

Introduction

Starting with version 6.6, Bose® Modeler® sound system software contains new features designed to facilitate the import of two and three-dimensional drawing files. These features allow you to leverage work performed outside the Modeler software environment within popular 2D and 3D drawing environments. Two new import file types are now supported:

- Modeler Text Format files (.MTF)
created by the Bose Modeler Software Plugin for Google® SketchUp®.
- Drawing exchange format files (.DXF)
created by Autodesk® AutoCAD® and other compatible drafting applications.

This application note offers specific information about working within the AutoCAD environment to streamline the creation of DXF files for import to Bose Modeler software.

AutoCAD is one of the world's leading design and documentation software solutions used by millions of people all over the world. Considering its widespread use in architectural and engineering firms, it is often possible to acquire drawings of the facilities for which we are contracted to develop sound system designs. Leveraging the building information that already exists in AutoCAD drawings helps us to spend more time on acoustic analysis and sound system design and less time converting paper drawings to Modeler surfaces.

The information in this application note is organized into two primary sections:

Section 1: Preparing a drawing within Autodesk AutoCAD software

Section 2: Importing a (.DXF) into Modeler software

Associated Reading:

Modeler 6.6 Software User Manual
Modeler Application Notes
Importing DXF Files to Bose Modeler Software

Section 1 - Preparing a drawing within Autodesk AutoCAD software

Working with AutoCAD

Autodesk incorporates new features with every release of AutoCAD software. It is very common to receive a drawing from an architectural or engineering firm saved in a version newer than your currently installed version. When you encounter this condition, you will see the error dialog box shown in Figure 1 indicating drawing version incompatibility.

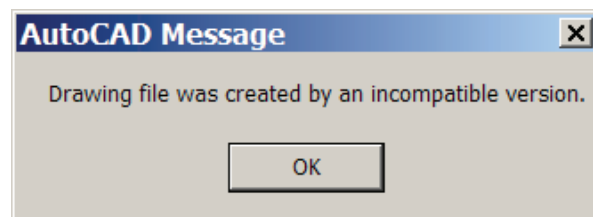


Figure 1: Drawing compatibility warning

Modeler®

Preparing AutoCAD® Files



Download a free copy of Autodesk® DWG TrueView™ from the Autodesk web site to gain the ability to convert AutoCAD® drawings to a version matching your local installation. Once you are able to open native AutoCAD (.DWG) drawings, you must save the drawing in the DXF format for import to Bose® Modeler® software. The very best option for creating DXF files is to use an installed AutoCAD software package.

Establishing AutoCAD Coordinates

Before creating this DXF file, one very significant AutoCAD system variable should be checked to establish the drawing units. Type **UNITS**, at the AutoCAD command line, to determine the drawing coordinates and precision. Engineering and Architectural formats produce feet-and-inches displays and assume that each drawing unit represents one inch as shown in Figure 2. The other formats can represent any real-world unit, such as metric units as shown in Figure 3. Log the drawing units' type once discovered. You will need to specify this during the Modeler software DXF import sequence which we cover later in this document.

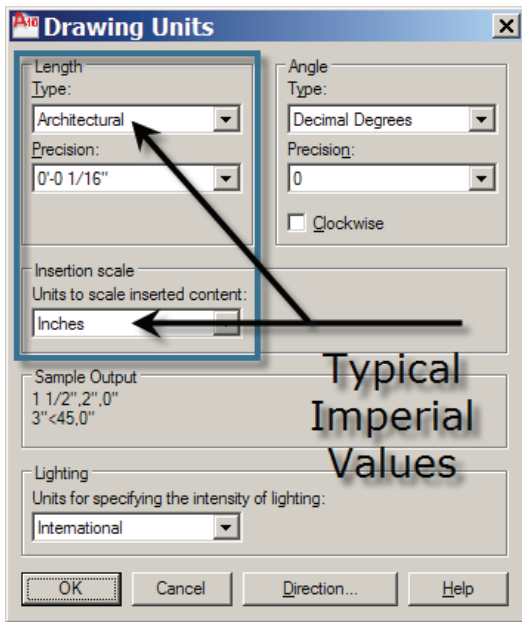


Figure 2: Imperial Drawing Units

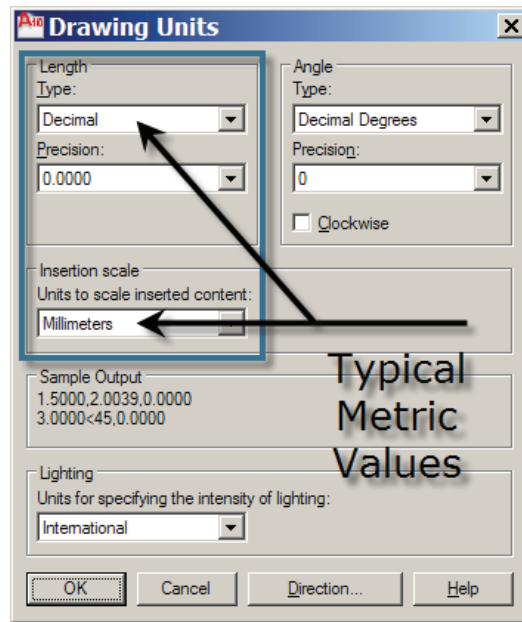


Figure 3: Metric Drawing Units

Managing AutoCAD Layers

Architectural drawings often contain dozens, if not hundreds, of layers. Creating layer sets allow you to quickly control visibility of objects on combinations of layers. Before making any layer adjustments to the original drawing, create a backup of the initial layer set. Use the *Layer States Manager* within the *Layer Properties* window to create this backup as shown in Figure 4.

Modeler®

Preparing AutoCAD® Files



Now that the original layer state is backed-up, we can begin isolating relevant layers for saving a DXF file for import to Modeler® software. You may manually turn off the visibility of layers from the layer manager or use the layer isolate tool by typing **LAYISO** at the command line.

This layer isolation tool presents a selection cursor for clicking on any drawing object that looks like a candidate for typical Modeler software surface types. (Floor, Wall, Ceiling, Seating, Misc.)

Note: AutoCAD versions since 2008, lock and fade layers by default. By specifying "off" while the **LAYISO** command is active in these newer versions of the software, you will restore the functionality of the Layer Isolate command to AutoCAD R14-2007 methods as described in this application note.

When all the significant objects are selected, press ENTER to complete the command. You will now have a reduced number of visible layers by isolating relevant objects. Access the *Layer States Manager* once more, press the *New* button, type another layer state name to signify the reduced number of visible layers, and press *OK*. Now you should have two layer states saved within the drawing as indicated by Figure 5.

Managing External References

Many architectural drawings contain external references. If the drawing you plan to save as a DXF file for import to Modeler software leverages external references, links to other drawings, you should *bind* them to your primary drawing to create a single unified drawing. This will ensure that all significant architectural elements are available for use when the drawing makes its way to Modeler software.

Type **XREF** at the command line to open the external reference dialog. This will facilitate the binding operation shown in Figure 6. The preferred *Bind Type* to use is *Insert*.

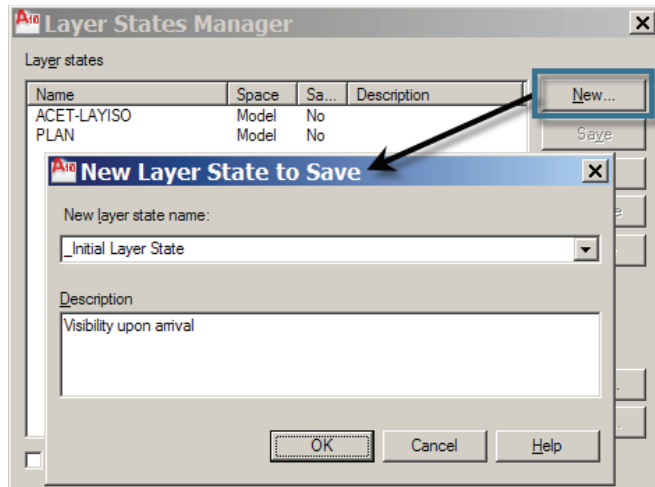


Figure 4: Layer States Manager

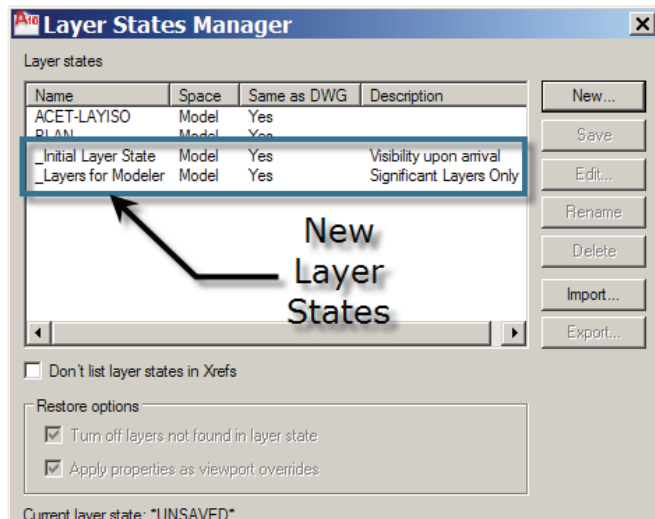


Figure 5: New Layer States

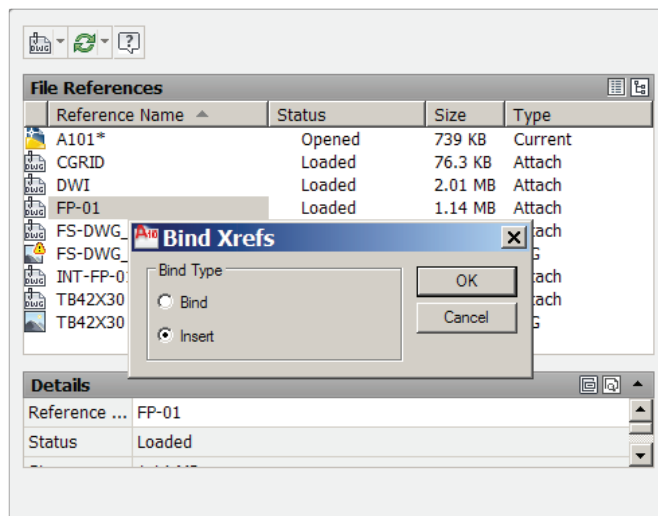


Figure 6: Binding External References

Managing Blocks

Now that the number of visible layers is reduced to show only relevant objects for modeling and all external references are bound to the base drawing, it is time to consider treatment of blocks. Within AutoCAD®, blocks are compound objects (collections of drawing entities), inserted into a drawing and anchored by a single geometric reference. Blocks containing features you intend to leverage in Modeler software should be deconstructed by using the **EXPLODE** command within AutoCAD. Note the difference between the original block reference properties in Figure 7 versus those of an exploded block in Figure 8.

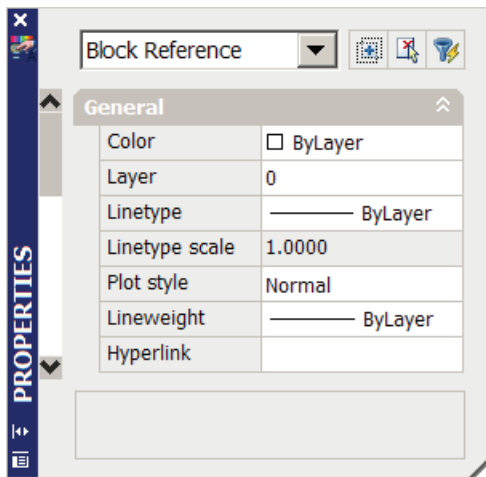


Figure 7: Block Reference Properties

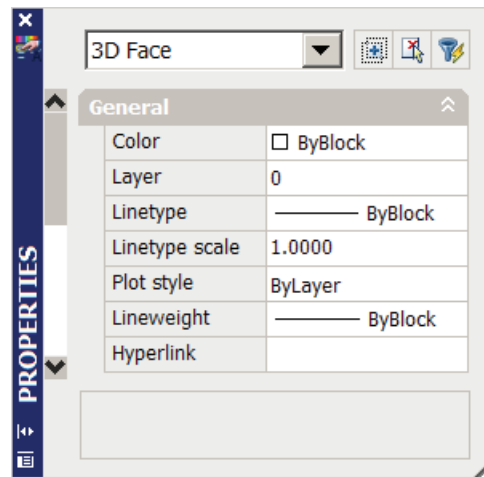


Figure 8: Exploded Block Reference

Note: It may be necessary to repeat the **EXPLODE** command when working with nested block references.

Supported drawing objects

Specific drawing object types are supported during the translation process from DXF to Modeler software. Both two-dimensional and three-dimensional drawing objects are included.

- 2D objects import to the new Modeler Guide Layer. Layers are retained and may be assigned to one of three constraint planes (XY, YZ, XZ). Once a constraint plane is chosen, all drawing entities are referenced to that plane within the model thereafter.
- 3D faces and polylines import directly as Modeler surfaces. Layers are retained and may be assigned materials, color, and surface type properties.
- 3D Solids and blocks are unsupported at this time.

Right-click any object and select *Properties* to determine its 2D or 3D type.

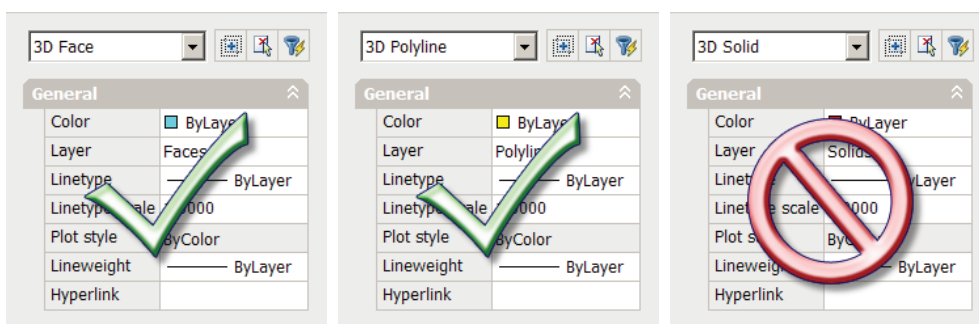


Figure 9: Object Properties

TIP: Owners of the full version of AutoCAD® (AutoCAD LT® excluded) may use the **3DSOUT** command within AutoCAD to convert drawings containing 3D solids to a 3D Studio file format (.3DS). During this process, all solids are converted to triangular 3D faces where 3D solids once existed. Use the **3DSIN** command to load the resulting 3D Studio file to AutoCAD and then save it as a DXF file suitable for Modeler software import.

Creating the DXF file

To fully leverage the work we've performed on our original AutoCAD drawing up to this point, we must perform these final steps to create a newly streamlined exportable drawing file.

1. Type **COPYBASE** to initiate a copy command which references a specific base point.
2. At the "Specify Base Point:" prompt, choose a coordinate within your drawing to represent the preferred (0,0,0 / X,Y,Z) coordinate origin within Modeler® software. This point translates to the "Center of Rotation" in Modeler software.
3. At the "Select object:" prompt, type **ALL** and press **ENTER**.
4. This copies all visible drawing objects to the Windows clipboard with a coordinate reference.
5. Create a new drawing with the same drawing units value.
6. In the new drawing, type **EDIT / PASTE SPECIAL** and choose the "AutoCAD Entities" type.
7. At the "Specify Insertion Point:" prompt, Type **0,0,0** and press **ENTER**.
8. **SaveAs** your newly created drawing to the DXF file type for import to Modeler software.

Section 2 - Importing a (.DXF) into Modeler software

Importing to Modeler software

In another application note entitled, "Importing DXF Files," we discuss the import process in greater detail. However, for the purposes of this application note, we will simply list the basic steps of the import process by way of summary.

1. Within Modeler software, access the **Import Modeler – AutoCAD DXF File (.dxf)** option from the **File** menu.
2. Browse the file system to locate the DXF file of interest, select it, and then click **OPEN**.
3. The **DXF Conversion** dialog appears and you must choose which layers to include during the import process.
4. Final phase in the import process
 - a. The **Guide Layer Attributes** dialog appears for 2D drawings.
 - b. The **DXF Scale (3D)** dialog appears for 3D drawings.

Conclusion

We certainly hope the concepts and recommendations discussed in this application note are helpful to you. We anticipate it will make sense for the way you use AutoCAD to create DXF files for import to Bose® Modeler® Sound System Software.