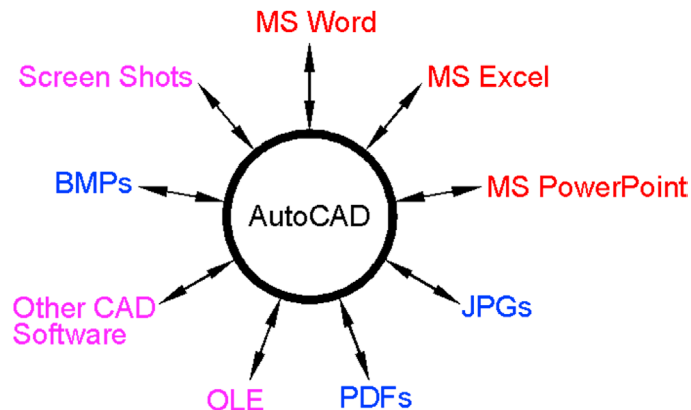


## Chapter 16

# Importing and Exporting Data



### Learning Objectives

In this chapter, we learn how AutoCAD interacts with other software you are likely to use in the course of design work. We cover the following topics:

- AutoCAD and MS Word
- AutoCAD and MS Excel
- AutoCAD and MS PowerPoint
- AutoCAD and JPGs
- AutoCAD, PDFs, and screen shots
- AutoCAD and other CAD software
- Exporting and Save As
- Importing and OLE

By the end of this chapter, you will smoothly import and export data among a variety of common office and design applications.

Estimated time for completion of this chapter: 2 hours.

### 16.1 INTRODUCTION TO IMPORTING AND EXPORTING DATA

AutoCAD and the designers who use it usually do not work in a “software vacuum.” They typically interact with not only AutoCAD but a number of other applications, some of them generic and used by many other professions, others unique to their own field. As such, there is often a need to either import data into or export data out of AutoCAD. Examples are numerous, such as an architect who wishes to transfer notes typed in MS Word into a project details page in AutoCAD or an engineer who needs to drop in an Excel spreadsheet. Just as often, AutoCAD drawings may need to be inserted into MS Word reports, PowerPoint presentations, and other applications. You may then need to create PDFs of your drawing or insert a PDF or an image into one.

Swapping files among the various software applications has been tricky in the past. Software companies are under no obligation to make such tasks flow smoothly, as it is not their business what else you may have on your PC (which may include programs from a direct competitor). Of course, such thinking scores no points with the customer, so developers do try to minimize compatibility issues whenever possible. Today, such tasks flow much smoother but still require knowledge of procedures that can be unique to each application.

The sheer quantity of software on the market is staggering, so we limit the discussion to

- Software or file types that are used or encountered by virtually everyone who uses a computer (Word, Excel, PowerPoint, JPG, and PDF).
- Software that has special relevance to AutoCAD users (such as other CAD programs).

We focus on two distinct tasks, how to *import* files *from* these applications and how to *export* AutoCAD files *into* them, analyzing each software pairing bidirectionally, and conclude with a brief overview of the export and insert features and OLE.

## 16.2 IMPORTING AND EXPORTING TO AND FROM MS OFFICE APPLICATIONS

We begin with MS Word, Excel, and PowerPoint, as those are probably the ones most important and relevant to the majority of users. Throughout, unless noted otherwise, we make extensive use of Copy and Paste. These Copy/Paste to clipboard tools are some of the most useful in computing, allowing you to shift around just about anything from one spot to another. The keyboard shortcuts are Ctrl+C for copy and Ctrl+V for paste or you can just right-click and select Copy and Paste.

Be aware that the “copy” is not AutoCAD’s standard copy command, so do not use that. Yes, some students mix these up, so let us be clear from the start. Open up Word, Excel, and PowerPoint and keep them handy as we go through each one.

### Word Into AutoCAD

An example of this may be when you would like to bring in extensive typed construction notes onto one of the pages of the AutoCAD layout.

Go ahead and click and drag to highlight the text in Word first and right-click or Ctrl+ C to copy to the clipboard. Go to the AutoCAD screen, but do not right-click and paste in the text. If you do this, it appears as an embedded object, with a white background (seen in the top line of [Fig. 16.1](#)), and cannot be edited. Instead, create an mtext field of an appropriate size, and paste the copied text into it. The result is easily editable text that can be further formatted, as seen in the bottom line of [Fig. 16.1](#).



FIGURE 16.1 Insertion of MS Word text.

### AutoCAD Into Word

An example of this may be when you are preparing a report and would like to include some of the graphics spread out among the text to enhance clarity or support documentation.

This is a direct application of the Copy/Paste function or the PrtScn (print screen) key. With Copy/Paste you no longer have to change the background color of AutoCAD before insertion, as you once did. Developers finally conceded to the fact that, yes, most paper is white and the black AutoCAD background just does not look right—an automatic color change is performed, but be careful with older AutoCAD releases.

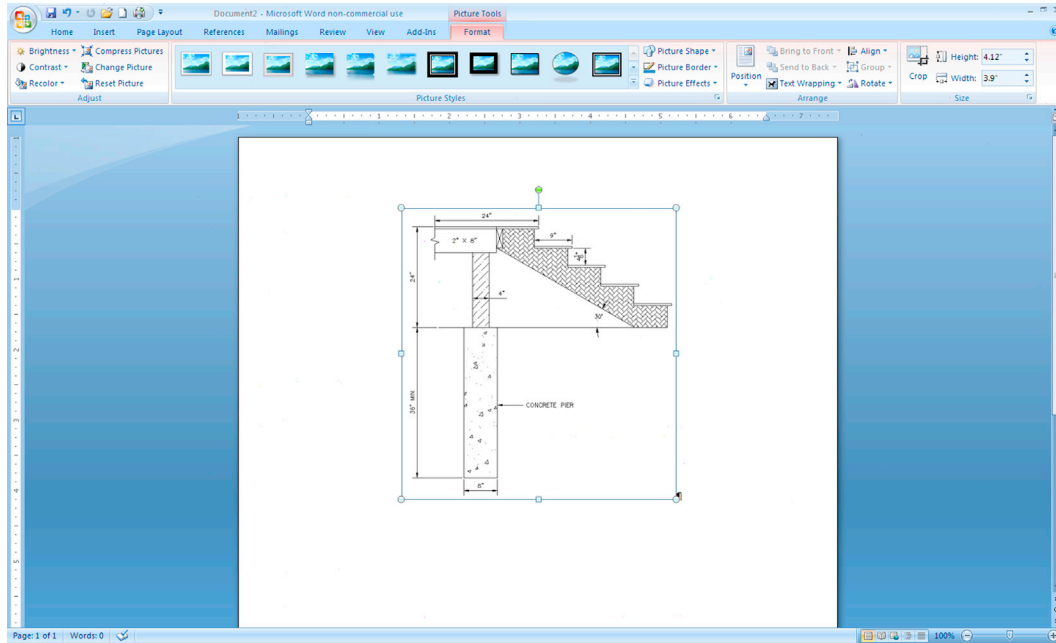
Once inserted, some cropping is necessary to get rid of excess white space. Often the Print Screen button followed by pasting in is easier, and the 2007 Word and newer versions bring the cropping tool up right away when you click on the pasted-in screen shot. Indeed, until a switch was made to more specialized software, this was the original method for importing screen shots throughout this textbook.

A typical view of this procedure is shown in [Fig. 16.2](#).

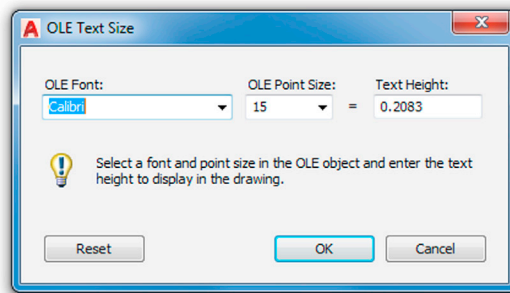
### Excel Into AutoCAD

An example of this may be when you would like to bring a spreadsheet into your electrical engineering drawing that details the type of connections and wiring used in a design.

Once again, you use Copy/Paste. In Excel, create a small group of cells, number them (adding borders if desired), then highlight all, right-click Copy, go into AutoCAD, and right-click Paste. As soon as you do this, the dialog box in [Fig. 16.3](#) appears.



**FIGURE 16.2** Insertion of an AutoCAD design into an MS Word 2007 document.



**FIGURE 16.3** OLE Text Size.

This is the OLE (object linked embedded) Text Size dialog box, which allows you to alter the text height of your inserted spreadsheet. The exact size is not too important for now; you can easily scale objects up or down any time after insertion, but the concept of OLE is important and is discussed again soon. For now, press OK, and you see what is shown in Fig. 16.4 (zoom in if needed).

1	2
3	4
5	6
7	8
9	10

**FIGURE 16.4** Embedded Excel cells.

This is your basic Excel insertion. The cells are regular objects (very much like blocks), and you can erase, copy, and move them as needed. You can also scale them by clicking once and moving around the resulting grip points. You cannot mirror or rotate the cells, however.

A major question usually arises at this point from students. Are the inserted Excel cells linked to Excel, allowing for changes and updates? They are not in the true sense of the word. What you can do is double-click on these inserted cells and Excel is called up temporarily for editing purposes, but any changes made to the original file after accessing it from Excel (not AutoCAD) are not reflected in AutoCAD.

Having truly linked files is a very useful idea. There are some fancy Excel/AutoCAD interfaces in the industry, where extensive Excel data is used to generate corresponding AutoCAD drawings, but this trick requires additional programming and extensive customization and is beyond the scope of this book.

## AutoCAD Into Excel

This action basically pastes an image into Excel with the same Copy/Paste procedure as for Word. This, however, is rarely done, as Excel is primarily for spreadsheet data; and unless you need a supporting drawing, there is just no overwhelming reason to do this.

## PowerPoint Into AutoCAD

This action is not very common, as PowerPoint is almost always the destination for text and graphics, not an intermediate step to be inserted into something else. However, if it is needed, you can insert slides into AutoCAD via regular Copy/Paste.

## AutoCAD Into PowerPoint

This makes a lot more sense, as you may want to insert a drawing into a PowerPoint presentation. Fortunately, PowerPoint behaves very much like Word in this particular case, and one Copy/Paste followed by some cropping is all it takes to insert an AutoCAD design, and no new techniques need to be learned.

## 16.3 SCREEN SHOTS

Screen shots or screen captures refer to capturing a snapshot of everything on your screen as seen by you, the user, and sent to memory, to be inserted somewhere. This is done by simply pressing the Print Screen button, which on most computers is called *PrtScn*, *SysRq*, or sometimes just *F12*. You can capture what is on your screen this way and insert it into Word or PowerPoint, then crop out what you do not need to see. While many computer users may know of the Print Screen function to actually print something, they may overlook this useful trick for inserting data into other applications.

## 16.4 JPGs

This file compression format (used most often with photographs) can be inserted directly into AutoCAD and is a great idea if you would like a picture of what you drafted next to the drawing. Examples include an aerial photo of a site plan for architectural and civil applications and a photo of an engineering design after manufacture for as-built or record drawings. Inserting JPGs is a straightforward process.

**Step 1.** Click on a file you want to insert and right-click to copy it.

**Step 2.** Then right-click and paste it into AutoCAD.

- AutoCAD asks for an insertion point: Specify insertion point <0,0>:

**Step 3.** Click anywhere you like.

- AutoCAD then asks for the image size: Base image size: Width: 0.00, Height: 0.00 Inches  
Specify scale factor or [Unit] <1>:

**Step 4.** Scale the JPG by moving the mouse to any size you wish (or type in a value).

- AutoCAD then asks for the rotation angle: Specify rotation angle <0>:

**Step 5.** If you want the image rotated, enter a degree value; otherwise, press Enter.

The result of a JPG insertion is shown in [Fig. 16.5](#). It has also been selected (one click), revealing the Ribbon's Image Editor.

The image can be erased, copied, moved, rotated, mirrored, and just about anything else you can do to an element. You can also do some very basic image adjusting via the Ribbon or by double-clicking on the picture. The dialog box shown in [Fig. 16.6](#) appears, allowing you to adjust Brightness, Contrast, and Fade, as well as reset everything. Any changes apply only to that JPG, not copies of it (if other copies exist).

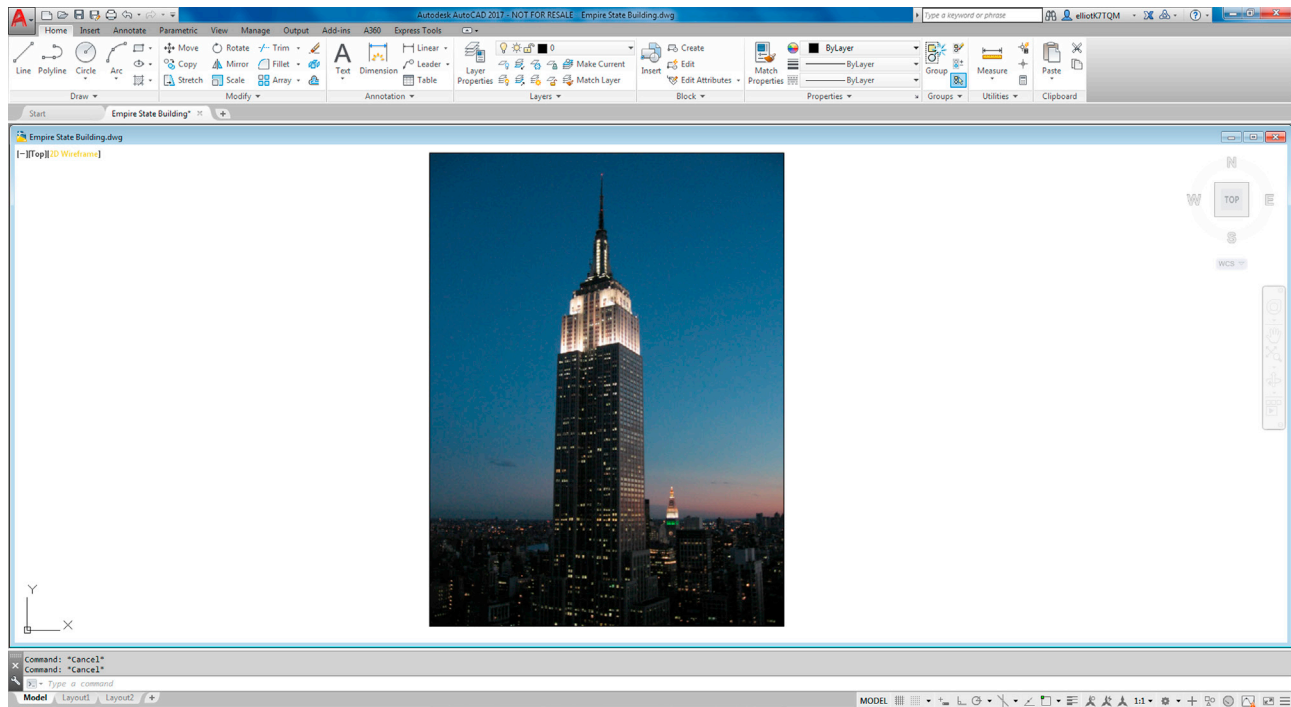


FIGURE 16.5 Embedded JPG.

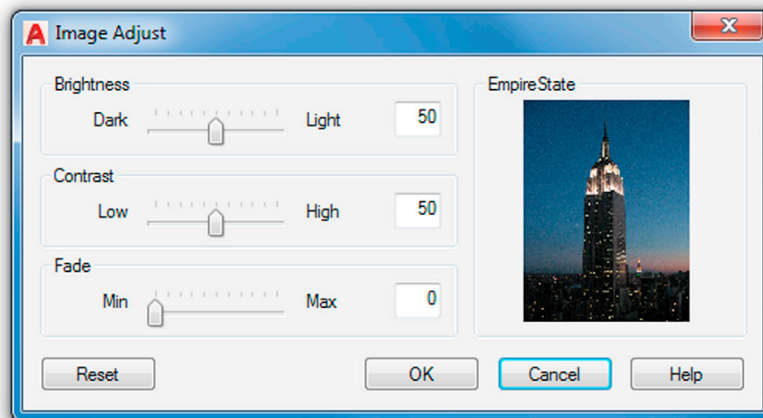


FIGURE 16.6 Image Adjust.

## 16.5 PDFs

The Portable Document Format (PDF) is, of course, Adobe's popular software for document exchange. AutoCAD always had a good relationship with PDF, allowing users to easily convert drawings by simply printing to PDF—in other words, selecting PDF as the printer (assuming Acrobat is installed). The Print function would then execute, and AutoCAD asks you where you want the file saved. Once the destination was selected, the PDF file was created. This process was much the same with Word and other software, and continues with the current AutoCAD release.

Another way to generate a PDF, especially if you need to customize the output (or you do not have Acrobat installed), is via the Ribbon's Output tab→ Export approach. If you select the PDF option, a "Save As PDF" dialog box appears and allows some tinkering with options and output to finesse the results, as seen in Fig. 16.7.

AutoCAD 2010 gained the ability to bring in a PDF file as an underlay. This meant that it came into AutoCAD as a "background," which you could see but not edit (at least not back then). This is not unlike raster images, mentioned in Chapter 15, Advanced Design and File Management Tools, and was quite useful if all you have of a design is a PDF. After

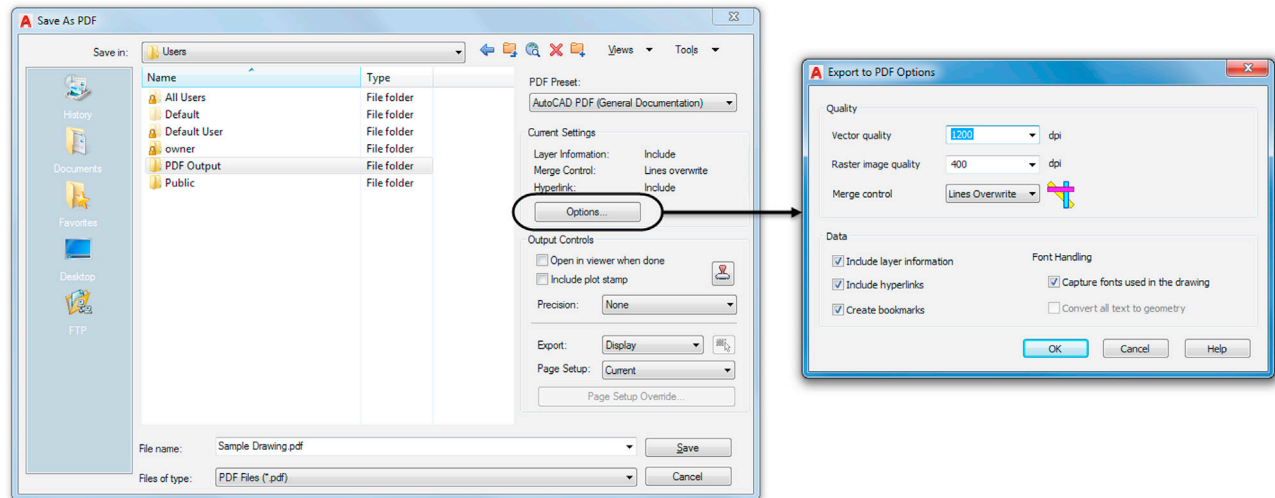


FIGURE 16.7 Save As PDF with Options.

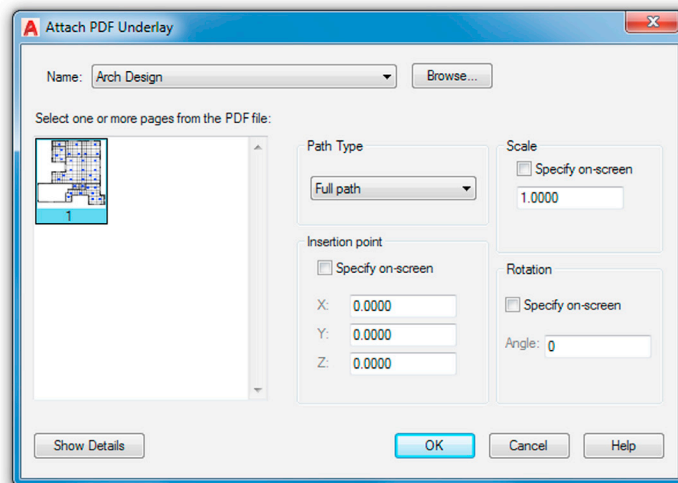


FIGURE 16.8 Attach PDF Underlay.

insertion you drew over it or used it as a supporting image, such as a key plan. You can still do all this with the current AutoCAD release.

To try it out and bring in a PDF, use the cascading menu **Insert**→**PDF Underlay**.... You then are prompted to look for the file you want to insert (that dialog box is not shown), and once you select the PDF, you will see the dialog box in [Fig. 16.8](#).

Once you press **OK**, the PDF inserts into the AutoCAD file and the box prompts you for an insertion point and scale factor. Once the image is embedded, you can click on it and the Ribbon changes to show you some of the image editing options, as seen in [Fig. 16.9](#), with **Change to Monochrome** and some **Fade** and **Contrast** adjustments among the more useful tools. The PDF is now part of your drawing and you can draw over it and delete it later if needed. It remains an embedded feature and is not editable itself, so the biggest use for this is to serve as a background to redraw the image.

A question that arises often is how to go backwards, another words convert a PDF document back to AutoCAD. There is considerable need for this in the industry. Some drawings exist only in PDF format with the original **dwg** files lost or unavailable, and you may need to convert a PDF to a useable drawing form. Prior to AutoCAD 2017, there were basically two ways to do this: via online websites or via desktop applications. In all cases, the quality of your conversion depends on the method used to create the PDF in the first place. If the PDF was a scan of a hand drawing, then the conversion software may not be able to accurately tell what is what. If the PDF is a print of a CAD file, things are much easier, and you can get close to a 100% correct conversion.



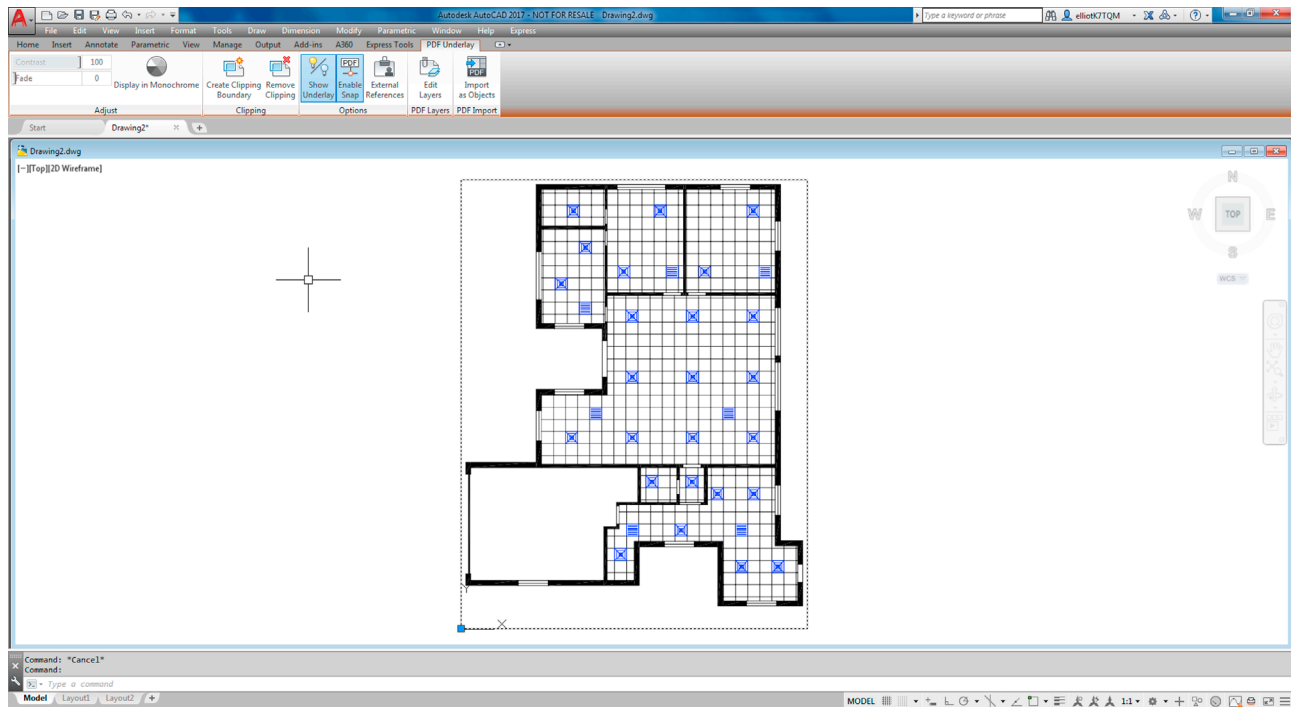


FIGURE 16.9 PDF Underlay Ribbon menu.

If this is something you need done, and you have AutoCAD 2016 or older, research a bit online for both methods. Web-based (and usually free) converters require you to upload the PDF and they return a dwg. This method is usually limited as the website is trying to get you to buy the full software and is interested in having you only try it out online. If you purchase a PC software package (most are pretty low cost, around \$100), then you can convert directly on your computer, without going online.

Autodesk must have seen a glaring gap in PDF capability last year, and introduced some new tools with AutoCAD 2017. You can now convert PDFs directly to dwg files via the PDFIMPORT command. To be fair, it is not a full converter but rather more of a handy new import feature that goes a step beyond the basic underlay and recognizes features such as lines, circles, and text. Keep in mind, however, what was mentioned earlier—the better the source file, the better the conversion. Let us give this a try.

**Step 1.** Open up a blank AutoCAD file and also set aside a PDF of some floor plan in a folder.

**Step 2.** You can start up the command via the Application menu (the big red A at the top left corner of the screen). Drop that down and select Import then PDF. Alternatively, you can just type in `pdfimport` and press Enter.

- AutoCAD says: Select PDF underlay or [File] <File>:

**Step 3.** Go ahead and select F for File.

**Step 4.** Browse around and select the PDF file you wish to import. Once you click the file name, the Import PDF dialog box (Fig. 16.10 appears).

**Step 5.** Review the information on the right of the dialog box and click OK. If all is well; and if AutoCAD likes the PDF file, it will be converted to vector elements (lines, circles, arcs, text, hatching, etc.).

- AutoCAD will say: Importing page 1 of PDF file: (your file path and name...)

Take a close look at the new CAD file and try to erase or otherwise manipulate some of the features; it is indeed a true AutoCAD drawing now. The layering generally is not brought in; and if you bring up the layer dialog box, you will see generic PDF\_Geometry, PDF\_Solid Fills, and similar type of layers instead of the custom ones the original drawing may have had.

While this new feature is certainly a welcome addition to AutoCAD, keep in mind that it is not a 100% solution. Text does not always import correctly and may just come in as splines. Hatches are also made up of pieces as opposed to solid fills. These issues may or may not be present with more advanced software available from third-party vendors—it is not possible to evaluate them all. Autodesk may also enhance this import feature in future releases. However, the bottom line is that importing, converting, and then “fixing up” a few items in a PDF is still preferable to redrawing the entire file!

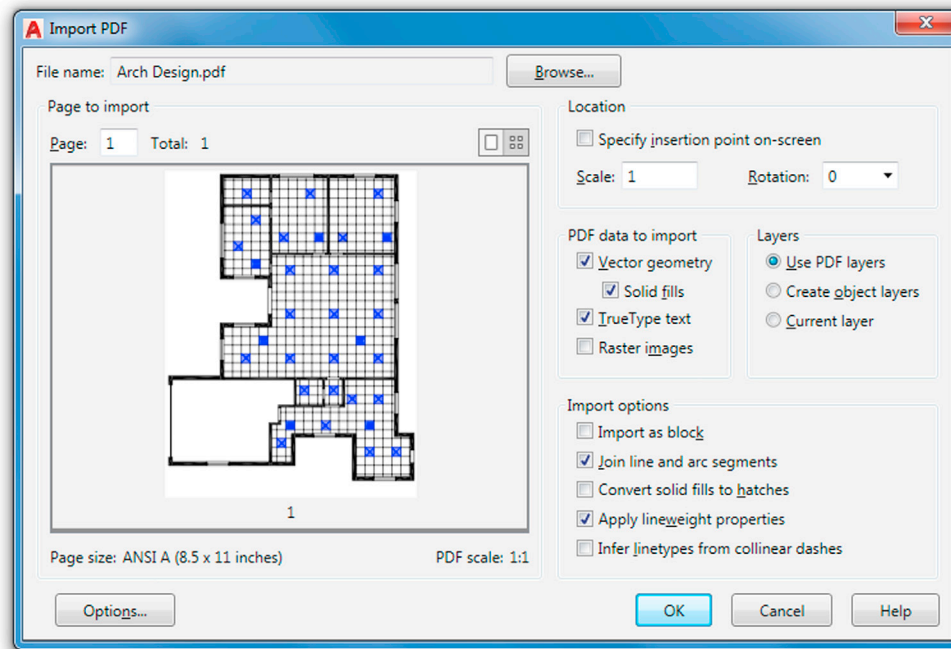


FIGURE 16.10 Import PDF.

## 16.6 OTHER CAD SOFTWARE

Initially, as AutoCAD gained market dominance, it did not really attempt, nor had any incentive, to “play nice” with other CAD software on the market. Being the 2D industry leader allowed AutoCAD to get away with not accepting any other files in their native format. It was the company’s way or the highway, but that slowly changed. One major concession in regard to importing and exporting was with MicroStation, AutoCAD’s nemesis and only serious competitor. MicroStation always opened and generated AutoCAD files easily but not the other way around.

Finally, in recent releases, AutoCAD listed the `.dgn` file format as something you can import and export. You were then able to bring in MicroStation files, more or less intact, as well as create ones from AutoCAD drawings. In AutoCAD 2009, the settings box was expanded and that was carried over into the current AutoCAD 2017. You can now compare layers and other features side by side and make adjustments so the target file is similar to the original.

To access this, use the cascading menu `File→Import...` and search for the MicroStation `dgn` file you are interested in importing. Another way around all of this is just to have the MicroStation user generate the AutoCAD file. You can also export `.dwg` files directly to `.dgn` as well by using the cascading menu `File→Export...` and selecting `.dgn` as the target file. You then see the Settings dialog box in [Fig. 16.11](#). Of course, MicroStation accepts the AutoCAD file with no problem, so this may not be necessary. If you would like to learn a bit more about MicroStation in general, see [Appendix B](#), Other CAD Software, Design and Analysis Tools, and Concepts.

Let us expand the discussion to other CAD software. What if someone is using another CAD program and needs to exchange files with an AutoCAD user? The `.dxf` file is the solution, as it is a format agreed upon by most CAD vendors as the go-between that can be understood by all applications for easy file sharing. AutoCAD easily opens a `.dxf` or generates its own `.dxf` files for any drawing. This is discussed momentarily.

A few observations on sharing files: Among architects, the issue is not much of a problem, as AutoCAD is the main application in this profession, and competitors such as ArchiCAD easily open AutoCAD’s files and send a `.dxf` right back if needed. In engineering, however, AutoCAD has a lesser presence. While some electrical, mechanical, and civil engineers use AutoCAD, many others, especially industrial, rail, aerospace, automotive, and naval engineers, use 3D modeling and analysis software instead, such as CATIA, NX, Pro/Engineer, or SolidWorks.

Until recently, these applications did not interact well with AutoCAD. Their respective “kernels” (the software’s core architecture) are significantly different in design and intent from AutoCAD’s ACIS 3D kernel. Their native and export file types (such as IGES and STEP) may also be unfamiliar to AutoCAD users. Some of the previously mentioned software





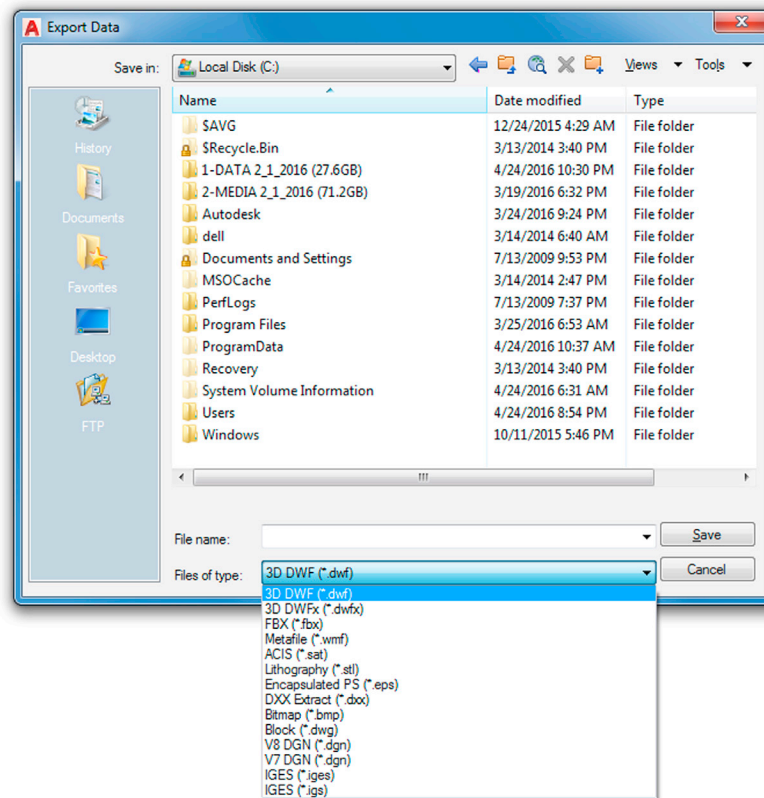


FIGURE 16.12 Export Data dialog box.

- *Bitmap*: This converts the drawing from vector form to bitmap form, with the resulting pixilation of the linework; it is not recommended.
- *Block*: This is another way to create the familiar block covered in Level 1.
- *V8 DGN*: MicroStation Version 8, as described previously.
- *V7 DGN*: MicroStation Version 7, as described previously.
- *IGES*: IGES stands for Initial Graphics Exchange Specification and is a vendor-neutral format for 3D CAD solid modeling files. The files can end in either *.iges* or *.igs*.

The Save As dialog box can be accessed anytime you select File→Save or File→Save As... from the drop-down cascading menus. You can also type in *saveas* and press Enter. In either case, you get the dialog box shown in Fig. 16.13.

The extensions presented here are described in detail in [Appendix C](#), File Extensions, but in summary, you can save your drawing as an older version of AutoCAD (an important step that is automated via a setting in Options, as covered in chapter: Options, Shortcuts, CUI, Design Center, and Express Tools) or as a *.dxf* file, as described earlier. Note that the *.dxf* files can also be created going back in time, all the way to Release 12 (that was a mostly DOS-based AutoCAD). The other extensions, *.dws* and *.dwt*, are used less often and are also mentioned in [Appendix C](#).

## 16.8 INSERTING AND OLE

The final discussion of this chapter features the Insert menu option in general and the OLE concept or command in specific. The Insert cascading menu is shown in Fig. 16.14.

You may already be familiar with most of what is featured in this drop-down menu, or it is covered soon as a separate topic:

- Block insertion is the same as typing in *insert* (from Level 1).
- Hyperlinks and raster images are covered in [Chapter 15](#), Advanced Design and File Management Tools.
- External references is all of [Chapter 17](#), External References (Xrefs).
- Layouts is a Paper Space topic from [Chapter 10](#), Advanced Output—Paper Space.

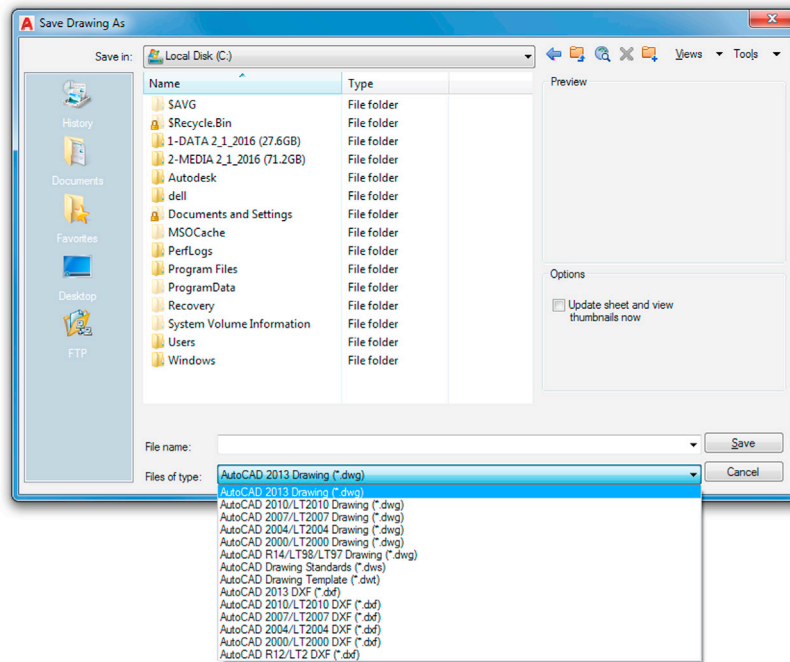


FIGURE 16.13 Save Drawing As dialog box.

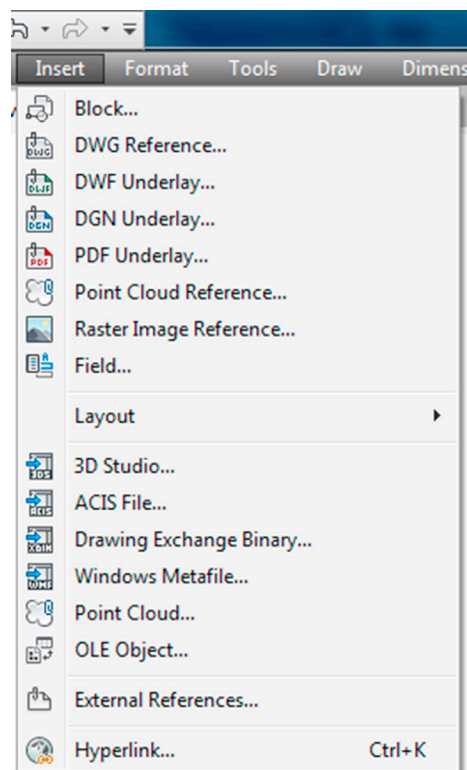


FIGURE 16.14 Insert cascading menu.

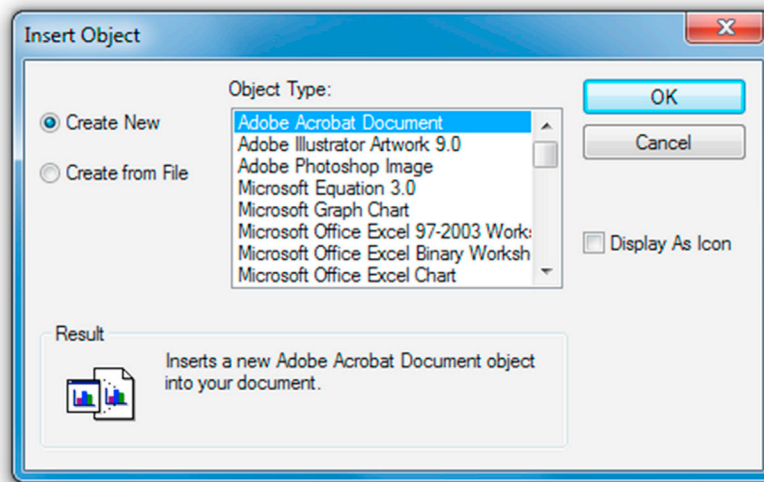


FIGURE 16.15 Insert Object.

Other items we do not cover (and you rarely need) are

- Fields.
- 3D Studio, ACIS, Drawing Exchange Binary, and the like.

Let us then focus on OLE (object linked embedded). OLE is a way to embed (insert) nonnative files into AutoCAD on a provisional basis, meaning these files are not part of AutoCAD (they cannot be anyway, as they are of non-AutoCAD formats), but they are merely dropped in and are visually present. In principle, you can drop in just about anything, with just about any results. Some files sit nicely, others do not appear, and still others may even cause a crash. Let us take a look at the dialog box.

Select OLE Object... from the Insert menu, and the dialog box in [Fig. 16.15](#) appears.

These, in theory, are the various software file items that can be inserted into AutoCAD. Looking through it, top to bottom, you can see that a wide variety of Adobe, Microsoft, and even Dassault (they own CATIA and SolidWorks) files can be inserted. You can also, in principle, insert video and audio clips (one can envision music files playing upon the opening of an AutoCAD drawing) and even Flash animations. Simply pick what you want to insert and select Create from File. Some of the more useful OLE insertions are related to the Microsoft products listed, but much of that topic was already covered in this chapter. To insert a file, select Create from File and browse for the file in which you are interested.

## 16.9 LEVEL 2 DRAWING PROJECT (6 OF 10): ARCHITECTURAL FLOOR PLAN

For Part 6 of the drawing project, you complete the internal design of the house by adding a reflected ceiling plan (RCP) and a heating, ventilating, air conditioning (HVAC) system that is made up of diffusers and a few return air ducts. Note that a residential home is not likely to have an RCP, which is so named because it looks exactly as if you held a mirror in your hand and looked down at it to see the ceiling. RCPs are mostly part of commercial space design and include what you generally see in a typical office: white ceiling tiles, lights, and HVAC diffusers. Here, for educational purposes, we add this ceiling into the residential design.

**Step 1.** Create some appropriate layers, such as

- M-RCP (Gray\_8).
- M-Diffuser (Yellow).
- M-Ret\_Air (Cyan).

**Step 2.** Create some HVAC symbols, as shown in [Fig. 16.16](#). Make blocks out of them for easier handling. Be sure to be on that object's layer before making a block.

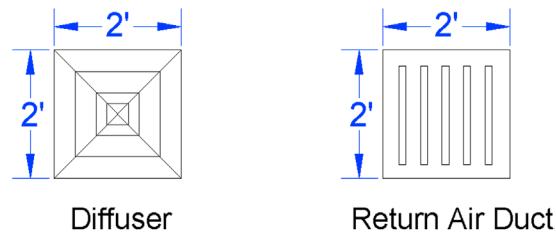


FIGURE 16.16 Diffuser and return air duct symbols.

**Step 3.** Create the RCP plan by drawing arbitrary vertical and horizontal “starter” lines in the middle of each room and offsetting 2 feet in either direction until you reach the walls. Then, trim as necessary.

**Step 4.** Add in the diffuser and return air duct symbols, as shown in the plan (Fig. 16.17).

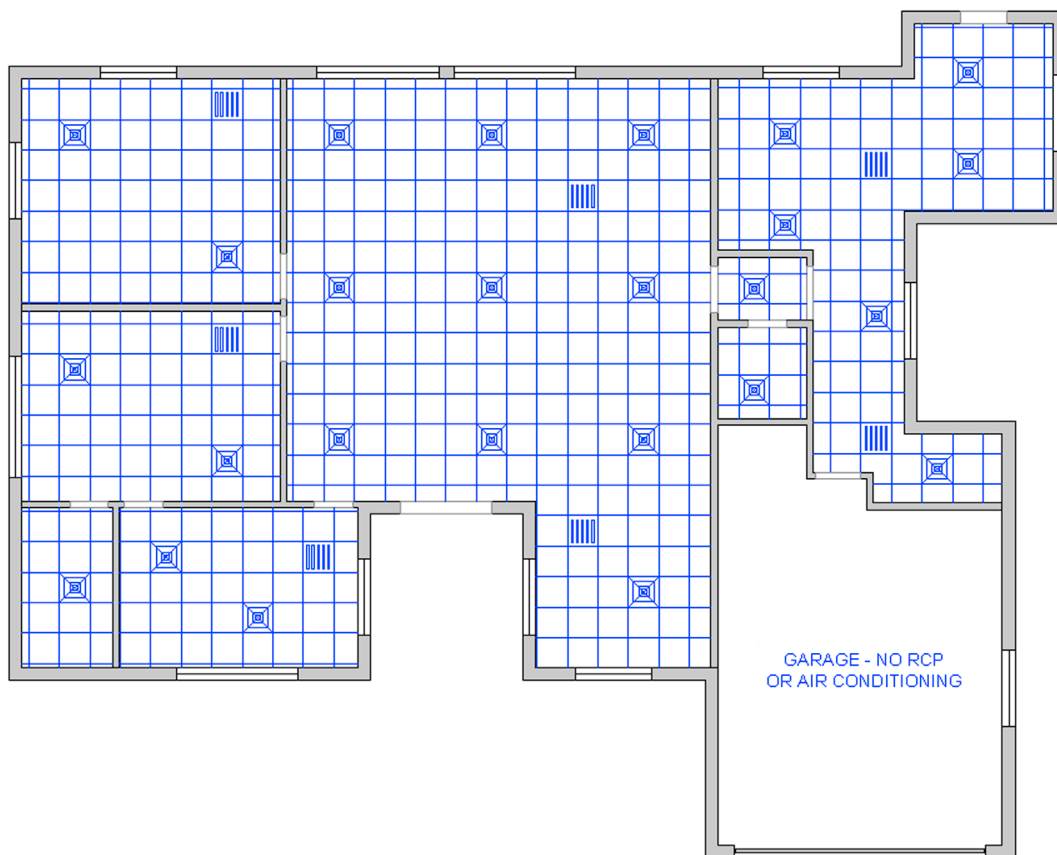


FIGURE 16.17 RCP and HVAC layout.

## 16.10 SUMMARY

You should understand and know how to use the following concepts and commands before moving on to [Chapter 17](#), External References (Xrefs):

- Data transfer from Word to AutoCAD
- Data transfer from AutoCAD to Word
- Data transfer from Excel to AutoCAD

- Data transfer from AutoCAD to PowerPoint
- Screen shots, JPGs, and PDFs
- Interaction with other CAD software
- Exporting and Save As features
- Inserting and OLE

---

### Review Questions

Answer the following based on what you learned in this chapter:

1. What is the correct way to bring Word text into AutoCAD?
  2. What is the procedure for bringing AutoCAD drawings into Word?
  3. What is the correct way to bring Excel data into AutoCAD?
  4. What is the procedure for bringing AutoCAD drawings into PowerPoint?
  5. What is the procedure for importing JPGs and generating PDFs?
- 

---

### Exercise

1. At your own pace, review everything presented in this chapter and do the following:
    - Type any short paragraph in MS Word and import it into AutoCAD correctly, using Copy and Paste.
    - Type in several columns of data in MS Excel, then import them into AutoCAD. Adjust them by scaling up and down.
    - Import any image from AutoCAD into MS Word using:
      - The Print Screen function.
      - Copy and Paste.
    - Export any drawing to a .dxf format.
    - Bring in any JPG (picture) using Copy and Paste. Adjust it in AutoCAD. (Difficulty level: Easy; Time to completion: 15 minutes.)
-