You are viewing sample pages from our textbook:

MicroStation XM Training Manual 2D Level 1

Five pages of Module 7 are shown below. The first two pages are typical for all Modules - they provide the Module title and set out the learning objectives. The suggested time for completion of the Module is given at the end of Page 7-3.

Pages 7-14 to 7-16 are instructional pages and, in this case, discuss the use of snaps, dimensional entry, and AccuDraw shortcuts to draw a relatively complex shape. The information and step-by-step instruction is typical throughout our training manuals.

Please note the "Tool Tip" boxes on various pages; these are located throughout the Manual to emphasize a technique or to add specific points of information.

If you require more information about the contents of this book, paste this link into your web browser:

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MicroStation V8 XM 2D LEVEL 1

Module 7

ACCUDRAW

Module Information

Prerequisites:

Module 6 MicroStation - 2D

Introduction:

This is perhaps the most important Module in this course. The AccuDraw drawing aid provides extremely efficient methods of entering dimensional information in your designs, and it is vital that you become totally familiar with AccuDraw's actions and options. After completing this Module you will use AccuDraw in almost every exercise or assignment you draw.

Objective(s):

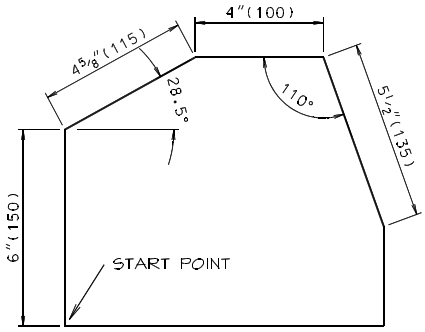
7.1 Activate AccuDraw using the AccuDraw icon.
7.2 Identify AccuDraw's rectangular and polar compasses.
7.3 Identify and apply drawing plane coordinate information.
7.4 Identify and apply AccuDraw's keyboard shortcuts options.
7.5 Place circle elements using AccuDraw and snap options.
7.6 Recall previous dimensional values using AccuDraw's recall options.
7.7 Recognize and apply methods of constraining data points.
7.8 Unlock and relocate the compass origin.
7.9 Recognize and apply shortcut snap modes and constraints.
7.10 Recognize and apply unit roundoff options.
7.11 Enter dimensional values using the Popup Calculator.
7.12 Identify and classify all AccuDraw options and shortcut keys.

Time:

This Module should be completed within 6 hours.

THIS SAMPLE STARTS ON PAGE 7-13 AND DISCUSSES A TYPICAL DIMENSION-ENTRY, SNAP, AND ACCUDRAW SHORT-CUT SEQUENCE.

CONSTRAINING WITH *T* AND *ENTER*



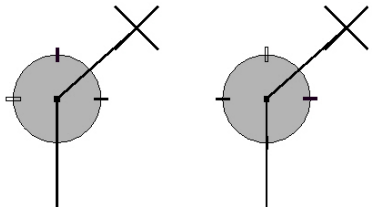
In this exercise you will use the *T* and *Enter* (Smart Lock) shortcuts to draw the figure at the right:

Step 1 The *Line* tool should still be active.
Step 2 Enter a *Data-Point* anywhere in the window.

Start with AccuDraw's *Rectangular* compass.

Step 3 *Move* the cursor *above* the origin and index to the Y-axis.
Step 4 Enter :6 (150) and *Data-point*.
Step 5 Change to the *Polar* compass.

At this point the polar compass is located at the second data point and is oriented to the first line. You need to enter an angle of 28.5^0 *to the horizontal* and you cannot do this with the current compass orientation.



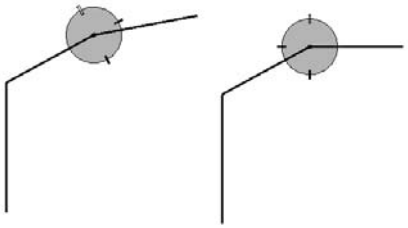
Step 6: Rotate the compass with the "T" key.

Step 6 Press "T" to reorient the compass.

The compass will rotate to orient with the *design plane axes*. Now you can enter the correct angle.

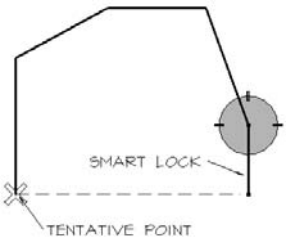
Step 7 In the *Angle* box enter 28.5, in the *Distance* box enter 4 ⅝ (115), and *Data-point* to accept. Note the space between the 4 and the 5/8.

The compass is now oriented with the second line and must be rotated so that you can draw the next horizontal line.



Step 8: Rotate the compass again.

Step 8 *Press* "T" and *index* the dynamic line to the X-axis.
Step 9 Enter a *distance* of :4 (100) and *Data-point*.

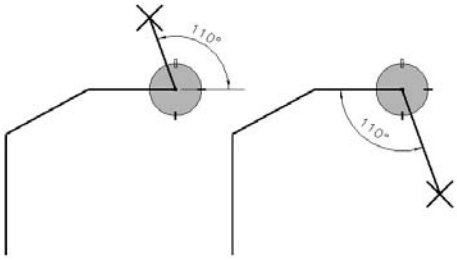


Steps 13 and 14.

In **Step 10** and **11** you need to draw a line at an internal angle of 110^0. Since the compass is oriented to the design plane (because the last line was horizontal), you might think that you need to do some math to calculate the full angle from the X-axis (eg., 110 + 180 = 290). However, AccuDraw allows you to enter the 110^0 angle and then accept the line as *either* 110^0 *from* the X-axis *or* the *reciprocal* of the line. All you have to do is move the cursor *below* the line to display the reciprocal. To confuse you further, you could also enter *-70* for the angle.

Step 10 *Enter* 110 in the *Angle* box, and :5.5 (135) in the *Distance* box.

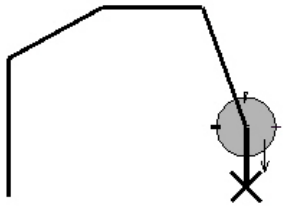
Step 11 *Move* the cursor *downward* to display the line and Data-point to accept.



Steps 10 and 11. Line 110^0 from the X-axis and as a reciprocal.

Actually, in this case it doesn't matter whether your cursor is above or below the starting horizontal line when you enter the active angle. AccuDraw will still offer the two line-position choices.

Step 12 *Press* "T" to reorient the compass for the vertical line.



Step 12.

You will notice that there is no dimension given for the next line. You don't need one because you will use *Smart Lock* to lock the dynamic line to the vertical, and use a *keypoint snap* to locate the endpoint horizontally in line with the shape's starting point.

Step 13 *Drag* the cursor downward and press *Enter* to *Smart Lock* the dynamic line to the negative Y-axis.

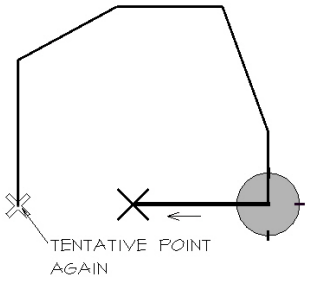
As you move the cursor the line is dynamic only in the *vertical* direction (try moving the cursor).

Step 14 *Locate* a *Tentative* point and *snap* to the *starting point* of the shape.

When you place the tentative point AccuDraw draws a dashed line from the tentative point to the dynamic line, indicating where the dynamic line will terminate. When you complete the snap with a Data-point, the dynamic line is terminated in line with the snap location.

Step 15 *Data-point* to complete the snap.

Step 16 To complete the shape, *snap* to the starting point and *Reset*.

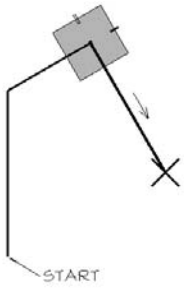


Steps 15 and 16.

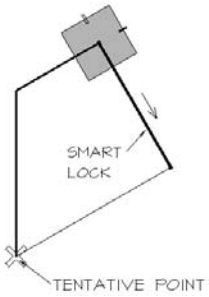
It is important to practice the Smart Lock option in conjunction with snap options.

In the example above, Smart Lock and the end-point snap aligned the second vertical line with the start point because the two vertical lines were *parallel*. If these two lines were not parallel, what effect would that have on the Smart Lock - snap combination? Try the following exercise:

Step 1 *Draw* the *three lines* as shown at the right.
Step 2 The third line should be "dynamic" at this point (the length has not yet been accepted).
Step 3 Press "*Enter*" to *Smart Lock* the third line to the negative Y-axis.
Step 4 *Locate* a *Tentative Point* at the starting point.



Step 3.



Step 4.

The dashed line appears, connecting the tentative point and the dynamic line. Note that the angle between the dashed line and the dynamic line is 90^0, while the angle between the starting point and the dashed line will depend on the specific geometry. This is always the case with the Smart Lock because Smart Lock *only locks lines to the X- or Y-axes*. Clearly, you cannot use this procedure to *horizontally* align to the starting point under this *specific* condition.

To *cancel* Smart Lock, press the *Enter* key again. Reset to stop the Place Line tool.

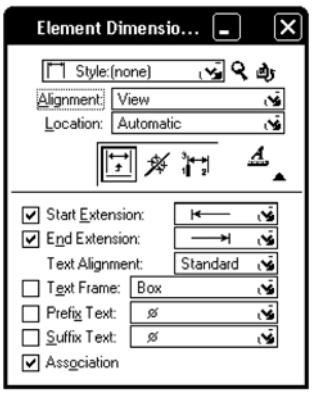
(Then follows four practice shapes.)

The next three pages are taken from Module 18 - Dimensioning. The sample starts on page 18-13 and discusses the use of the Dimension Element tool.

18.4 DIMENSION ELEMENT TOOL

You are going to use the first tool in the tool box, the *Dimension Element* tool:

This is the most flexible of the dimension tools, and the simplest. It will place dimensions on *single* elements or element segments, and offers two additional modes of dimension placement.



Be sure your Text Height and Width is set to 12" (10) before continuing. If you are unsure, click on the magnifying-glass icon to the right of the Style box to be taken to Dimension Styles.

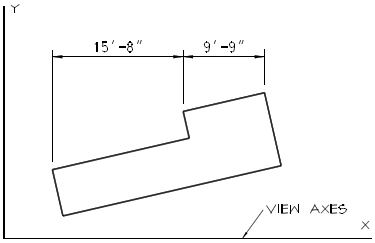
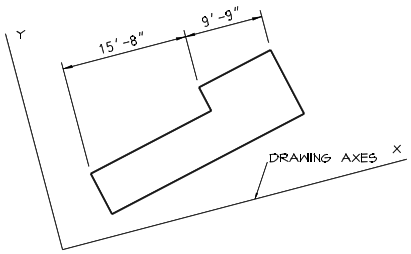
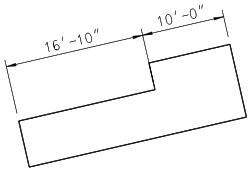
Step 1 Start the *Dimension Element* tool. 

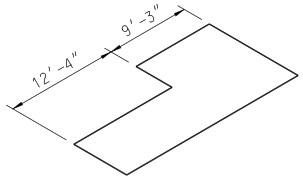
Take a look at the *Tool Settings* box, shown at the right.

There are some extra settings not available in the Dimension Styles box, plus a selection of three dimension placement options. Look at the more important ones:

Alignment

The *Alignment* option allows you to place *dimensions* in various *alignments* with the *elements* in the design. The table below describes each alignment option:

Alignment	**Examples**
View: Dimension lines are aligned parallel to the *View Axes*. If the *view* is rotated, the dimension lines remain parallel with the view axes.	
Drawing: Dimension lines are aligned parallel to the *Drawing Axes* (Design Plane). If the *view* is rotated (as shown here), the dimension lines rotate with the drawing axes.	
True: Dimension lines are aligned parallel to the element being dimensioned. The extension lines remain at right-angles to the dimension line.	

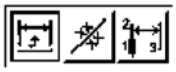
Alignment	Examples
Arbitrary: Dimension lines are aligned parallel to the element being dimensioned, but the extension lines are not at right-angles to the dimension line. Usually used for 2D isometric drawings (Iso Lock must be on).	

For our purposes in this Course, you need only use the *View* alignment since you will not be rotating views or drawing isometrics.

Location

The *Location* option allows you to let MicroStation locate *dimension text* on the dimension line automatically, or lets you locate the text manually. For the moment let MicroStation locate the dimension values *automatically*.

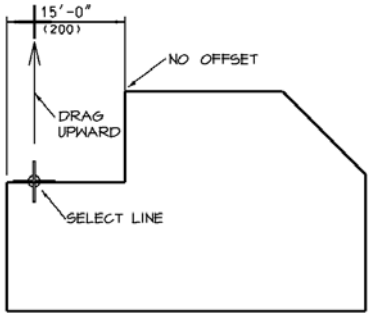
Tools



The three icons provide three methods of placing a dimension with the Dimension Element tool. You will be concentrating on the first dimension placement method.

In the *expanded* Tool Settings window there are options for selecting the terminator type, text orientation, text frames, and text prefixes and suffixes. *None* of these options should be on. The last option, *Association*, will associate the *dimension* with the *element* that is being dimensioned. This means that if the element is edited larger or smaller, the dimension will *automatically change* to reflect the new element size. Association is discussed later in this Module, but turn it ON for now.

Be sure you made the settings in the Tool Settings window shown on the previous page, and that the *line weight* is set to *0*. Now you can continue with the Dimension Element tool:



Step 2 *Data-point* on the top left element (you don't need to snap).

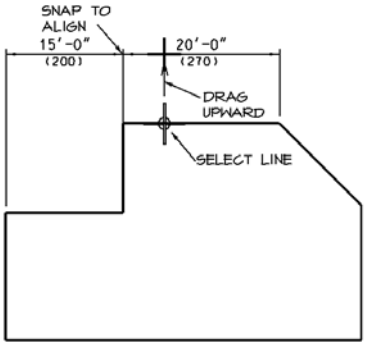
Step 3 *Drag* the cursor upward and the dimension will display dynamically.

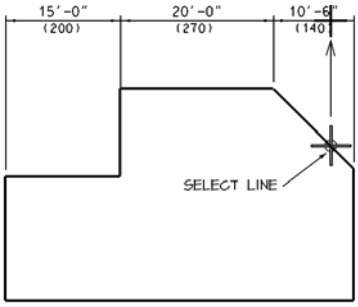
Step 4 *Data-point* at a suitable location to set the dimension in place. Do *not* reset.

This is a quick method of placing a dimension. Note, however, that while there is an *offset gap* at the left extension line, there is no gap at the right extension line. This occurs because the extension lines are generated from the ends of the selected element. This problem will be solved later by using the *next tool* in the tool box. In the meantime, continue with the Dimension Element tool.

Step 5 *Select* the next horizontal segment and drag the cursor upward.

Step 6 *Snap* the dimension to the previous dimension so that they line up. Do not reset.



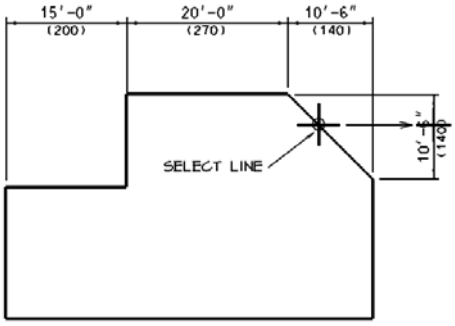


Step 7 *Select* the *diagonal line* next and place the dimension by dragging *vertically*. *Snap* to the previous dimension again.

Because the *Alignment* is set to *View*, the dimension line will display horizontally.

Step 8 *Select* the *diagonal line* again, but this time move the cursor to the *right* and place the dimension line.

MicroStation automatically generates a *vertical* dimension.



Step 9 *Continue* around the object, placing horizontal and vertical dimensions as you go.

Undo the dimension placements when you are finished.

TOOL TIP !
When placing dimensions, if the dimension text is not displaying in the font and size you expect when a dimension is placed, check the dimension *Text* box to see if the font ***overrides*** are active.

I am showing both English and metric dimensions in the examples. This is for users of either measurement system and *you do not need to show both dimension in your design*

Experiment with the two other tools in the Tool Settings window. Select them and data-point on and drag one of the elements to see how the tools place dimensions. Undo them when you are finished.