TurboCAD®

Version 7
User Guide

IMSI US
75 Rowland Blvd.
Novato, CA 94945, USA
Tel: +1–415–878-4000
Fax: +1–415–897-2544
Web Site Addresses
http://www.imsisoft.com
http://www.turbocad.com

IMSI Program License Agreement

IMPORTANT NOTICE: Please read the terms of the following License Agreement carefully. Your use of the product signifies your acceptance of the terms of the Agreement. If you do not agree with the terms of this Agreement, you should promptly return the package; your money will be refunded. Retain this License Agreement for future reference.

Article 1: License Grant

The software is the intellectual property of IMSI and its licensors, and is protected by law, including United States copyright laws and international treaties.

IMSI grants to you a license:

1. To use the program on a single machine.
2. To make a single archival back-up copy of the program in support of your use of the single program on a single machine.
3. To modify the program and/or merge it into another program for use on a single machine.
4. To transfer the program to another party if that party agrees to accept the terms and conditions of this Agreement, and you do not retain any copies of the program, whether in printed, machine readable, modified, or merged form. Except as expressly provided for in this license, you may not copy, modify, or transfer this program.
5. If the software in this package is licensed as a Site License, it is licensed for use on several machines. Additional master copies of the software may be made by the licensee, equal to the number of licenses purchased.

No reverse engineering. Except as stated above, MAY NOT MODIFY, TRANSLATE, DISASSEMBLE, OR DECOMPILE THE SOFTWARE, OR ANY COPY, IN WHOLE OR PART.

Article 2: Term

The license is effective until terminated. You may terminate the license at any time by destroying the program together with all copies, modifications, and merged portions in any form. The license will also terminate upon conditions set forth elsewhere in this Agreement, and IMSI may terminate your license if you fail to comply with this Agreement. You agree, upon such termination for any reason, to destroy the program together with all copies, modifications, and merged portions in any form.

Article 3: Disclaimer of Warranties and Limitations of Remedies

1. IMSI software is licensed to you As Is. You, the consumer, bear the entire risk relating to the quality and performance of the software. In no event will IMSI be liable for direct, indirect, incidental, or consequential damages resulting from any defect in the software, even if IMSI had reason to know of the possibility of such damage. If the software proves to have defects, you, and not IMSI, assume the cost of any necessary service or repair. In the event any liability is imposed on IMSI, IMSI's liability to you or any third party shall not exceed the purchase price paid for this product.
2. Thirty-day limited warranty on disks. IMSI warrants the enclosed disks to be free of defects in material and workmanship under normal use for 30 days after purchase. During the 30-day period, you may return a defective disk to IMSI with proof of purchase, and it will be replaced without charge, unless the disk is damaged by accident or misuse. Replacement of a disk is your sole remedy in the event of a defect. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.
3. THE LIMITED WARRANTY STATED ABOVE IS THE ONLY WARRANTY OR REPRESENTATION OF ANY KIND WITH RESPECT TO THE SOFTWARE MADE BY IMSI OR ANY THIRD PARTY INVOLVED IN THE CREATION, PRODUCTION, DELIVERY, OR LICENSING OF THE SOFTWARE. IMSI AND ANY SUCH THIRD PARTY DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE SOFTWARE, ITS QUALITY, RELIABILITY OR PERFORMANCE; OR ITS MERCHANTABILITY, NON-INFRINGEMENT OF THIRD PARTY RIGHTS, OR FITNESS FOR A PARTICULAR PURPOSE.
4. Some states do not allow the exclusion or limitation of implied warranties of liability for incidental or consequential damages, so the above limitations or exclusions may not apply to you.

Article 4: General

You may not sub-license, assign, or transfer the license or the program except as expressly provided in this Agreement. Any attempt otherwise to sub-license, assign, or transfer any of the rights, duties, or obligations hereunder is void.

This Agreement will be governed by the laws of the State of California, and you agree that any claims regarding the software shall be brought in California, and waive any objections to jurisdiction in the US District Court for the Northern District of California or the California Superior Court for Marin County.

You acknowledge that US laws prohibit the export/re-export of technical data of US origin, including software, and agree that you will not export or re-export the software without the appropriate US and foreign government license.

Copyright

Contents

Chapter 1 – Welcome

From humble beginnings in the mid 1980s, TurboCAD has evolved into one of the most widely used computer-aided-design software products in the world. Now with the release TurboCAD v7, it is self-evident that TurboCAD has become the clear leader in terms of price versus performance.

TurboCAD v7 is the result of extensive user input from passionate beta testers combined with the global programming effort of experienced programmers, contributing writers and training specialists.

If you are new to TurboCAD you will find it to be a versatile, intuitive and very powerful drawing application. If you are already a TurboCAD user you will be impressed with over seventy-five enhancements and improvements in this new version.

If you are an Architect, Engineer, Designer, Contractor, Mechanical Engineer or even just a hobbyist drawing for fun, you will find TurboCAD to be your tool of choice. You will create accurate scaled drawings with ease in both two and three dimensions.

About this Guide

Updates On The Web

Please be sure to check www.turbocad.com for updates to this documentation. It is very likely that a revised version with more recent information can be downloaded in PDF format from the web site. The electronic form of this document has several advantages over the printed version in that you can use the Table-of-Contents interactively. If you are reading this document in Adobe Acrobat reader you can press F6 to display the navigation palettes.

Professional vs. Standard

This *User Guide* is written specifically for the convenience of the TurboCAD Professional v7 user. The majority of the content will also be applicable to the TurboCAD Standard user but there are noted sections that will not apply. The main differences between the Professional and Standard versions are third party licensed software components such as ACIS solid modeling and advanced LightWorks rendering. For a full list of differences between the Professional version and Standard versions please consult the TurboCAD web site at www.turbocad.com.

Chapter 2 - Contents of the Package

The content displayed in the following list is applicable to the full version of TurboCAD Professional v7. Depending on the offer you received from IMSI your package may or may not contain each item list.

CD 1 – Program CD

TurboCAD Professional v7

The program itself and associated files are stored in the *BIN* folder on the program CD.

Training Module One

The training modules presented by TriCAD Systems, in conjunction with IMSI, are a set of audio-visual, interactive documents designed specifically for self-paced learning. They allow you to read the notes, listen to instructions and use the Screen Cam Player to show you how to build your drawing step-by-step.

Corel OCR-Trace

Corel OCR-TRACE is a fast, flexible program with which you can convert bitmap images to editable vector graphics and text characters. These vector drawing can be imported into TurboCAD via WMF, DXF or PLT formats.

FloorPlan 3D v5

FloorPlan 3D v5 is a standalone Home Design Conceptualizer from IMSI. The full 3D FloorPlan design can be imported and professionally presented in TurboCAD via the FloorPlan Print Space Maker.

With FloorPlan 3D 5.0, you can easily design and draw precise 2D and 3D floor plans and render beautiful photo realistic views.

Features include:

- Real-time VRML Walkthroughs.
- Photo-Realistic LightWorks® Rendering.
- 100+ Design Tools.
- Materials and Textures.
- Unlimited Building Levels.
- Square Footage Calculations.
- Key-In Wall Dimensions.
- Self-Healing Walls.
- One-Click Roof Designer.
- Automatic Stairs.
- Customizable Symbol Database.
- Home and Office Symbols.
- Editable Furniture and Fixture Symbols.
- 2D & 3D Objects.
- Continuous Object Insertion.
- Handle-Based Editing.
- Intuitive Walkthrough Tools.
- Direct Access to Online Resources

1000+ House Plans (folder on CD 1)

Find inspiration among thousands of award-winning HomeStyles® plans. Over a thousand editable house plans in TurboCAD format. They are located in the *House Plans* folder on the program CD.

Online Training Software

Centra Symposium is a Web-based enterprise application that enables live eLearning and business collaboration over intranets, extranets, and the Internet by supporting a wide range of live business interactions. Centra Symposium is highly flexible allowing live eLearning activities to be planned or spontaneous, structured or ad hoc, for internal or external audiences, large or small.

Live TurboCAD demonstrations and training courses are planned using this software. Watch www.turbocad.com for more details.

Adobe Acrobat Reader v4

Adobe® Acrobat® Reader™ is free, and freely distributable, software that lets you view and print Adobe Portable Document Format (PDF) files on all major computer platforms, as well as fill in and submit PDF forms online.

Internet Explorer v5.5

Internet Explorer is Microsoft's web browsing application.

CD 2

Over 14,300 vector CAD symbols. Number of symbols in parenthesis indicates the number of symbols in that category.

3D Symbols

Over 2,300 new ACIS based 3D Symbols. Categories include Antiques (50), Bathroom (103), Cabinets ES (366), Cabinets FP (398), Cabinets RP (390), Counter (50), Décor (108), Door (100), Gazebo (73), Kitchen (79), Landscape (69), Office (85) and Window (510).

British

Architectural (55), Bearings (19), Draftaids (76), Ducting (75), Electric Motors (38), Electrical Symbols (341), Fasteners (57), Gearing (38), Heating & Venting (114), Hydraulics (76), Isometric (57), Jigs (56), Piping (76), Pneumatic (76), Structure (57) and Transmission (56).

ISO

Basic Home Design (93), Bath (284), Business Flow Charting (84), CMOS (154), Construction (157), Electric Circuit Layout (110), Electric Power (133), Electrical Wiring (120), Electricity (200), Heating Venting & Ac (84), Home Furniture (167), Home Office & Appliances (83), Kitchens (277), LAN (138), Landscaping (164), Office Furniture (191), Plumbing (103), Printed Circuit Boards (324) and Timing Circuit Layout (318).

US

Basic (259), Basic Home Design (92), Bath (285), Business Flow Charting (81), Circuit Protection Components (224), CMOS (154), Construction (157), Electric Circuit Layout (110), Electric Power (130), Electrical Wiring (120), Electricity (164), Heating Venting & Ac (83), Home Furniture (167), Home Office & Appliances (83), Kitchens (270), LAN (138), Landscaping (163), Office Furniture (227), Plumbing (107), Power (223), Printed Circuit Boards (351), Switches (295) and Timing Circuit Layout (318).

Chapter 3 - Installation Instructions

System Requirements

Operating System

This release of TurboCAD will install and run on any of the following operating systems:

- Windows 2000.
- Windows NT version 4 Service Pack 4 or above.
- Windows Millennium Edition
- Windows 98 Second Edition.
- Windows 98.
- Windows 95 Service Pack 1 or above.

Minimum Requirements

To install and run TurboCAD, your computer must meet the following minimum requirements:

- Intel Pentium Class Processor
- 64 megabytes of RAM
- 60 megabytes hard drive space
- CD-ROM drive

Optimal Requirements

To run TurboCAD optimally, especially for drawing and rendering complex 3D assemblies, the following system requirements are suggested as a guideline:

Processor: Intel Pentium II, Pentium III, AMD K6/2, AMD K6/3, or AMD Athlon.

Memory: 64-512 megabytes of RAM (64+ megabytes for modeling smaller assemblies and moderately complex 3D objects, 128+ megabytes for modeling assemblies of several hundred 3D objects, 256+ megabytes for assemblies containing thousands of 3D objects).

Graphics/Display Resolution: 1024×768 and color depth of 16-million colors (24 bit), or better. TurboCAD will run on any graphics driver that supports Windows 2000, Windows NT 4, or Windows 98/95. Contact your graphics driver manufacturer to determine whether their graphics adapter/driver supports these operating systems. Note that running with extremely high screen resolution and color depth increases the memory requirements on the system and may result in apparent performance degradation. If you experienced this, try reconfiguring the display system to a lower resolution and color depth for improved performance.

Swap File: Should be the maximum size possible, no less than 300+ megabytes for machines with 64 megabytes of RAM. To better manage the system memory resources while running TurboCAD, it may be necessary to turn off "*Show window contents while dragging*". On Windows NT 4, this is done from the Plus! settings. It is not necessary to disable this on Windows 98/95.

Wheel mouse: Facilitates zooming and panning in TurboCAD.

Registration

You can register your copy of TurboCAD over the online at http://www.imsisoft.com/registration/index.cfm

If you do not have internet access, please call 1+(415) 878-4024.

Front Line is the first page that you see when you launch TurboCAD and allows you to start new drawings, register TurboCAD, and get program updates and much more. By default, Front Line does not attempt to make an Internet connection. However, if you choose Email registration, Update, or other online features from Front Line, TurboCAD will attempt to make a connection. Note: You can bypass Front Line and directly load TurboCAD by un-checking (or deselecting) "Show the initial screen every time you run the program" from Startup Options accessible from the TurboCAD Start menu group.

If you do not have an Internet connection you can phone +1–800–833–8082 to receive a registration code.

Becoming a Registered User of TurboCAD has many advantages, including technical support, access to extensive online support databases, and program updates.

Installing TurboCAD

These installation instructions apply to TurboCAD Professional and TurboCAD only.

To install TurboCAD:

- Insert the TurboCAD Program CD into your CD-ROM drive.
- If the installation program is not automatically started after the CD drive door closes (which may take a few seconds) then select *Start* | *Run* from the Windows taskbar.
- Type *D:\bin\setup.exe* (where D is the letter of your CD-ROM drive).
- Follow the instructions on screen to finish.

Symbol Libraries

A large number of symbols including clip art images are bundled with TurboCAD. During the Symbols Installation you will be presented with a choice of installing the full set (or subset) of symbols to your hard drive, or the option of having pointers in the Symbols Palette to the CD so that the symbols can be accessed from there.

- Insert the TurboCAD Program CD into your CD-ROM drive.
- Select *Start* | *Run* from the Windows taskbar.
- Type *D:\setup.exe* (where D is the letter of your CD-ROM drive).
- Follow the instructions on screen to finish.

Installing the SDK and SDK samples

By default, the TurboCAD installation program does not install SDK (Software Development Kit), SDK documentation or samples. To install these options, select Custom Install (or Modify) from the installation program, proceed to the window displaying installation options, select the option for SDK and highlight the desired components displayed in the underlying tree structure. Continue with setup and any selected options will be installed on your computer.

SHX Fonts

TurboCAD includes a full set of SHX fonts. SHX fonts are based on AutoCAD font styles. Using SHX fonts creates a higher level of compatibility for drawings shared by varying CAD packages, including AutoCAD. This fonts are part of the default installation.

Installing Without Internet Explorer

Warning: If you choose not to install Internet Explorer with TurboCAD, or if you uninstall Internet Explorer from your computer, none of the Internet features in TurboCAD will be available.

The Internet palette is a mini-version of Microsoft Internet Explorer that is attached directly to the TurboCAD interface. The Internet palette gives you access to a searchable knowledge base, documentation, support and other useful online resources. By default, the Internet palette does not attempt to make an Internet connection. However, the Internet palette will attempt to make a connection for many of the links available. Other links such as FAQ's, Tips and Tricks, and Mini Tutorials can be browsed locally - no connection is needed. If you have a full browser installed and an Internet connection with the automatic dial-up feature, TurboCAD will automatically connect when needed. Some users (such as America Online members) may have to be connected before using the Internet features in TurboCAD.

By default, the TurboCAD installation program will check if Internet Explorer is already installed. If it is not already installed you will be asked if you wish to install Internet Explorer. If you do not wish to install the browser, answer *NO*. TurboCAD will then be installed without the Internet Explorer browser.

Clean Install Procedure

If problems are encountered installing or running TurboCAD, try a "clean" install. During installation, the software will need to utilize certain resources that may already be in use by other applications. Such applications may include, but are not limited to, virus scanners, file management applications, and screen savers. In order to achieve an effective installation of our software and minimize technical support problems for our customers, IMSI recommends that you set up your machine for a "clean install" using one of the following procedures.

For Customers Using Windows 98 or ME:

Run the Windows 98 Maintenance wizard (*Start* | *Programs* | *Accessories* | *System Tools* | *Maintenance Wizard*). If you have not already set up the Windows 98 Maintenance wizard, please consult the Windows Help file. The Windows 98 Maintenance wizard settings must include:

- Deleting Unnecessary Files
- Running ScanDisk
- Running Disk Defragmenter

Restart your computer.

Press *CTRL+ALT+DEL*. This will open the *Close Program* dialog.

In the *Close Program* dialog, select each item except for Explorer or Systray and click [End Task]. (If you end task on a program that shuts your computer down, then leave that one running, in addition to Explorer and Systray.)

Start the application installation.

For Customers Using Windows 95:

Use Windows Explorer, My Computer, or DOS to empty the C:\Windows\Temp folder (where C is the letter of your hard disk drive).

Open the *Windows Recycle Bin* and check its contents. Restore any necessary files, and then empty the contents.

Run ScanDisk (*Start* | *Programs* | *Accessories* | *System Tools* | *Scan Disk*). Choose the *Thorough* radio button. When Scan Disk is complete, close out of it.

Run Disk Defragmenter (*Start* | *Programs* | *Accessories* | *System Tools* | *Disk Defragmenter*), even though it may indicate 0% fragmented.

Restart your computer.

Press *CTRL+ALT+DEL*. This will open the *Close Program* dialog.

In the *Close Program* dialog, select each item except for Explorer or Systray and click [End Task]. (If you end task on a program that shuts your computer down, then leave that one running, in addition to Explorer and Systray.)

Start the application installation.

For Customers Using Windows NT or 2000:

- Open the Windows Recycle Bin and check its contents. Restore any necessary files, and then empty the contents.
- Restart your computer.
- Press *CTRL+ALT+DEL*. This will open the NT Security dialog.
- Click [Task Manager].
- Click the Applications tab.
- Select each item in the list and click [End Task].
- Start the application installation.

If you are still having problems with your application after following these instructions, you should check to make sure that you have the latest device drivers for your system.

Installing Training Module One

TurboCAD's multi-media audiovisual training tour demonstrates various features in TurboCAD. It is highly recommended that you take the training tour to help quickly familiarize yourself with the product.

To Start The Tour:

- Verify that the TurboCAD Program CD is in the CD Rom drive.
- Click *Install Training Module* on the TurboCAD Start page.
- Follow the instructions on screen.

Installing additional modules

Modules 2 and 3 are optional advanced training courses that can be purchased from www.turbocad.com. It is not possible to install these modules without purchasing the small installation program.

IMSI Program Folder

When you install TurboCAD, the Setup program creates a program folder. If you chose the default settings, TurboCAD is installed in the C:\Program Files\IMSI\TCWP70 folder. This folder contains several subfolders that contain TurboCAD's program files and related files such as templates, sample drawings, and symbols. The Setup program also creates a program group containing the TurboCAD application icon, as well as shortcuts to Help, ReadMe, Startup Options and Uninstall programs.

To start TurboCAD in Windows:

Select *Start* | *Programs* | *IMSI TurboCAD Professional v7* | *TurboCAD Professional v7*.

Before you start the program, please read the ReadMe file, which contains the latest information on TurboCAD. The ReadMe file is located in the TurboCAD program group.

To remove TurboCAD

- Choose *Start* | *Settings* | *Control Panel*.
- Double-click Add/Remove Programs
- Choose TurboCAD Professional v7 from the list.
- Click *Add/Remove* and follow the instructions on the screen.

To remove TurboCAD from your computer:

- Choose *Start* | *Settings* | *Control Panel*.
- Double-click Add/Remove Programs
- Choose TurboCAD Professional v7 from the list.
- Click Add/Remove and follow the instructions on the screen.

Or:

- With the TurboCAD CD in the drive, start the installation procedure again and select the Remove option.

Chapter 4 - Getting the Answers You Need

TurboCAD comes with a combination of printed and on-line help, and web links to the IMSI web site that can help you learn to use the program or provide answers to your questions.

IMSI Technical Support Services

The best place to check for more information about different support options is the TurboCAD support page at www.turbocad.com.

Internet Forums

The TurboCAD support forums are a good way of getting the answers that you cannot readily find elsewhere. Please make sure that you check the forums regularly for discussions, views, solutions, or "tips and tricks" from the TurboCAD support staff as well as peer support from fellow TurboCAD users. Follow the link to the forums at www.turbocad.com.

Updates and Maintenance Patches

TurboCAD provides an automatic update feature on Front Line, the opening screen when you first start TurboCAD. This feature (Update Wizard) allows you to update to the current working version of TurboCAD over the Internet. Simply click the update button.

The TurboCAD support page at www.turbocad.com/support.html also provides current updated information and maintenance patches for TurboCAD. Download a maintenance patch at anytime, day or night, and manually update TurboCAD. Note: To determine the version and build of TurboCAD installed on your computer, click *Help* | *About* on the TurboCAD menu.

Please note that some users (behind firewalls and America Online members) may encounter difficulties when attempting to update TurboCAD using the Update Wizard. In such situations, it is recommended that TurboCAD be manually updated by first downloading and then applying the appropriate maintenance patch from www.turbocad.com.

Frequently Asked Questions

The answers to Frequently Asked Questions are another useful source of documentation and can viewed online at www.turbocad.com and at the end of this document. Subjects covered include: 3D Questions, Dimensions, Documentation, Error Messages, File Formats, Feature Differences, General Issues, Installation, Setup, Registration, Internet Palette, Printing, Programming, Audio Visual Training/Tour, Rendering, Symbols, Tutorials and Training and Customization.

Technical Support Check List

You may already have the information you are looking for. Before calling, check your User Guide thoroughly. To receive the fastest response to your technical questions, please be in front of your computer with TurboCAD running, and be prepared to provide the following information before you call or send e–mail:

- The type of computer and Windows version you are using
- The name, version number, and other information about your specific version of the product (To find this information, select *Help* | *About TurboCAD* from the TurboCAD menu.)
- The exact sequence of events that created the problem (Verify that you can reproduce the problem by following the same series of steps.)
- The exact wording of any error messages
- Steps you've taken to find the answer to your question, including resources used
- The results of any steps you have undertaken to resolve the problem

Upgrade Information

Using Earlier Versions of TurboCAD with TurboCAD Version 7

When you install TurboCAD version 7, it does not remove or update your copy of version 6 or earlier versions of TurboCAD. TurboCAD version 5 and earlier versions of TurboCAD remain on your system. You can continue to use TurboCAD version 6 together with these earlier versions (but also see next section concerning TurboCAD versions 5 and 4).

Legacy Mfc42.dll Required for TurboCAD Versions 5 and 4

After installing TurboCAD version 7 on your computer, a new version of Mfc42.dll is installed to the \Windows\System folder. If you wish to continue using TurboCAD version 5 or 4 on the same computer as TurboCAD version 6, then read and follow the instructions concerning Mfc42.dll on the TurboCAD support page at www.turbocad.com.

Interface Configurations

Resolution Specific User Interfaces

TurboCAD has the ability to recognize the screen resolution that you are using. (You can change your screen resolution in Windows by right-clicking the Desktop and choosing Properties.) A slightly different interface will appear for each resolution. If you change your screen resolution between drawing sessions, TurboCAD will inform you that the most recently used interface does not correspond to the current screen resolution, and it will ask you if you want to load it. If you answer No, a new interface will appear that is tailored specifically for the new resolution. You may also load different interfaces manually in TurboCAD Professional by selecting *Tools* | *Customize* | *Setup* | *Load From*.

Restoring Settings after Upgrading TurboCAD

When upgrading TurboCAD Professional, you can manually restore your customized interface settings by following these steps:

Before upgrading, first locate and backup the file storing your customized configuration settings. This has a file extension of CFG and is found in the old "config" folder (usually, C:\Imsi\Tcwp60\Program\config). The configuration file stores your customized menu, keyboard, toolbars, and other custom settings.

After installing the upgrade and making sure that TurboCAD is not open, copy the previously backed up configuration file to the new Program Files\Imsi\Tcwp70\Program\config folder.

Open TurboCAD Professional, go to *Tools* | *Customize* | *Setup* and select the drop down box under “Load from”. Select the desired configuration file, make sure “Load all sections” is selected and click the “Load from” button. This will restore your previously saved customized settings; in any future upgrades, the same procedure can be followed.

Tip: A method to help restore the original toolbar locations is to use the “Print Screen” key to capture the screen of TurboCAD Professional before updating, and then paste that image into a bitmap image editor such as Windows Paint or IMSI HiJaak. Print out the image and use it to manually modify the location and content of the TurboCAD Professional toolbars after the upgrade.

Chapter 5 - Key New Features in v7

Based on extensive user input, TurboCAD v7 brings you the results of long term planning and programming, combined with the most rigorous testing effort we have ever given any of our software. This major upgrade delivers over 75 key improvements and brings TurboCAD to the forefront of integrated 2D and 3D desktop CAD.

- Faster Rendering in any view.
- Improved Dimensioning.
- 3D Modeling - shelling and lofting.
- Color, Property and Calculator Palettes.
- New Snaps and Construction Methods.
- Latest ACAD Compatibility.
- More Flexible and Powerful Drawing Presentation Tools.
- FloorPlan Compatibility.
- Save to All Web Formats**.**
- Most complete feature set in its class.
- More Printing and Publishing Options.

No previous TurboCAD upgrade has ever offered more improvements than TurboCAD v7. If you are a TurboCAD user in any discipline, you will find in v7 improvements specifically designed for you.

Power and Productivity

New and improved 2D and 3D drafting, presentation and drawing construction tools to further increase your productivity.

Optimized and Intuitive Interface

An optimized and more intuitive interface to give you visual feedback to allow you to access TurboCAD's power even more simply and with greater flexibility.

State-of-the-Art 3D

More high-end 3D modeling and visualization power equal to any design task.

Latest AutoCAD Compatibility

Total compatibility with the latest AutoCAD release and other software.

Help and New Courseware

Vastly improved Help and access to state-of-the-art TurboCAD instructional courseware.

Internet Compatibility

More ways to maximize TurboCAD's Internet compatibility.

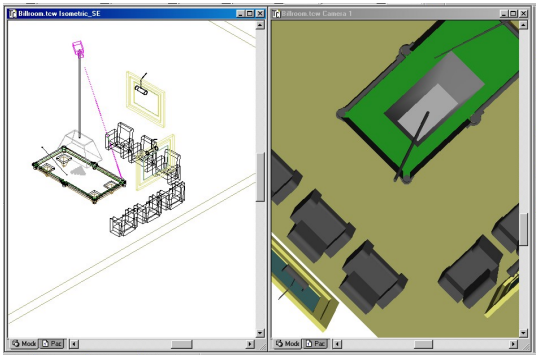
Improved Programming Tools

A more robust SDK.

Drafting, Presentation and Drawing Construction Improvements

Camera Objects

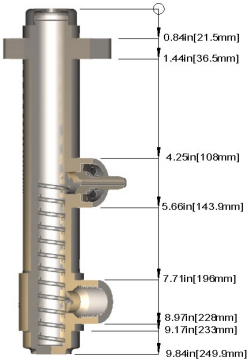
With TurboCAD v7's new “attachable” Camera Objects, you will be able to define a precise view of 2D and 3D models and, as the attached camera moves, so does the view automatically.



Improved Dimensioning

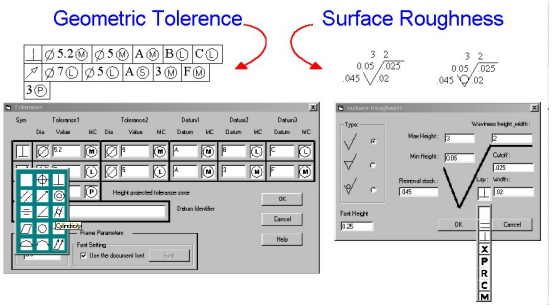
Enjoy ultimate dimensioning flexibility. New features include: dual units in one dimension,

geometric tolerancing and surface roughness options from pull-down menus, multiple dimension units on one drawing, incremental dimensions, and user defined text strings along with dimension values.



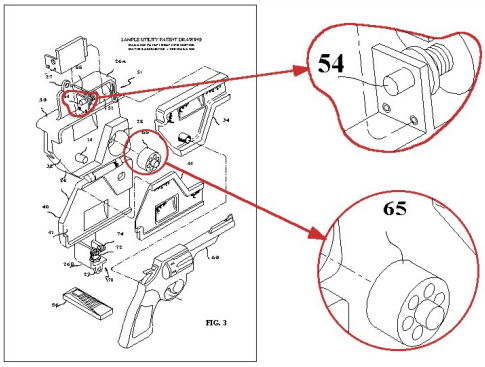
Advanced Dimensions

Incremental Dimensions with Dual Units



Floating and Shaped Viewports

If you like Viewports, you'll love the new Floating and Shaped Viewports, which allow you to change the shape of the viewport to any closed shape on-the-fly, edit the model directly in the viewport, and get a perfect fit with the new Zoom-to-Selection tool.

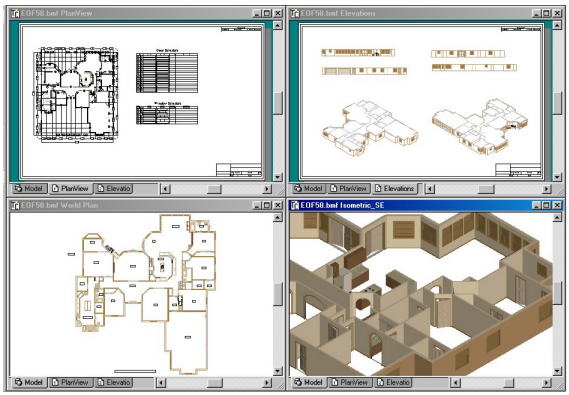


Double Lines and Walls

Double Lines and Walls now mirror copy with their left and right orientation automatically adjusted.

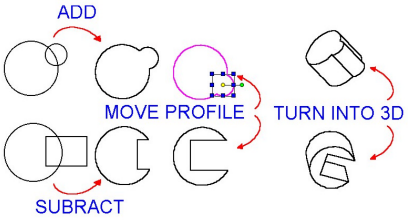
Multiple Paper Space

TurboCAD v7's new Multiple Paper Space allows for multiple pages per drawing, each with its own size, units and grid, with Excel™ like tabs for switching between pages. Perfect for presentations of your 2D or 3D model.



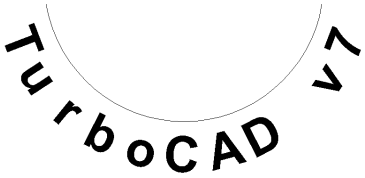
Regions and Booleans

With TurboCAD v7's new Regions and improved Booleans tools, you'll easily create complex "island" profiles without losing any of the underlying geometry, ready for extrusion and rendering.



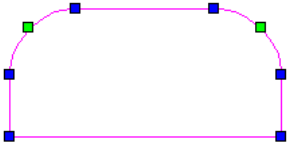
Text on a Curve

Improved Text options include Text on a Curve, allowing you to place text which "*follows*" any curve with you in control of all of the parameters. *In order to use this new tool you will have to install the SDK samples via Custom Installation.*



Continuous Polylines

Using TurboCAD v7's new Continuous Polylines, embedded chamfers and fillets become an integral part of the polyline, with all of the editing possibilities that follow.

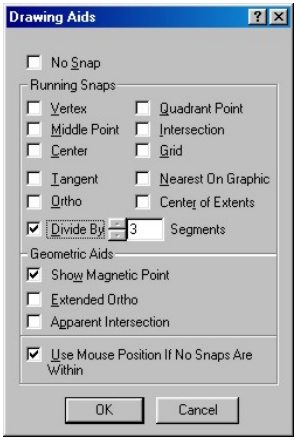


New Snaps

Three brand new snap tools include:

- A 2D / 3D "Center of Extents" for all objects.
- A configurable "*Divide By*" Snap to quickly locate regular divisions of lines and line segments.
- An automatic *No Snap* that uses the cursor position if no other active snap points are within the snap aperture.

Additionally, the functionality of the "*Center*" snap has been extended to find the center of circular surfaces such as the end of a cylinder.



Geometric Parameters

With the new Calculate Geometric Parameters tool, you will easily obtain the center of gravity, area, moments of inertia, radius of gyration and angle of radius of any 2D or 3D object.

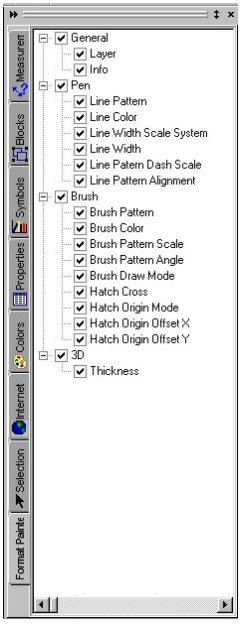
And MORE

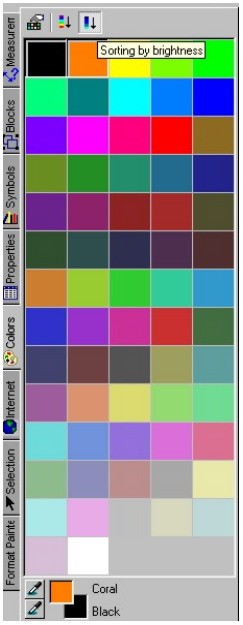
…. Other new features include new Construction Lines, better Search criteria, …..

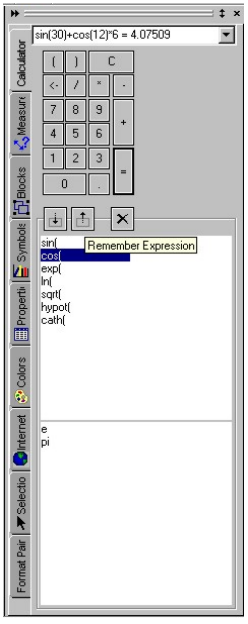
Interface, Ease of Use and Flexibility Improvements

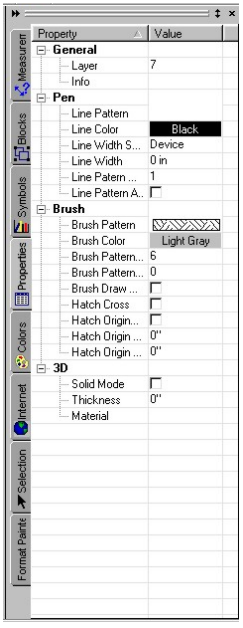
New Palettes

The new array of Palettes in TurboCAD v7, including the Calculator Palette, Color Palette, Properties Palette (with Explorer-like tree structure) and the industry standard Format Painter, you will be able to have on-the-fly access to any objects properties and be able to define or change them with a single click.









Interface Improvements

Major interface improvements including an Explorer-like tree structure for options, expanded layer controls, an updated scrolling inspector bar, a special toolbar for quick access to macros, more user settings which are saved, and more. You will find TurboCAD v7 more user friendly than ever.

Printing

Printing has never been more flexible, with options for Collated Copies, Grayscale mode, Print to File and Render for Printing.

New Wizards

If you've been thinking of using TurboCAD for creating Organizational Charts, try the new Org Chart Wizard, which will take you step-by-step to professional organizational charts.

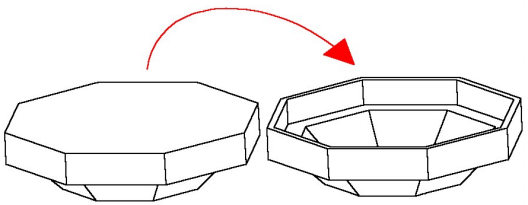
And MORE

…. Including improved installation options (modify, repair, remove), Zoom to Selection, Auto Unit Conversion, …..

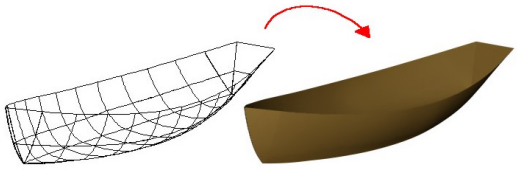
Modeling and 3D Visualization Improvements

Shelling and Lofting

The new Shelling tools will easily create “shells” of your ACIS based 3D models, including options to shell to the inside or outside of the object.

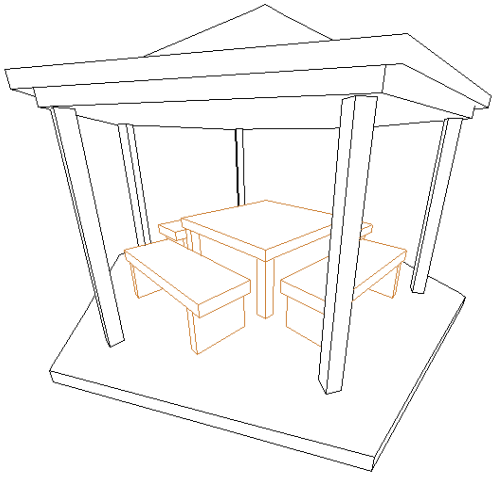


Use the new Lofting tool with multiple profiles to create complex 3D objects using NURBS.



Perspective Rendering

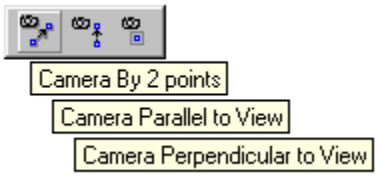
New advanced Rendering options include Hidden Line Rendering in Perspective with the ability to Clip Objects behind the camera, giving you realistic views from any perspective, plus Background Rendering in model space to optimize use of your computer.



More Rendering options give you the ability to use Full Render Options in Viewports, a dramatic speed increase in rendering and support for Acceleration Cards.

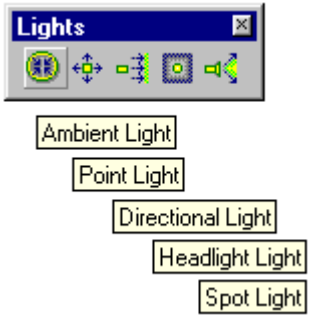
Cameras

Even more Rendering improvements include Cameras and named views that keep their rendering settings and improved Shadows for LightWorks rendering.



Light Objects

TurboCAD v7's Lights let you create new Light Objects similar to Camera objects with properties such as ambient, point, directional, spot and more which can be part of Groups or Blocks of Light Objects capable of making changes in one step.



And MORE

…. Additional modeling and visualization improvements include better Surface-to-Solid conversion, improved Mesh creation and editing, and more …

AutoCAD Compatibility Improvements

TurboCAD v7's AutoCAD filter makes it totally compatible with AutoCAD® 2000i and previous releases, including support for multiple paper space, shaped viewports and regions plus improved hyperlink translation.

Compatibility with Other Software

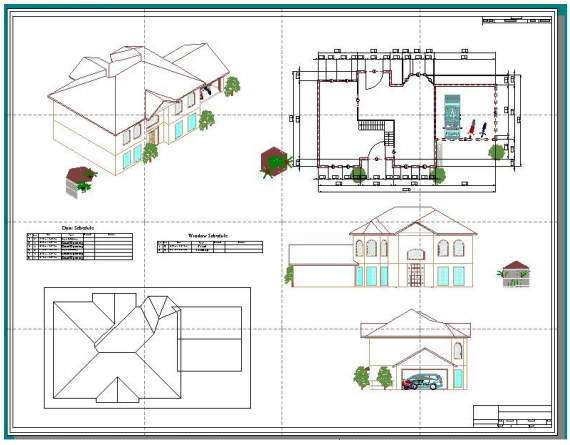
The NEW *3DS* filter includes key frame import options and is totally compatible with the latest 3D Studio version.

An improved *EPS* filter now includes options for model space and paper space.

TurboCAD v7's vastly improved File Converter will let you easily convert single or multiple files to and from any drawing format supported by TurboCAD.

FloorPlan Bridge

For users of IMSI's award-winning FloorPlan software, the new FloorPlan Bridge will allow you to create your house or other floor plan, then import it directly into TurboCAD and automatically create dimensioned plan and elevation views with hidden lines, door and window schedules, roofs, foundations and more.



Help Improvements

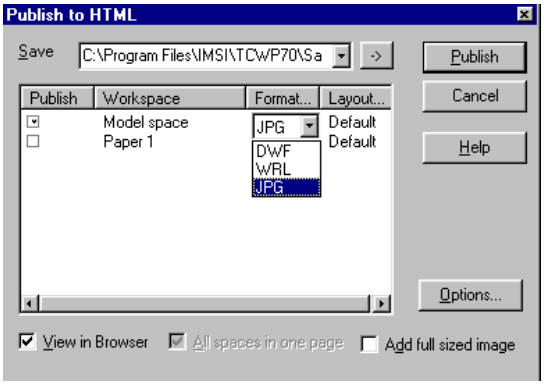
Based on feedback from users, TurboCAD v7's Help files have been extensively revised, expanded and improved, with each tool getting its own “Tips and Tricks” section and any known issues clarified.

New Courseware

The TurboCAD team worked closely with Tri-CAD and CourseFactory.com to give you access to state-of-the art instructional courseware specifically for TurboCAD v7. An introductory course from Tri-CAD is included free with v7. Please visit www.turbocad.com for more information.

Internet Compatibility

TurboCAD v7's *Publish to HTML* tool lets you automatically create HTML pages for web publishing, with your choice of format for your drawing (JPG, DWF, or 3D VRML) and custom text headings with orientation control.



The new Save to JPG export filter allows you to easily and directly export your files to this most popular format for web publishing.

Programming and Development

TurboCAD v7's improved Software Development Kit (SDK) includes options to handle any entity type, full support for Rendering (multiple paper space, custom palettes, custom ties), a host of new Sample Files, full internal support for VBA version 6, and external SDK support for Visual C++ and other compilers.

Corel OCR-TRACE

Corel OCR-TRACE is a fast, flexible program with which you can convert bitmap images to editable vector graphics and text characters.

Bitmaps are images made up of a series of individual dots (pixels). The major drawback with bitmaps is their fixed resolution, a limitation that can result in the deterioration of image quality when bitmaps are scaled to different sizes. For example, straight lines become jagged when enlarged. Vector graphics are created by mathematical equations that describe each line and curve of an object. Vector graphics can be scaled, and even rotated, with no distortion or loss of quality, and lines remain sharp at any size. Additionally, when bitmaps are printed on high-resolution output devices, the image quality does not improve. Vector graphics, on the other hand, appear sharper the higher the resolution of the printer.

With Corel OCR-TRACE, you can create vector copies of your bitmap images using several tracing methods. You choose the tracing method most appropriate for your desired result. Some of these methods add special effects to your images. The tracing methods available are Outline, Centerline, Woodcut, Sketch, Mosaic, and 3D Mosaic.

Corel OCR-TRACE also has an Optical Character Recognition (OCR) feature that converts bitmap text characters into editable text characters. When a document is scanned into digital format, it produces a bitmap image of the pages. Text characters are then treated as pictures and, as such, cannot be edited. The OCR feature translates the bitmaps back into text characters so the document can be exported and edited in other applications, such as word processing and database programs like Corel WordPerfect and Corel Quattro Pro.

You can select portions of the bitmap image to be converted using the trace and OCR features, create and save templates to use with multiple images, and work with multiple documents simultaneously.

You can also print vector graphics or converted text from within Corel OCR-TRACE. You cannot, however, print the bitmap image. The Corel Print dialog box is used when printing the vector graphic and converted text and provides you with full printing capabilities.

Chapter 6 - Quick Reference

Angle

Tools | Measurement | Angle

Finds the angle defined by three points or the vertex angle between any 2 entities.

By *Right-Clicking* and selecting the *By Entity* option, the User can find the angle of two lines that meet.

A temporary angular dimension is inserted in the area being measured. These temporary measurements are not dimension entities.

When finding the angle between two arcs, the *By Entity* option cannot be used.

Area

Tools | Measurement | Area

Finds the surface area by tracing a Sum Path and temporarily filling in this area with a solid fill pattern.

The information provided in the Measurement Palette is described in square mm (or whichever units of measurement has been selected).

Array Copy

Edit | Copy Entities | Array Copy

This command is used to create a rectangular pattern of objects by defining a distance along the *horizontal* (X-Step) and the *vertical* (Y-Step) axes. *A depth (Z-Step) can be specified when in 3d drawing mode.*

Blocks

Format | Create Block

A Block is similar in structure to a Group, but it has more powerful characteristics.

Blocks are usually created from complex entities that will be reused in that drawing.

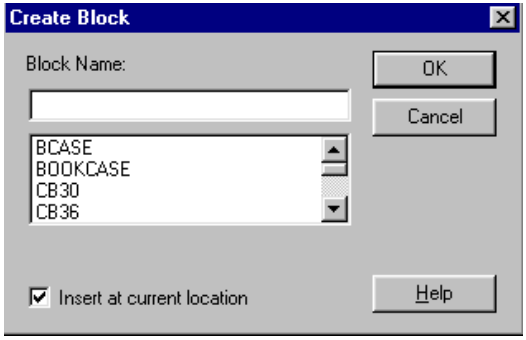
One advantage of a Block is that the file size is not significantly increased by the size of the Block when it is reinserted from the Block palette.

All similar Block entries in a drawing can be updated at once by using the *Edit Content* function in the Block palette.

Blocks can be simplified to their component parts by using *Format* | *Explode*, but will then not retain their Block characteristics

Creating A Block

From the View Menu, select the *Blocks* option. The Blocks palette will dock into the right side of the screen.



To automatically name a block at creation, check the setting:

Options | Auto Naming | Blocks Tile | Prompt for name

Using the Select Tool, left click the objects and drag to the Block palette, pressing the *CTRL* key if a copy of the block is to remain at its original position in the drawing.

Type in the required name in the *Block Name* field.

Inserting A Block

Click onto the *Blocks* page of the docked palette.

Check *View* | *Blocks* if not docked in the screen.

All blocks resident in the current drawing will be displayed in the palette.

From the *Blocks* page of the docked palette, click, hold and drag the required block into the drawing

The *Selector Shell* remains attached to the block in order to re-locate, scale, rotate or copy it if required. Press *ESC* to discard the Selector Shell.

Chamfer

Modify | Chamfer

The Chamfer creates a beveled edge between 2 lines.

The resulting chamfer will either trim or extend the lines to the newly created edge.

When both chamfer distances are set to zero, the lines will be trimmed or extended without creating a chamfer, similar to the *Meet 2 Lines* feature.

This command will create a chamfer on lines and double line entities.

Concentric Circles

Insert | Circle/Ellipse | Concentric

Draws a series of circles by defining the center point of the first circle.

The radius values of subsequent circles can either be dragged to the required position or input into the data field of the Inspector Bar.

Construction Entities

Insert | Constructions

Construction objects are used as an intermediate aid in determining the geometry of subsequent drawing elements.

Construction entities are created on their own layer. They can be erased by using either *Edit | Clear | Construction* or *Edit | Clear | Construction | All Construction.*

The default layer name for construction entities is *$Construction* and the color and line type of construction entities can be changed in *Options | Layers.*

The *Print Construction* option found from *File | Page Setup* or *File | Print | Page Setup* allows the User to specify whether or not construction objects will print.

Coordinate Systems

Modes | Coordinate System

In order to determine points within your Model space drawing area for purposes of specifying distances or angles etc, it is necessary to use either an *Absolute, Relative or Polar Coordinate* system.

Absolute Coordinates

Modes | Coord System | Absolute Coords

Determine the location of points in the Graphics area relating to the 0,0 (lower left) position in the drawing and all subsequent points are thus calculated from the 0,0 position.

When using Absolute coordinates the position in the drawing is given by a positive or negative value X-Y value. No angles are given, lengths and angles are determined by coordinate points. Lines traveling from west to east are positive values; east to west are negative values. Line traveling from south to north are positive values; north to south are negative values.

Relative Coordinates

Modes | Coord System | Relative Coords

Determine the position relative to the last point indicated in the graphics area.

When using the *Relative Coordinate* entry method a small red dot will occupy the current position in the graphics area and will move around the drawing in relation to the last position identified in the graphics area.

Polar Coordinates

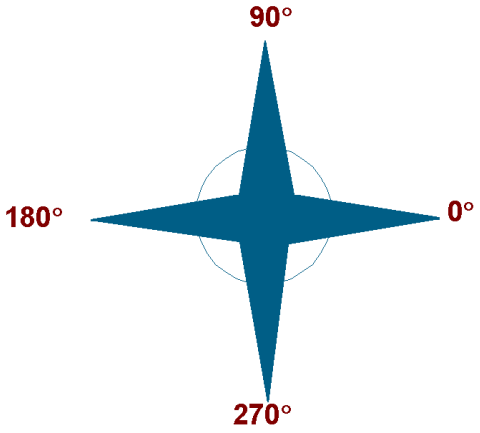
Modes | Coord System | Polar Coords

This is the method by which the user defines a linear distance and angle, to determine a position in the graphics area.

This method applies to the drawing and/or manipulation of an object or group of objects.

When defining the length and angle of a line, the Tab key of the keyboard is used to access the relevant fields of the Inspector Bar.

When using *Polar Coordinates*, the position of the cursor is always the *center of the compass* and the angle directions are calculated from this point.



For example, the standard format to draw a straight line of 100 from left to right would be *Length* 100 *Angle* 0

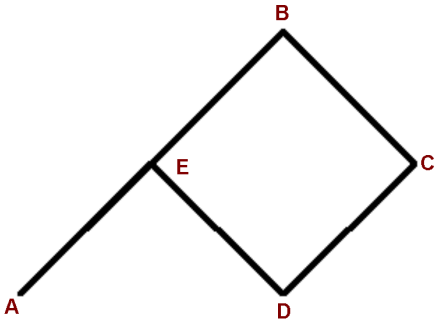
Using the *Polyline* command, left click any point in the drawing screen and use the *TAB* key to enter the following values in the data fields of the Inspector Bar.

A-B = Length 200; Angle 45

B-C = Length 100; Angle 315

C-D = Length 100; Angle 225

D-E = Length 100; Angle 135



Coordinates of the Point

Tools | Measurement | Coordinate of the Point

This command will find the physical coordinate of a point relating to its X-Y position in World Coordinates.

Dimensions

Insert | Dimensions

Orthogonal Creates linear (horizontal and vertical) dimensioning

Parallel Creates dimensioning between aligned points

Rotated Creates a dimension between aligned points at a specified angle.

Datum Creates dimension lines from an X-Y setout point

Baseline Draws dimensions incrementing from a base point.

Continuous Draws a connected set of orthogonal dimensions.

Angular Creates an angular dimension between 2 lines or arcs.

Radius Creates a radius dimension on an arc or circle.

Diameter Draws a diameter dimension through a circle.

Leader Used for adding dimensional notes with a leader arrow.

Entity Dimensions Automatically create a dimension by left clicking onto the line.

Incremental Dimensions Used to define incremental dimensions from a starting point.

Distance

Tools | Measurement | Distance

Finds the linear distance between 2 or more points.

This feature traces the points indicated and presents the information in the *Measurement Info* palette.

When finding the distance between 2 points, the *Measurement Info* will provide both the *linear* distance (*length)* and the angle.

When finding the multiple, consecutive distances, such as a perimeter, *Measurement Info* will display the total distance.

While using this tool, by *Right-Clicking*, the User will find options in the local menu for Finish, Close, One Step Back, By Entity, Single Entity and various measurement units.

Fillet

Modify | Fillet

The fillet command creates a radius between two lines. The resulting radius will either trim or extend the lines to the radius.

When the fillet radius is set to zero, the lines will be trimmed or extended without creating a radius, similar to the *Meet 2 Lines* feature.

This feature will create a radius on line and double line entities as well as arcs and circles.

A connecting arc to the specified radius will be inserted between two parallel lines.

Groups

Format | Create Group

A Group is a compound entity comprising a number of separate entities that are grouped

together, either temporarily or permanently, for ease of manipulation in a drawing.

Groups can be named by creating the group, then *Right-Clicking* to obtain the Properties dialogue box and naming the group in the Attributes field of the General tab.

Objects that are grouped together from different layers keep their existing layer structure.

Groups can be separated into their original component parts by using *Format | Explode.*

Creating A Group

Groups can be named prior to creation by setting the following option:

Options | Auto-Naming | Groups | Prompt for name

Using the *Select* tool, group together all the objects that comprise the intended group.

From the *Format* section of the pull-down menu select *Create Group*.

Type in the name of the group in the *Create Group* dialogue box.

Hatching

Insert | Path Hatching

TurboCAD provides the option to either fill a selected object with a pre-defined hatch pattern, or to create a hatched area within specified boundaries.

The properties (scale, angle etc) of the hatch pattern can be set prior to creating the hatch by *Right-Clicking* onto the *Hatch* feature in the *Drawing Tools* toolbar.

Hatch patterns are created as compound entities. To reduce the hatch pattern to individual entities use *Format | Explode.*

Hatch patterns are created associatively to the object.

Hatching A Single Object.

Select the object to be hatched by using the Select tool;

Right-Click onto the *Hatch* icon in the *Drawing Tools* toolbar.

From the *Brush* page, set the required *Pattern*, *Scale* and *Angle* options and optionally check the *Crossed* checkbox.

Return and left click onto the Hatch feature. The hatch pattern will appear in the selected object.

Editing The Hatch Pattern.

To change the properties of a pre-drawn hatched area do the following:

Select the hatch pattern by using the Select tool.

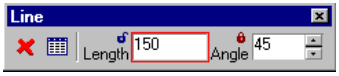
Right-Click to obtain the local menu and select the Properties option.

Select the Brush page of the Properties dialogue box.

Change the properties of the hatch pattern to suit.

Inspector Bar

The *Inspector Bar* is usually located at the bottom of your screen and is *Context Sensitive*, meaning it will respond with different data entry fields for different commands selected.



To input information in the data fields of the Inspector Bar, use the *TAB* key on your keyboard.

Keep pressing *TAB* to cycle forwards and *SHIFT+TAB* to cycle backwards through the different fields. The “padlock” on at the top left of

the data field indicates that the value typed therein will be locked for the duration of the function.

Layers

Using the Layering facility within a drawing allows objects drawn on a particular layer to be controlled by *name*, *color* and *linetype.*

Layers can be *switched off* (invisible) or *locked* (visible, but may not be modified) and selection of objects can be achieved by using the layer *name* and/or *color* to identify that layer.

Named layers can be standardized at the beginning of a job and these layers can be stored in a template to avoid you having to re-create them in subsequent new drawings.

Any layers contained in symbols, blocks or other drawings that are inserted into your current drawing, will be incorporated into your current drawing.

Layers cannot be deleted if objects are still resident on that layer.

Model & Paper Space

Model Space is the area in which the user creates the geometry of the 2D or 3D model of the drawing. *This should be drawn at full scale.*

Paper Space is the area where the viewports of the model will be assembled. Text notes and title blocks are also inserted into the Paper Space area. This is set to the real-life, physical size of the paper onto which the drawing should be printed.

The user can toggle between *Model* and *Paper Space* at any time without disturbing either area and any changes done to the drawing in *Model space* will automatically be reflected in the relevant viewport in the *Paper space* area.

Important Notes About Model & Paper Space

When beginning a new drawing in Model Space, draw at full (1:1) scale. It is not necessary to define a drawing sheet size as the TurboCAD drawing area expands infinitely to accommodate all entities.

Strict layer control is advised when drawing the model.

Changes made to the model after the viewports have been created in paper space will automatically update.

Each viewport in Paper Space functions as a "self-contained" drawing. Consequently, independent settings for Scaling, Rendering, Layers etc. can be set for each separate viewport.

Viewports can be *moved*, *copied*, *scaled* & *rotated* in Paper space without their contents being adjusted.

The *scale factor* of a viewport is set by left clicking onto the viewport border in Paper Space and using the *Properties* | *Viewport* | *Fixed scale* feature.

When Text labeling is done in Paper Space; the size of the text should be set to the actual, true printed size.

It is permissible for viewport borders to overlap, but it is inadvisable for viewports to be fully contained within other viewports.

Objects within the viewports can be edited while in *Paper Space* by using the *Workspace* | *Model Space Floating* feature.

A custom viewport border can be created by using the *Workspace* | *Update Viewport boundary* feature.

Viewport borders may be switched off prior to printing.

Title blocks and *text notes* are inserted into the Paper Space area.

Drawing In Model Space, Printing In Paper Space

Draw to *Full Scale* in the *Model Space* area of your drawing, and then dimension the model.

Views of the model and any details or 3D views will now be created.

Select the *Create View* feature from the *Standard Tools* toolbar and drag a selection rectangle around the desired area, taking care not to exclude any intended drawing entity or dimension.

In the *Create Named View* dialog box, give the view a suitable name, e.g. Plan, Elevation etc.

Next, left click the *Paper Space* feature from the Standard toolbar.

In the *File* | *Page Setup* menu, check that the Drawing Sheet Size and Printing Paper size are correct.

Now, left click the *Insert Viewport* feature in the *Standard Toolbar* and drag a selection rectangle into the area where the view will be presented.

From the *Named View* dialog box, select the required view name, click *Go To,* click *OK*

To set the scale ratio of the viewport, *left click* onto the viewport border, *Right-Click* and select *Properties* and from the *Viewport* page select the *Fixed Scale* option. Set the required scale.

Viewport borders are switched off by un-checking the option *Visible Box* in the Properties Sheet.

Node Edit

Edit | Node

By using the *Edit Node* feature, the *Selector Shell* attaches handles and *node edit* points along the selected object.

The number of blue control handles will vary depending on the type of object selected.

Edit Node can be used to:

- Convert arcs into full circles or to convert full circles into arcs
- To reshape regular or irregular polygons, and
- To convert polylines into polygons.
- To reshape curves, arcs and ellipses by manipulating either the radius or the endpoints.
- To change the radius of a circle or arc, and
- To change the major or minor axes of ellipses.
- To edit the shape of a *3D Mesh*. Note multiple nodes can be selected for 3D Entities.

Mirror Copy

Edit | Copy Entities | Mirror

The Mirror copy feature is used to create a symmetrical, opposite hand image of the selected objects.

This command requires 2 points on a mirror line. (This can be an imaginary line).

The line that runs though the first and second points defines the mirror line. The copied object will be created on the opposite side of the mirror line, with each corresponding vertex equidistant through a perpendicular projection to the mirror line. The copy operation is dependent on the position of mirror line, not where one clicks to define it.

Multi Line

Insert | Multi Line

Multi Lines are lines that contain multiple parallel offsets at pre-determined distances.

The offset lines within the Multiline segments can be assigned different colors, layers and line styles.

When setting the properties for Multi Lines, the User can assign the feature such as *Start and End Caps; Offset values; Line and layer properties; Connecting joints.*

When using the *Multi Line* | *Polyline* tool, *Right-Clicking* to obtain the local menu enables the User to *Close* or *Finish* the Polyline sequence

Multi Lines – whether by using *Single* or *Polyline* options respond to the Modify commands *Shrink/Extend Line; Object Trim; Line Length; Node Edit.*

Offset Scale sets the overall offset scale of the multi line separations.

For example, if the *Offset Scale* is set to 10 and the settings in *Line Elements* contain *Offsets* of *5* and *10,* these offsets will be multiplied by *10* to create offsets of *50* and *100.*

Offset Copy

Edit | Copy Entities | Offset

The *Offset* feature creates a new object with the exact properties (color, layer, line type etc) as the entity from which it was offset.

Parallel Lines

Insert | Line | Parallel

Creates a parallel line at a specified offset distance from the selected line.

The newly created line will assume the properties of the currently set layer.

This feature will create parallel lines from Single Lines, Multilines, Rectangles, Rotated Rectangles and Polygons only.

A distance can be fixed by clicking the lock area in the Inspector Bar.

Polygon

Insert | Line | Polygon

Creates a regular polygon (all sides of equal length) of three or more sides. It is defined by indicating the center point and a point on the vertex, or by a side mid-point (selectable from the local menu or Inspector Bar).

The number of sides, angle and radius can be entered by using the *TAB* key to enter data into the Inspector Bar.

A polygon is a compound entity, treated as one object.

Polygons can be reduced to single line entities by selecting *Format* | *Explode* from the pull down menu.

Polyline

Insert | Line | Polyline

Polylines are connected segments of lines that ultimately form a single line with one start and end point.

Properties for *Polylines* can be changed during the drawing sequence by *Right-Clicking* within the Polyline sequence and setting the relevant features from the Property Sheet.

Polylines allow straight line and arc segments to be drawn in one sequence by *Right-Clicking* and selecting either Line Segment or Arc from the local menu.

Arc segments can be created in the Polyline sequence by indicating *arc direction, center of radius, start and end angles of arc* etc.

The option *One Step Back* allows the last segment to be undone without undoing the entire sequence.

Sequential lengths, angles and line width's can be given to Polylines by typing the relevant *Length*, *Angle* and *Start* and *Finish Width* values in the data fields of the Inspector Bar.

Polylines respond to the *Modify* features *Meet 2 Lines, Object Trim, Shrink Extend Line, Fillet, Chamfer, Split Entity etc.* and can be offset by using the *Parallel* feature.

The Polyline can be modified by *Right-Clicking* and selecting *Edit Node* which will attach a handle to each vertex allowing editing of one control point at a time.

Nodes can be added to and deleted from a Polyline by *Right-Clicking* and selecting *Edit Node.* By positioning the bi-directional arrow over the required node, node handles can be added or deleted, arcs inserted or width segments adjusted.

Properties Dialog

The *Properties Dialog* is context sensitive and is used to change any physical characteristic of an entity, including Text, Dimensions and Hatching.

It is also used to set the preferred method of how a command will function. *Right-Clicking* onto any command in the toolbars can set defaults for that command.

Shrink / Extend Line

Modify | Shrink/Extend Line.

This command is used to either shrink or extend the end point of a line to another line, arc or circle.

All line entities have a geometric mid-point; the required side of this midpoint should be selected.

This command works to connect single lines, double lines and multi lines to other objects.

The plane in which the line is drawn will be maintained. Consequently, it is only possible to use this command on objects that share the same workplane.

Radial Copy

Edit | Copy Entities | Radial

This command creates a circular or polar pattern around a common base point. A number of sets can be given and the angle between the copied objects will automatically be calculated.

Radial Fit Copy

Edit | Copy Entities | Fit Radial

This feature creates a circular pattern of an object around an arc by defining the angle through which the copies are to be arrayed.

The *angle of rotation* is calculated as zero from the object which is to be arrayed. Objects traveling in a *clock-wise direction* are given a *negative angle;* Objects traveling in a *counter-clockwise direction* are given a *positive angle.*

Selection

Selection Info

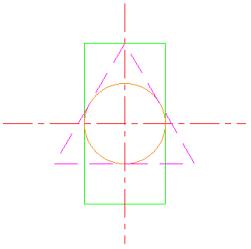
View | Selection Info

When the measurement properties of a single entity are required, for example, the distance and angle of a line, the entity can be selected by using the Select tool and the information will be presented in the *Selection Info* palette**.**

Selecting & Manipulating Objects

Selecting an object

Create a 2D drawing similar to the following illustration.



A *Selector Shell* encloses the object, with 4 handles at the corners, (*resize)* 4 handles at the midpoints of the lines (*stretch)* a green rotator bar & handle (*rotate)* and a yellow reference point in the center of the object.

Adding objects to the current selection.

To include the rectangle in the current selection, hold down the *SHIFT* key on the keyboard and click onto the rectangle.

The selector shell expands to include both objects currently selected.

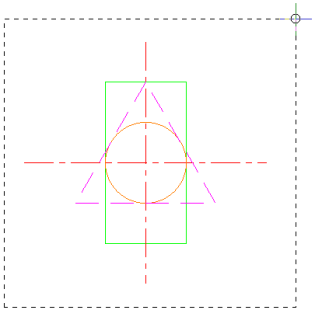
Removing objects from the current selection

To remove the rectangle from the selection, hold down the *SHIFT* key on the keyboard and click onto the object to be de-selected.

The selector shell shrinks to enclose the remaining objects selected.

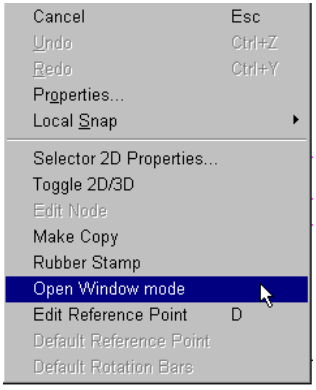
Selecting a group of objects.

To simultaneously select a group of objects into one selection, click the lower left corner of the objects and drag the cursor to the opposing corner, creating a rectangle around the objects to be selected.



Open & Closed Window Mode

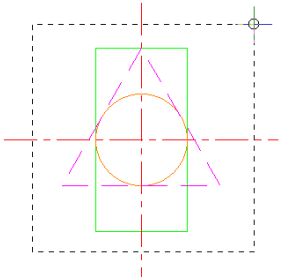
When the *Open Window Mode* is checked, the objects cut through and contained within the selection rectangle will be selected.



When the *Open Window Mode* is checked off, only objects contained fully within the selection rectangle will be selected.

To control the Open Window Mode, select the objects, then *Right-Click* and check the *Open Window Mode* option from the *Local Menu.*

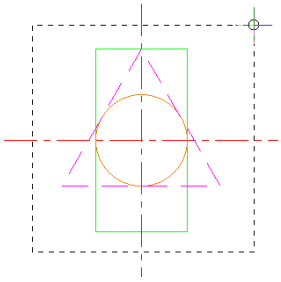
Open Window Mode off



Centerlines will be *excluded* from selection.

Open Window Mode on

Centerlines will be *included* in selection.



Advanced Selection Methods

Additional methods of selecting entities can be achieved by using the *Edit | Select by* method. This feature allows the user to select objects using various criteria, such as *Query, Entity Type, Color, Layer, Attribute and Fence.*

By using the *Select by color* method, for example, all entities on the drawing that are drawn in the specified color will be selected.

Manipulation Of Selected Objects

Objects are required to be selected and enclosed within the *Selector Shell* prior to manipulation.

When selecting the objects to be manipulated, the yellow dot indicating the *Reference Point* of the Selection may be obscured by the Red dot indicating to the Relative Coordinate position. This will not affect the sequence.

Rotating Objects

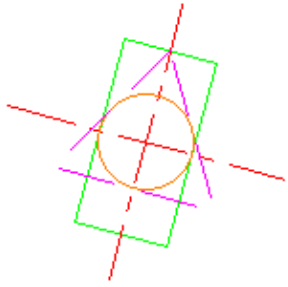
Select the objects to be rotated.

A *Selector Shell* with a green rotation handle will enclose the selected objects.

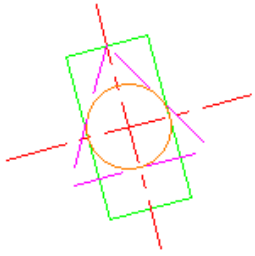
Place the cursor over the green rotation handle and dynamically rotate the objects until they are in the required position, *or*

Use the *TAB* key to enter the required rotation angle in the *Rotation field* of the Inspector Bar.

A *clockwise* rotation is given as a *negative* number. The *rotation angle* for the object below is -15°.



A *counter-clockwise* direction of rotation is given a *positive* number. The *rotation angle* for the object below is 15°.



Scaling Objects

Objects can be re-sized by clicking onto one of the *corner handles* (or *edges*) of the selector shell. (In 3D it is also possible to rescale by selecting a face).

By positioning the mouse cursor over a corner handle, a resize arrow will appear enabling the objects to be rescaled, or

Use the *TAB* key to enter the required X and Y scale in the Scale X and Scale Y fields of the Edit Bar.

When using the resize arrow to re-scale the object, hold down the *SHIFT* key on the keyboard to maintain the x-y aspect ratio.

The x-y aspect ratio ensures proportional re-sizing both vertically and horizontally.

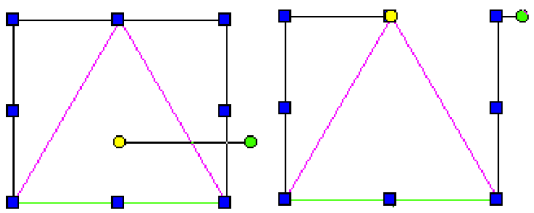
Changing the Reference Point

It is frequently necessary to relocate the **Reference Point** of the Selector Shell in order to precisely position objects. The Reference Point can be placed anywhere within the drawing, either inside our outside the Selector Shell.

To relocate the Reference Point of the triangle below to the top vertex do the following:

Select the 3-sided polygon by using the *Select Tool* from the Standard Toolbar.

Pick up the reference point by typing *D*. (Note that you could also do this by holding down the *CTRL* key while clicking on the *Reference Point*, or by *Right-Clicking* somewhere in the drawing area and clicking on *Edit Reference Point* in the local menu.)



A hand will appear to guide the Reference

Point to the new position.

Position the hand over the top vertex point of the triangle and type *V*. (This will ensure that the Reference Point is relocated to the exact endpoint of the line.)

Snap Modes

Snaps are useful for targeting specific points of geometry on an object, such as vertices, centers of circles, middle points of lines etc. in order to create a greater degree of accuracy.

Snaps can specified in a number of ways, including the *Modes* | *Snaps* menu, the *Snap Modes* Toolbar, the *Drawing Aids* dialog, options in the local menu or by using *Single Entry Keyboard Equivalents* (SEKEs).

The snap aperture is a circle whose size is specified in pixels around the intersection of the cross-hairs and will determine the range within which the cross-hairs will snap to the point of geometry.

When snapping to a point, the cross-hair and its associated snap aperture are required to be positioned over the object prior to setting the snap.

The snap aperture size and the option to show or hide the snap aperture circle can be set in the *Options* | *Preferences* section of the pull-down menu.

SEKEs

A Single Entry Keyboard Equivalent (SEKE) can be used to conveniently snap to a point of geometry on an object and does not require any changes to other snap mode settings.

The *snap aperture* size (the size of the circle around the intersection of the cross-hairs will

determine the range within which the cross-hairs will snap to the point of geometry.

The snap aperture size can be set in the *Options | Preferences* section of the pull-down menu.

The following *single entry keyboard equivalent* **(***SEKE's)* snap to points by positioning the cross-hairs over the point of geometry and typing in the required option. (*Do not press ENTER)*

V (Vertex)

Snaps to the *endpoints* of lines, rectangles, polygons or arcs.

M (Middle Point)

Snaps to the Middle point of a line or line segment.

I (Intersection)

Snaps to the intersection of 2 or more lines, arcs or circles.

Q (Quadrant)

Snaps to the polar points of a circle or arc.

J (Project)

Connect to an entity and project a perpendicular line.

C (Center)

Snaps to the center of an arc or circle. The cursor must be positioned on the edge of the circle.

S (No Snap)

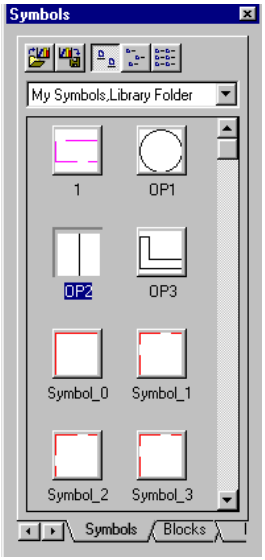
Places a point at the position of the cursor.

For a complete listing of SEKEs, check TurboCAD help topics under the listing *Local Snaps and SEKEs*.

Symbols

A Symbol is a compound entity which can be created and inserted into any drawing.

Symbols are created by dragging the selected objects into the *Symbols Palette,* into the required folder. They can similarly be dragged from the *Symbols Palette* into subsequent drawings.



Symbols can be named prior to creation by setting the following option:

Options | Auto Naming | Groups | Prompt for name

TurboCAD assigns a drawing name suffix (*.tcw)* to newly created symbols.

Symbols can be separated into their original component parts by using *Format | Explode*.

Any file type that TurboCAD can open directly can be utilized be as a symbol.

Creating and Inserting Symbols

Create Symbol

From the *View* Menu: check the option for *Symbols Palette*.

Set the required folder destination, for example *My Symbols, Library Folder* to ensure the symbols will be placed in an accessible folder.

Select the intended symbol, then left click and hold onto the reference point.

Drag the symbol into the *Symbols Palette*.

The selection will remain in the drawing after being dragged to the *Symbols Palette*.

Inserting Symbols into other drawings

A symbol can be inserted into any subsequent drawing by making use of the *Symbols Palette*.

From the *Symbols Palette,* click, hold and drag the required symbol into the drawing.

The selector shell remains attached to the symbol in order to re-locate, scale, rotated or copy the symbol if required.

Split

Modify | Split

This command is used to split an *arc, circle, line* or *double line* into segments or can be used to create a gap in an entity.

Stretch

Modify | Stretch

Stretches or shrinks a group of objects by selecting the objects within a "selection rectangle" and defining a base point.

A new *length* and *angle* can be specified in the Inspector Bar. Any associative dimensions attached to objects being stretched or shrunk will be automatically updated.

Toolbars & Palettes

A *toolbar* or palette can either be *floating* (positioned anywhere within the drawing screen area) or *docked* (slotted into the edges of the screen – without occupying drawing screen space.)

This allows the user to customize their TurboCAD desktop (screen) area according to current requirements. For instance, the toolbars required for two dimensional and three dimensional drawing will differ and the user can bring into the drawing area any toolbar required to complete a specific task.

To bring additional toolbars into the drawing, go to the pull-down menu and select *View | Toolbars***.** A dialogue box will be presented which allows the user to select the necessary toolbars by checking the box next to the required toolbar.

When a toolbar is selected from the dialog box, it will either drop into a convenient menu area (*docked)* or drops into the drawing screen area (floating).

When the toolbar is *floating,* the *title bar* of the toolbar is visible and the user can click and hold the mouse button on this bar and drag the toolbar to the required new position.

When the required position is located, the mouse button is released. The toolbar will dock into the most convenient space and will not overlap another toolbar. The toolbar is considered docked when the title bar disappears.

Palettes are pages of information of related subjects. Palettes behave in a similar manner to toolbars, and can be minimized while docked in order to occupy less screen space.

When docked toolbars or palettes are required to be moved, the user can click into an area within the toolbar (*but not onto the command icon)* and drag the toolbar to another position in the screen. Each palette and toolbar has its own *Close* button represented by the icon in the top right corner of the title bar.

A toolbar icon containing a *yellow triangle* in the lower right corner represents a *Flyout* which contains a sub-group of related features.

Text

Inputting Text

Set the required properties by *Right-Clicking* onto the Text button.

At the command *Define the start position of text* click a point in the drawing where the text is required.

A vertical bar will flash on the screen to indicate where the text will be placed.

Type in the required text.

Adding another line of Text

To add another line of text, press (keyboard) *SHIFT, ENTER* at the end of the first line.

The text will automatically align itself with the text line above. Press *ENTER* at the keyboard when the text is finished.

Editing the Text.

To change the wording of your text, left click onto the text to be changed, then *Right-Click* and select *Properties* from the *Local Menu.*

Select the *General* page and change the text in the *Attribute* field.

Alternatively, click the *Text Edit* button in the *Selection Info Palette* to edit the text in place.

Manipulating the Text

To move the text to another position in the drawing, left click onto the required text.

Click onto the yellow Reference Point and move the text to a new position.

Do not hold the mouse key down while traveling.

Changing Text Properties

Left click onto the text to change, then *Right-Click* and select *Properties* from the *Local Menu.*

Change the Height, Font, Style, Justification etc in the *Text* page.

Trim

Modify | Object Trim

The Trim command will delete a part of a line, arc or circle as defined by one or more cutting edges. The portion of the entity that you select will be deleted.

Wall Tool

The *Wall* tool is referred to as a "*Smart Object*" indicating that it contains built-in extended functionality that allows for greater flexibility in

the design and manipulation of objects such as floor plans, pipe work etc.

Walls created by using the wall tool have the ability to automatically accept doors and windows etc., without further editing. Likewise, walls drawn with the *Wall* tool are self-healing when other smart objects, such as *Blocks* and *Symbols* are removed.

Using The Wall Tool For Floor Plans

Display a Grid of 1000 x 1000 in your drawing for reference purposes.

Options | *Grid*

Spacing X = 1000; *Spacing Y=1000*

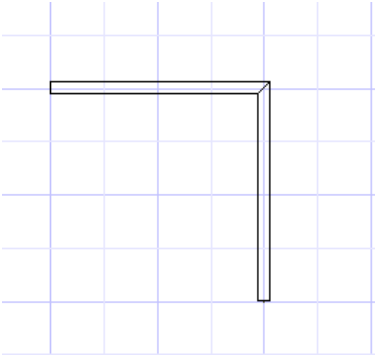
Set the *Grid Snap* on from the Snap Modes toolbar.

Select the *Wall* tool from the Drawing Tools toolbar then *Right-Click* somewhere in the drawing and from the *Properties Sheet* set the following options:

In the *3D page*, set the *thickness* to *2500*. *This is the extrusion height of the walls.*

In the *Wall* page, set the *width* to *220. This is the thickness of the brickwork.* Set the *Reference* to *Center* and check the options for *Start* and *End* caps. *Click OK.*

With the *Justification* option set to *Center,* neither the outside nor the inside of the wall will be drawn on the grid. The Wall tool uses the Grid as an imaginary center line, offsetting the wall by 110 on either side of the grid line.



Click onto a grid point in the upper left corner of your drawing sheet and using *the TAB* key to access the data fields of the Inspector Bar, type in the following values for *Length* and *Angle.*

Length	*30000*	Angle	*0 ENTER*
Length	*15000*	Angle	*270 ENTER*
Length	*10000*	Angle	*180 ENTER*
Length	*6000*	Angle	*270 ENTER*
Length	*20000*	Angle	*180 ENTER*

Right-Click and select *Close* from the Local Menu.

Use *Zoom Extents* to view the entire drawing on your page.

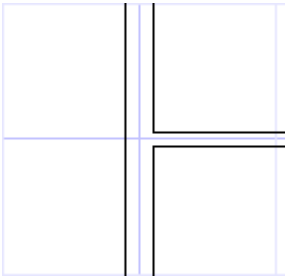
Drawing An Inside Wall

Left click onto the *Wall* tool in the *Drawing Tools* toolbar, then *Right-Click* somewhere in your drawing and set the following options from the *Wall* page in the *Properties* sheet.

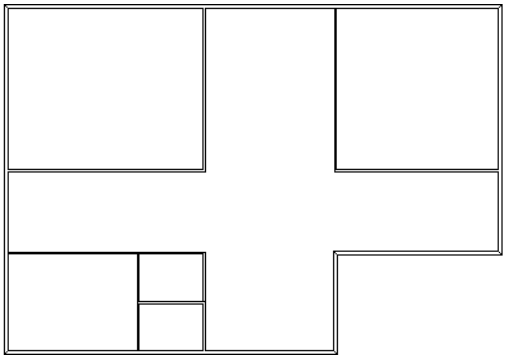
Check off the options *Start* and *End Cap.* Set the *Width* to *110.*

Click onto a grid point near the position indicated below and draw the inner wall, connecting the next point on another outside wall.

Zoom in to where the newly drawn wall starts or ends. Notice how the wall geometry has self-corrected.



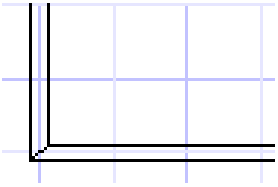
Using the Grid points as a reference, add some more internal walls so that the drawing resembles the sketch below.



Using Blocks To Create Wall Openings

In the next exercise a *Block* will be created in order to create an opening in a wall.

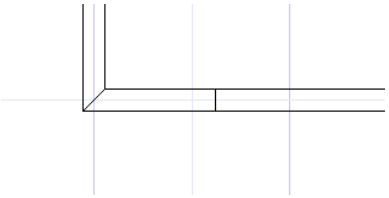
Zoom into the lower left corner of the floor plan indicated right.



Remove the *Grid snap.*

Using the *Line* tool, click onto any point of the inner wall by typing *N* to snap to the nearest available point.

Draw a line to the opposite side of the wall by typing in *J* to project the single line to a perpendicular point on the opposite side of the wall.



Use the *Parallel Tool* to create another line at *1000* to the right of the newly drawn line.

Left click onto the small line, *TAB* to the data field *Length,* type in *1000* and click to the right of the small line.

Creating The Block

Bring the *Blocks* Palette into the drawing as follows by checking the option *View* | *Blocks*

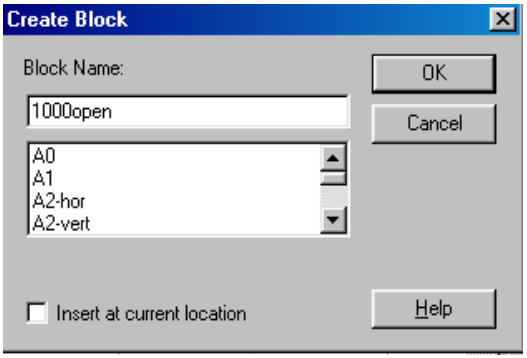
Click on the left newly created line with the *Select* tool, hold down the *SHIFT* key on your keyboard and click onto its parallel line on the right. The *Selector Shell* should expand to enclose both lines 1000mm apart.

Make sure the Option for *Block Naming* is checked as follows:

Options | *Auto Naming* | *Prompt for name* in the Blocks tile must be checked.

Click onto the Reference Point of the selector shell and drag the Block to the Blocks palette.

The *Create Name* dialogue box will be presented allowing the User to create a unique name for this Block. Type in *1000open* in the *Block Name* field and click *OK*.



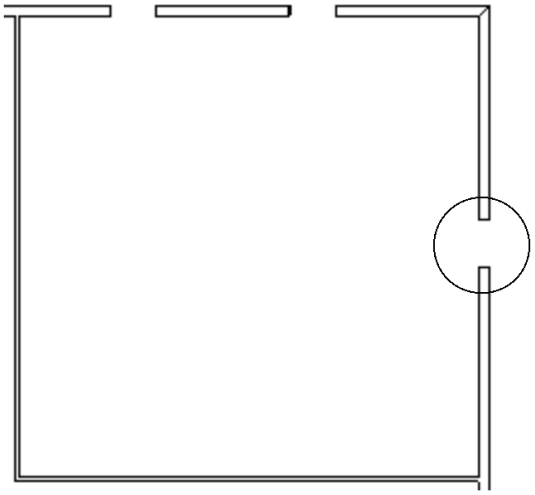
Dragging the BLOCK into the Walls to create a 1m opening.

Zoom into the top right corner of the floor plan.

Click onto the newly created Block *1000open* in the *Blocks palette* and drag the block to a horizontal position on the outside walls.

It is not necessary to re-set the Grid Snap as smart-blocks will align themselves correctly into the wall automatically.

Repeat the above step, but this time drag the block to a vertical position on the outside wall.

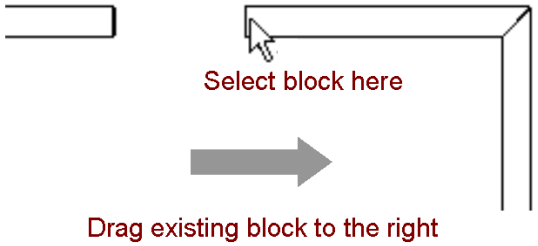


Changing Positions Of Wall Openings

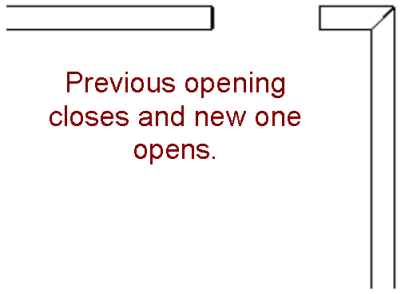
When the opening in the wall is required to be moved, the *Wall* tool has a *self-healing* application that will repair the previous wall opening and break open another opening wherever the Smart Block is placed.

Zoom up into the upper right corner of your floor plan.

Click onto the newly inserted block as shown right.



The Selector Shell will expand to enclose the block.



Drag *(holding the SHIFT key down to maintain orthogonal constraint)* to a position to the right of the existing block.

Closing A Wall Opening

Zoom into any block that has been inserted into the wall and select the edge of the block

Press *DELETE* on the keyboard. The wall opening automatically closes when the block is removed.

Using Polyline to Draw an Outside Wall

In this exercise, the *Double Line | Polyline* tool will be used in a similar manner to the *Wall* tool, but the properties for the hatch pattern will be pre-set prior to drawing.

The Grid snap will not be used to draw the Double Polyline, but the Snap mode *Extended Ortho* will be used to project points where there is no available geometry.

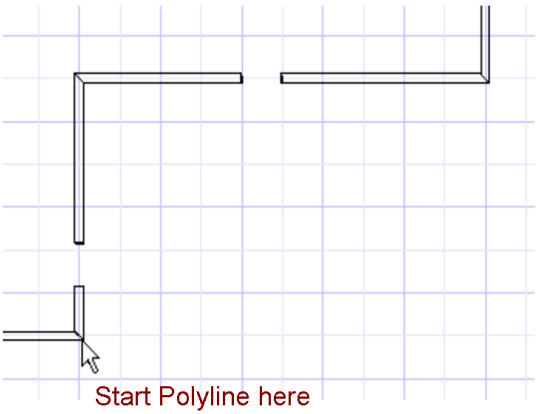
Left click onto the *Double Line | Polyline* tool in the *Drawing tools* toolbar, then *Right-Click* somewhere in the drawing and set the following options.

From the *Brush* page of the Properties sheet, set the hatch pattern to *B816* and the hatch *scale* to 20. From the *Double Line* page, set the *separation* to 220, the *justification* to *Right* and tick the *Start* and *End Caps* on.

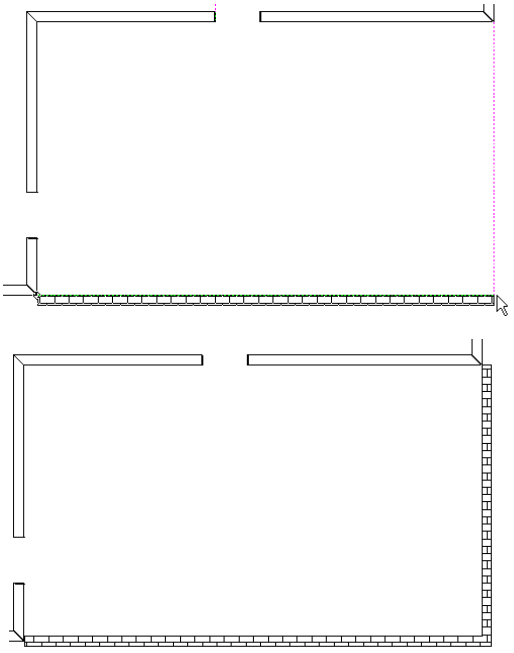
Zoom up into the lower right of the floor plan.

Set the Snap mode to *Extended Ortho.*

Start the polyline from the bottom left corner of the existing walls by typing in *V* to snap to the Vertex.

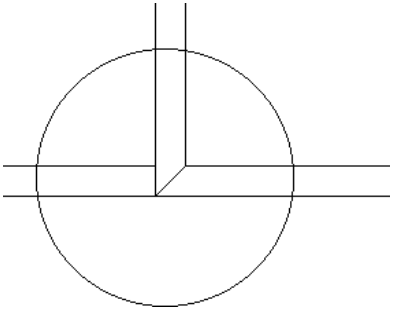


Drag the cross-hairs towards the projected vertical point until the dotted *extended ortho* line is visible. Hold *SHIFT* down for greater accuracy.

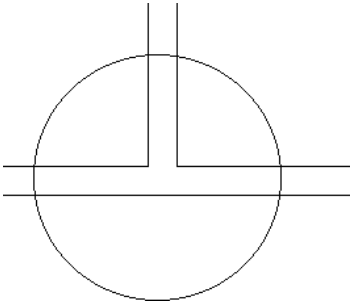


Cleaning Up Intersecting Walls

Frequently, when additional walls have been added to pre-drawn walls, an overlap occurs which should be cleaned up. To do this, click onto one of the walls that are overlapping, *Right-Click* and select *Edit Node* from the local menu, *Right-Click* again and select *Drop Gaps.*



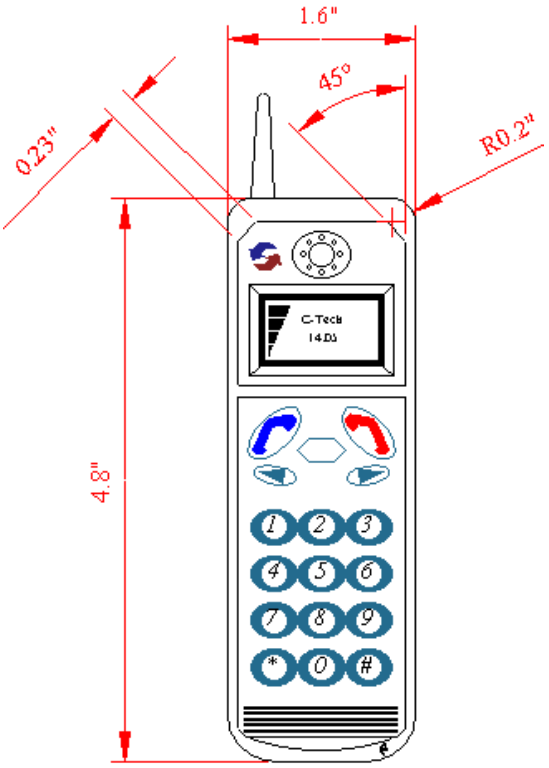
If the overlap does not immediately repair, select the wall, *Right-Click* – select the *Wall* page and check the *start* and *end caps.* Adjust accordingly.



Chapter 7 – Training Module One

Introduction

The Audio Visual Tour of TurboCAD is designed as a multimedia presentation of TurboCAD's intuitive functionality. This section is meant as a supplement to the course by providing a printed reference. Ideally you should be running and reading this course via PDF files and ScreenCam movie files on the computer. See Installation instructions for details pertaining to the running of the program. In this tutorial we will draw the following diagram.



Navigation & Page Setup

Layers And Grid

By using the *Page Setup Wizard,* the User can customize the drawing and program setup prior to starting the drawing.

Settings such as drawing units; precision units; drawing & printing scale can all be set to individual user requirements.

Page Setup

From the Initial Screen, select the option

Page Setup Wizard

Page 1 select English units

Page 2 select Decimal category, Inches, 2 places of Decimal precision

Page 3 select ANSI A (8.5 x 11) drawing size

Page 4 select Full (1:1) scale

Page 5 uncheck Default Viewport

Finish

Layers

The use of Layers within a drawing is a feature of most CAD drawing programs.

Using the Layering facility within a drawing allows objects drawn on a particular layer to be controlled by *name, color* and *linetype.*

Layers can be switched off (invisible) or *locked* (visible – but not able to modify). Selection of objects can be achieved by using the layer *name* and/or *color* to identify that layer.

Create New Layer

From *Options* | *Layers* click onto *NEW,* left click over the computer assigned name Layer_1 and type Model.

Click the *Color Bar* and assign the color Black.

Line styles are similarly changed.

Display A Grid

The Grid displays an X-Y matrix of non-drawing lines or points at user defined increments.

A grid is useful for giving size and scale perspective to a drawing.

Halve and *Double Grid* options allow the user to display a larger or smaller grid matrix by dividing or multiplying the original settings.

A grid is useful for symbol dependent drawings such as Electrical schematics or Instrumentation and Hydraulic circuit drawings.

Create A Grid Of .04"

Bold grid lines represent the value set in the *Spacing* fields.

Light grid lines represent the values set in the *Division* fields or *Advanced Grid.*

If the Grid matrix is not immediately visible, adjust the magnification of the current zoom by pressing either the plus (+) or minus (-) keys on your keyboard.

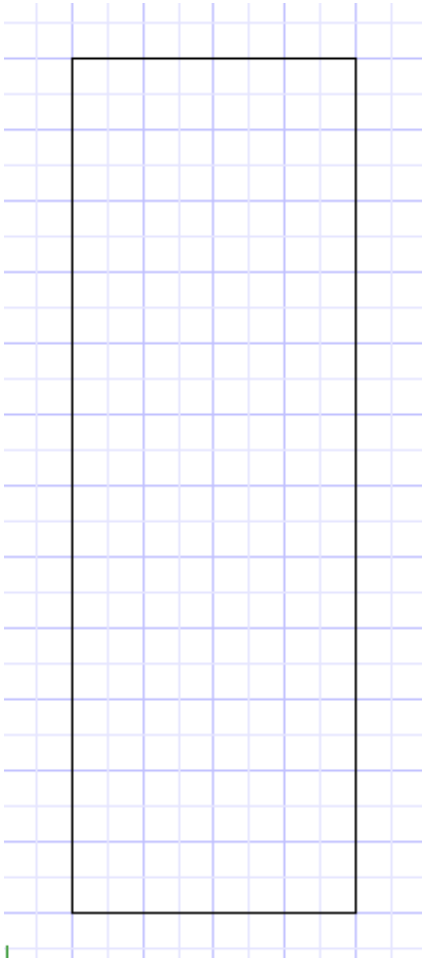
Drawing The Outer Rectangle

Drawing Tools Toolbar | Line Flyout

Bring the Snap Modes Toolbar into the drawing.

View | Toolbars | Snap Modes.

- Select *Rectangle* from the Line Flyout
- Click onto a major Grid intersection at the lower left of your drawing screen.
- In the *Size A* field type 1.6" TAB to the *Size B* field and type 4.8"



- Create The Parallel Lines

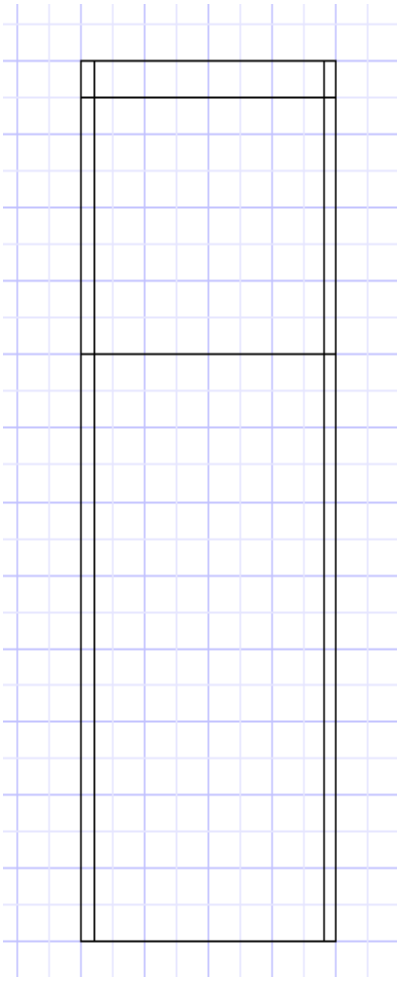
Select *Parallel* from the Line Flyout.

Use the TAB key to access the *Offset* field of the Inspector Bar.

Type in .08"

- Repeat for the right vertical line.
- Click onto the top line, then indicate a position below it.

- Click onto the newly created line, then indicate a position below it.



Zoom In

In order to magnify the appearance of the top part of the casing, position the mouse cursor in the center of the newly created parallel lines.

By using the *PLUS* or *MINUS* keys on your keyboard, the drawing entities will either reduce or increase in magnification.

Create 90° Corners

Drawing Tools Toolbar | Modify Flyout

Meet 2 Lines

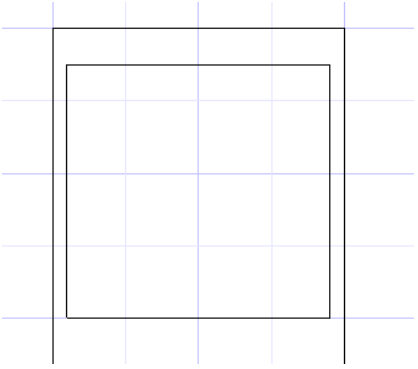
By lengthening or shortening existing lines this feature will join 2 lines to create a corner.

Select *Meet 2 Lines* from the *Modify* Flyout

Left click a point towards the top of the inside left vertical line.

Left click a point diagonally across on the inside top horizontal line

Repeat this command by clicking onto the inner corners of the inside lines to create a rectangular shape.

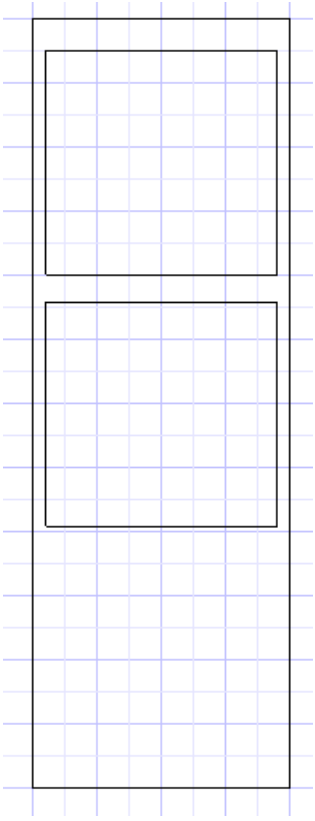


Copy

To create a similar shape for the lower casing, the top inner lines will be selected and copied to a position below.

Select Tool

The *Select Tool (*Drawing Tools toolbar) is used to select an entity. When multiple entities are required, a *selection rectangle* can be dragged from one corner to an opposing corner to enclose the required entities.



Left click the lower left corner of the inner rectangle and drag to the upper right corner enclosing only entities of the inner rectangle.

The *Selector Shell* provides a convenient method of modifying and manipulating groups of entities and consists of *stretch handles* and the edges, *resize handles* at the corners, a *rotator bar* and *rotator handle* and a reference point.

Objects can be relocated or copied by placing the mouse cursor over the *Reference point* to obtain a bi-directional arrow.

Left click onto the *Reference Point* and from the *Inspector Bar* select the option for *Make a Copy.*

Use the minus key on your keyboard to decrease the screen magnification.

Position the copied entities on a parallel grid matrix and press *ESC* on your keyboard to discard the *Selector Shell.*

Remember to deactivate the option *Make a Copy* when this action is finished.

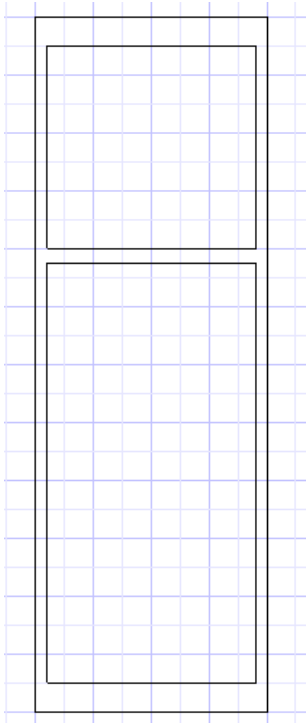
Resizing The Lower Rectangle

Modify Flyout | Stretch

To modify the lower rectangle so that it is longer than the upper rectangle, the modify command *Stretch* will be used.

The *Stretch* command allows objects to be stretched in one direction while maintaining the original base point of the object.

Use the *Halve Grid* option grid as many times as necessary until 1 light grid lines and 1 heavy grid line are visible at the bottom of the drawing.



Select *Stretch* from the Drawing Tools Toolbar

Enclose the lower part of the object in a selection rectangle.

Next, indicate a point somewhere on the horizontal line within the *selection rectangle.*

Next, click a parallel point on the major grid axis at the bottom of the drawing.

Blending The Corners

Modify Flyout | Fillet

To create the blended corners at the top and bottom of the casing, the modify command *Fillet* will be used.

This command will create a blend between 2 lines by defining a radius.

Click onto the *Fillet* command and use the TAB key of your keyboard to access the data fields of the Inspector Bar.

Type in a value of *.2* for the radius, then click onto the left vertical line near the top.

Next, click onto the top horizontal line near the left.

Repeat this for the right side.

To change the radius for the bottom corners, *TAB* to the data fields and type in the value of *.4*"

Click corresponding positions on the vertical and horizontal lines.

Creating The Angled Corners

Modify Flyout | Chamfer Distance; Distance

To create the beveled edges of the inner casing, the command *Chamfer* will be used.

This command is similar in action to the *Fillet* command and will create an angled corner connecting two non-parallel lines.

By giving the *X* and *Y* values of the chamfer and equal distance, a 45º angle will be created.

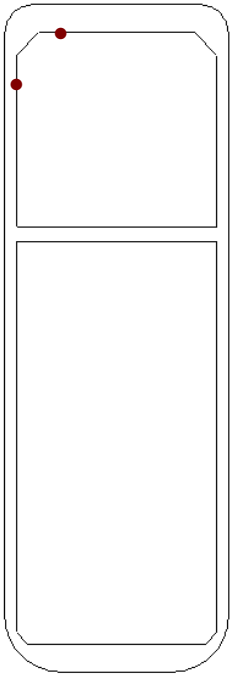
From the Drawing Tools toolbar, select the option for *Chamfer, Distance, Distance.*

TAB to the data fields and in the field for

Dist A type in the value of .16"

TAB to the *Dist B* field and type in the same value.

Left click vertical and horizontal positions at the top of the inner casing.



TAB to the data fields of the Inspector bar and change the values of both A & B to .08.

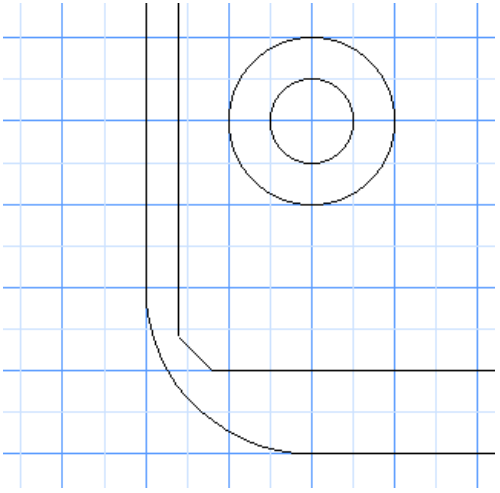
Repeat for the bottom corners of the inner casing.

Drawing The Lower Left Key

Circle Flyout | Concentric circles

Use the *Double Grid* option until 3 major vertical grid lines are visible within the drawing.

Position the cursor over the indicated position at the lower left of the drawing and press *plus* three times on your keyboard to obtain a greater magnification of the area.



Select *Concentric circles* from the Circle Flyout.

Left click onto a lower left grid position.

Next, drag the cross hairs to the upper grid point.

Now use the *Halve Grid Option* and drag the radius of the next circle to the new grid point.

No more circles are required, use the right click mouse button to obtain the *Local Menu.*

This *Local Menu* is a context sensitive menu, responding in accordance with the active command.

Select *Finish* from the local menu.

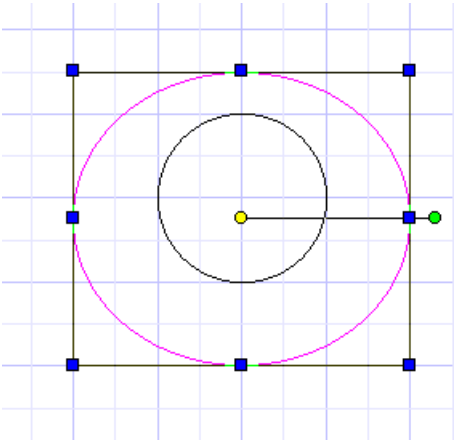
Reshaping The Key

Edit | Select

Zoom again into the middle of the concentric circles and use the *Halve grid* option.

The outer circle will be reshaped into an elliptical object using the *stretch handles* of the Selector Shell.

Click onto the outer circle and use the middle *selection handle* to drag the quadrant of the circle to a lower grid point.



Repeat this for the bottom of the circle.

Color

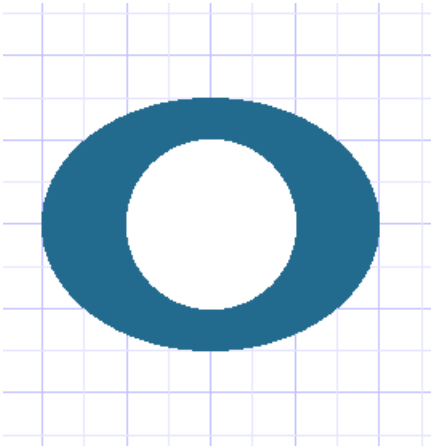
The color of the inner and outer button can now be changed to a more appropriate color.

Use the *Select Tool* and left click the outer button.

From the *Property toolbar,* select a solid *Brush Pattern* and select the color Steel Blue as the *Brush Pattern Color.*

ESC to discard the Selector Shell.

Repeat this for the inner button, making the *Solid Brush Pattern* white.



ESC to discard the Selector Shell.

Creating A Group

Groups & Blocks Toolbar | Create Group

At present, both the inner and outer buttons are separate entities.

In order to manipulate these buttons easily, a *Group* can be created of both buttons.

A *Group* will create a compound entity of many objects allowing easier manipulation.

Groups are stored only in the drawing in which they were created.

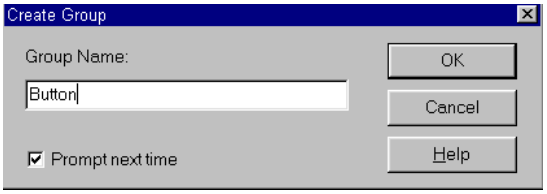
Most users find it convenient to give *Groups* a suitable name for reference purposes.

To allow the naming of groups in your drawing, the option *Auto Naming* should be checked. To do this, check the option *Prompt for name* in the *Groups Tile.*

Use the *Select tool* to create a selection rectangle around both buttons.

Once the buttons are selected, go to the *Format* section of your pull-down menu and select the option for *Create Group.*

A small dialog box will be presented allowing the user to type in a suitable name for the group.



Type in *Button* and click OK.

Duplicating The Buttons

Copy Entities Flyout | Array Fit Copy

The buttons at the lower left will now be duplicated to create a 4 row, 3 column array of buttons.

To do this, the command *Array Fit Copy* will be used.

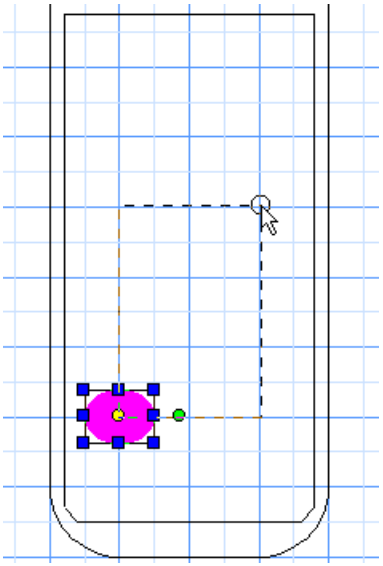
Use the *Double Grid* option until 3 major vertical grid lines are visible.

Select the buttons and from the drawing tools toolbar select the option *Array Fit Copy* from the *Copy Entities Fly-Out.*

Press TAB key to access the *Row* field and type in 4.

Press TAB to access the *Columns* field and type in 3.

Position the flexible rectangle onto the indicated grid point and left click twice.



This command will fill the selected area with a four row, three column array of the objects.

Press *ESC* to discard the Selector Shell

Drawing An Ellipse

Circle Flyout | Rotated Ellipse

The top left button will now be drawn using the *Rotated Ellipse* option.

The *Zoom Window Tool* is a convenient method of creating a rectangular zoom around an area to magnify.

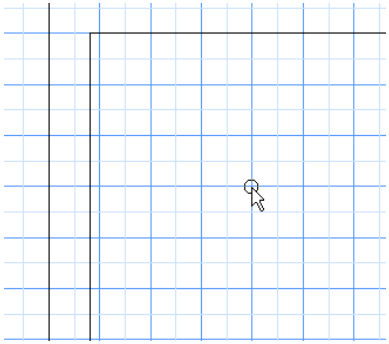
Click onto the *Zoom Window* command and drag a rectangular window around the required area to magnify.

Use the *Halve Grid* option twice to create a smaller grid.

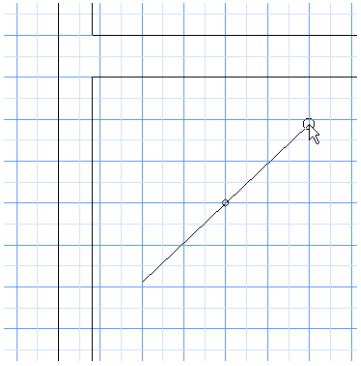
By using the *Rotated Ellipse* feature, the user can identify the center point and a diagonal point about which the major axis will be drawn. The third point will indicate the minor axis.

Select *Rotated Ellipse* from the *Circle* Flyout.

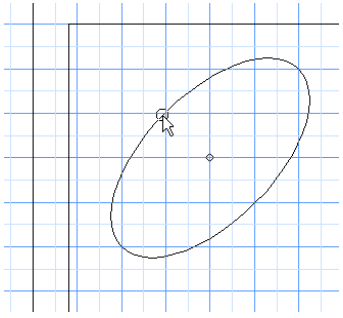
Left click a grid point at approximately 3 x 3 major grid lines.



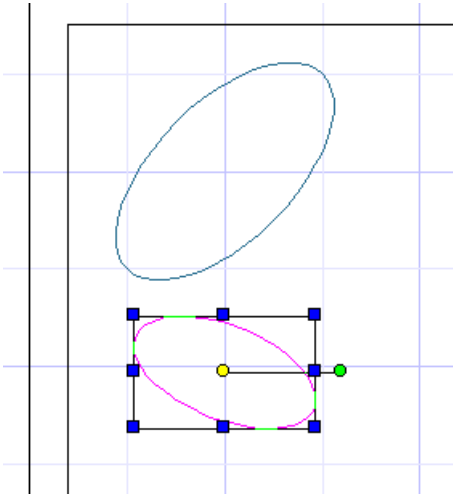
Next, drag the cross-hairs to an approximate position to the right of the center.



Then drag the cross-hairs to a suitable grid position, taking care not to make the ellipse too flat or too circular.



To create the button just below the newly created feature, the handles on the *Selector Shell* can be used to create a mirrored duplicate of the object.



To do this, select the ellipse and attach the cross-hairs to the top middle handle.

By left clicking and holding the *CTRL* key of your keyboard, this handle can be dragged to a suitable position below the rotated ellipse.

The *CTRL* key will ensure that a duplicate mirrored image will be created while maintaining the position of the original ellipse.

The lower button will now be scaled down and rotated slightly.

With the *Selector Shell* still attached to the lower button, use the *TAB* key of your keyboard to access the data fields of the Inspector Bar.

In the fields for *Scale X* and *Y* type in a value of .75

Press the TAB key until the *Rotation* data field is highlighted and type 15. Press *ENTER*.

This will both reduce the scale by three quarters and rotate the lower ellipse in an anti-clockwise direction by 15 degrees.

Use the *ESC Key* of your keyboard to discard the Selector Shell.

Drawing The Phone Symbol

Line Flyout | Polyline

To create the outline of the phone symbol on the top left button, the *Polyline* feature is used.

The *Polyline* is a continual line sequence that will create a *Node* at each vertex.

These nodes on the polyline can be edited using the *Node Edit* tool.

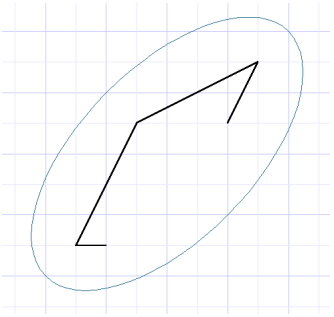
Zoom in to top left button and use the *Halve Grid* option so that sufficient grid lines are visible within the ellipse.

Select *Polyline* from the *Line Flyout.*

Changing The Pen Width

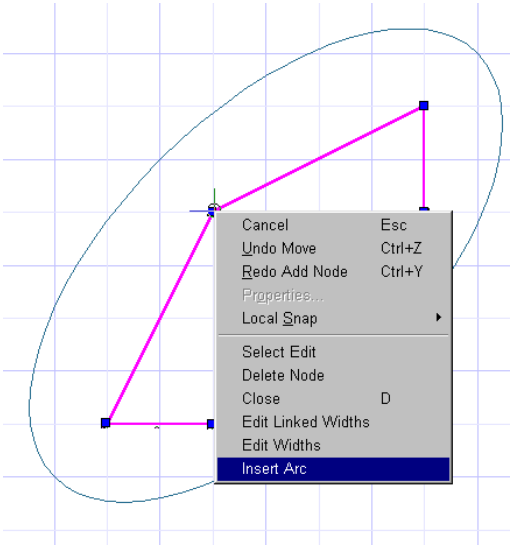
To draw the phone symbol with a thicker pen width, set the *pen width* to .05 of an inch in the *Property Toolbar.*

Left click a suitable grid position and continue to draw the approximate outline of the phone symbol.



To reshape the outline of the phone symbol, select the *Node Edit* Tool from the *Select Flyout.*

A *Node* has been attached to each vertex of the polyline. These nodes can be manipulated by dragging the vertex to a new position.



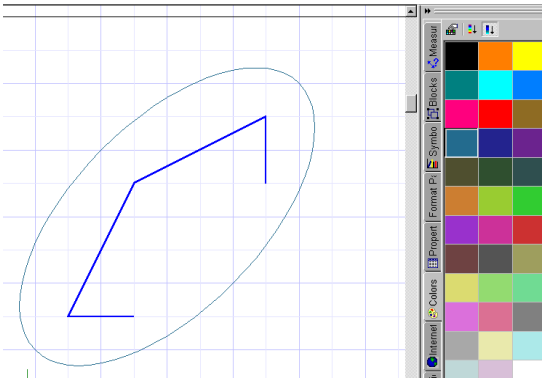
The polyline can now be reshaped by dragging the nodes to different grid positions.

To create a curve between 2 nodes, *Right-Click* onto the middle node and select the option for *Insert Arc.*

Docked Palette - Color

With the *Selector Shell* still attached to the polyline, select the *Color* tab from the *Docked Palette* on the right side of your screen.

This *Docking Palette,* so called because it automatically docks into position when selected from the *View* menu will expand to allow the user to select a different *pen* or *brush* color.



Left click onto the option for *Pen Color* and drag the mouse to the required color in the color palette.

Press *ESC* to discard the *Selector Shell* and collapse the *Docking Palette*.

Express Tip

When the object is selected, position the cursor over the required color in the palette and *left click* to change the Pen color, *Right-Click* to change the *Brush Fill* color.

Create The Tapered Shape

The *Polyline* command can also be used to create the arrow feature on the button below.

Zoom in to the lower button and select the *Polyline* command from the *Drawing tools Toolbar.*

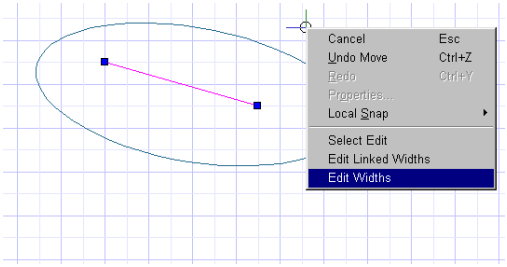
Make sure the *pen width* for this line is set to 0 as the width can be edited at a later stage. Do this is the *Property Toolbar*

Draw a short *Polyline* diagonally from left to right.

Right-Click and select *Finish.*

Use the *Select Tool* to select the newly drawn polyline and *Right-Click* to obtain the local menu and select *Edit Node.*

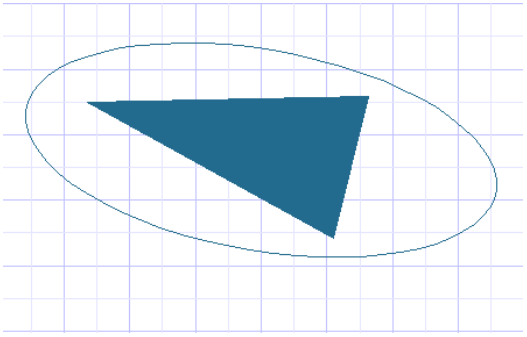
Position the mouse cursor over the lower node and again use *Right-Click* and select the option *Edit Widths*.



A *green node* will appear at the last vertex of the polyline indicating that the width of the line can be changed to create a taper.

Drag this node to another grid point to create the arrow shape.

With the nodes still attached to the polyline, change the *pen color* to Steel Blue



Discard the nodes by using *ESC* and collapse the docking palette.

Mirror The Phone Buttons

Copy Entities Flyout | Mirror Copy

To create a mirrored duplication of the left buttons, the command *Mirror Copy* will be used.

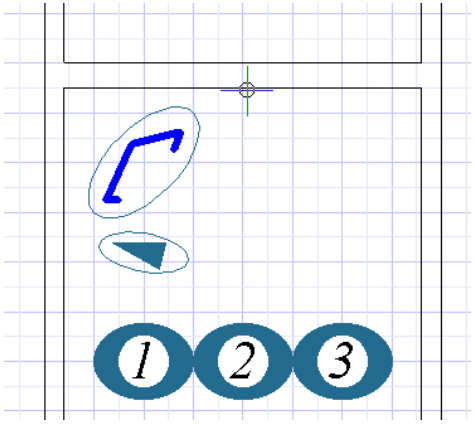
Zoom into the area and select both buttons by dragging the selection rectangle of the *Select tool* around both objects.

Use the *Double Grid* option so that 7 vertical grid lines are visible.

With both keys highlighted, select the *Mirror Copy* option from the *Copy Entities* flyout of the Drawing Tools Toolbar.

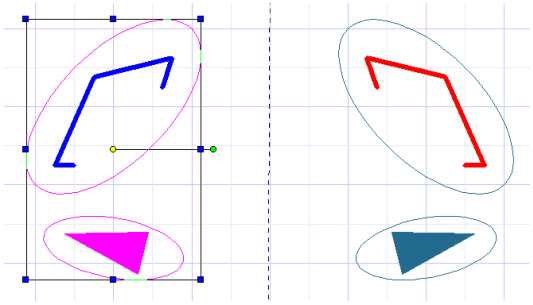
As both of these keys should be mirrored symmetrically about an equidistant point, two parallel points will be given using the *midpoints* of the upper and lower rectangles.

Now select a point midway along the lower rectangle.



A 360º *mirroring axis* will appear, allowing the user to mirror the selected objects about this axis.

Next, click a parallel point midway along the upper rectangle.



Use the *ESC* to discard the *Selector Shell.*

Select the right hand phone outline and change the color to red.

Use the *ESC* to discard the *Selector Shell.*

Polygon

Line Flyout | Polygon

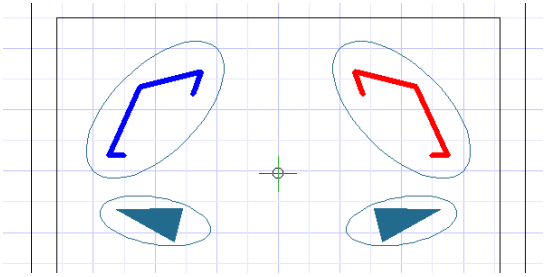
To create the key in the middle of the newly created buttons, the *Polygon* command will be used.

Create an appropriate zoom magnification between the two sets of phone buttons.

Select the option for *Polygon* from the *Line Flyout.*

The *Polygon* command allows the user to create a polygonal shape by defining the center point, number of sides, angle of orientation and the radius.

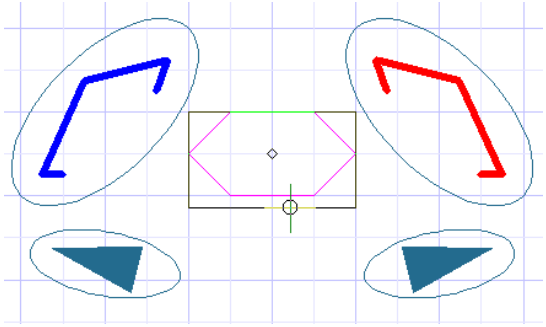
Next, indicate a grid position in between the two sets of buttons.



Now drag the cursor in a horizontal direction to a suitable grid point.

The polygon can be re-shaped by using the *Stretch* handles of the *Selector Shell*, in a similar manner to that used earlier on the keypad buttons.

Select the Polygon and left click onto the top middle handle. Drag the handle to a lower grid and repeat with the bottom handle.

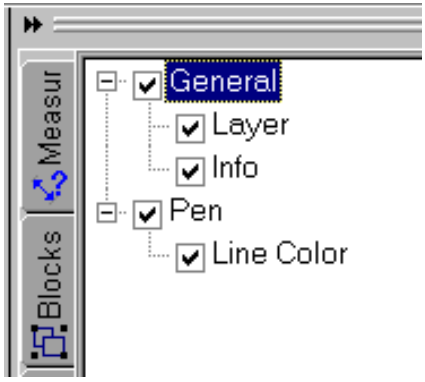


Change to a *Halve Grid* if necessary and stretch the polygon in a horizontal direction.

Format Painter

Drawing Setup Toolbar; Properties Palette

As shown earlier, the *pen color* of an object can be changed by using the *color palette.*



Frequently similar properties of an object, such as *color, layer,* and *line style* are required by other objects in your drawing.

To force the properties of a selected object onto a destination object, the command *Format Painter* can be used.

From the *Docking Palette* select the page for *Format Painter.*

Now *Select The Source Object,* by clicking onto the upper left button with the steel blue color.

Next *Select The Object To Be Painted*, by clicking onto the other buttons within your current zoom window.

Drawing An Arc

Arc Flyout | Start, Included, End

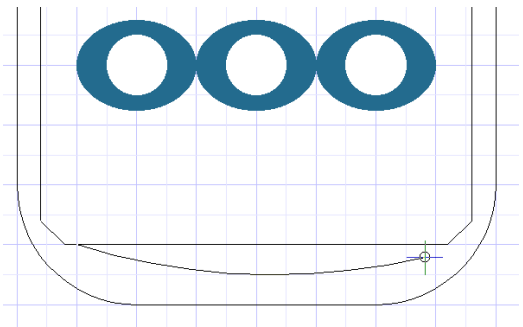
To draw the *Arc* at the bottom of the mobile phone, a 3-point arc is used.

Zoom into the bottom area of your drawing, making sure the magnification of the objects is suitable for this exercise.

From the *Drawing Tools Toolbar,* select the option *Arc Start / Included / End* from the *Arc Flyout.*

This command will describe an arc by defining the start, middle and end point.

Left click a position on the bottom line, using the Grid line which is tangential to the left buttons of the keypad as a guide.



Now, indicate a position at the apex of the intended arc. Use the *major grid* line that runs through the middle button of the keypad as a guide.

Next, indicate a corresponding position on the bottom line, again using the grid line that is tangential to the right button on the keypad as a guide.

Horizontal Feature Lines

Drawing Tools Toolbar | Line Flyout | Line

To create the parallel lines above the newly created arc, use the upward *directional arrow* on your keyboard to pan to the required position.

A *Single Line* with a width of .02 will be drawn, and this line will then be copied four or five times using the *Rubber Stamp* option.

From the *Drawing Tools* toolbar select the option for *Line.*

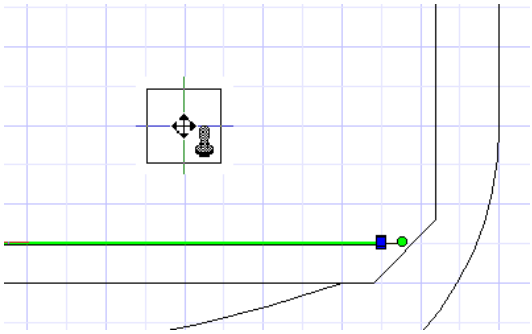
Set the pen width to .02" on the *Property* toolbar.

Draw a single line along the bottom of the casing, using the grid lines as a guide.

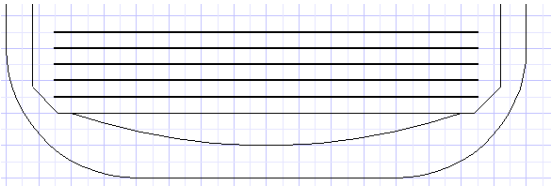
Copying The Lines

Local Menu | Rubber Stamp

Click onto the newly drawn line with the *Select Tool* and from the *Inspector Bar,* select the option for *Rubber Stamp.*



A *Rubber Stamp* icon will appear, allowing the user to duplicate the selected object as many times as required.



Press *ESC* to finish this command.

Top Features

Insert | Circle/Ellipse

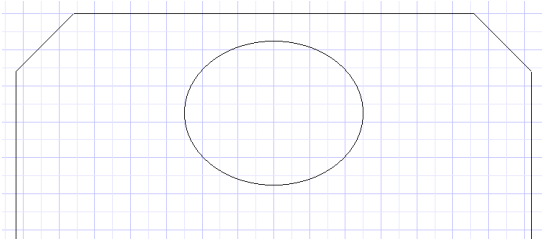
To create the top features of the phone, zoom in to the area and make sure at least 6 major vertical grid lines are displayed.

An *Ellipse* will be drawn by defining 2 corners of an elliptical box.

To do this select the *Ellipse Tool* from the *Drawing Tools Toolbar.*

Make sure the pen width is set to 0 for this feature.

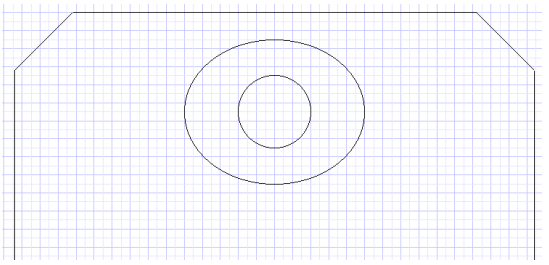
Next, indicate a minor grid position and drag the cross-hairs to an opposing corner.



Zoom again into the middle of the ellipse and use the *Halve Grid* option to display a smaller grid.

Now select the CIRCLE option – *Double Point Circle* to draw an inner circle within the ellipse.

Next, indicate a grid point towards the top of the ellipse and drag the cross hairs to a parallel grid point below.

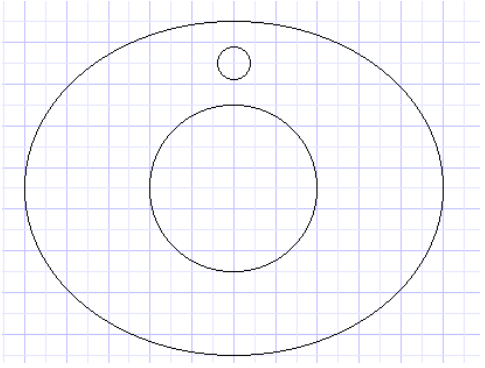


Creating A Circular Pattern

Copy Entities Flyout | Radial Copy

A smaller circle will now be drawn using the circle option *Circle Center And Point* from the *Drawing Tools Toolbar*

Click onto a grid point in between the top of the circle and the upper quadrant of the ellipse.



Use the TAB key to access the *Radius* field of the *Inspector Bar* and type in a value of .02" and press *ENTER*.

Radial Copy.

This newly drawn circle will now be duplicated eight times in a circular pattern using the inner circle as the center point.

Using the *Select Tool*, click onto the small circle.

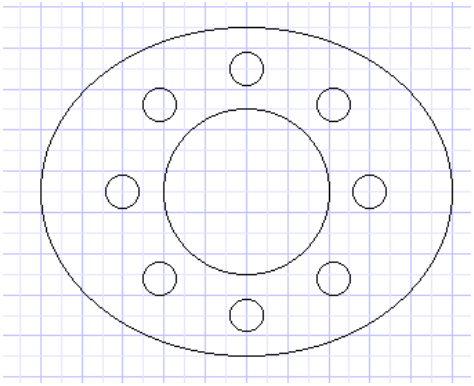
From the *Drawing Tools* toolbar, select the option for *Radial Copy* from the *Copy Entities Flyout.*

Click onto the grid intersection at the center of the inner circle.

TAB to access the data fields of the Inspector Bar.

In the field for *Sets,* type in a value of 8. In so doing, the *angle* and *degree of rotation* will automatically be calculated.

Press *ENTER*.



Use the *Selector Shell Handles* to slightly alter the shape of the ellipse.

Multi-Line Rectangle

Multi-Line Flyout | Rectangle

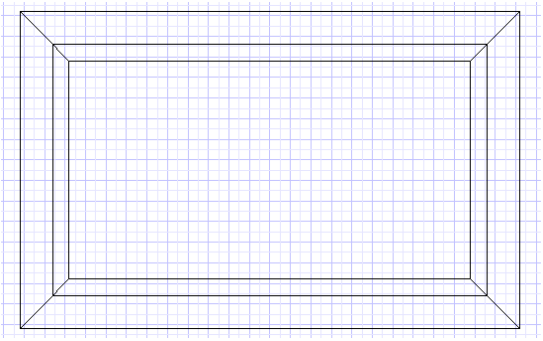
To draw the face of the LCD, a *Multi-Line Rectangle* will be used.

Multilines are lines that contain multiple parallel offsets at pre-determined distances.

Adjust the zoom magnification slightly by using the minus key of your keyboard.

From the Multi-line Flyout, select the option for *Multi-Line Rectangle.*

To set the parallel offsets of the multi-line prior to drawing, *Right-Click* somewhere in your drawing and select the option for *Properties.*



The *Properties Sheet* will be displayed, allowing the user to pre-set the necessary features.

From the *Explorer Bar* on the left hand side, select the option for *Line Elements.*

For this particular drawing, *offsets* of .08 and .12 will be given. Use the *Add* key to include offsets and the *DELETE* key to remove any unnecessary offsets.

From the *Explorer Bar* on the left hand side, select the option for *Joints* and check the option for *Show* joints.

Click ok.

At the command *Define The First Corner Of The Box,* indicate a lower left grid position and drag to an opposing corner.

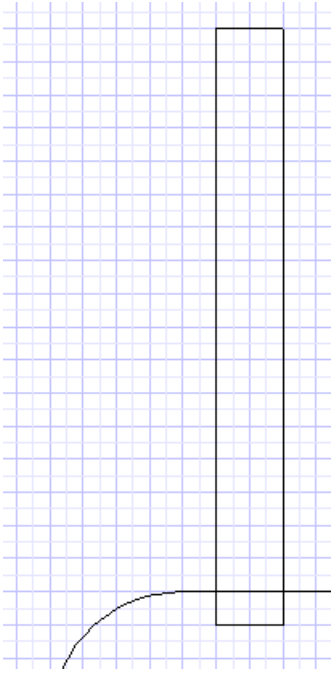
Tangential Circles

Circle Flyout | Circle Tan to Entities

To draw the antenna of the mobile phone, the command, *Rectangle* and *Circle Tangent To Entites* will be used.

Zoom into the upper left side of the mobile phone, making sure there is enough room above the phone to draw the antenna.

Use the *Rectangle* command to draw the approximate shape of the antenna. This will be reshaped later.

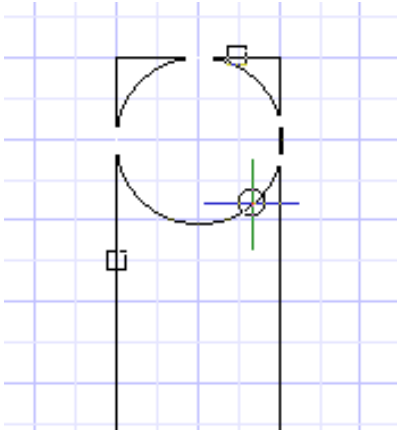


To create the rounded top of the antenna, zoom into the top of the Antenna and select the command *Circle Tan To Entities* from the *circle flyout.*

At the command *Pick First Entity*, click onto the left vertical line of the antenna.

At the command *Pick Second Entity* click onto the top horizontal line of the antenna.

At the command *Pick Third Entity,* click onto the right vertical line of the antenna.



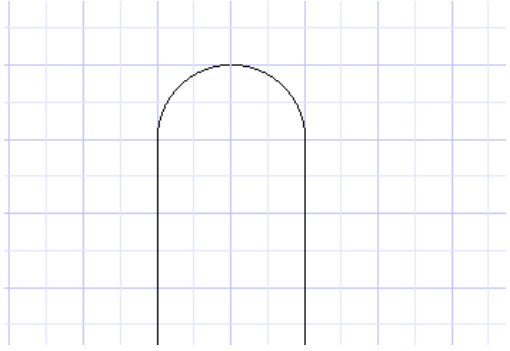
Trim

Modify Flyout | Trim

The *Object Trim* command will now be used to crop unwanted lines from the antenna.

The *Trim* command requires the User to select a *Cutting Edge* first, then the object to be trimmed next.

In this case the circle will be used as the *Cutting Edge* for the lines above the antenna.



By using the *ESC* key on the keyboard and re-selecting the Rectangle, the inner part of the circle can be trimmed.

Node Edit

All polyline entities, including Rectangles are drawn as compound entities. This means that modifying separate lines of the rectangle cannot be done until the rectangle is reduced to its individual components.

To create single lines from a rectangle, the command *Explode* should be used.

To do this make sure the rectangle is selected and from the Format Menu, and then select the option *Explode.* This will shatter the rectangle into separate line segments.

Delete the bottom line of the rectangle by clicking onto it and pressing the *DELETE* key on your keyboard.

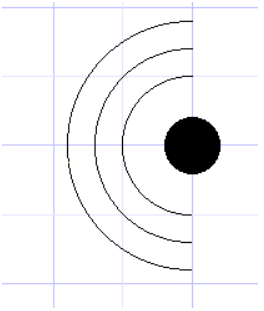
To reshape the vertical lines of the rectangle to make the antenna wider at the bottom, the *Node Edit* Tool can be used. Select the line, *Right-Click* and select *Edit Node.*

Drag the handles to new grid positions.

Drawing The Audio Symbol

Insert | Point | Circle / Point Flyout | Circle

To create the audio symbol feature at the lower right of the mobile phone, the *Point* command and *3 Point arc* commands will be used.



Once this symbol has been drawn, it will be stored as a *Block* in your drawing.

Zoom in to the lower right side of your drawing and use the *Halve Grid* option to display a smaller grid.

Select *Circle Option* from the *Point Flyout.*

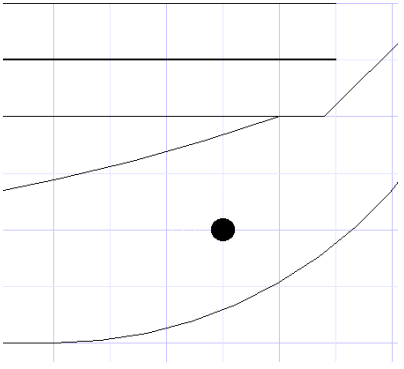
A point is a solid circle, usually used as a marker for illustrative purposes in your drawing.

Right-Click to set the *Properties* of the Circle.

From the *Explorer Bar* on the left of the *Properties Sheet*, select the option for *Point* and set the size to .02"

Click a point on the grid somewhere at the lower right side of the mobile phone.

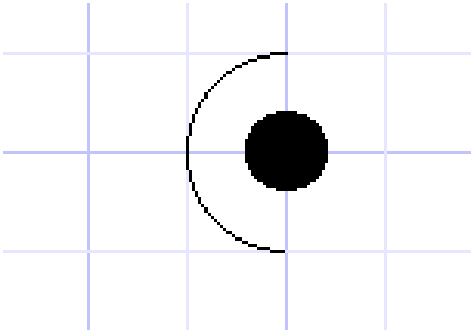
Use the *ESC* key or the *Cancel* icon to finish this command.



3 Point Arcs & Offset Copy

Copy Entities Flyout | Offset Copy

Use the *Halve Grid* Option and zoom in closer if necessary.



Draw the first arc by using the *Arc / Included / End* option.

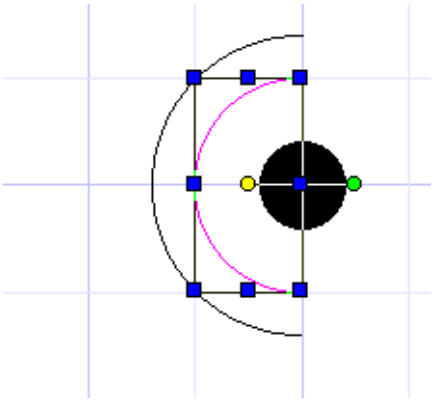
Offset Copy

To create a parallel offset from this arc, the *Offset Copy* command will be used.

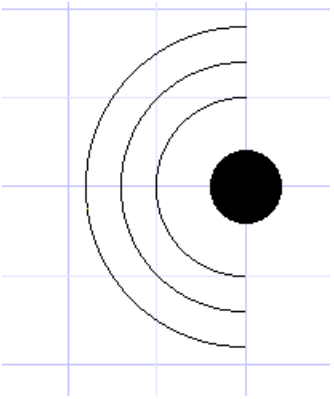
Left click onto the newly drawn arc.

From the *Copy Entities* flyout, select *Offset Copy*.

TAB to the Length field and type in .01 and press *ENTER*.



Click a point to the left of the selected arc.



TAB again to the Inspector Bar and type in a value of .02 and press *ENTER*.

Click a point to the left of the new arc.

Use *ESC* to discard the selector shell.

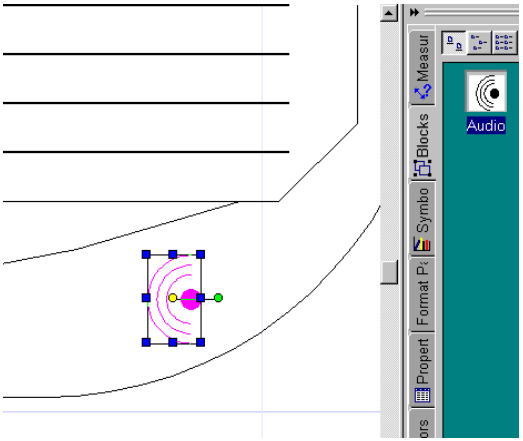
Creating A Block

Format | Create Block; Blocks Palette

To make a *Block* of this object, use the *Select Tool* to create a *Selection Rectangle* around the objects.

If a *User Assigned Block Name* is required, make sure the *Prompt for name* option is checked on in the *Blocks Tile* of the *Auto-Naming Menu.*

Click onto the *Blocks* page of the docked palette and drag the selected objects into the *blocks palette. Hold the mouse key down while traveling*



By holding the *CTRL* key of your keyboard, the block will remain in the original position in the drawing and a copy will be stored as a *Block.*

Name the Block *Audio* and click ok.

Blocks are only retrievable from the drawing in which they were created.

Inserting Symbols

Symbols Palette

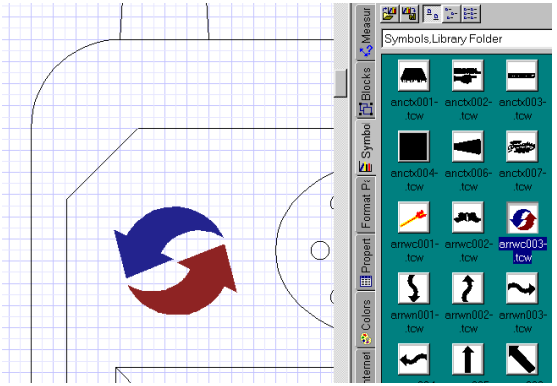
Use the *Zoom Extents Tool* to view your entire drawing and zoom in to the top part of the phone in order to insert the Logo Symbol.

Unlike *Blocks* which are retrievable only from the drawing in which they were created, *Symbols* can be accessed from any drawing.

Click onto the *Symbols* page of the docked palette and choose an appropriate symbol. For this exercise, a symbol from the "Symbols" library folder has been selected.

Click and drag (holding the mouse key down while traveling) this symbol into an approximate position in the top part of the phone.

With the *Selector Shell* still attached, *TAB* to the *Inspector Bar* and scale this symbol down by typing in a value of .03 for both the X and Y Scale. Press *ENTER.*



Adjust the position of the symbol if necessary and discard the *Selector Shell.*

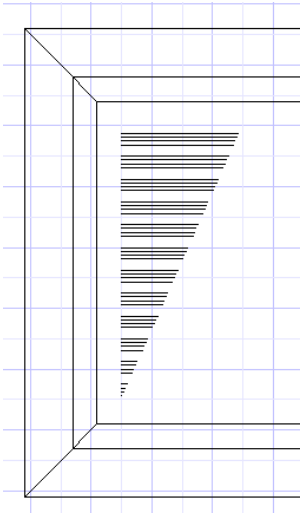
Hatch Patterns

Hatch flyout | Path Hatching

To create the pattern in the LCD, a simple *Hatch Pattern* will be created using the *Path Hatching* option.

From the *Drawing Tools Toolbar,* select the option *Path Hatching.*

Right-Click and select the option *Properties.*



Set the *Brush Pattern* to a suitable style, such as *ANSI 34* and make the scale approximately .05 All *Brush Pattern* scales will be relative to the size and scale of the drawing.

Set the *Hatch Angle* to a minus 45 degree or 315 degree angle.

An outline for the *Hatch Pattern boundary* will not be required, so click onto the *Pen* Page and set the *Line Style* to invisible. Click *OK*.

At the command *Define The Vertex Of The Hatch Boundary* draw a simple triangular shaped area for the pattern.

To create the *solid brush pattern* for the inside of the LCD casing, the Multi-Line Rectangle should be *exploded* in order to create 3 separate rectangles.

As learned earlier this is done by selecting the object and using the *Explode* feature from the *Format* menu.

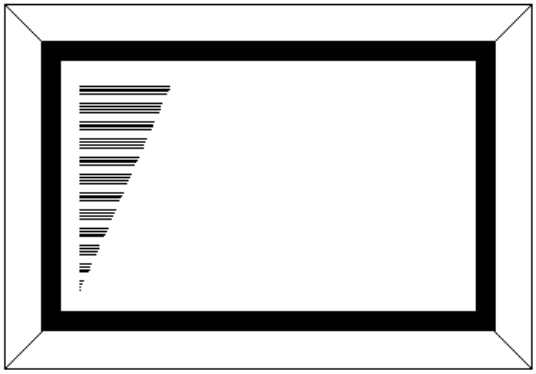
Pick Point Hatch

To select an enclosed area use the hatch option, *Pick Point Hatch*.

Right-Click onto this icon, select *Properties* and select a solid Black or Dark Grey *Brush Pattern*. Click *OK*

Left click anywhere inside the boundary.

Repeat this for the other sides if necessary.



Inserting Text

Drawing Tools Toolbar | Text Flyout

To insert single line *Text* onto the buttons of the keypad, the *Text Tool* from the *Drawing Tools* menu will be used.

Right-Click somewhere in the drawing sheet and select *Properties*.

From the *Text Page,* set the *Font* to a suitable style such as Times New Roman.

Set the *Text Style* to *italic* and the *size* to a quarter of an inch.

In the *Justification Tile,* set the *orientation* to *Center* and the position to *Middle*.

This will ensure that the text is centered in the middle of the button.

Zoom in to the keypad area.

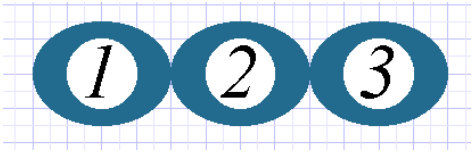
At the command *Define The Position Of The Text,* indicate the center of the button.

The indicator bar will flash in the position where the text will be located.

Type in *1* and press *ENTER*.

Go to the next button and click onto the center. Type in *2* and press *ENTER*.

Repeat this with the other keys.



Text can be edited by selecting the required text, selecting the *Properties* Sheet, then modifying the text in the *General* page.

Multi-Line Text

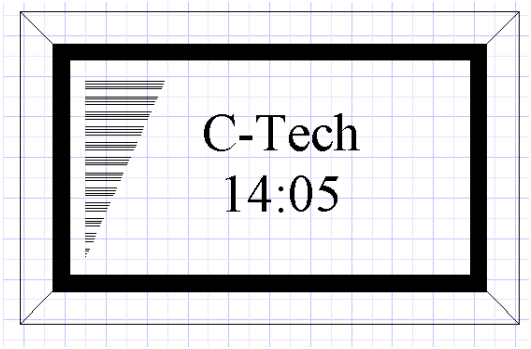
To insert 2 sequential lines of text into the face of the LCD, a similar method of insertion will be used.

From the Drawing Tools toolbar, select the *Text Tool* option.

Right-Click somewhere in your drawing and from the *Properties* sheet select the option *Text*

Set the style to *Regular* and the *text height* to a smaller size such as *.15* of an inch. Click *OK*

The *Grid Snap* mode can be removed at this stage as the text insertion can be done by sight.



Left click somewhere in middle of the LCD and type the first line of text.

To add another line, hold down the *SHIFT* key on your keyboard and press *ENTER*.

Type in the next line of text and press *ENTER*.

The text can be repositioned using the *Select Tool* if necessary.

Dimensions

Drawing Tools Toolbar | Dimension Flyout

Ideally, dimensions should be created on their own layer. A layer called *Dims* was created at the beginning of this lesson for this purpose.

To start the dimension command, go to the Drawing Tools toolbar and left click onto the *Orthogonal Dimension* Command.

The *Orthogonal Dimension* will draw both vertical and horizontal dimensioning

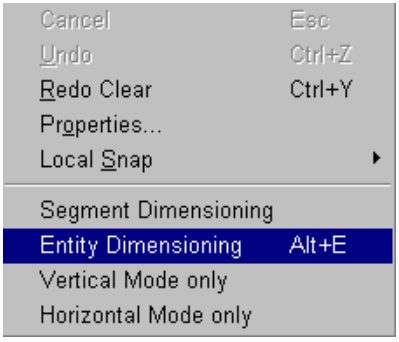
Right-Click somewhere in your drawing sheet, select the *Properties Sheet* and set the dimension features to suit your particular application.

In this case, the *Force Text Horizontal* will be unchecked and the *units* symbol will be set to *inches.*

All other dimension settings will remain unchanged. Click *OK* when done.

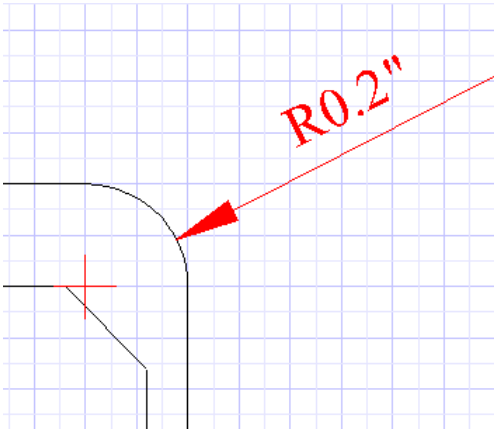
Set the Layer to *Dims* in the *Properties Toolbar*.

When dimensioning an object using *Orthogonal Dimensions*, the feature for *Entity Dimensioning* can be set by *Right-Clicking* and ticking this option.

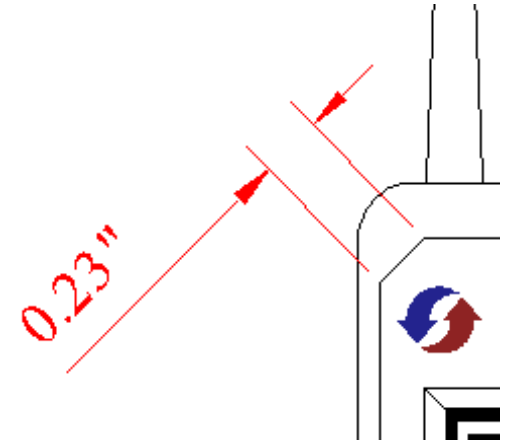


Left click onto the left vertical edge of the phone and drag the dimension line to the required position. Zoom into the top part of the phone.

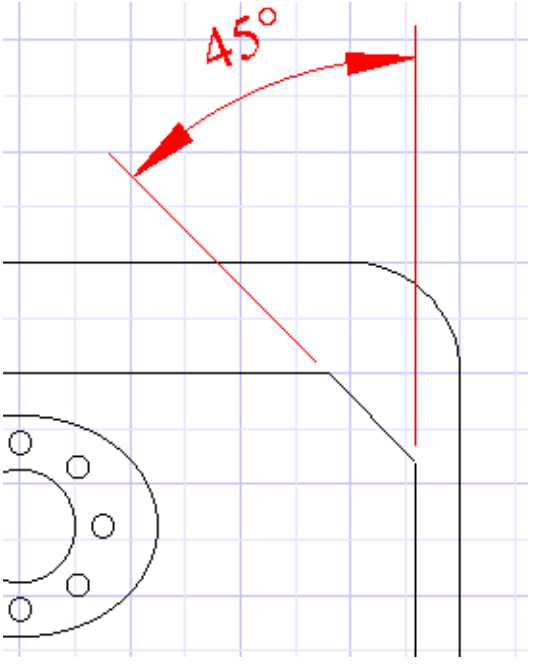
Use the *Radius* dimension to create a radial dimensions on the Fillet blend.



To dimension 2 aligned parallel points the *Parallel* dimension is used.



The *Angular* dimension command is used to dimension the angles of the chamfer.



Continue to dimension the mobile phone until all the required dimensions are complete.

Model & Paper Space

The drawing of the Mobile Phone has been drawn at full scale in the *Model Space* area of TurboCAD.

Once the model is complete, print preparation can begin.

To assemble a view of the Mobile phone onto the correct paper size, with an realistic scale factor, a *View* is created in *Model Space* which is then inserted into the *Paper Space* area.

To do this, select the option *Create View* from the *Standard Toolbar.*

At the command *Define The First Corner of the view,* click a corner of the area to view and drag to an opposing corner, taking care not to exclude any of the drawing or dimensions.

Create View

Standard Toolbar | Create View

The *Create Named View* dialog box will be displayed prompting the user to type in a suitable name.

Type in the name *Front* and click ok.

From the bottom of your screen select the tab for *Paper.*

This area is the sheet onto which the view of the mobile phone will be assembled.

Check that the correct drawing sheet size is selected by going to the *File* | *Page Setup* section of your pull-down menu.

Insert View

Standard Toolbar | Create View

To insert the newly created view click onto the option *Insert Viewport* from the *Standard* toolbar. At the command *Define the first corner of the viewport,* click onto a point in the upper corner of your drawing and drag to an opposing corner.

The *Named View* viewport will be presented. Click onto the view name called FRONT, click *Go To* and *OK*.

The model of the Mobile Phone will be displayed within the viewport.

The scale ratio of the Mobile phone can be set by left clicking onto the Viewport border and selecting the option for *Fixed Scale.*

Adjust the scale ratio to a 1:1 scale and adjust the viewport borders if necessary.

Once the drawing is seated appropriately in the drawing, the viewport border can be removed by un-checking the option *Visible Box* in the viewport page of the Properties Sheet.

Save your drawing and print.

Chapter 8 - Frequently Asked Questions

General Questions

How do I change the current layer?

The current layer is a property of the tool you are using. Change it by using the property toolbar or *Right-Clicking* the specific tool and set it in the Properties dialog.

Inspector bar has incorrect field lengths

It is possible to change the width of the fields on the inspector Bar. Move to the edge of the field. When a double-headed arrow appears, drag the edge of the field to the right.

I've lost the Inspector bar; how do I get it back?

To view the Inspector bar, follow these steps:

- Select *Workspace* on the menu bar.
- Make sure there is a check mark at the *Inspector Bar*. Check for the presence of the Inspector bar. If you still do not see it, continue to the next step.
- Select *Options* | *Desktop* from the menu bar.
- On right side of window make sure that the *Inspector Bar* is checked.
- Click on *Toolbars And Menu* tab.
- Click on the *Reset All* button.
- Accept the defaults by clicking on *OK*.
- Click on *OK* on the dialog box.

If the Inspector bar does not come back, you will need to uninstall and reinstall the program.

How do I use viewports of Model Space in Paper Space?

Follow the steps in this example tutorial:

- Open a new file from template A4.
- Make sure you are in Model space.
- Draw a basic floor plan.
- Go to *View* | *Create View*. You will get a marquee at the end of your cursor.
- Drag the marquee around the whole floor plan.
- When you let go of the mouse button you will get a *Create Named View* Dialog box.
- Type in *MyView*, and then select *OK*.
- Change to Paper space.
- Select *Insert* | *Viewport*. You will again get a marquee at the end of your cursor.
- Drag out a marquee. When you finish the marquee, the Named View dialog box will appear.
- Select *MyView*.
- Click *Go to*.
- Click *Close*.
- With your Selection Arrow, click on the viewport you just drew.
- Right-click inside the viewport and select Properties.
- Select the Viewport Tab at the top of the Properties dialog box.
- Put a check mark in the *Scale/Fixed* box. This allows you to click on the down-arrow and select the scale 1 in = 16 ft.
- Click *OK*.
- Click somewhere off the viewport.
- What you see is what you get when you print from Paper Space including the box marking the Viewport.

You can also make the box invisible.

- Go to the viewport properties dialog box again.
- Uncheck the box marked *Box/Visible*.
- Click *OK*.
- Deselect the viewport by clicking somewhere off the viewport.
- The box is now invisible.

The box is still there and you can select it.

- Hold down the left mouse cursor and drag over where the viewport is located.
- When you let the mouse button up the viewport will be selected.

You can have multiple viewports open at different scales all at the same time.

- Go to Model Space and *View* | *Create View*.
- Drag the marquee around the kitchen.
- Name it kit.
- Go back to *View* | *Create View* and drag the marquee around the bathroom.
- Name it bath.
- Go to Paper Space.
- Select *Insert* | *Viewport*.
- Drag the marquee out about 1" x 2".
- Select "kit."
- Create another viewport underneath this one and select bath.
- Select the viewport you named kit.
- Set the scale to 1" = 8', and click OK.
- Select the viewport you named bath.
- Set the scale to 1" = 12', and click OK.
- Deselect the viewport.
- Your drawing now has three viewports set to different scales.

The viewports will print at their separate scales and look like they do in Paper space. You only had to draw the floor plan once, and you can see how it will look before it gets printed.

Is there any way to zoom in and out using keystrokes?

Position the cursor at the point you want to magnify and press the + key on the numeric keypad. The – key zooms out. Also see *Help* | *Keyboard*.

The Snap tools don't work when I relocate an object.

Probably, you use "Drag and Drop" technique to relocate an object. To have Snap tools working, use "Move" mode. That is, release the left mouse button – do not keep it pressed while moving an object. Most TurboCAD tools work best with this click-click technique rather than a drag and drop technique. See Tips and Tricks on moving objects.

Changing the number of segments used for the Divide By snap mode

To change the default value of three segments for the *Divide By* snap mode *Right-Click* the word *Snap* on the status bar at the bottom of the screen.

Installation and Registration

My program is in a registration loop; it keeps popping up and asking me to register.

Forcing Registration though the Registry

- Start by Clicking on *Start*
- Click on RUN
- Type in REGEDIT This will bring up the Registry Editor
- DOUBLE CLICK on HKEY_LOCAL_MACHINE.
- Double Click on SOFTWARE
- Double Click on IMSI
- Double Click on your TurboCAD Directory name. (TCW70)

You should see a folder named REG. If you do perform section B

A. If you do not have REG

- Click on Edit on the Menu Bar
- Click on NEW, then KEY
- Type in REG
- Click on Edit and NEW, String Value
- In the Name type REGISTERED
- Click on EDIT and MODIFY
- In the Value Data box type TRUE
- Click on OK.

B. If you do have the REG folder

- Click on REG

Do you have the entries for REGISTERED? Does the value equal "TRUE"? If you do then you are registered and there may be something else wrong. It is suggested that you delete the REG folder and then reinstall the program.

Palettes

How do I resize my palettes?

Follow the steps in this example tutorial:

- Open the Internet Palette by selecting *View | Internet Palette*.
- Place the cursor over the edge of the palette that is closest to the drawing.
- The cursor will change to two vertical lines crossed by a double arrow.
- When the cursor changes, click and drag the edge of the palette.
- The edge will move right or left, and the palette will scale to fit the new edge.

How do I turn off the Internet Palette and Front Page?

Go to the START button, PROGRAMS, TurboCAD Professional v7, START UP OPTIONS and deselect Connect automatically.

If your Internet dial-up starts whenever you load MS Internet Explorer and you want to disable it, go to the TOOLS menu in IE, INTERNET OPTIONS, the CONNECTIONS tab and experiment with the settings.

Drag the INTERNET tab away from the DOCKING PALETTE and click the X in the upper right corner of the newly floating palette. This will create a docking palette 2 that should stay hidden if deselected in OPTIONS menu, DESKTOP.

How do I use Netscape instead of IE

Unfortunately there is no Integrated Netscape Browser in TurboCAD. You will have to use the Netscape browser on www.turbocad.com that contains just about everything that is on the desktop palette.

What is the Internet palette for?

Besides the more obvious advantages of the Internet Palette such as creating hyperlinks and accessing web sites, the Internet palette is proving to be especially useful for creating add-on applications using VB Script. For more examples of add-on applications that run in the Internet Palette visit www.softdevspb.com. These examples include programs that allow for animation of TurboCAD drawings and even automatic generation of mathematical curves based on formulas.

Programming and Macros

How do I run a macro

If VBA is installed follow these steps to run a VBA Macro:

- Start TurboCAD.
- Select *Tools | VBA Macro | Macros...*
- The Macro dialog will open. This dialog displays the macros associated with the current drawing.
- Type a name for a macro in the Project Scope field.
- Click Add.
- The Open TC Macros project dialog will open.
- Locate and select the desired macro.
- Click Open.
- This will return you to the Macro dialog.
- Click Run to start the macro.

Note: new to v7 is the floating/tabbed Macro Toolbar which will provide a shortcut to running the macro.

3D Topics and Rendering

Why can't I blend a surface object?

Blend Edges only works on solid objects. Check the object properties to see if the object you are trying to blend is a “Surface” or “Solid” object. When you create a 3D object make sure to select “Solid” in the Properties dialog. You can turn an

unchanged surface object into a "Solid" (ACIS) object via the *Properties* | *3D* dialog.

Why does blending not always work?

Blending is part of the ACIS engine included in TurboCAD Professional v7. This engine will not blend when the object is too complicated, or when the blending radius is set to an overly high value. A value can be too big when the resultant blend would be bigger than the solid itself (or a part of the solid).

How can I build an Extrusion from lines and arcs?

You need to convert your complex object to Polyline. The Join Polyline tool combines separate entities into a single 2D object that can be used as a Profile for creating an Extrusion.

How do I show dimensions in a Rendered or Hidden Line View?

Rendered images only show 3D objects and not 2D objects like dimensions. It is, however, possible to show both the rendered image and the dimensions by using overlapping viewports in Paper Space.

- In Model Space prior to rendering, dimension the objects making sure that the dimension are on a different layer.
- Create a Named view in Model Space
- In Paper Space insert a viewport of the view and set the rendering to hidden line.
- Duplicate the viewport and make sure it overlaps the existing viewport.
- Select the new viewport and edit its properties to show only the dimension layer.
- If needed use the *Format* | *Send to Back* and *Bring to Front* option to arrange the order of the viewports.

This technique is also useful for showing the combination of both rendered and hidden line rendering methods. For more information see Tips and Tricks section.

Once in a "Rendered View", how do I return to my drawing space?

There are two ways to return to the drawing space:

- Tap the *ESC* key on your keyboard.
- *Right-Click*, and then click cancel.

How can I speed up rendering?

Try splitting your window into four views (*Window* | *Open Layout Template*) and render just one view. This speeds up rendering while doing test renders, simply because there are less pixels to render. When you're ready for the full render then do full screen.

This is also very useful for interactive rendering in the quicker modes. As you edit in the one window the rendered image is automatically updated.

How do I change my render settings?

Render a view and then right-click anywhere in the window. From the local menu choose Camera Properties and select the Render Tab. Choose either OpenGL or LightWorks rendering and the rendering mode.

You can also preset the rendering quality by *Right-Clicking* the render buttons on the toolbar to bring up the render properties dialog. Remember to set the quality for both *Draft* and *Quality* render modes.

How do I get perspective rendered views?

Check the perspective option under Camera Properties. Make sure that you are using the quickest rendering mode – OpenGL. Use the Walk tool to navigate to a view you require. Optionally name the view you are in. Change to a higher rendering mode e.g. LightWorks – full.

How can I turn up brightness in rendered mode?

You will get different results depending on which rendering mode you use (OpenGL vs. LightWorks). The quickest way to ensure that you get better lighting is to turn on all the lights via the Lights dialog. See www.turbocad.com for further documentation on lighting.

How do I Export Rendered images to BMP or JPG format?

Render the image. Choose *File* | *Save As*. Select the *BMP* (TurboCAD For Windows Bitmap) or *JPG* (TurboCAD For Windows JPEG) format. Click the *Setup* button. Choose *View* and *OK*. Enter a filename and press *OK*.

Why does the Render not reflect the material properties of an object, as set in Material Properties?

To have material properties applied, use LightWorks Render mode instead of OpenGL. Also, make sure that a sufficient number of lights are turned on in *View* | *Lights* panel, and that their parameters are adjusted. Reduce light levels if the scene renders as blank white. Different render modes will require changing light levels

Symbols

What is a Symbol?

Symbols are pre-drawn objects available for repeated use. You can draw an object that you intend to reuse, save it as a drawing, then use it later when working on future projects. In TurboCAD, symbols are fully independent TurboCAD drawings; they are not saved in a special format reserved only for symbols. Using the same format for symbols and drawings means TurboCAD can recognize any drawing and use it as a symbol.

TurboCAD can also use drawings from other CAD software programs as symbols, if TurboCAD can read the file format. (TurboCAD can read AutoCAD .DWG and .DXF file types, which are used by a variety of CAD programs. Check the Reference Manual for a complete list of supported file types.)

What is a Symbol Library?

The phrase “symbol library” is a common CAD industry term for any collection of symbols. Generally, related symbols are gathered into a single library. Kitchen appliances, TTL symbols, and evergreen shrubs for landscaping are examples of categories of objects that would be gathered together in a library.

TurboCAD uses the Windows metaphor of folders to organize libraries. As you install the libraries, TurboCAD places related groups of symbols in folders; the name of the folder explains the symbols inside.

How Do I Locate Symbol Library Folders?

The symbols supplied on the CD-ROM fall into the following main categories; 3D, British, ISO, US, and Clipart. The 3D symbols are mostly ACIS solid models of home appliances. The British symbols are applicable mainly for use in Britain, whereas the ISO symbols are in Metric format, and the US symbols are in Imperial format. The British, ISO and US symbols are all drawn to true scale and will import into drawings at the correct size. The Clipart folder contains a large selection of “clipart” images. Although the clipart libraries contain thousands of very useful images, they are not drawn to scale and should be used for illustration purposes only, or scaled to the required size after inserting them into the drawing.

Each category of symbols has its own collection of libraries. It is possible that different categories have the same names as libraries. For example, there is a US Bath library (stored in the folder Symbols\US\Bath) and an ISO Bath

library (stored in the folder Symbols\ISO\Bath). Although the symbols may appear similar in this book, they are different in that they are stored with different units and slightly different sizes.

How do I find the symbols?

Follow these steps to access the symbols:

- Place the TurboCAD Symbols CD in the CD-ROM drive.
- Once in the TurboCAD program select *Options* | *Symbol Libraries* from menu bar.
- Click on NEW in the symbol Library dialog box.
- Change the "look in" box to the CD-ROM drive letter.
- In the larger window double-click on the symbols folder.
- Double-click on the Libraries main folder (example: British).
- Double-click on the Library sub-folder (example: Architectural).
- You should be down to the individual symbols (example: ARCH1001.tcw).
- Double-click on the open button.

You should be back at the symbol library dialog box. If the *Symbols Palette* is not showing on the left:

- Click on VIEW on the menu bar.
- Click on the *Symbols Palette*.

You should now see the symbols in the palette.

AutoCAD Compatibility

My External References are not displaying?

Warning: When transporting DWG files from AutoCAD on one computer to TurboCAD on another computer, and externally referenced files are not in exactly the same folder on both machines, the external reference will error upon opening and not display in TurboCAD. Sometimes this can be rectified by recreating the external reference - but the placement of the external reference in the original file is lost.

Chapter 9 - Tips and Tricks

Lighting and Rendering

Importing bitmap images as a texture

It is possible to use any bitmap image as a texture pattern for 3D objects created in TurboCAD Professional v7. Follow this procedure:

- Select the object.
- *Right-Click* and choose Properties.
- Select the 3D option.
- Click the Edit Material button.
- Select the category and material names (if required create new names.)
- Select Wrapped Image as the pattern and then browse to the BMP or JPG file.
- Choose the Wrapping tab.
- Choose a wrapping method (None, Auto Axis, Cylindrical etc.)
- Type in a scaling for the bitmap. This figure is not limited even though the scrollbar only scrolls to 100. You can type any figure in the scaling field.
- Hit the preview button to see the results.
- Render the image (click the green teacup on the standard toolbar.)
- *Right-Click* in the drawing area and choose Camera Properties.
- Change the render mode to be LightWorks
- Use the *Quality*-rendering mode.

Directing a spot light to shine on an object

It is possible to easily control the direction of a spotlight. Follow this procedure:

- Choose *View* | *Lights.*
- Turn off all the other lights (this is optional)
- Make sure the Spotlight is visible by clicking the “eye” column.
- Choose Window | Open Window Layout.
- Select the four views window (second left.)
- Highlight the isometric view and click the render button (or draft render button.)
- In another view select the green box representing the light.
- *Right-Click* and choose *Node Edit*.
- Move the nodes (in any window) (the plus and minus keys zoom in and out) to direct the destination and source of the spotlight.

Notice how the rendered view shows the results as you move the nodes.

Showing the Juncture of two 3D objects

To show the juncture of two 3D objects in rendered mode use the Boolean-subtract tool and select the *Don't remove subtrahend* option from the local menu. Then subtract the one entity from the other.

Seeing the Latitudinal and Longitudinal of Hemisphere

Latitudinal and Longitudinal lines can only be visible if both the Hemisphere is changed to a surface object (in the object's *Properties* | *3D*), and *Options*| *Drawing Setup*| *Display* is set to *Draw form-building edges*.

Converting Hidden Line Renders to Vector Drawings

It is possible to convert a hidden line render of a viewport in paper space into a vector drawing by saving as a WMF drawing and reopening the file.

Snap modes

The faster way to select a point

Have you ever had to use a snap mode to select just one point? Did it seem inefficient to have to toggle the snap button on and off? There is a quicker way. TurboCAD includes a set of commands known as SEKEs (Single Entry Keyboard Equivalents). SEKEs allow you to perform a function by pressing a single key. Most SEKEs temporarily activate a snap mode. The

snap mode will remain active only while the point is being selected. The most commonly used of the SEKEs is the *V* key. By pressing *V* you can activate the Vertex Snap. To use the *V* SEKE the cursor must be positioned near a vertex. If the cursor is not near a vertex TurboCAD will ignore the command.

Try the following:

- Select the *Line* | *Single* tool.
- Draw a line of any length.
- While the line tool is still active position the cursor near one end of the line you just created.
- Press *V*.

Notice that the new line starts exactly at the end of the first line.

The following is a list of the common snap SEKEs.

- *V* (*Vertex*) snaps to any vertex or node
- *M* (*Middle*) snaps to the midpoint of any line segment
- *C* (*Center*) snaps to the center point on a selected arc, circle or surface.
- *I* (*Intersection*) snaps to the nearest intersection of two lines
- *G* (*Grid*) snaps to the nearest grid point
- *Q* (*Quadrant*) snaps to the nearest quadrant point on an arc or circle
- *N* (*Nearest*) snaps to the nearest point on the selected graphic. *Note this snap is inherently inaccurate because it uses a screen pixel position to calculate the point closest to the graphic.*

Note: For snap SEKEs to work, the cursor must be positioned near the desired point or on the line or entity.

How to find the point that is equally distant from any two points

When drawing, it is frequently necessary to find a point that is centered between two previously defined points. This can be very useful for placing new objects so that they are properly aligned. There are two quick and easy ways to find this type of point with TurboCAD.

The first method is to draw a line between the two points. Then select the middle of the line using *Snap* | *Middle Point* or the *M* SEKE. The middle of the line will be the equidistant point. The disadvantage to this method is that it is somewhat sloppy. When you use this method you are creating a drawing object that is not needed in the drawing, which means you will have to cleanup the drawing by deleting the extra line.

The second method is to draw a double point construction circle. The construction circle is drawn using each of the existing points as the points for the circle. Once the construction circle is drawn use *Snap* | *Center* or the *C* SEKE to select the center of the circle. The center of the circle will be the point that is equidistant from the original two points. One advantage to this method is that it is cleaner. TurboCAD allows you to delete all construction objects with one command, so cleanup is easier. Another advantage to this method is that it provides you with more information about the relationship of the three points.

How to find the point that is equally distant from any three points

When creating a drawing it sometimes becomes necessary to find the location of a point that is equidistant from three previously defined points. This can be especially useful for finding the hinge point for a door, a switch, or a mechanical linkage. TurboCAD provides a very quick way of finding this point by using a triple point construction circle. Select *Construction* | *Triple Point Circle* and then use the three existing points as the points for the circle. Once the construction circle is drawn use *Snap* | *Center* or the *C* SEKE to select the center of the circle. The center of the circle will be the point that is equidistant from the original three points.

Using Ortho Mode to your advantage

Ortho is one of the snap modes provided by TurboCAD. When Ortho is on, TurboCAD constrains the angle of the entity you are drawing. The default angle is 90 degrees. This means that when you draw a line with Ortho mode the second point on the line must be at 90 degrees to the first point. The setting for the Ortho angle is changeable. To change the Ortho angle open the Angle page by selecting *Options* | *Angle*.

Set the Step Angle to any value you require. To use Ortho quickly, hold the *SHIFT* key down. As long as the *SHIFT* key is being pressed, Snap Ortho will be active.

Here are some great uses for Ortho:

- Using Ortho can greatly speed up drawing lines at regular angles.
- Using Ortho and snapping to the center of an arc or circle will allow you to find specific angular point on the circle's circumference.
- Use Ortho with the Irregular Polygon tool. Set the Length field to a desired value and lock it. Now you can draw a regular polygon with a particular side length.

Moving an object in TurboCAD

In TurboCAD there are two main ways of moving an object: Drag and Drop and Pick and Drop. Each method has advantages and disadvantages.

To Drag and Drop a TurboCAD object, you must:

- Select the object (or objects)
- Position the cursor over the objects reference point.
- Press the left mouse button and hold it.
- While pressing the mouse button “drag” the object to a new location.
- Release the mouse button, and the object is “dropped” at its new location.

Advantages:

- Drag and Drop can move objects to or from the symbols and block palettes.
- Drag and Drop can move windows, toolbars, buttons etc.
- Drag and Drop can move objects from one drawing to another.

Disadvantages:

- Drag and Drop ignores snap modes, geometric alignment aids, and SEKE's.
- Drag and Drop cannot be used with the coordinate fields for accurate placement.

To Pick and Drop a TurboCAD object, you must:

- Select the object (or objects)
- Position the cursor over the objects reference point.
- Left-click on the reference point. This will “pick up” the object.
- Move the cursor to a new location.
- Left-click again (or use a SEKE) to “drop” the object at the new location.

Disadvantages:

- Pick and Drop can only move TurboCAD drawing objects. You cannot move windows, palettes, or toolbars this way.
- Pick and Drop cannot move objects to the symbols or blocks palettes.
- Pick and Drop cannot move objects between drawings.

Advantages:

- Pick and Drop can be used with snap modes, geometric alignment aids, and SEKE's
- Pick and Drop can be used with the coordinate fields to accurately place an object.

Selection Methods

Selecting objects by order of their creation

TurboCAD provides two options for selecting objects by the order of their creation. The *F6* key selects objects by order of creation. When you press *F6* the first object created in the drawing will be selected. If *F6* is pressed repeatedly, TurboCAD will successively select each object in order from the first to the last. When the last object has been selected, selection will restart with the first object. If an object is already selected and then *F6* is pressed the next object in the order of creation will be selected. Hold the *SHIFT* key while pressing *F6* to select a series of objects. The *F7* key selects objects by reverse order of creation. When you press *F7* the last object created in the drawing will be selected. If F7 is pressed repeatedly TurboCAD will select each object in reverse order of creation, from last to the first. When the first object has been selected, selection will restart with the last object. If an object is already selected when *F7* is pressed the previous object in the order of creation will be selected. Holding the *SHIFT* key while pressing *F7* allows the selection a series of objects.

By using *F6* and *F7* together you can select any number of objects by their order of creation. You can determine which objects were created before or after a selected object.

Workplanes and Selector Properties

While using the 2D selector and selecting objects that have been created on different workplanes, the default workplane will change according to the object you select. However, while using the 3D selector the default workplane will not change. This can be confusing if you do not understand the concept of changing workplanes as they appear to "jump" around the drawing and do not stay consistent. Once you are aware that the 2D selector can automatically change workplanes but the 3D selector cannot, it is a very powerful function of the program.

When editing 2D objects use the *2D Selector* Mode, and objects will stay on the Active Workplane. You can quickly and easily Toggle between Selector Modes from the Local Menu. Choose *Toggle 2D/3D.*

In the 3D Selector Mode, *Place on Workplane* will move the selected entities onto the current workplane.

Selecting inside Double Lines

Closed Double Lines that have a set Brush Pattern can cause selection difficulties for entities within their interior areas. To reduce these difficulties, set the Double Line's Layer to *Read Only*, while working in these interior areas. It may be helpful to create a separate layer for this purpose.

Selecting Viewports

Normally, select the viewport by clicking on the viewport boundary. It can be hard to select the viewport when the boundary is invisible. In this case use *F6* to cycle through objects until the viewport has been selected. You can also try dragging a selection marquee in *Open Window* mode over the invisible edge. Additionally you can select a viewport by clicking on any of the entities contained within the viewport.

Selecting Region Components

If you have created a complex *Region* by combining two or more *Regions*, it's much easier to select Region components by using the Selection Info Palette.

Editing

Editing Regions

As a result of 2D Boolean Operations a *Region* is created. To edit the Region use *Select Profile* (*Right-Click* on the entity) and *Edit Node*.

By placing a closed shape entirely within another closed shape you can use the Subtract tool as a "Cookie Cutter" to create holes.

Quick calculations in the Edit Bar

One of the least known features in TurboCAD is the calculator. The calculator can be activated whenever a field in the edit bar or status bar is selected. To activate the calculator, select a field and then press *F2*. The TurboCAD calculator is not a standard button type calculator. It is an expression calculator. This means that the calculator accepts the input of mathematical expression. The result of the expression is placed into the selected field in the Edit Bar. The calculator will accept the following operations: addition, subtraction, multiplication, division, sine, cosine, square root, and equals.

The following list contains sample expressions:

- 2*3 (multiply 2 times 3)
- 2+3 (add 2 and 3)
- 2-3 (subtract 3 from 2)
- 2/3 (divide 2 by 3)
- cos(3) (find the cosine of 3)
- sin(3) (find the sine of 3)
- sqrt(4) (find the square root of 4)
- A = 6 (assign the value of the variable A equal to 6)
- B=A (assign the value of the variable A to the current value of the variable B)
- B=cos(A) (assign the value of the variable B to the cosine of the current value of A)

Operations can have standard parenthetical format so operations inside of parenthesis are performed first.

C=sin(B*(sqrt(A)))

Note: All variables retain the values until that value is changed or the TurboCAD session ends.

Changing the radius of a circle

Node editing has many interesting uses. One of the easiest uses is to adjust the radius of a circle or arc. To change the radius of a circle or an arc, follow these steps:

- Select the circle or arc.
- Select Node Edit from the local menu.
- In the Edit Bar type the desired value into the Radius field.
- Press *ENTER*.

Notice that the Edit Bar also provides you with an option to adjust the starting and ending angles on an arc.

Circle Tangent to Arc – setting radius

After clicking on the circle or arc, you can set the radius, circumference or diameter of the circle you are drawing in the Inspector Bar and press Enter, finishing the entity.

Circle Tangent to Line – setting radius

After clicking on the line (step 2), you can set the radius, diameter or circumference of the circle you are drawing, in the Inspector Bar and press Enter, finishing the entity.

Quickly Redrawing your Screen

Sometimes creating and editing drawing object leaves scraps or leftover pixels on your screen. To remove these scraps from your screen, press *F5* or select *View | Redraw*.

Calculating Area

The "Pick Point Hatch" tool gives the ability to hatch any enclosed area and with this ability comes some additional benefits as well. As a "bi-product" of the use of this tool, TurboCAD creates an enclosed polyline, matching the area that is hatched. This object can then be selected and assigned a 3D thickness to form a solid, or extruded. Another additional benefit is the ability to simply determine the area and perimeter of very complex enclosures.

To Find the Area and Perimeter of a complex object—

- First, Select the "Pick Point Hatch" Tool
- Click somewhere within the enclosure to be measured.
- Click on the "Selection Info" tab on the palette or go to *View* | *Selection Info*
- You will find the area and perimeter measurements.

Note: If your enclosure contains completely straight-line segments, these measurements should be "exact". If your enclosure also contains curves or arc segments, these measurements will be slightly less than exact due to linear segmented approximations to the original curves and arcs.

Rotating Hatch Patterns

A hatch pattern will rotate with its associated entity only in 3D Selector Mode. (The Toggle 2D/3D button will be available on the Inspector Bar, when the Select Tool is active.)

Using Overlapping Viewports for Clarity and Impact

TurboCAD has a variety of presentation options that are now available with viewport property settings, including rendering options. Solid renderings can give very realistic effects, but individual parts may not be as distinct as desired. Hidden line settings can add clarity to an assembly, but lack the realism and depth of the solid options. Both of those settings make it difficult to present text and dimensions without changing the quality of the text itself. One option then, is to have several viewports across the page-each with its own settings—Another powerful option is to overlay viewports on top of one another, each with the same view and different rendering settings.

To Create an Overlapping Viewport

- In Model Space, create your 3D objects. Make sure the "pen" color has some contrast from the "material" color and that text and dimensions are on layers separate from the 3D objects. Create new layers for each of the viewports you will be creating, LightWorks, hidden line and text.
- Create and name the view you want to present
- In Paper Space, go to *Insert* | *Viewport* and assign it to the "LightWorks" layer. Draw out the viewport and specify your named view.
- Select that viewport, and go to *Format* | *Properties* | *Viewport*—There set the rendering option to "LightWorks"
- Go to *Insert* | *Viewport* and assign it to the "hidden line" layer. Snap to the top left and bottom right corner of the existing viewport.
- Go to *Edit* | *Select by* | *Layer* and select the "hidden line" layer. Then go to *Format* | *Properties* | *Viewport*—There set the rendering option to "Hidden line"
- Go to *Insert* | *Viewport* and assign it to the "text" layer. Snap to the top left and bottom right corner of the existing viewport.
- Go to *Edit* | *Select by* | *Layer* and select the "text" layer. Then go to *Format* | *Properties* | *Viewport*—There, set the rendering option to "none" and in the layer settings there, check only "dimensions".

Changing the Size of an Object

You can scale a selection either by dragging its *handles* (the blue rectangles that appear when an entity is in select edit mode) or *edges*, or by entering values for its X and Y scale in the Inspector Bar. For 3D objects you can use handles, edges and faces.

Making a Copy

The *Make Copy* option can also be turned on or off via the icon in the Inspector Bar. If *Make Copy* is left on after the move or scale operation it will also apply to the next action. When using this option remember to turn it off when finished.

Dividing a Line Segment

It is possible to divide a line segment into equal length segments while in *Node Edit* mode. If you place the cursor over a line segment you will see the "Divide Segment" button appear at the bottom of the screen, as well as in the local menu. If you pick it, you will get a "Divide Segment By…" dialog box in which to enter the number of parts into which to break the segment.

Parallel Line

You can draw a Parallel Line, by using a segment of a polyline, rectangle or other segmented 2D entity.

You can also select the source line, and then specify the length of the parallel line and its distance from the source line in the Inspector Bar.

To create multiple parallel lines lock the distance in the Inspector Bar and then use the mouse to position the new line either above or below the existing line.

To create a Parallel line that is a different length, turn off the *Keep Length* option on the Inspector Bar. This and other options are available from the Local Menu.

Node Edit with many vertices

You cannot Node Edit entities with more than 500 vertices. Split them into smaller sections before node editing.

While it possible to node edit an entity with 500 vertices, it severely taxes Windows resources. If you have other applications running (such as a browser), it's easy for GDI and SYS resources to drop to zero, locking up the entire system.

Exploding a Polygon

After you break a polygon, the polygon becomes an open polyline, and there are two nodes on top of each other, located at the point where you broke the polygon.

Closing a Polyline

If the Polyline begins and ends at the same point, choose *Close* to draw the last segment and complete the Polyline, or simply snap to the first Vertex and choose *Finish*. Both methods produce a closed Polyline. Once a polyline is closed, TurboCAD treats it as a polygon, which means that it will be filled with the color and hatch pattern of the current brush. You can control the hatch and brush formatting through the *Properties* dialog, of the tool (before drawing the polyline) or object (after drawing).

2D Boolean Operations

Use the Nearest on Graphic Snap (SEKE "N") if you have difficulty selecting entities for 2D Boolean Operations

3D Construction

Creating Springs and Coils.

The Torus Tool is not just for doughnuts and hula-hoops - but is in fact quite a versatile tool that can be used to create complex spirals with relative ease.

To Create a Spiral:

- Select the Torus Tool and go to *Format* | *Properties* | *Revolution Shape*.
- Set the *Spiral Pitch* to a positive non-zero value, then set the number of 'coils' as desired.
- Click OK.
- Set points for the center and radius of the object, then a point for the radius of the “tube” - voilà - that's it - you've created your spiral.

This object can then be 3D-sliced so that it rests flat on another surface - or modified with other Boolean operations.

Note: To create a mirrored or reverse spiral effect set the *Spiral Pitch* to counterclockwise.

Viewing the Drawing

Using the Examine tool

Often when using the Examine tool the object will rotate off the screen. Use the *Look to Drawing Center* button to center the object on screen. You may even want to customize your interface to include this button.

Deleting a Named View

If the view to be deleted in the *Named View* dialog is inserted in paper space, the *Delete* option will be grayed out. To delete the required named view it will be necessary to remove the view in *Paper Space*. After this is done and returning to model space, a dialogue box will appear and state *Viewport is still referenced in the undo buffer. Clear undo buffer?* Click on *Yes* to complete the action. The undo buffer is where TurboCAD stores the required elements to allow you do undo commands.

Modifying a Named View

Select an area that you want to save as a *Named View* with the *Create View* tool. When the dialog box appears save the required view with the same name as the one you wish to replace. Click *Yes* when the prompt asks to overwrite the existing view.

Alternatively you can zoom to the required view and then highlight the view in the *Named View* dialog and then choose Modify.

Views of the Drawing Space

If you need to see a close-up of two parts of the drawing at the same time, or you need to see both a close-up and a broad overview, use either *Aerial View* or *Open Layout Template* (in the Window Menu).

Interface

Tooltips

Notice that if you place the mouse cursor over a tool and leave it there briefly, small yellow rectangle called a tooltip will appear beneath the tool, displaying its name. Tooltips may be disabled by going to *Options* | *Program Setup* and deselecting the Tooltips check box.

Paper Space and the Drawing Sheet

The drawing sheet size will be shown in white (or a custom color if one has been set) and the dashed lines show individual pages of paper. As well, changes in the drawing sheet size may change the amount of columns and/or rows.

Properties

When using a tool for the first time, right-click after selecting it and note the options available for that tool.

Relocating the reference and rotation handles

Both the Reference Point (yellow handle at the center of a selection) and the Rotation Handle (green handle) can be moved relative to the selection by pressing and holding the *CTRL key* and then clicking on the handle. After immediately releasing the mouse they can then be placed by using the standard SEKE commands.

Using Templates

To use a drawing for a template it must be saved in the template folder as a template *.TCT file.

Hyperlinks

You can use this feature to display pictures of special items (such as a specialized bracket or fastener). In the *Define Hyperlink* dialog, link to a JPG or GIF file on your hard drive, or to a site on the Internet. It will then appear in the Internet

Palette, when clicked with the Pick Hyperlink tool.

Limitations of the Wall Tool

Some users have found that when using the wall tool at advanced levels they find the tool has some serious limitations that prevent them from adopting this tool as their preferred method of creating walls.

- Walls cannot be filleted or chamfered.
- A wall cannot split into two lengths.
- Nodes cannot be added or deleted from a wall.
- When turning a wall into 3D, the walls appear hollow.
- Turning Caps On in a 3D wall make the wall solid but from a top view the junctions of the wall show at the corners. Unfortunately these junction lines cannot be removed without adding the walls together.
- It is difficult to make a parallel wall.
- Junctions once formed cannot be undone without deleting and then redrawing the wall.
- Blocks can become detached from the wall when layers were turned on and off, or when files opened and closed.
- Some walls, when overlaid on others, form junctions, or insertions, that are not intended.
- When inserting blocks the thickness of the walls should not exceed thickness of elements in the block - otherwise the block will not “cut” the wall.

For the above reasons it may be preferable to use the FloorPlan 3D product to draw walls and then to import the file via the FloorPlan Bridge. Alternatively use the Double Line command in preference to the wall tool.

Options

Cursor View Settings

To simplify your work and better fit your individual drawing style, TurboCAD offers three optional enhancements to the standard *plus* shaped drawing cursor. See *Options* | *Program Setup* | *Preferences*.

Aperture - Graphically display the snap aperture at the cursor intersection.

Crosshairs - Change the cursor from a small *plus* to a full-screen crosshair.

Isometric Cursor - When in an isometric view, change the cursor to display all three axes aligned with the workplane instead of only two, which are not aligned with the workplane.

Inserting pictures

You can embed a .jpeg or .gif image into a drawing using *Insert* | *Picture*. However the picture is shown in the drawing as an Icon. If you double click on the Icon the Picture will open In Internet Explorer. You can also edit the object using the tools of the source application. See *Edit* | *Object*

To make the picture appear in TurboCAD, use the *Paste Special* option and choose *Device Independent Bitmap*.

Customization

Adding Brush Patterns to TurboCAD

TurboCAD contains a hatching tool that fills polygons with a brush or hatch pattern that can be used to represent material, properties, etc. TurboCAD allows you to use your own bitmaps as brush patterns. It also allows you to create and use your own vector-based hatches. This article will tell you how to load your own bitmaps for brush patterns.

TurboCAD maintains an internal array of tables to store information used during a session. TurboCAD keeps this information inside an .INI file. The file is stored in the TurboCAD Program subdirectory. To add brush patterns we will edit this file. The file will be named TCW70.INI.

WARNING: Be sure to make a backup of your .INI file before making any modifications. Some modifications, when made incorrectly, can cause TurboCAD to crash.

Load the .INI file into your favorite text editor (editor must be able to edit and save plain ASCII text) and scroll down for a bit. You'll find the heading [BrushStyle_Table]. Under this heading you'll find the definitions for all TurboCAD's brush information. (Except for the 'Solid' brush; it's hard coded into TurboCAD.) TurboCAD's brush pattern table is actually a table of flexible user defined patterns and bitmaps. To create your own hatch pattern or load your own bitmap a certain set of required parameters must be met.

There are three main types of brush patterns loaded in the [BrushStyle_Table]. To identify a brush pattern as one of these types, brush patterns have three things in common: (1)a Style_name to identify the pattern by, (2)either a 'T' or a 'W' to denote 'TurboCAD or 'Windows and (3)either an 'H' or 'B' to determine whether the pattern is a 'H'ATCH pattern or a 'B'ITMAP pattern.

T - TurboCAD pattern, W - Windows pattern, H – Hatch, B - Bitmap

Syntax:
<Style_name>=W,B,<Bitmap_file_pathname>

Scroll down through the [BrushStyle_Table] until you reach the section labeled “BITMAP pattern table.” By default the bitmap patterns are disabled in the .INI file. Even though there is an entry in the Brush Style Table for bitmap patterns, it's commented out using the number symbol (#) This is because it's impossible to predict where the standard Windows bitmaps will reside on every machine. You can activate the Bitmap Pattern table by deleting the “#”. However, in order to use the default bitmap patterns you must ensure that the paths to the listed bitmaps are correct.

The first parameter for a bitmap patterns start is the name TurboCAD will use to identify the pattern. The next parameter required is a 'W' to indicate a Window's pattern. Currently, this is the only value allowed in this position. However, this does not restrict you from loading other .BMP files. The last parameter required is the path to the bitmap, including the bitmap's filename.

Tip: The only real restriction I've seen on bitmaps is the size of the pattern. If you've got a tile that's largely black with a small white dot in the center, when it is loaded as a brush pattern all you'll see is the black.

Example excerpt from TCW70.INI:

WB_1=W,B,c:\win95\stitches.bmp
Waves=W,B,c:\win95\waves.bmp
Straw=W,B,c:\win95\argyle.bmp

Backing Up INI File

Tcw70.ini also contains other settings such as file locations, custom paper sizes, line widths, hatches etc. If it becomes necessary to reinstall TurboCAD, you may want to back up this file first and, after reinstalling TurboCAD, reinstall it.

Setting Up the Desktop

You can control whether TurboCAD saves your desktop arrangement when you exit by setting the *Save Desktop on Exit* option in the *Program Setup* dialog. This is set *on* by default.

Chapter 10 - Using the FloorPlan Print Space Maker

Introduction

The FloorPlan Print Space Maker is specially designed to automate the process of converting FloorPlan plans into professional looking architectural TurboCAD drawings.

The main advantage of FloorPlan Print Space Maker, affectionately know as the FloorPlan Bridge, is its ability to filter the .BMF file format while at the same time supplying convenient tools to create a traditional 2D architectural layout. You can create separate layouts for foundations, floors, elevations and roofs, all from in information stored in the drawings that have been created in IMSI's FloorPlan 3D v5 product.

Launching the Bridge

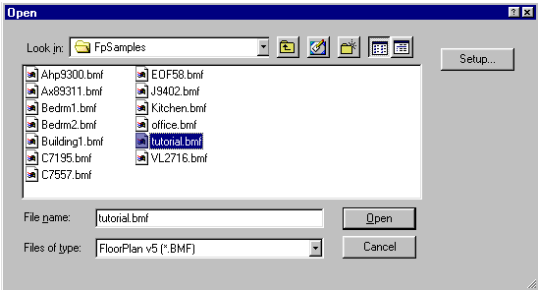
You can launch the FloorPlan Print Space Maker application either from TurboCAD or as a standalone application. If you run the Bridge by launching it from within TurboCAD you will be able to place the drawing directly into the TurboCAD environment once the layout procedure is completed.

FloorPlan Print Space Maker can open and save files of various types, despite the fact that it is mostly oriented for working with the FloorPlan files.

From the TurboCAD menu select:

Tools | FloorPlan Print Space Maker | Open

The Bridge application will open and you will be presented with the following Open dialog box:



From the *Program Files/IMSI/TCWP70/ Samples/FpSamples* folder, select the *Tutorial.Bmf* file. Click *OK* to open the FloorPlan drawing.

Please be patient

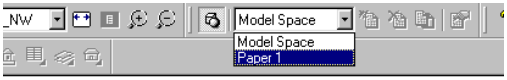
As the drawing loads, a huge amount of FloorPlan information is converted into useable 3D TurboCAD data. The more complicated the FloorPlan model the longer this operation will take. For example if the FloorPlan drawing contains many 3D symbols (such as cars or furniture), the conversion process can take several minutes on a slower computer. Please be patient as this process takes place. The results will be worth it!

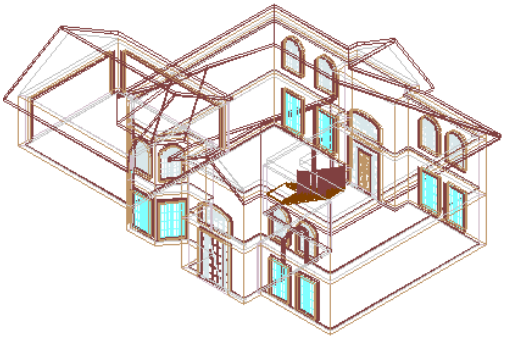
Changing to Paper Space

Once the drawing has opened you will be presented with the full 3D wire frame view of the model. The 3D model itself is not used extensively within the Bridge, but is used mainly to provide information for the 2D presentation tools that will be used in Paper Space. Viewports of the model will be created to layout a professional presentation of the building.

Switch to *Paper Space* by choosing from either the menu or toolbar:

Workspace | Paper Space | Paper 1





A clean sheet of paper will appear according to the settings under Paper Space Properties.

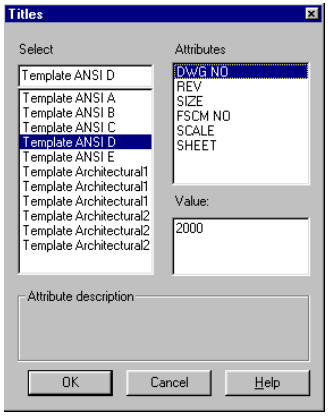
Choosing a Paper Size

You can customize you drawing sheet by using the different scaling, sheet size and inserting the title block. Text fields such as drawing name and sheet number can be entered via the properties of the title block.

From the menu or toolbar select:

Insert | Title Block

From the *Tile* dialog you can select the particular Title Block of your choice. In this case select the *ANSI D* size. The *Value* field can be adjusted for all the attributes appearing on the right side of the dialog. Each of these values will appear as text strings within the title block in the drawing.



Tip: The title block size can be changed at any time by reinserting a new tile block.

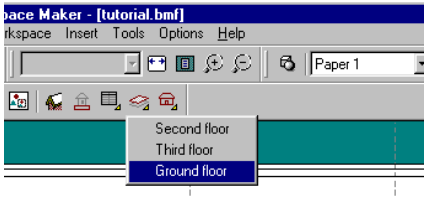
Tip: The dotted lines on the paper represent the number of pages it would require to print the drawing on the default printer selected for your computer.

Inserting Viewports

Within paper space you can automatically place viewports of the model. There are insertion tools for the foundation plan, plan views of different floors, roofs, schedules and even different elevation views.

From the menu or toolbar select:

Insert | Floors | Ground Floor

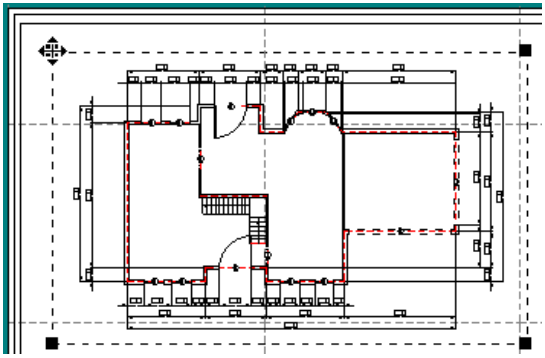


A Viewport containing the plan view of the ground floor appears selected in the middle of the paper.

Tip: If you insert the incorrect floor by mistake you can delete a viewport by *Right-Clicking* and choosing *Delete*.

Moving Viewports

Move the cursor over a black highlighted corner of the selected viewport. When the cursor changes to a four arrowed cursor click the left mouse button to pick up the viewport. Click again when the viewports is in the desired position.



Inserting Door and Window Schedules

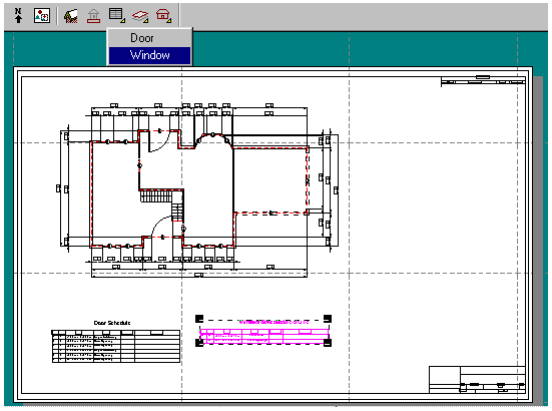
Each door and window in the Plan view contains an associated number. These numbers can be used as references to the type of window or door used in the drawing. The list displaying this information extracted from FloorPlan is automatically presented by inserting Door and Window Schedules.

To insert schedules select from either the menu or toolbar:

Insert | Schedule | Door

or

Insert | Schedule | Window



The Schedules appear in the middle of the screen but can be repositioned as in the previous example.

Adding Paper Spaces

Additional paper spaces can be added to the layout by selecting:

Workspace | Paper Space | Insert

Typically plan views will be presented on one-page and elevation views on another.

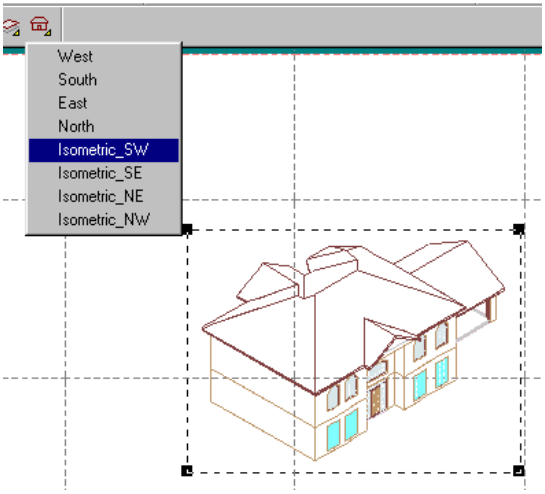
Tip: Duplicating a paper space may be easier than starting a new paper space from scratch.

Inserting Elevations

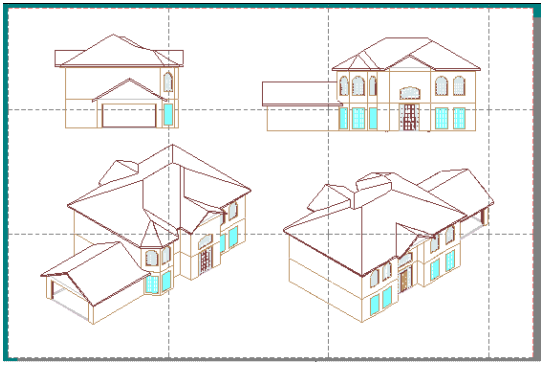
Elevations views are presented in hidden line render mode. This is a particularly useful feature for creating the traditional elevation views required in architectural drawings.

From the menu or toolbar select:

Insert | Elevations | Isometric_SW



Insert and position elevations for *North*, *East* and *Isometric_NE* to create the following layout.

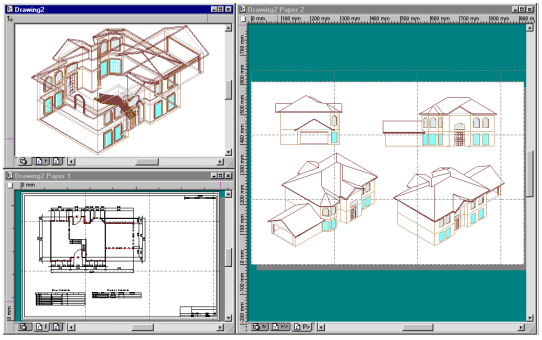


Inserting the Drawing into TurboCAD

Once your layout is complete you can automatically insert the drawing in TurboCAD by choosing:

File | Complete

The layout becomes a true TurboCAD drawing. Features of the drawing include layers, viewports; multiple paper spaces, the full 3D Building model, and embedded 3D symbols of household utilities, and more!



Tips when using the Bridge

Properties of Viewports

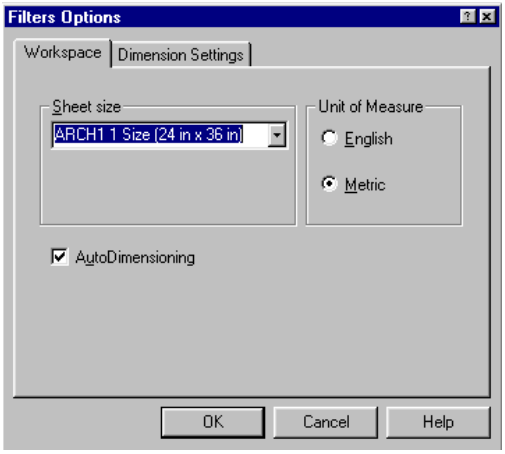
Each viewport has its own set of properties. You can access the properties by selecting the viewport and then right-clicking and choosing Properties. Within the properties dialog the scale, layers, position and outline of the viewport can be adjusted.

Default Settings

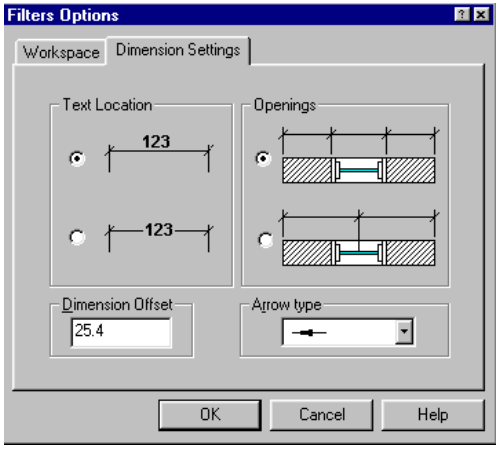
The default settings for the Bridge can be set from within TurboCAD by selecting:

Tools | Floor Plan Sprint Space Maker | Setup

Options for default page size, unit system and AutoDimensions can be set from the Workspace tab.



The Dimension Settings tab allows you to control the nature of the dimensions that are automatically created as displayed in the plan view viewports.



Paper Space Properties

Paper Space properties can be adjusted via the *Workspace* | *Paper Space* | *Properties* menu. You can adjust the size of the printer paper as well as the size of the worksheet.