Drafting and Dimensioning

About Drafting and Dimensioning

Allegro/APD drafting and dimensioning features support Electronic Design Automation (EDA) industry standards that let you specify the dimensions of every feature on a board. This gives you greater control over the release to manufacturing of your design. Drafting and dimensioning normally is performed in the later stages of the design process. You can access the drafting and dimension commands from the Manufacture menu option.

The Allegro/APD dimensioning environment enables you to specify default dimensioning parameters that govern the format and syntax of the drafting process. These parameters conform to the ANSI specification for Dimensioning and Tolerancing (Y14.5M-1982) and can be displayed and modified at any time during the drafting session without interrupting the active command.

Allegro/APD supports the following industry standards:

- •ANSI (American National Standards Institute) (default)

- •BSI (British Standards Institute)

- •DIN (German Industrial Normal)

- •ISO (International Organization for Standardization)

- •JIS (Japanese Industrial Standard)

- •AFNOR (French Association for Normalization)

When you select an industry standard, Allegro/APD automatically matches the default parameter settings to the standard you have selected. In addition, Allegro/APD enables you to modify these settings to accommodate your unique dimensioning style. For example, if you specify AFNOR, Allegro/APD provides all dimensions in millimeters. You can, however, change the units parameter from millimeters to whichever units are required by your site.

Note: Selecting dimensioning units has no impact on current database units or accuracy.

Adding Balloon Leaders to your Design

1. Choose **Manufacture > Dimension/Draft > Balloon Leader** . The cursor becomes a balloon and Allegro/APD displays the following message.

   ```
   Pick a point or element for leader origin
   ```

   The Value box in the Options tab displays the text value to be added in the balloon.

2. If necessary, change the **Value** box in the Options tab.

3. Position the balloon at the start point for the leader and click. Allegro/APD displays the following message.

   ```
   Add dimension value with popup menu
   ```

4. Move the balloon and click for each vertex of the leader that you are adding.

5. Choose **Done** or **Next** from the pop-up menu to continue processing.

   If auto-increment is On, Allegro/APD automatically increments the text value for the next balloon leader and displays it in the Value box. If the text is a number, Allegro/APD increments it by one. If the text is alphabetic, Allegro/APD increments it to the next alphabetic

character (A to B, B to C, and so on).

To add a balloon without a leader, position the balloon in the design and click. Do not move the balloon to draw the leader; instead, choose **Dimension Value** from the pop-up menu.

Adding Chamfer Leaders to your Design

1. Choose **Manufacture > Dimension/Draft > Chamfer Leader** . Allegro/APD displays the following message.

   ```
   Pick a point or element to dimension
   ```

2. Position the cursor on the 45 degree chamfer segment and click.

   The command displays the dimension text in the **Value** box of the Options tab, and the cursor becomes a text block and dynamic rubberband .

3. Choose the chamfer segment.

4. Select a position for the chamfer dimension. Allegro/APD displays the message:

   ```
   Add dimension value with popup menu
   ```

5. Choose **Dimension Value** or **Next** from the pop-up menu to continue adding chamfer dimensions.

6. Choose **Done** to end the command.

Adding Diametral Leaders to your Design

1. Choose **Manufacture > Dimension/Draft > Diametral Leader** . Allegro/APD displays the following message.

   ```
   Pick a point or element to dimension
   ```

2. Click on the edge of the circle that you want dimensioned. Allegro/APD performs the following tasks.

   - Calculates the diameter of the circle

   - Places the calculated amount in the Value box on the Options tab

   - Displays a rubberband line from the circle center to the cursor

3. Move the cursor and click again to establish the position and length of the leader.

4. Continue shaping the line by moving the cursor and clicking until the leader is in the correct position. Allegro/APD displays the following message:

   ```
   Add dimension value with pop-up menu
   ```

5. Choose **Dimension Value** or **Next** from the pop-up menu.

   To override the automatic dimension value

6. Move the cursor to the **Value** box on the Options tab.

7. Enter another value and press **Return**.

8. Choose **Dimension Value** from the pop-up menu

Adding Leader Lines to your Design

1. Choose **Manufacture > Dimension/Draft > Leader Lines**. Allegro/APD displays the following message.

   ```
   Pick a point or element for leader origin
   ```

2. Position the cursor at a point on an element or in the layout where you want the leader to point.

3. Click at that point. Allegro/APD displays a rubberband from that point.

4. Move the cursor and click a point for a vertex of the leader.

5. Continue creating leader segments by moving the cursor and clicking.

6. Choose **Done** or **Next** from the pop-up menu.

   If you choose **Done**, Allegro/APD adds the leader with an arrow pointing to the first point you selected.

   If you choose **Next**, you can add another leader.

Adding Radial Leaders to your Design

1. Choose **Manufacture > Dimension/Draft > Radial Leader**. Allegro/APD displays the following message.

   ```
   Pick a point or element to dimension
   ```

2. Click on the edge of the circle to be dimensioned. Allegro/APD performs the following tasks.

   - Calculates the radius of the circle

   - Places the calculated amount in the Value box on the Options tab

   - Displays a rubberband line from the circle center to the cursor

3. Move the cursor and click again to establish the position and length of the leader.

4. Continue shaping the line by moving the cursor and clicking until the leader is in the correct position. Allegro/APD displays the following message.

   ```
   Add dimension value with popup menu
   ```

5. Choose **Dimension Value** or **Next** from the pop-up menu.

   To override the automatic dimension value

6. Move the cursor to the Value box on the Options tab.

7. Enter another value and press Return.

8. Choose **Dimension Value** from the pop-up menu.

Creating an Angular Dimension

1. Choose **Manufacture > Dimension/Draft > Angular Dim**. Allegro/APD displays the following message.

   ```
   Pick first line segment for dimension...
   ```

   Note: After selecting the first temporary segment, a dynamic arc appears to qualify the

defined angle.

2. Click on one of the line segments to be dimensioned. Allegro/APD displays the following message to confirm the selection.

```
Pick second segment...
```

3. Select the second line segment to be dimensioned. Allegro/APD displays the following message.

```
Pick first extension line...
```

4. Select a position for the first extension line. Allegro/APD displays the following message.

```
Pick second extension line...
```

5. Select a position for the second extension line. Allegro/APD displays text box in the cursor and the following message.

```
Pick location for dimension value
```

6. Select a location for the dimension. Allegro/APD adds the angular dimension lines and value.

7. Choose **Done** or **Next** from the pop-up menu to continue the command.

Creating Detailed Views

A detailed view is a separate view of an assembly or configuration that typically depicts the assembly or configuration in greater detail. In Allegro/APD, you create a detailed view by enlarging a selected area in your design. Allegro/APD copies only geometric information, and not electrical, logical, and property information. For example, Allegro/APD copies only the geometric elements of symbols. You can locate a detailed view anywhere on your drawing.

1. Choose **Manufacture > Dimension/Draft > Create Detail**.

2. In the **Control Panel**, display the Options tab.

A default scaling factor of (2) is displayed in the Options tab.

Allegro/APD automatically copies all visible elements in the selected area and enlarges the selected area by a user-defined scale factor.

To change the scaling factor, click the **Scale Factor** field and type a new scale factor.

3. If necessary, change the **Find** Filter to control the selection of certain types of items.

4. To deselect specific items from the selection area, click right to display the pop-up menu and choose **Group**.

Otherwise, go to **step 5.**

Note: When you choose Group mode in the pop-up menu, Allegro/APD automatically activates deselection mode. Allegro/APD expects you to deselect items from the selection area.

5. Select two points to define the selection window (area).

Allegro/APD copies visible elements in the selection window, clips items (rectangles, lines, arcs, shapes, text, and voids) to the window, and highlights visible elements in the window. Other element types, such as symbols or pins, must lay completely within the selection window to copied.

Allegro/APD enlarges the copy of the selection window to create the detailed view, but only the

outline of the detailed view appears when you move the cursor. You cannot see the actual detail until you position the view (step 8). The bottom left corner of the detailed view outline attaches to the cursor.

Allegro/APD does one of the following:

- Asks you to pick the location for the detailed view.

  Go to **step 8.**

- If you activated group mode in (step 4), Allegro/APD asks you to pick the elements that are not needed in the detailed view.

  Go to **step 6**.

6. To deselect elements in the selection window:

    a.   Click each element to be removed from the selection.

    b.   When you finish deselecting elements, click right to display the pop-up menu and choose Complete.

The outline of the detailed view appears, with the cursor attached to the bottom left corner of the outline.

Allegro/APD asks you to pick the location for the detailed view.

7. To change the scale factor of the detailed view, rotate the detailed view outline, and mirror the detailed view outline before positioning the detailed view, do the following. Otherwise, go to step 9.

To change the scale factor of the detailed view:

a. Click the **Scale** Factor field in the Options tab and type a new scale factor.

The detailed view outline changes accordingly. Allegro/APD enlarges the elements in the detailed view using the new scale factor, but you cannot see the actual detail until you position the view (step 9).

b. When you finish changing the scale factor, go to step 9 or perform other operations (rotate the view, mirror the view, and so on).

To rotate the detailed view outline 90 degrees:

a. Click right to display the pop-up menu and choose **Rotate**.

The detailed view outline rotates in a counterclockwise manner. You cannot see the actual detail until you position the view (step 9).

The cursor remains attached to the same corner, but that corner rotates with the detailed view.

For example, after one rotation, the bottom left corner of the view becomes the bottom right corner.

b. To continue rotating the detailed view, repeat **step a** for each 90 degree, counterclockwise rotation.

c. When you finish rotating the detailed view outline, go to step 9 or perform other operations (mirror the view, undo the operation, and so on).

To mirror the detailed view:

a. Click right to display the pop-up menu and choose Mirror.

Allegro/APD mirrors the elements in the detailed view, but you cannot see the actual detail until

you position the view (step 9).

When you move the cursor, the outline of the detailed view appears. You can tell the view has been mirrored by observing the cursor location.

The cursor remains attached to the same corner, except that the corner is now mirrored and appears as if it were flipped (mirrored to the other side).

When you finish mirroring the detailed view, go to step 9 or perform other operations (change the scale, undo the operation, and so on).

b. Position the detailed view outline within the drawing extents and click.

Allegro/APD displays the detailed view. The outline of the detailed view remains attached to the cursor so you can position additional views in other locations. You can also change the scale factor, rotate the view, and mirror the view before positioning the view in other locations.

8. When you finish positioning the detailed view, either create a different detailed view or end the session.

To create a different detailed view

a. Click right to display the pop-up menu and choose Next.

The existing selection window dehighlights. Allegro/APD asks you to select two points to define a selection window.

b. Repeat steps 2 through 7.

To end the session

Click right to display the pop-up menu and choose **Done**.

Creating Linear Dimensions

1. Choose **Manufacture > Dimension/Draft > Linear Dim**. Allegro/APD displays the following message.

```
Pick a point or element to dimension
```

2. Position the cursor at a point that you want dimensioned, such as a corner of an element, and click. Allegro/APD displays the following message to confirm the selection.

```
First point found, pick second point
```

3. Position the cursor for the second selection and click. Allegro/APD displays the following message.

```
Pick location for dimension value
```

4. Select a position for the dimension. Allegro/APD adds the dimension lines and value.

5. Choose **Done** or **Next** from the pop-up menu to continue the command.

Creating Datum Dimensions

1. Choose **Manufacture > Dimension/Draft > Datum Dim**.

2. Click to select the first datum reference point.

    You can continue selecting extension line end points, or select **Dimension Value** (or **Next**) from the pop-up menu. The datum reference point appears (0).

    The **Dimension Axis** box in the Options tab shows the default **Both**, along with axis choices X or Y.

    Note: Always create a datum reference point using Both axes.

3. Select the second datum reference point.

4. Select **Dimension Value** (or **Next**) from the pop-up menu to place the second datum reference point (0).

5. Once you have set a reference point for your datum dimensions, start selecting elements or locations and applying dimension values that show dimensions that are relative to the datum reference point that you created in Steps 1 through 3.

    Note: It may be easier to select all datum dimensions one axis at a time. To do this, select the Dimension Axis box in the Options tab. Set the axis to X, apply your dimensions, and set the axis to Y.

Setting Dimension Text Parameters

1. Choose **Manufacture > Dimension/Draft > Parameters.**

    The Drafting dialog box appears.

2. Click the **Dimension Text** button in the **Parameter Editing** section of the.

    The Dimension Text dialog box appears.

3. Set any **Special Dimensioning**, **Dual dimensioning** and **Dimensional Tolerancing** on the **Dimension Text** dialog box.

4. Click **OK** to close the **Dimension Text** dialog box.

5. Click **OK** to close the **Drafting** dialog box

Setting Dimension Line Parameters

1. Choose **Manufacture > Dimension/Draft > Parameters**.

    The Drafting dialog box appears.

2. Click the **Dimension Lines** button in the **Parameter Editing** section of the **Drafting** dialog box.

    The Dimension Line dialog box appears.

3. Set the dimension line parameters on the **Dimension Line** dialog box.

4. Click **OK** to close the **Dimension Line** dialog box.

5. Click **OK** to close the **Drafting** dialog box

Setting Extension Line Parameters

1. Choose **Manufacture > Dimension/Draft > Parameters**.

   The Drafting dialog box appears.

2. Click the **Extension Lines** button in the **Parameter Editing** section of the **Drafting** dialog box.

3. Set the **line suppression**, **offset distances** and **distances beyond dimesion lines** on the Extension Line dialog box.

4. Click **OK** to close the **Extension Lines** dialog box.

5. Click **OK** to close the **Drafting** dialog box

Setting the Balloon Options

1. Choose **Manufacture > Dimension/Draft > Parameters**.

   The Drafting dialog box appears.

2. Click the **Balloons** button in the **Parameter Editing** section of the **Drafting** dialog box.

3. Set the parameters to control the appearance of the balloons you want to use in your design on the Balloon Parameters dialog box.

4. Click **OK** to close the **Balloon Parameters** dialog box.

5. Click **OK** to close the **Drafting** dialog box

Setting the Drafting Standard

1. Choose **Manufacture > Dimension/Draft > Parameters**.

   The Drafting dialog box appears.

2. Select the industry standard from the **Standard Conformance** section of the **Drafting** dialog box.

   The **Units** reflect the standard chosen.

3. Change the **Units** in the **Parameter Editing** section of the dialog box if required.

4. Click any of the buttons in the **Parameter Editing** section to set the relevant dimension parameters.

5. Click **OK** to close the **Drafting** dialog box.

Setting the Line Font for Drafting and Dimensioning

1. Choose **Manufacture > Dimension/Draft > LineFont**.

2. In the Options tab, select the font you want to use from the **Line Font** list box.

Adding Cut Marks to a Board Outline

Note: The board outline needs to be input as a shape element for this command to work.

1. Choose **Manufacture > Cut Marks** to display the Cut Mark Options dialog box.

2. Set the color and visibility options for the CUT_MARKS subclass in the Geometry Group in the Color/Visibility dialog box (**Display > Color/Visibility**).

3. Edit the Line Options as appropriate for your design. These distances are based on the user units set in the Drawing Parameters dialog box (**Setup > Drawing Size**).

    Offset lets you set the cut marks at a specific distance from the board outline. Normally, this would be zero.

    Length increases or decreases the line length of the cut mark.

    Line Width widens or narrows the thickness of the cut mark.

4. If your drawing outline contains arcs, select the method by which cut marks will be generated for arcs.

    The default method (no option selected) creates cut marks for arcs in the same manner as they are generated for lines.

    Arcs As Corners creates cut marks as corners at the endpoints of the arc.

    Always Complete Arcs creates cut marks that span the entire length of the arc, ignoring the Length line option.

    Note: You can delete existing cut marks by deselecting both options and clicking **Apply**.

5. Edit the **Line Location** to create cut marks for the **inside** and/or **outside** corners of the outline.

6. When you have finished editing the dialog box options, click **Apply.**

Any existing cut marks are replaced by new cut marks.

7. Click **OK** to close the dialog box.