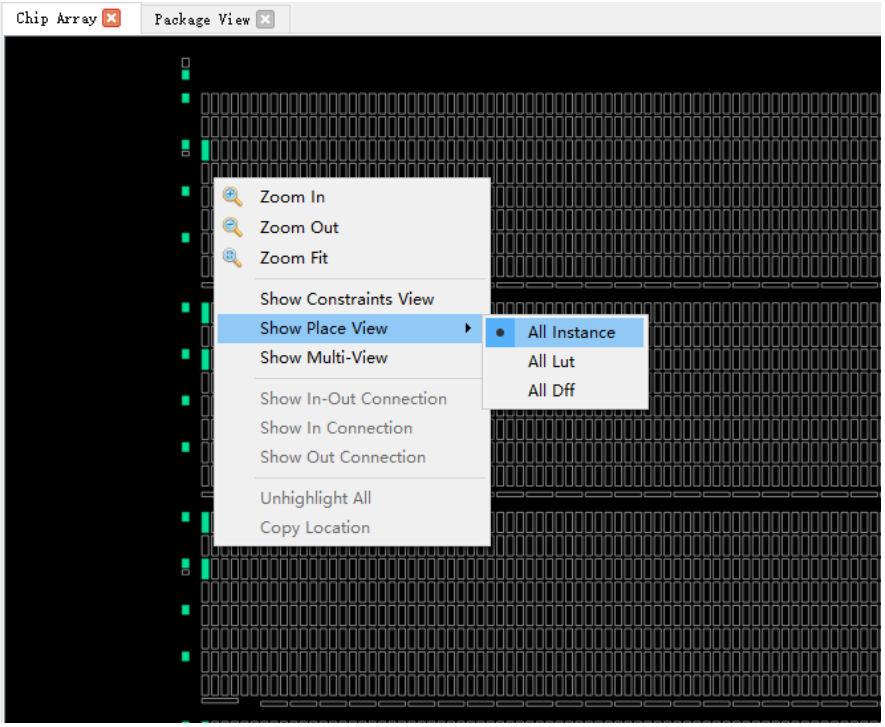


Figure 3-44 Mouse Hovering Display

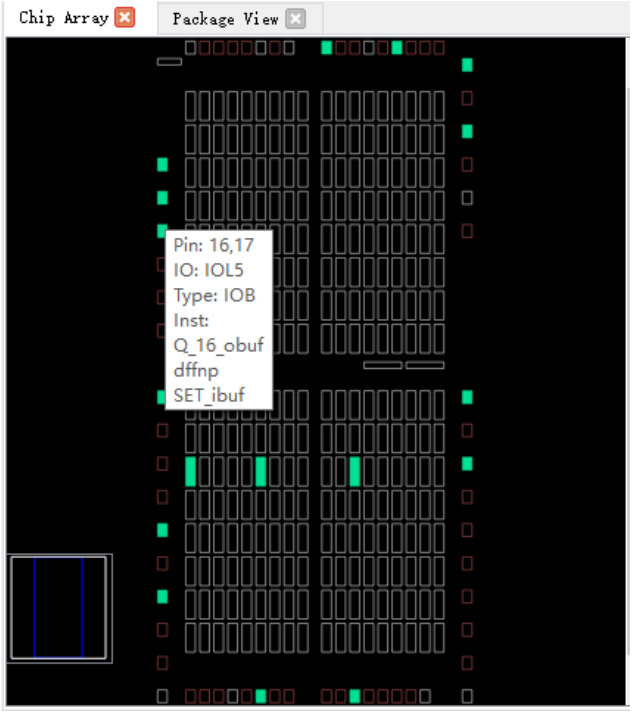
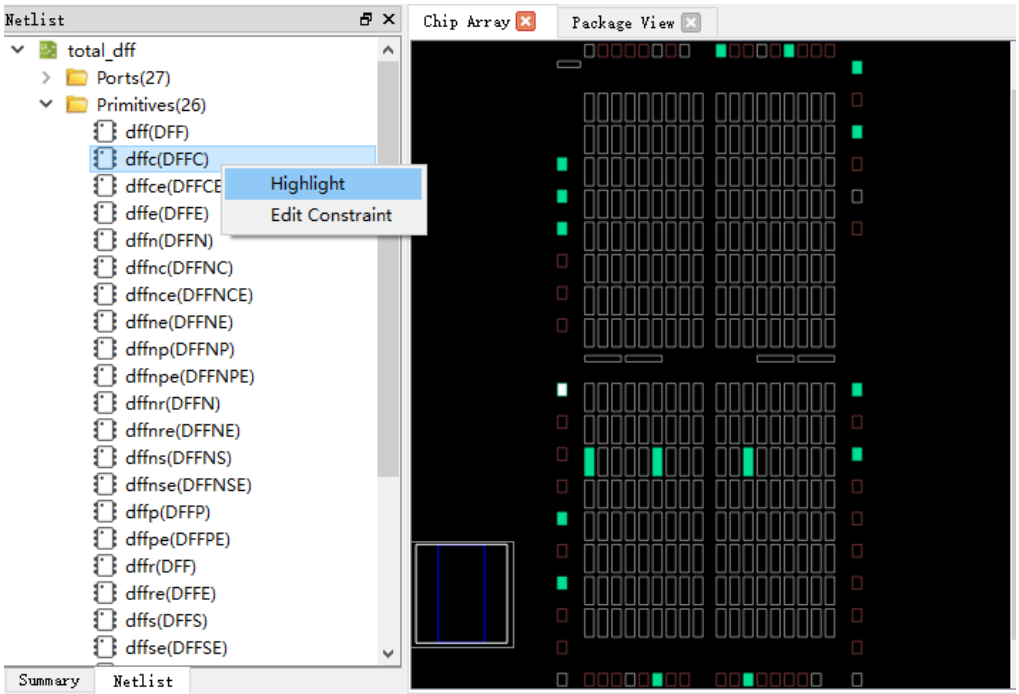


Figure 3-45 Right-click to Select Hightlight



3.2.5 Constraints Editing Window

Constraints editing window includes eight constraints views, such as, "I/O Constraints", "Primitive Constraints", "Group" Constraints, etc., which are used to display constraints and provide constraints editor and drag function. The brief introduction of each view is as follows.

I/O Constraints

I/O Constraints is used to constrain ports. I/O constraint view is as shown in Figure 3-46, and the functions are as follows.

- Display IO Port attributes and constraints in user design, such as Direction, Bank, IO Type, Pull Mode, etc.
- Support to edit constraints locations and attribute, etc.
- Change constraints by dragging, double-clicking, etc.

Note!

- Set I/O location by dragging or double-clicking.
- Display IO name when dragged.
- When I/O is dragged into Chip Array window, the location where I/O can be placed is brightened, and the color of the location where I/O cannot be placed remains unchanged.
- When I/O is dragged into Package View window, the color of the location where I/O can be placed remains unchanged and the location where I/O cannot be placed becomes darker.
- After setting, the constraints location in Chip Array is highlighted in light blue, and the constraints location in Package View is highlighted in orange.

The details of the right-click menu are as follows.

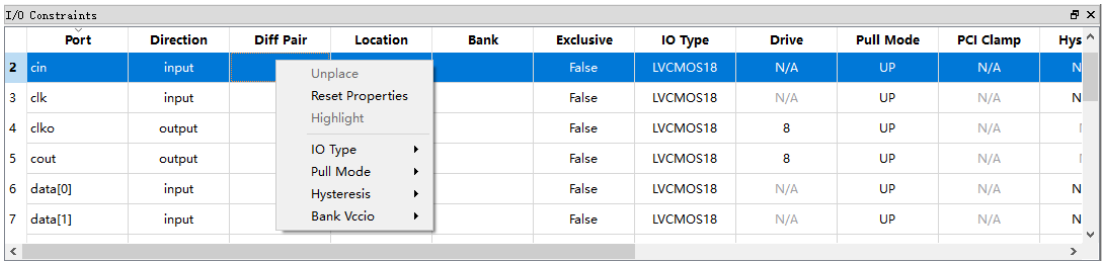
- Unplace: Cancel placement
- Reset Properties: Reset Port properties
- Highlight: Highlight constraints location
- IO Type: Set the level standard
- Drive: Set drive current
- Pull Mode: Set pull-up mode
- PCI Clamp: Set the switch of PCI protocol
- Hysteresis: Set hysteresis
- Open Drain: Set the switch of open-drain circuit

- Vref: Set reference voltage
- Single Resistor: Set the switch of single-ended resistor
- Diff Resistor: Set the switch of differential resistor
- Bank Vcc_{IO}: Set BANK voltage

Note!

You can modify port attributes in batches by right-clicking; if you select multiple ports, and these ports have the same attribute values to be configured, they can be configured in batches. For the details, you can see *DS102, GW2A series of FPGA Products Data Sheet*.

Figure 3-46 I/O Constraints View



Primitive Constraints

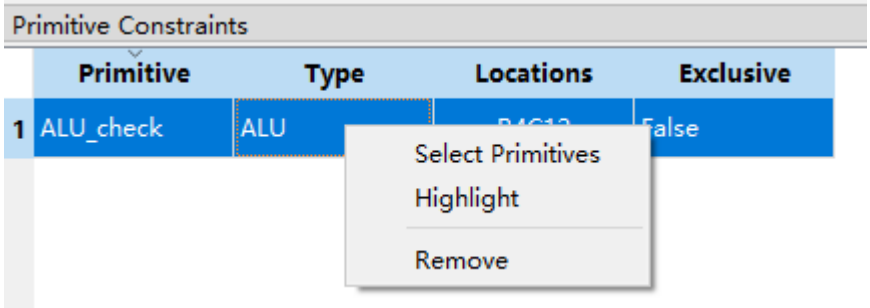
Primitive Constraint is used to constrain primitive location, as shown in Figure 3-47, and the functions are as follows:

- Display the name, type, location, and Exclusive of all Primitive constraints;
- Support editing; you can highlight, remove, add and update constraints by right-clicking.

Note!

- Modify the locations by dragging or double-clicking
- Set Exclusive by double-clicking
- Syntax and legality will be checked for the locations when manually writing primitive constraints, and error message dialog boxes are as shown in Figure 3-11 and Figure 3-12.

Figure 3-47 Primitive Constraints View

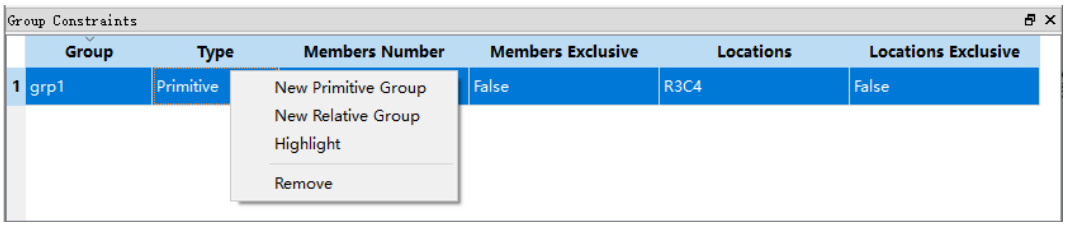


Group Constraints

Group Constraints is used for group constraints on the I/O and some primitives in the design, the group constraint view is shown in Figure 3-48; and the functions are as follows.

- The view displays the name, type, number of primitive, location, and Exclusive of all group constraints, which includes primitive and relative group constraints. As shown in Figure 3-10 and Figure 3-14, double-click the group to edit constraints.
- You can highlight, remove, add and update constraints by right-clicking.

Figure 3-48 Group Constraints View



Resource Reservation

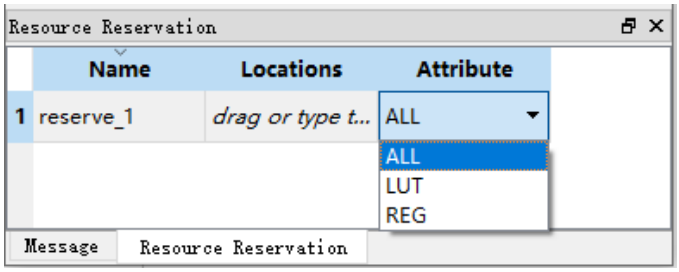
Resource Reservation is used for reservation constraints on the resources available in the current package, as shown in Figure 3-49; and the functions are as follows.

- The view can display reserved constraints locations.
- You can highlight, remove, add and update constraints by right-clicking.
- "Name" is used to distinguish utilization resource of each reservation constraint; and you cannot modify the name.

Note!

You can change the locations by dragging or double-clicking;

Figure 3-49 Resource Reservation View



Clock Net Constraints

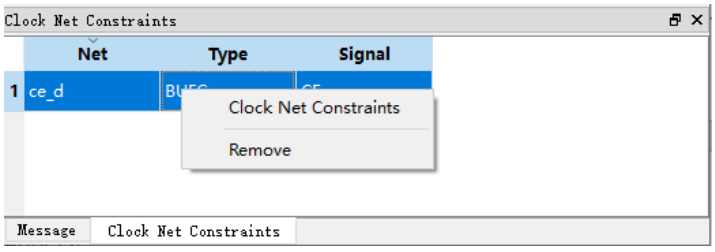
Clock Net Constraints is used for clock constraints on the net in the design, as shown in Figure 3-50, and the functions are as follows.

- The view displays all clock constraints.
- You can add and remove clock constraints by right-clicking.

Note!

- Double-click to edit.
- Dragging is not supported if there is no location.
- Global clock constraint creation is as shown in Figure 3-16.

Figure 3-50 Clock Net Constraints View



GCLK Primitive Constraints

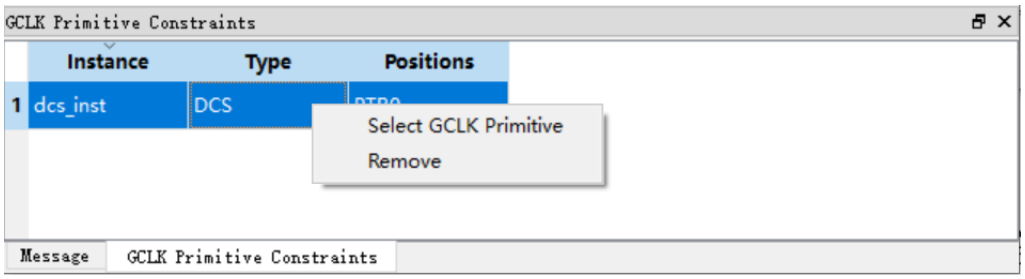
GCLK Primitive Constraints is used to constrain global clock primitives, as shown in Figure 3-51, and the functions are as follows.

- Display all global clock constraints, including Instance name, type, and locations.
- You can remove and add constraints by right-clicking.

Note!

Global clock constraint creation is as shown in Figure 3-17.

Figure 3-51 GCLK Primitive Constraints View

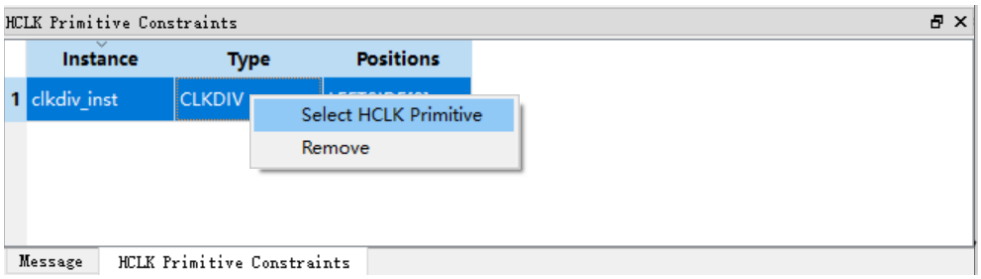


HCLK Primitive Constraints

HCLK Primitive Constraints is used to constrain HCLK primitives, as shown in Figure 3-52, and the functions are as follows.

- The view can display the instance location constraints of HCLK, including Instance name, type, and quadrant location.
- You can remove and add constraints by right-clicking. HCLK constraints creation is shown in Figure 3-19.

Figure 3-52 HCLK Primitive Constraints



Vref Constraints

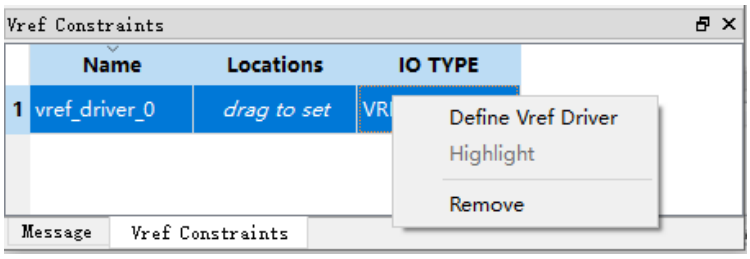
Vref Constrains is used for the external reference voltage of the bank where the constraint is located, as shown in Figure 3-53, and the functions are as follows.

- The view can display Vref Driver defined by users, such as, Vref name and location.
- You can highlight, remove, and add constraints by right-clicking.

Note!

Locations can only be set by dragging.

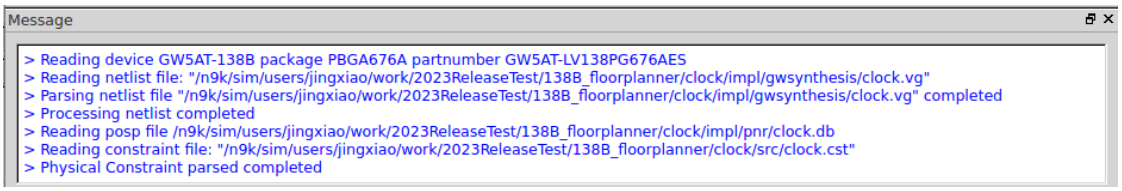
Figure 3-53 Vref Constraints View



3.2.6 Message Window

The message view is as shown in Figure 3-54, and it displays the output.

Figure 3-54 Message View



4 FloorPlanner Usage

FloorPlanner can create and edit constraints, generate physical constraint files used in Place & Route.

4.1 Create Constraints File

FloorPlanner can output newly created or modified physical constraint files, and the steps are shown below.

1. Start FloorPlanner as described in 3.1 Start FloorPlanner.
2. Click "File > New" to open the "New" dialog box.

Note!

You can also open "New" dialog box in the following two ways.

- Use the "Ctrl+N" shortcut
- Click the "New" icon in the toolbar

3. Select netlist file and part number, as shown in Figure 4-1.

Figure 4-1 New Physical Constraints

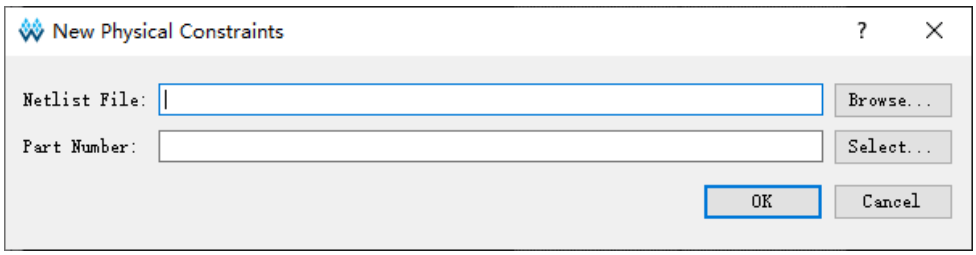
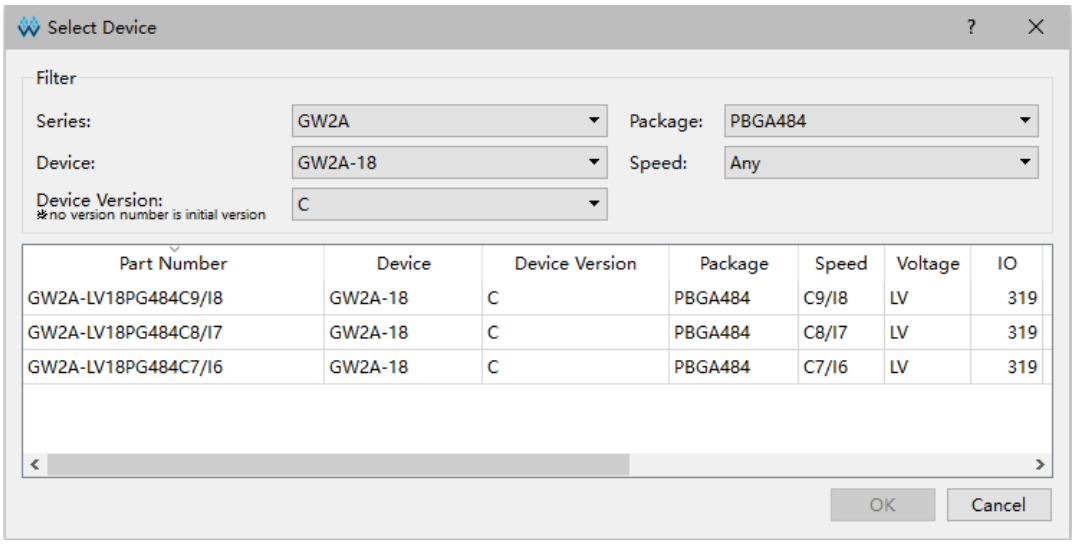


Figure 4-2 Select Device



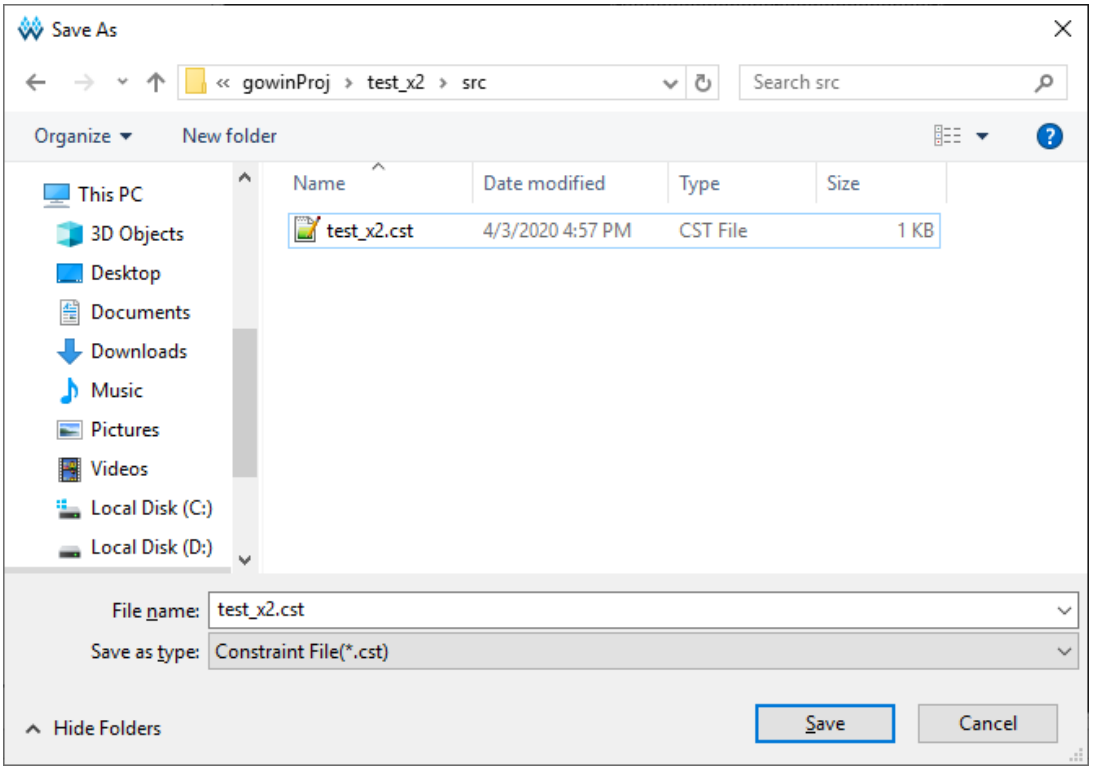
Note!

- You can select the device, package, and all Gowin FPGA devices, as shown in Figure 4-2.
- Start FloorPlanner using the first way in 3.1 Start FloorPlanner.

You can perform the following operations in FloorPlanner:

1. Distribute the pins location by dragging;
2. Click "Save" to output constraint files.
3. You can modify the file name in "Save" dialog box, as shown in Figure 4-3.

Figure 4-3 Save Output File



4.2 Edit Constraints File

FloorPlanner supports constraints creation of I/O, primitive, group, resource reservation, global clock assignment, global clock primitive, high-speed clock primitive, and reference voltage, etc. Constraints can be generated via Constraints menu, see Menu Bar for details.

Note!

Constraints can also be created by other ways; the following section mainly introduces how to generate constraints by dragging.

4.2.1 Constraints Examples

Take the user design counter.v for an instance to introduce how to create various constraints.

```
module counter1(out, cout, data, load, cin, clk, ce, clko);
output [7:0] out;
output cout;
output clko;
```

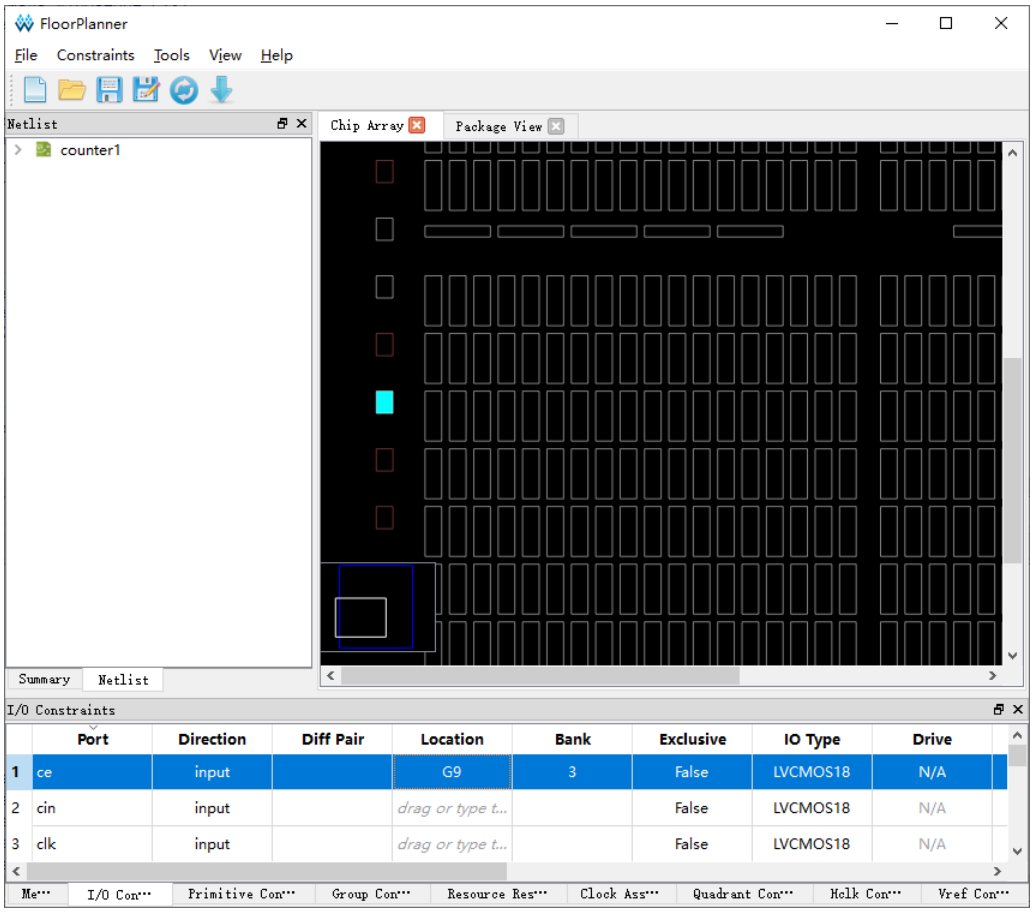
```
input ce;
input [7:0] data;
input load, cin, clk;
reg [7:0] out;
always @(posedge clk)
begin
    if (load)
        out = data;
    else
        out = out + cin;
end
assign cout = &out & cin;
wire clkout;
CLKDIV clkdiv_inst (
      .CLKOUT(clkout),
      .HCLKIN(clk),
      .RESETN(1'b1),
      .CALIB(1'b0)
);
defparam clkdiv_inst.DIV_MODE = "2";
defparam clkdiv_inst.GSREN = "false";
DQCE dqce_inst (
      .CLKOUT(clko),
      .CLKIN(clkout),
      .CE(ce)
);
endmodule
```

4.2.2 Edit I/O Constraints

Drag to Chip Array to create I/O constraints.

1. Click I/O Constraints to zoom in Chip Array to macrocell mode.
2. Select Port "ce" and drag it to "G9" in Chip Array, as shown in Figure 4-4.
3. Port "ce" location is displayed as G9.

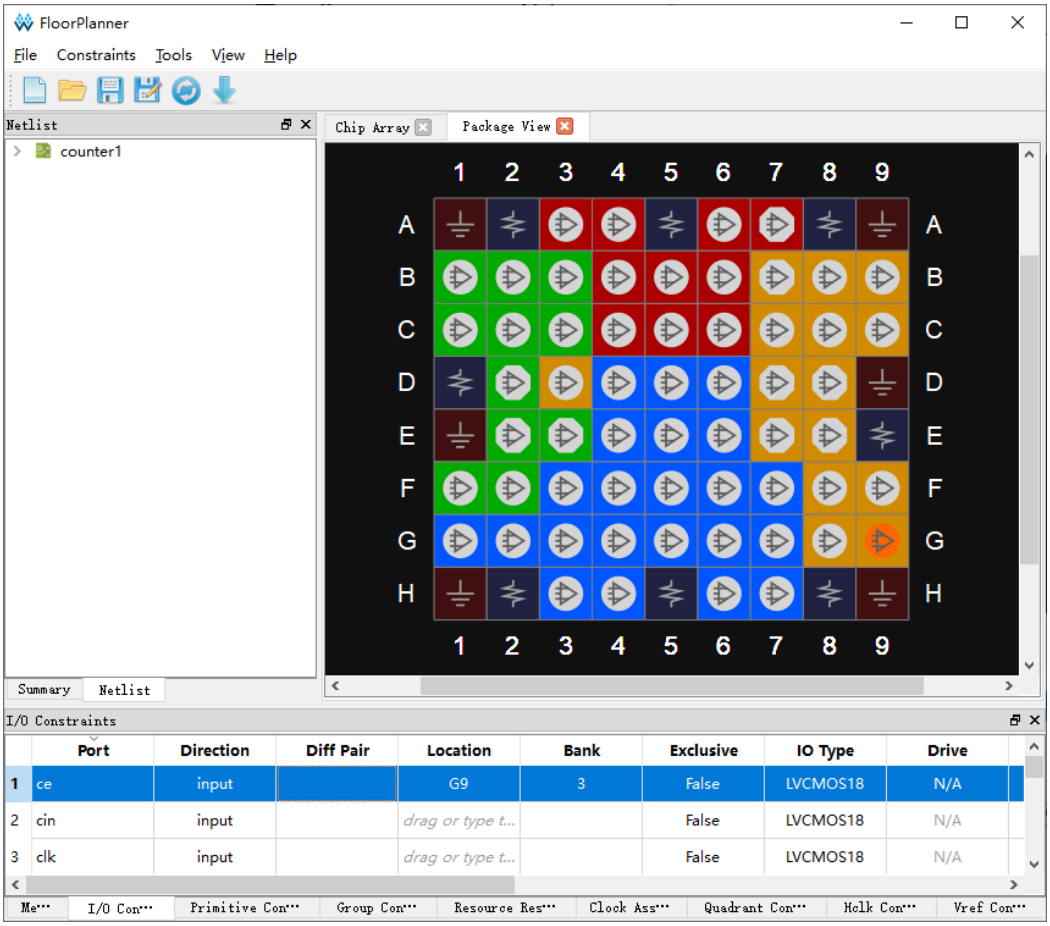
Figure 4-4 Drag to Chip Array to Create I/O Constraints



Drag to Package View to create I/O constraints.

1. Click IO Constraints.
2. Select Port "ce" and drag it to "G9" in Package View, as shown in Figure 4-5.
3. Location for Port "ce" is displayed as G9.

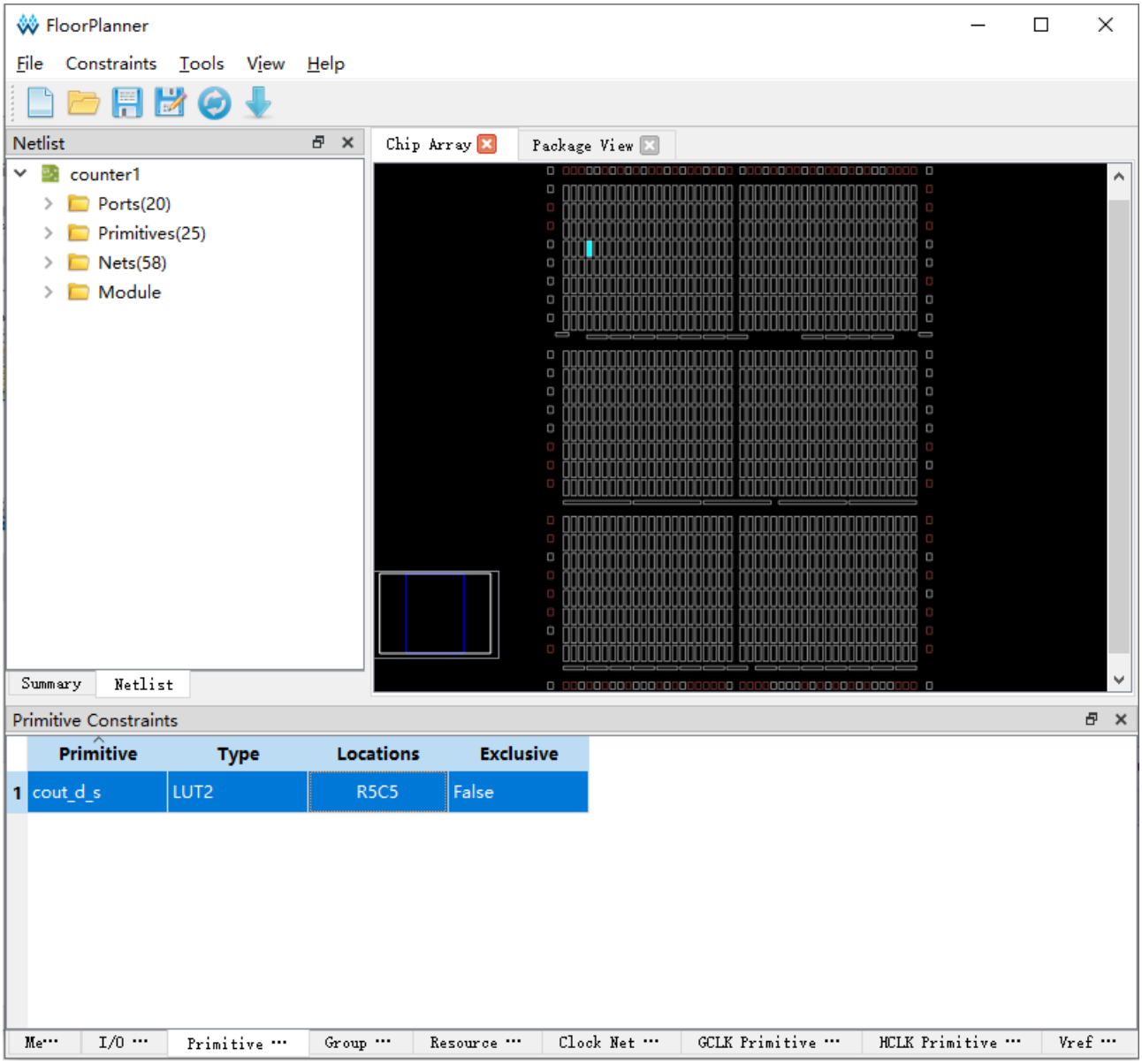
Figure 4-5 Drag to Package View to Create I/O Constraints



4.2.3 Edit Primitive Constraints

1. You can right-click the menu in "Primitive Constraints" and select "Select Primitives", then "Select Primitives" dialog box pops up. You can select Primitive "cout_d_s" and click "OK".
2. Select the created primitive constraints and drag it to "R5C5" in Chip Array, as shown in Figure 4-6.
3. Location for primitive "cout_d_s" is displayed as R5C5.

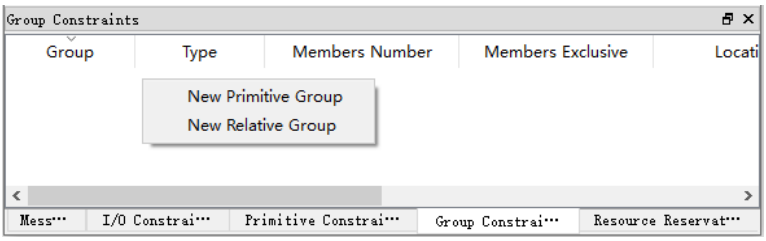
Figure 4-6 Drag to Chip Array to Create Primitive Constraints



4.2.4 Edit Group Constraints

As shown in Figure 4-7, you can create Primitive Group and Relative Group by right-clicking in Group Constraints.

Figure 4-7 Group Constraints Right-clicking



Create Primitive Group Constraints

1. Right-click "Group Constraints" and click "New Primitive Group", then "Edit Primitive Group" pops up.
2. Enter "grp1" and click "", then "Select Primitives" pops up.
3. Select "n14_s0" and "n14_s"; click "OK", then add them to Members list.
4. Enter "R9C7" in "Locations", as shown in Figure 4-8.
5. Click "OK" in "New Primitive Group" diaog box to create primitive group constraints, as shown in Figure 4-9.

Figure 4-8 Create Primitive Group Constraints

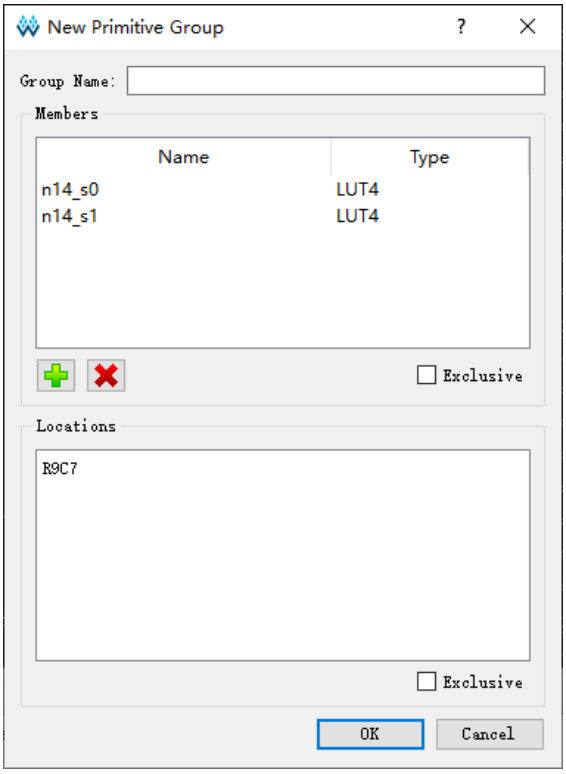
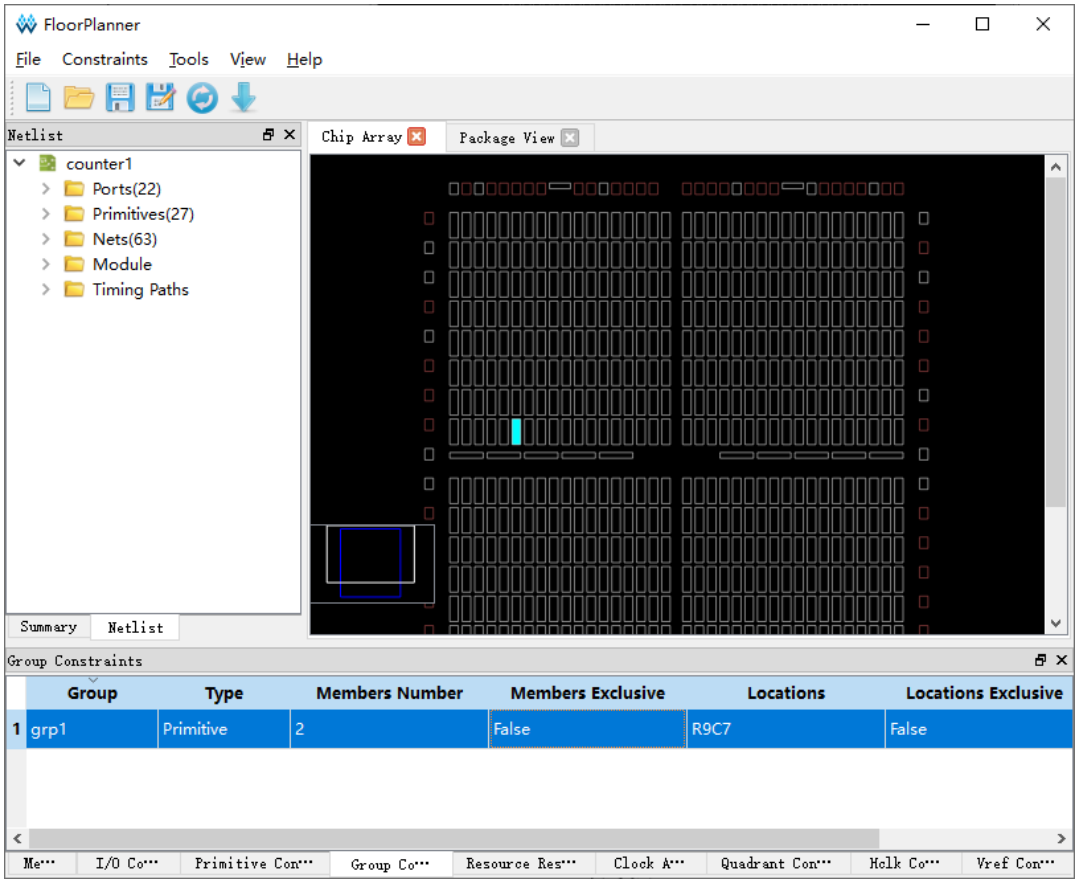


Figure 4-9 Primitive Group Constraints



Note!

The location in Primitive Group Constraints can only be entered manually or copied from Chip Array, and cannot be generated by dragging

Create Relative Group Constraints

1. Right-click "Group Constraints" and click "New Relative Group", and "New Relative Group" pops up.
2. Enter "rel_grp" and click "", and "Select Primitive" pops up.
3. Select the primitives "cout_d_s" and "n14_s0" in "Select Primitive" and click "OK", then add them to the Member list.
4. Add "R0C0" and "R4C5" to the Primitives, as shown in Figure 4-10.
5. Click "OK" in "New Relative Group" to create relative primitive group constraints, as shown in Figure 4-11.

Figure 4-10 Create Relative Group Constraints

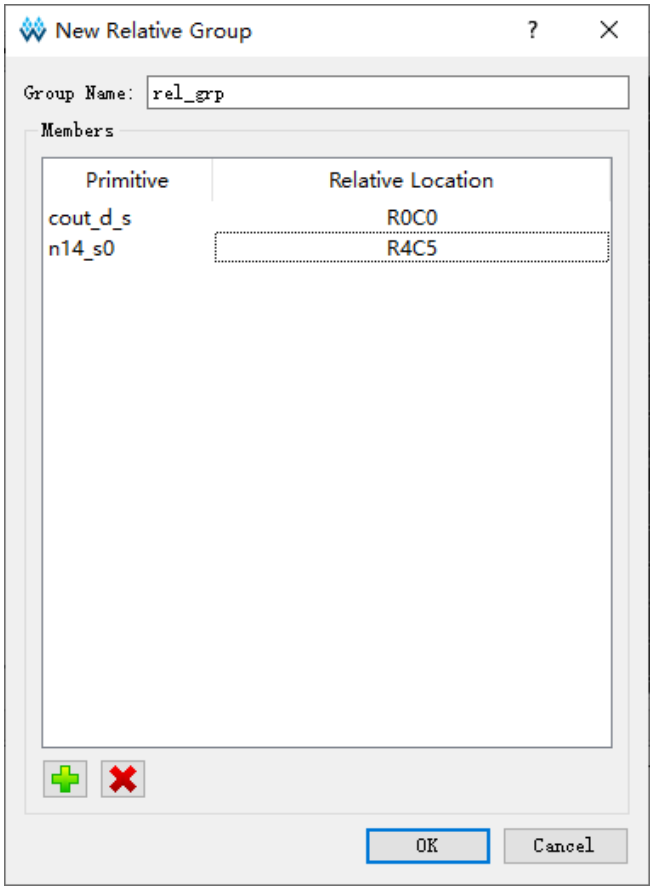
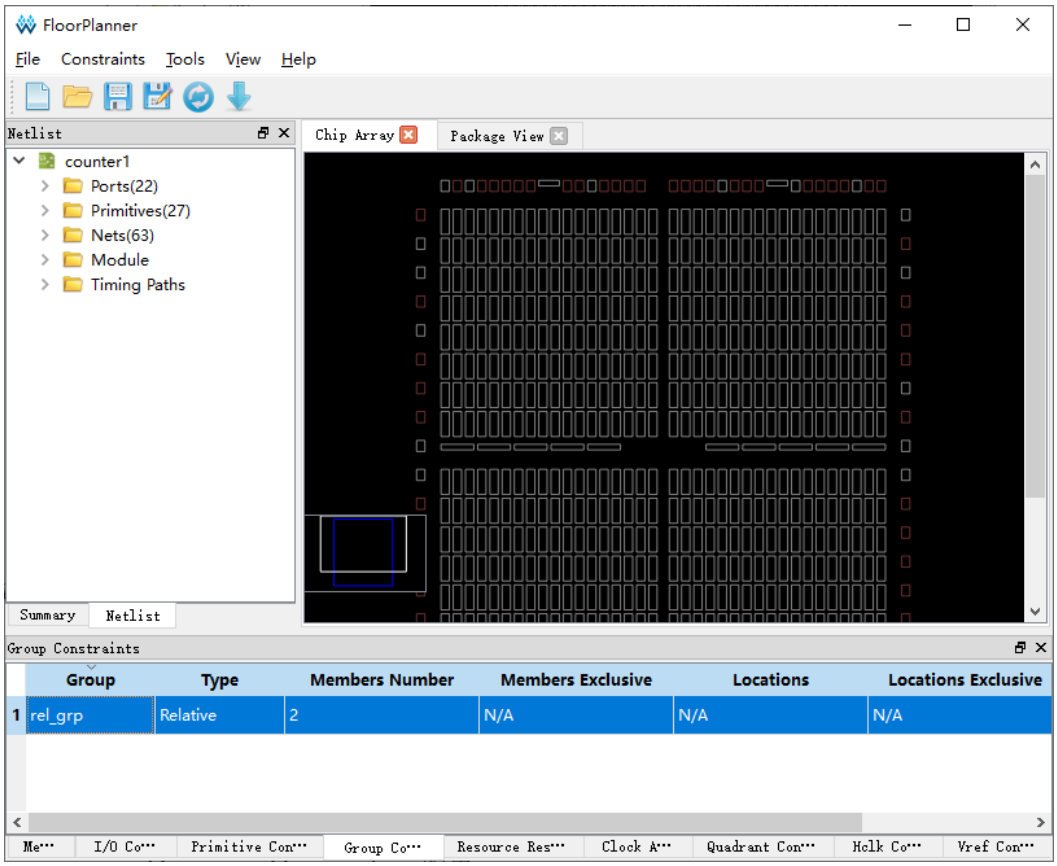


Figure 4-11 Relative Group Constraints



4.2.5 Edit Resource Reservation Constraints

1. Right-click "Resource Reservation" and click "Reserve Resources" to add resource reservation constraints, as shown in Figure 4-12.
2. Select the created resource reservation constraints and drag it to a location in Chip Array. As shown in Figure 4-13, drag to BSRAM_R10[1] to generate constraints.

Figure 4-12 Create Resource Reservation

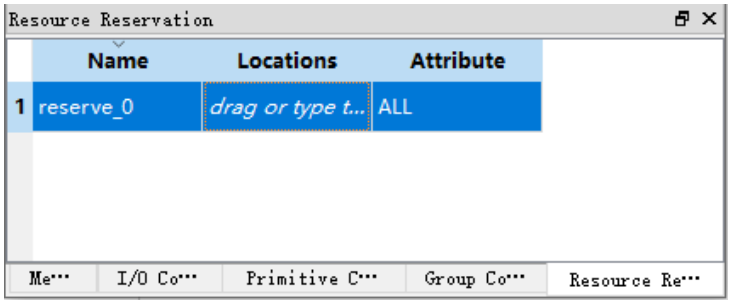
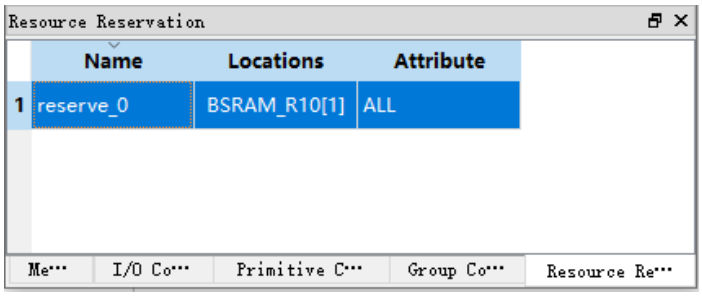


Figure 4-13 Resource Reservation



4.2.6 Edit Clock Net Constraints

1. Right-click to select "Clock Net Constraints" in Clock Net Constraints window, then "Clock Net Constraints" dialog box pops up.
2. Click "" and "Select Net" dialog box pops up. Select a Net and click "OK" to add a net.
3. Select clock type and set signal type, as shown in Figure 4-14.
4. Click "OK" to add constraints to Clock Net Constraints, as shown in Figure 4-15.

Figure 4-14 Create Clock Net Constraints

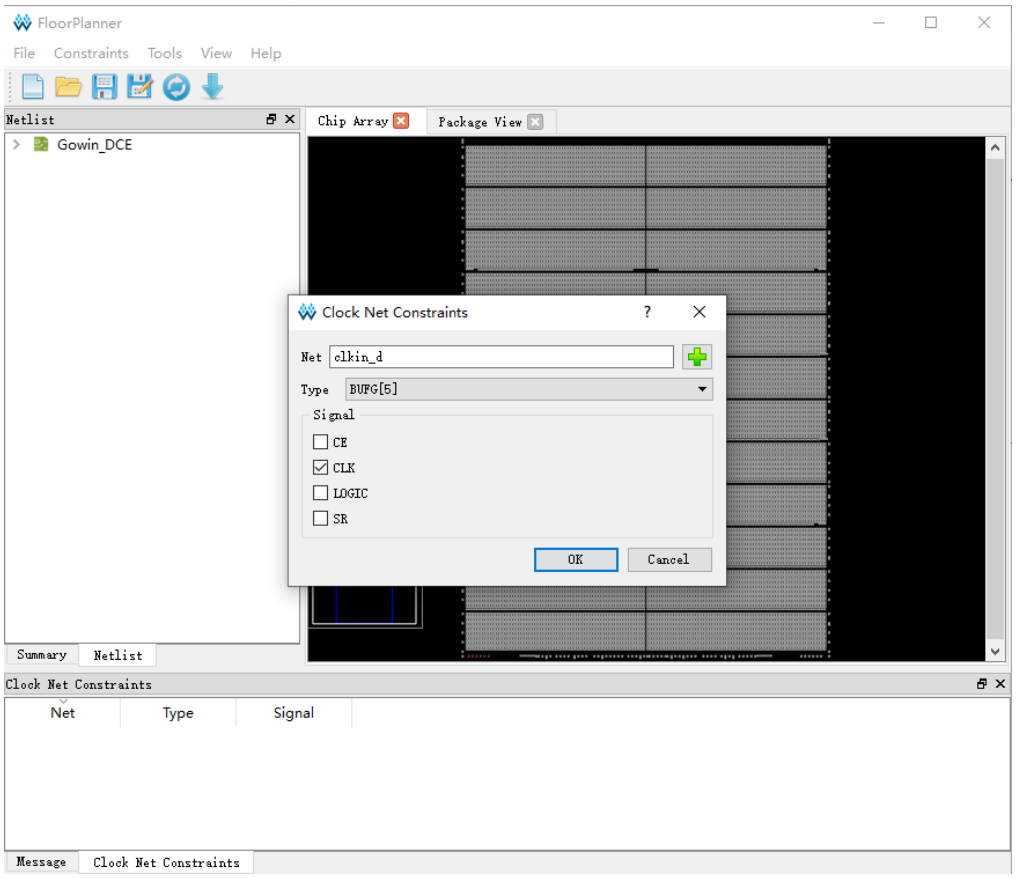
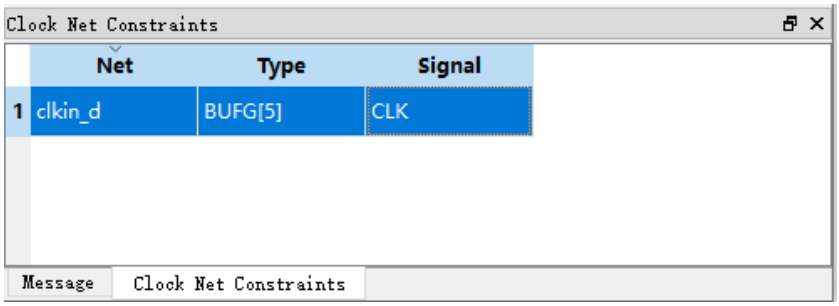


Figure 4-15 Clock Net Constraints



4.2.7 Edit GCLK Primitive Constraints

GCLK Primitive Constraints only support DCS and DQCE constraints.

1. Right-click to select "Select GCLK Primitive" in GCLK Primitive Constraints window, then "GCLK Primitive Constraints" dialog box pops up.
2. Click "" and "GCLK Primitive" dialog box pops up. Select a "Instance" and click "OK".
3. Select a GCLK position in "Position", as shown in Figure 4-16.
4. Click "OK" to add this constraint, as shown in Figure 4-17.

Figure 4-16 Create GCLK Primitive Constraints

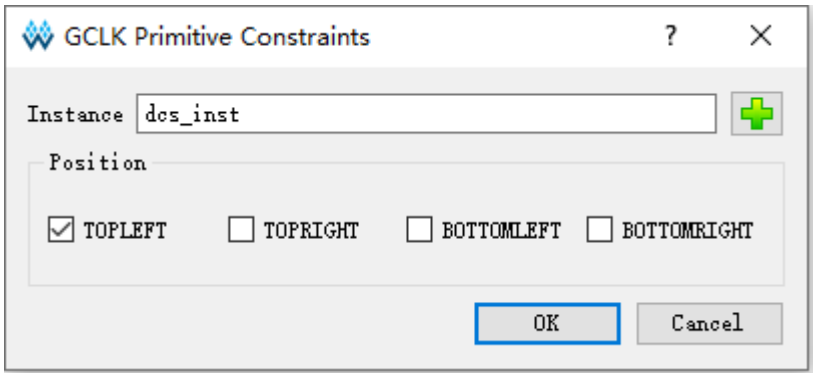
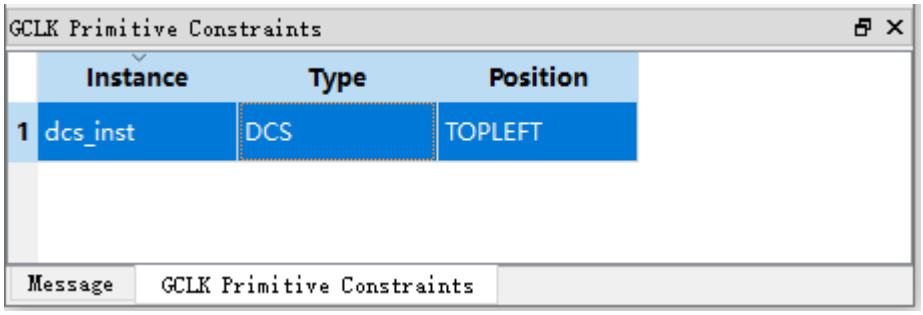


Figure 4-17 GCLK Primitive Constraints



4.2.8 Edit HCLK Primitive Constraints

HCLK Primitive Constraints only support CLKDIV and DLLDLY constrains.

The steps are as follows.

1. Right-click to select "Select HCLK Primitive" in HCLK Primitive Constraints window, then "HCLK Primitive Constraints" dialog box pops up.
2. Click "" and "HCLK Primitive" dialog box pops up. Select a "Instance" and click "OK".
3. Select a HCLK position in "Position", as shown in Figure 4-18.
4. Click "OK" to add the constraints, as shown in Figure 4-19.

Figure 4-18 Create HCLK Primitive Constraints

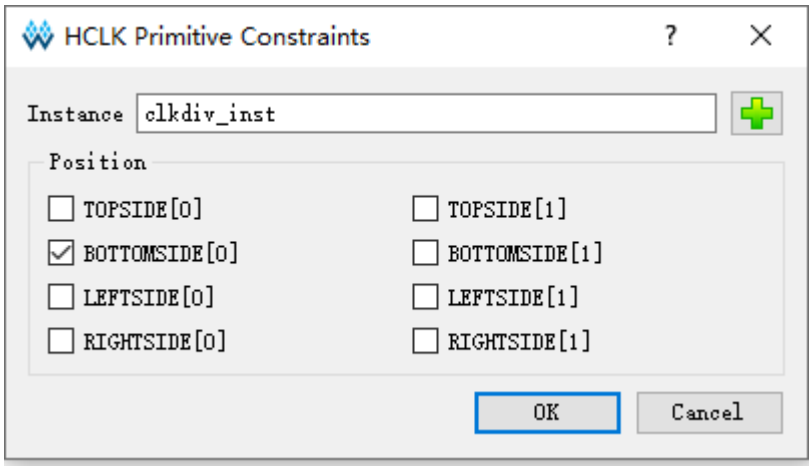
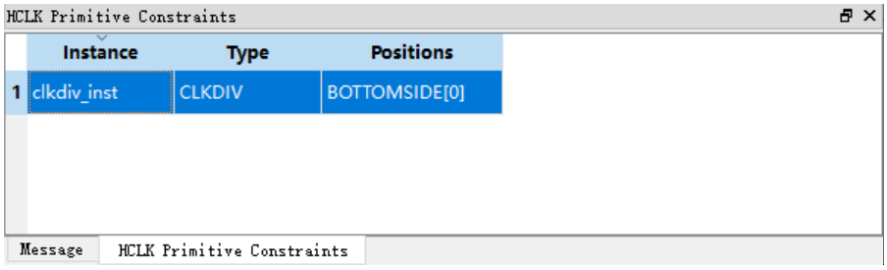


Figure 4-19 HCLK Primitive Constraints



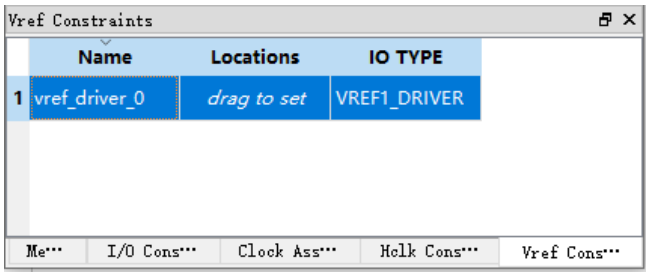
4.2.9 Edit Vref Constraints

Drag to Chip Array to create Vref Constraints.

1. Right-click Vref Constraints and select "Define Vref Driver" to add the constraints to Vref Constraints, as shown in Figure 4-20.

2. Zoom in Chip Array to macrocell mode. Select the created Vref Constraints and drag it to B7 in Chip Array. The location of the Vref Constraints is displayed as "B7", as shown in Figure 4-22.

Figure 4-20 Create Vref Constraints



You can customize Vref constraint name, but duplicate names are not allowed; if there are duplicate names, you will be prompted, as shown in Figure 4-21.

Figure 4-21 Prompt

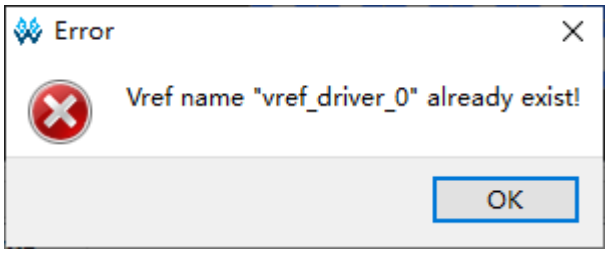
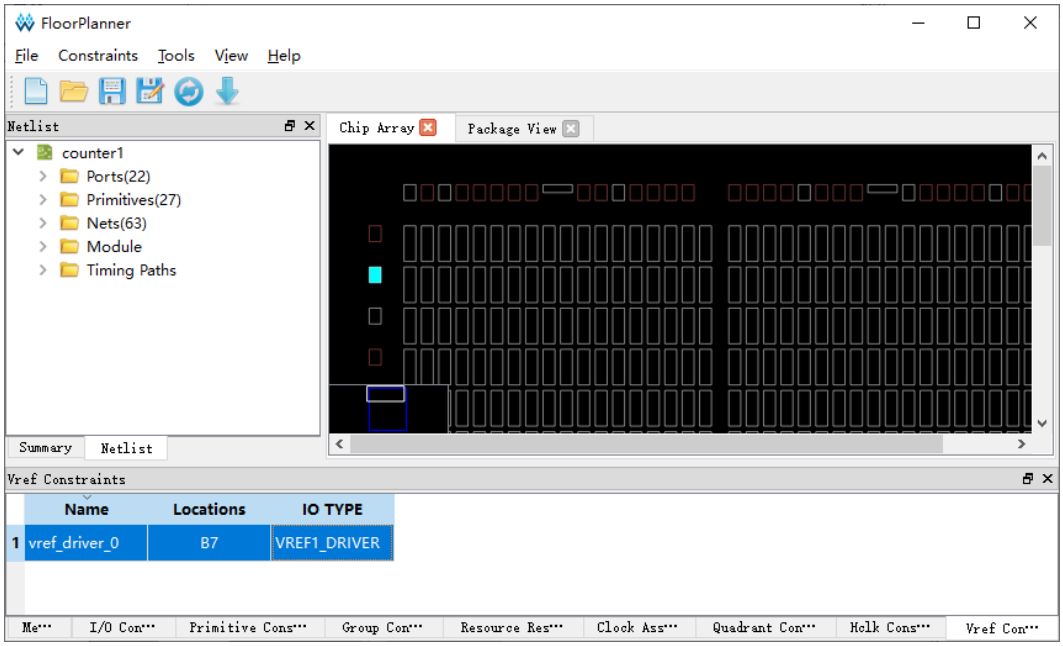


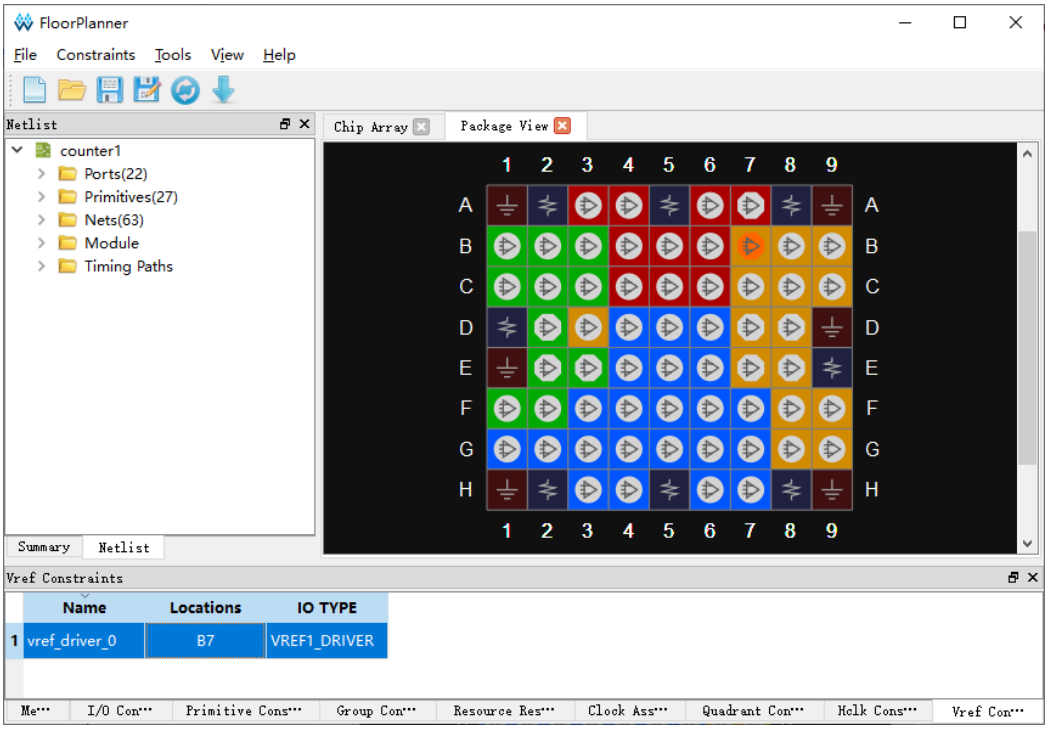
Figure 4-22 Drag to Chip Array to Generate Vref Constraints Location



Drag to Package View to create Vref constraints.

1. Right-click Vref Constraints and select "Define Vref Driver" to add the constraints to Vref Constraints, as shown in Figure 4-20.
2. Select the newly created Vref Constraints and drag it to B7 in Package View. The location of the Vref Constraints is displayed as "B7", as shown in Figure 4-23.

Figure 4-23 Drag to Package View to Generate Vref Constraints Location



Appendix A Physical Constraints Syntax Definition

A.1 I/O Location Constraints

The IO location constraints can be used to constrain a port to a specified IOB location. The specific IO locations can be found in the device's Pinout manuals.

Syntax

IO_LOC "obj_name" obj_location [exclusive];

Syntax Rules

- Constraint statements end with a semicolon (;).
- The constrained object obj_name must be enclosed in double quotation marks ("").
- Multiple IO locations can be specified for obj_location, separated by commas (e.g., "A11,B2").
- Different parts of the constraint statement are separated by spaces.

Constraint Elements

- obj_name

  obj_name is the port name used in the example case.

- obj_location

  obj_location refers to the IO locations, such as "A11", "B12". If multiple locations are specified, they must be separated by commas, e.g., "A11, B2".

- exclusive

exclusive is optional. When it is placed after obj_location, it indicates that the IO locations listed in this constraint can only be occupied by the objects defined by obj_name.

Application Examples

Example 1

IO_LOC "port0" G2;

// The object port0 is constrained to location G2 on the GW2A-18-PBGA256 package.

Example 2

IO_LOC "port1" P10,N10,G2;

// The object port1 is constrained to locations P10, N10, and G2 on the GW2A-18-PBGA256 package. During placement, the first available location among these three will be selected.

Example 3

IO_LOC "port2" P10,N10,G2 exclusive;

// The object port2 is constrained to locations P10, N10, and G2 on the GW2A-18-PBGA256 package, and these three locations can only be assigned to port2.

A.2 I/O Attribute Constraints

I/O attribute constraints are used to set various attribute values for I/Os, such as the port's level standard (IO_TYPE), pull-up/pull-down mode (PULL_MODE), drive strength (DRIVE), etc. For detailed attribute settings, please refer to the product datasheets.

Syntax

IO_PORT "obj_name" attribute = attribute_value;

Note!

- Multiple attributes can be set in one constraint statement, separated by spaces.
- Syntax rules can be found in A.1 I/O Location Constraints.

Constraint Elements

- obj_name

The port name in the example case.

- attribute

  The name of the I/O attribute.

- attribute_value

  The value assigned to the I/O attribute.

For the port attributes and their corresponding values, please refer to *UG289, Gowin Programmable IO (GPIO) User Guide*.

Application Examples

Example 1

IO_PORT "port_1" IO_TYPE = LVTTL33;

// Sets the IO_TYPE of port_1 to LVTTL33.

Example 2

IO_PORT "port_2" IO_TYPE = LVTTL33 PULL_MODE = KEEPER;

// Sets the IO_TYPE of port_2 to LVTTL33 and the PULL_MODE to KEEPER.

A.3 Primitive Constraints

Primitive constraints are used to place instances at specified GRID locations. These constraints can be applied to primitives such as LUT, DFF, DL, MUX, IOLOGIC, BSRAM, SSRAM, DSP, PLL, DQS, etc.

Syntax

INS_LOC "obj_name" obj_location [exclusive];

Note!

Syntax rules can be found in A.1 I/O Location Constraints.

Constraint Elements

- obj_name

  The instance name of a primitive to be constrained.

- exclusive

  exclusive is optional. It indicates that the IO locations listed in this constraint can only be occupied by the objects defined by obj_name.

- obj_location

The obj_location specifies a valid location for the given obj_name (primitive instance). It includes the following categories:

1. LUT Constraint Locations

- A single location specifying one LUT, such as RxCy[0-3][A-B]
- A range of locations specifying multiple rows or columns
  - Multiple CLS or LUTs: RxCm, RxCm[0-3]
  - Row range: R[x:y]Cm, R[x:y]Cm[0-3], R[x:y]Cm[0-3][A-B]
  - Column range: RxC[m:n], RxC[m:n][0-3], RxC[m:n][0-3][A-B]
  - Row and column range: R[x:y]C[m:n], R[x:y]C[m:n][0-3], R[x:y]C[m:n][0-3][A-B]

Notes!

- In LUT location formats, x and y indicate the row information of the GRID.
- m and n indicate the column information of the GRID.
- R represents the row, and C represents the column of the GRID.
- 0-3 represents the index of the CLS within a GRID.
- A-B represents the index of LUT location within a CLS.
- The location constraints for MUX, DFF, and DL primitives follow the same format as those for LUTs.

2. PLL Constraint Locations

The format for PLL constraint locations is either "PLL_L" or "PLL_R", representing the left or right side of the device. If multiple PLLs are available on one side, they can be indexed as:

PLL_L[0], PLL_L[1], ...

PLL_R[0], PLL_R[1], ...

3. BSRAM Constraint Locations

The format for BSRAM constraint locations is "BSRAM_R10[0]" (First BSRAM in Row 10), "BSRAM_R10[1]", ...

4. DSP Constraint Locations

The format for DSP constraint locations is "DSP_R37[0]" (the first DSP block in row 37), "DSP_R37[1]", ...

If it is constrained to a macro, the format can be written as "DSP_R37[0][A]" or "DSP_R37[0][B]".

Note!

Each DSP block contains two macros. A macro refers to the location for one MULT18X18 primitive.

5. IOLOGIC Constraint Locations

IOLOGIC constraint locations refer to specific IO positions. Please refer to the Pinout manuals of the target device for detailed IO location information.

6. SARADC Constraint Locations

The format for SARADC constraint locations is "ADC[0]", "ADC[1]"…

Note!

Currently, only GW1AN-5 devices support SARADC constraints, and only two locations are supported: ADC[0] and ADC[1].

Application Examples

Example 1

INS_LOC "lut_1" R5C10[0][A];

// lut_1 is constrained to the first LUT in the first CLS of R5C10.

Example 2

INS_LOC "ins_2" R5C6[2] exclusive;

// ins_2 is constrained to the third CLS in R5C6, and this CLS can only be used by ins_2.

Example 3

INS_LOC "ins_3" R[2:6]C2;

// ins_3 is constrained to row 2 to 6 in column 2.

Example 4

INS_LOC "ins_4" R[2:4]C[2:6] exclusive;

// ins_4 is constrained to the region from row 2 to 4 and column 2 to 6, which can only be used by this object.

Example 5

INS_LOC "ins_5" R[2:4]C[2:6][1];

// ins_5 is constrained to the second CLS of any GRID located between row 2 to 4 and column 2 to 6.

Example 6

INS_LOC "ides4_name" N10;

// ides4_name is constrained to the IO pin position N10 on GW2A-18-PBGA256 package.

Example 7

INS_LOC "pll_name" PLL_L[0];

// pll_name is constrained to the first PLL on the left side of the device on GW2A-18-PBGA256 package.

Example 8

INS_LOC "bsram_name" BSRAM_R10[2];

// bsram_name is constrained to the third BSRAM location in row 10 on GW2A-18-PBGA256 package.

Example 9

INS_LOC "dsp_name" DSP_R37[2];

// dsp_name is constrained to the third DSP block in row 37 on GW2A-18-PBGA256 package.

Example 10

INS_LOC "saradc_inst" ADC[0];

// saradc_inst is constrained to the first SARADC location on the GW1AN-5A-LQFP144X package.

A.4 Group Constraints

The group constraints include Primitive Group Constraints and Relative Group Constraints.

A.4.1 Primitive Group Constraints

Primitive Group Constraint is used to define a group constraint. A group is a collection of various instance objects. The instances such as LUT, DFF, DL, IOLOGIC, Buffer, BSRAM, SSRAM, DSP, PLL, and DQS can be added to a group using the Primitive Group constraints. And the location constraints of all objects in the group can be achieved by constraining the location of the group. Meanwhile, Primitive Group constraints support the use of wildcard characters "?" and "*". The "?"

matches a single character and "*" matches zero or more characters.

Syntax

Definition of Primitive Group:

GROUP group_name = { "obj_names" } [exclusive];

GRP_LOC group_name group_location[exclusive];

Note!

- Syntax rules can be found in A.1 I/O Location Constraints.
- The Primitive Group constraint syntax supports wildcards, where “?” matches a single character and “*” matches zero or more characters.
- Both group definition and group location statements are required. If either is missing, the constraint is considered invalid.

Constraints Elements

- group_name

  The name of the Primitive Group being defined.

- obj_name

  The name of the instance to be added to the group.

- group_location

  Specifies the constraint location for the group. The available locations include IO, CFU, DQS, BSRAM, DSP, PLL, etc.

- exclusive

  The keyword "exclusive" is optional and can be used after the group definition statement or the group location constraint statement.

  When added after the group definition, it indicates that the objects in the group can only belong to this group, even though an object can normally be included in multiple groups.

  When used after the location constraint statement, it means that the specified constraint location can only be occupied by objects within this group.

Application Examples

Example 1

GROUP group_1 = { "lut1" "lut2" "lut3” "ins_4" };

GRP_LOC group_1 R[3:4]C4 exclusive;

// Creates a group named "group_1" containing the objects lut1, lut2, lut3, and ins_4. All instances in the group are constrained to the region R[3:4]C4, and this region can only be occupied by instances belonging to group_1.

Example 2

GROUP group_2 = { "lut_*"} exclusive;

GRP_LOC group_2 R[2:3]C[2:4];

// Example of using the wildcard “*”. Creates a group named "group_2" which matches and includes all objects whose names start with "lut_". These objects can only belong to this group, and all instances in the group are constrained within the region R[2:3]C[2:4].

A.4.2 Relative Group Constraints

The relative location constraints of the instances, such as LUT1~LUT4, DFF, DL, MUX2, can be realized using the Relative Group Constraints.

Syntax

Definition of Relative Group Constraints:

REL_GROUP group_name = { "obj_names" };

INS_RLOC “obj_name” relative_location;

Note!

- Syntax rules can be found in A.1 I/O Location Constraints.
- Both group definition and group location statements are required. If either is missing, the constraint is considered invalid.

Constraints Elements

- obj_name

  The name of the Relative Group being defined.

- relative_location

The descriptions of the relative locations of each constrained object within the group.

Application Examples

REL_GROUP grp_1 = { "ins_1" "ins_2" "ins_3" "ins_4" };

INS_RLOC "ins_1" R0C0;

INS_RLOC "ins_2" R2C3;

INS_RLOC "ins_3" R3C5;

// Defines a relative group constraint named grp_1 and adds ins_1, ins_2, and ins_3 to the group. Using the relative position R1C1 of ins_1 as the origin, ins_2 is constrained to the relative offset position R2C3 from R1C1, and ins_3 is constrained to the relative offset position R0C5 from R1C1.

A.5 Resource Reservation Constraints

The specified location or range can be reserved using the Resource Reservation constraints.

Syntax

LOC_RESERVE location [-res_obj];

Note!

Syntax rules can be found in A.1 I/O Location Constraints.

Constraint Elements

- location

Specifies the reserved location. Only the following types can be reserved: CFU, IO, BSRAM, DSP, PLL, DQS.

- res_obj (optional)

res_obj (optional) is applicable only to CFU-type locations and it can be set to LUT/REG.

LUT: Only the LUT resource at the specified CFU location is reserved.

REG: Only the REG resource at the specified CFU location is reserved.

Application Examples

Example 1

LOC_RESERVE R2C3[0]-LUT;

The LUT resources in the first CLSat R2C3 are reserved.

Example 2

LOC_RESERVE R2C3[0]-REG;

The REG resources in the first CLS at R2C3 are reserved.

Example 3

LOC_RESERVE IOR3, IOR6, R2C3, R3C4;

The resources at locations IOR3, IOR6, R2C3, and R3C4 are reserved and will not be used during placement.

A.6 Vref Constraints

The chip supports the external reference voltage, which is valid for the BANK. The Vref Constraints can be used to constrain the name and location of the input pin of the external reference voltage.

Note!

- The input pin location where the external reference voltage can be set must have IOLOGIC resources.
- Vref Constraints and PORT constraints are valid when used together. When a single-ended input or inout port with IO Type SSTL/HSTL, the Vref attribute can be set to the created Vref Constraints, indicating that the reference voltage of this port uses the external reference voltage input from the Vref Constraints location.

Syntax

USE_VREF_DRIVER vref_name [location];

Note!

Syntax rules can be found in A.1 I/O Location Constraints.

Constraints Elements

- vref_name

  Customized VREF pin name

- location

Any IO location with IOLOGIC resources can be used as a location for the VREF pin constraints.

Application Examples

USE_VREF_DRIVER vref_pin L14;

IO_LOC "port_1" L13;

IO_PORT "port_1" IO_TYPE = SSTL18_I VREF=vref_pin;

// In the GW2A-18-PBGA256 package, a VREF pin named vref_pin is

defined at location L14. The VREF attribute of port_1 (constrained to L13) is set to reference vref_pin, requiring both L13 and L14 to reside within the same I/O bank.

A.7 GCLK Primitive Constraints

GCLK Primitive Constraints is used to constrain objects such as DCS/DQCE to a specified position.

Syntax

INS_LOC "obj_name" position;

Note!

Syntax rules can be found in A.1 I/O Location Constraints.

Constraints Elements

- obj_name

  Uses the instance name of the DCS or DQCE as obj_name.

- position

  Specifies the placement location of the constrained object.

LittleBee family: Devices such as GW1N-9, GW1NR-9, GW1N-9C, and GW1NR-9C support four positions: "TOPLEFT", "TOPRIGHT", "BOTTOMLEFT", and "BOTTOMRIGHT". Other devices in this family support only two positions: "LEFT" and "RIGHT".

Arora family supports four positions: "TOPLEFT", "TOPRIGHT", "BOTTOMLEFT", and "BOTTOMRIGHT".

Application Example

INS_LOC "dcs_name" TOPLEFT ;

// In the GW2A-18-PBGA256 package, the DCS instance dcs_name is constrained to the TOPLEFT position.

A.8 Clock Net Constraints

Clock Net Constraints is used to constrain a specific net to the global clock wire or non-clock wire in the design.

Syntax

CLOCK_LOC "net_name" global_clocks = signal_type;

Note!

Syntax rules can be found in A.1 I/O Location Constraints.

Constraints Elements

- net_name

  The name of the net as defined in the example case.

- global_clocks

  Specifies the type of clock routing for the net.

  BUFG[0-7] means the net is routed to a specific PCLK.

  BUFG means the net is routed to PCLK.

  BUFS means the net is routed to SCLK.

  LOCAL_CLOCK means this net is not routed to the clock wire.

- signal_type

  Specifies the signal type of the net.

  CLK: The net functions as a clock pin.

  CE: The net functions as a clock enable pin.

  SR: The net functions as SET, RESET, CLEAR, or PRESET signals.

  LOGIC: The net does not fall into any of the above categories.

  The sign "|" can be used to separate multiple specified signal_type.

Note!

If LOCAL_CLOCK is selected for LOCAL_CLOCK, signal_type is not available.

Application Examples

Example 1

CLOCK_LOC "net" BUFG = CLK|CE;

// Constrains the CLOCK object "net" with signal type set to CLK or CE to be routed through the PCLK clock network.

Example 2

CLOCK_LOC "net" LOCAL_CLOCK;

// Constrain the CLOCK object "net" to be routed through local (non-clock) wiring.

Example 3

CLOCK_LOC "net" BUFG[0] = CLK;

// Constrains the CLOCK object "net" with signal_type set to CLK to be routed through the first PCLK resource on the chip.

A.9 HCLK Primitive Constraints

HCLK Primitive Constraints is used to constrain CLKDIV and DLLDLY to the HCLK positions. The constraints positions of CLKDIV/DLLDLY are different from the ones of other general instances. The "TOPSIDE", "BOTTOMSIDE", "LEFTSIDE", and "RIGHTSIDE" indicate the four sides of the constraint positions.

Syntax

INS_LOC "obj_name" position;

Note!

Syntax rules can be found in A.1 I/O Location Constraints.

Constraints Elements

- obj_name

  Uses the instance name of CLKDIV or DLLDLY as obj_name..

- position

  Specifies the placement location of the constrained object.

  “TOPSIDE[0-1]”

  “BOTTOMSIDE[0-1]”

  “LEFTSIDE[0-1]”

  “RIGHTSIDE[0-1]”

Application Example

INS_LOC "clkdiv_name" TOPSIDE[0];

// In the GW2A-18-PBGA256 package, the instance clkdiv_name is constrained to location TOPSIDE[0].

A.10 Other Constraints

A.10.1 JTAGSEL_N Net Constraints

When the internal logic of the FPGA is used to control JTAGSEL_N functions, i.e., during the second download without power off, pull down JTAGSEL_N so that JTAG can be switched to the configuration function, and net physical constraints of JTAGSEL_N need to be added. For the details, you can refer to *UG290, Gowin FPGA Products Programming and Configuration User Guide*.

Syntax

NET_LOC "obj_name" V_JTAGSELN;

Note!

Syntax rules can be found in A.1 I/O Location Constraints.

Constraint Element

- obj_name

  A routable net within the internal logic is used as the obj_name.

Application Example

NET_LOC "netname" V_JTAGSELN;

// The netname net is used to control the functions of JTAGSEL_N.

A.10.2 RECONFIG_N Net Constraints

When the internal logic of the FPGA is used to control RECONFIG_N functions, i.e., during the second download without power off, pull down RECONFIG_N so that JTAG can be switched to the configuration reset function, and net's physical constraints of RECONFIG_N need to be added. For the details, you can refer to *UG290, Gowin FPGA Products Programming and Configuration User Guide*.

Syntax

NET_LOC "obj_name" V_RECONFIGN;

Note!

Syntax rules can be found in A.1 I/O Location Constraints.

Constraint Element

- obj_name

  A routable net within the internal logic is used as the obj_name.

Application Example

```
NET_LOC "netname" V_RECONFIGN;
// Use this netname to control the RECONFIG_N function.
```

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