

User Manuals

Trix DrawingCenter™ 6.6  
and  
TracTrix™ 6.6

[support@trixsystems.com](mailto:support@trixsystems.com)

Copyright Trix Systems AB, 2000-2014. All rights reserved.

Trix Systems | USA (978) 256-4445 | UK (020) 7193 7445 | Sweden (0) 10 451 0500  
[www.trixsystems.com](http://www.trixsystems.com) | 1075 Westford St, Suite 301, Lowell, MA 01851

Rev 66.5

## Legal Notice and Disclaimer

### NOTICE

Nothing from this manual may be reproduced, transferred, copied or translated to any language, in any form or by any means for any purpose. Trix Systems does not make any guarantees, neither expressed nor suggested which includes all implied guarantees that the program will work properly when operated in a careless way or if the system does not meet the system demands. Trix Systems disclaims any responsibility of direct or indirect damage that may be caused by loss of information, computer standstill or any other loss of data or any damage that may be caused by the program.

### LICENSES and TRADEMARKS

Trix Systems, Trix RasterServer, Trix ImageMaker, Trix Organizer, Trix FastDoc, Trix DrawingCenter and TracTrix are trade marks of Trix Systems AB and Trix Systems, Inc. AutoCAD is a registered trademark of Autodesk, Inc. Microsoft and Windows are registered trademarks of Microsoft Corporation. Acrobat is a registered trade mark of Adobe Systems Corporation. All other trade names referenced herein are either trademarks or registered trademarks of their respective holders.

Trix Systems reserves the right to change and improve the product. All examples and symbols used in the manual are made up and Trix Systems disclaims all responsibility for any resemblance.

### CAUTIONS

File formats are not standards. Variations of individual file formats exist and formats continuously evolve. Any two files sharing a common file suffix or format may not contain identically structured data. Where the software described in this manual is used to open, display, print, create or otherwise manipulate or transfer files it is the user's sole responsibility to inspect the results in order to assure accuracy and fitness for purpose. Trix Systems cannot be held liable for any omissions, additions or changes in content. The existence of variations in any format means that different software applications and computer systems, regardless of vendor, may display or print the same file differently. We recommend that you establish and employ procedures to assure yourself that the information contained in your files is presented with the integrity and consistency necessary for your purposes.

## Contents

<b>Section 1: Introduction .....</b>	<b>7</b>
<b>Why one document for two applications? .....</b>	<b>7</b>
<b>What does Trix DrawingCenter do? .....</b>	<b>7</b>
<b>What does TracTrix do? .....</b>	<b>7</b>
<b>Installation and Licensing.....</b>	<b>8</b>
Activate your license.....	8
Installation instructions .....	8
Moving the license to another computer .....	8
<b>Image types.....</b>	<b>8</b>
<b>First Use - Registering file types.....</b>	<b>9</b>
<b>Program Settings .....</b>	<b>9</b>
Default Unit .....	9
When opening a file .....	9
Show markup.....	9
Ask for missing X-ref in DWG/DXF .....	9
Ask for missing font or SHX files in DWG/DXF .....	9
Only show plot layers in DWG/DXF .....	9
Show HPGL files black/white .....	9
DWG/DXF/DWF .....	10
Dark background .....	10
Black/White.....	10
Pen widths set by Pen File.....	10
Font files directory .....	10
Hover.....	10
Mark objects automatically / Show object information.....	10
Fast Printing .....	10
Markup directory.....	10
<b>Software updates.....</b>	<b>10</b>
<b>Section 2: Reference .....</b>	<b>11</b>
<b>Using the Mouse.....</b>	<b>11</b>
<b>Menu Shortcuts.....</b>	<b>11</b>
<b>The Quick Access Toolbar .....</b>	<b>11</b>
Customize the Quick Access Toolbar .....	12
<b>Tools in the File Menu.....</b>	<b>12</b>
Start .....	13
Start - View .....	13
Start - Markup (Redline) .....	14
Start - Raster.....	14
Start – Raster Editing (TracTrix only).....	14
Start - 3D.....	15
Tools .....	15
Tools - Dimension.....	15
Tools – Dimension (TracTrix only) .....	16
Tools - Utilities.....	16
Tools – Conversion (TracTrix only) .....	17
Settings.....	17
Settings - Show/Hide.....	18

Settings - Windows .....	18
Objects (only visible when object selected) .....	19
Objects - Layer .....	19
Objects - Appearance .....	19
Objects - Area.....	20
Objects - New Entities.....	20
<b>Section 3: Functions Available in Both Trix DrawingCenter and TracTrix Applications.....</b>	<b>21</b>
<b>General Viewing, Navigation, and Printing .....</b>	<b>21</b>
Opening files .....	21
Scanning.....	21
Moving between pages and layouts .....	21
Zooming .....	21
Displaying Shortcut Reminders .....	22
Snapping .....	22
File Properties .....	22
Raster file functions .....	22
Capturing raster clips (to paste into Word, etc.).....	22
Erasing regions.....	22
Saving raster files .....	23
Vector file functions.....	23
X-refs and SHX fonts.....	23
DWG layers.....	23
<b>Scaling Functions .....</b>	<b>23</b>
Why scale? .....	23
Calculating the scale of a raster image.....	24
Cross-checking a scale .....	24
<b>Markup (Redline) .....</b>	<b>24</b>
Markup layers .....	24
Markup tools .....	25
Setting the default color and pen width for markup .....	25
Editing Markup Objects .....	25
Sharing markup .....	25
Saving markup and .TRX files.....	26
<b>Printing.....</b>	<b>26</b>
CAD files .....	26
Pen Settings.....	26
Hiding markup .....	27
Printing a partial detail.....	27
Printing Choices .....	27
Printing Pages .....	28
Watermarking.....	28
Paper head.....	28
Select area for printing.....	28
Pen selection .....	28
Print Scale .....	28
Printing using Paper Views.....	29
<b>Creating a PDF .....</b>	<b>30</b>
PDF Settings .....	30
Controlling what is in the PDF.....	30
<b>Advanced Functions .....</b>	<b>31</b>
DDE Commands .....	31
<b>Section 4 – TracTrix Specific Functionality.....</b>	<b>32</b>
<b>Symbol/Approval Stamps .....</b>	<b>32</b>

Using the Symbol Library.....	32
Creating your own symbols and stamps.....	32
<b>Saving Markup and Symbols into DWGs .....</b>	<b>33</b>
<b>Taking off Heights and Angles .....</b>	<b>34</b>
Heights and Pitches .....	34
Angles .....	34
Check .....	34
<b>Orthogonal adjust, de-skew, calibrate .....</b>	<b>35</b>
Orthogonal adjustment .....	35
Horizontal and vertical adjustment .....	35
<b>Raster Editing .....</b>	<b>35</b>
<b>Despeckle/Fill holes in rasters .....</b>	<b>36</b>
Despeckle .....	36
Fill .....	36
Cycle <b>Despeckle</b> and <b>Fill</b> to enhance thin lines .....	36
<b>Raster to Vector Conversion .....</b>	<b>36</b>
Introduction .....	36
What images work best for vectorizing? .....	37
Quick start .....	37
Functions .....	38
Scanning a drawing into TracTrix .....	38
Pre-scan checklist .....	38
Advice for vectorizing photographs .....	38
Scanning settings .....	38
Raster editing and clean-up .....	39
Techniques for selected areas .....	39
Erasing content .....	40
Bit-depth .....	40
Automatically reduce bit depth .....	40
Manually reduce bit depth .....	40
Edit lines and edges for optimal vectorization .....	41
Fixing imperfections on the pixel paths .....	41
The Raster Pen, Line and Eraser .....	41
Character Recognition .....	41
Text conversion options .....	41
Manual text conversion .....	42
Using built-in OCR feature .....	42
Start .....	42
Settings .....	43
Training .....	43
Vectorizing .....	44
Start vectorization .....	44
Trace settings .....	45
Trace method .....	45
Drawing entities .....	45
Tolerance .....	45
Intersections .....	45
Layering separation .....	46
Trace the lines and examine the results .....	46
Restart the cycle if necessary .....	46
Saving the vectors in .TRX files .....	47
Saving as a DWG/DXF .....	47
Editing vector lines and objects .....	47
Standard editing functions .....	47
Join points to form polylines .....	48

Disconnect lines .....	48
Control Bezier curves.....	48
Object properties .....	49
Select vector entities.....	49
View object information.....	49
Set the default color and pen .....	49
<b>Vector to Raster Conversion .....</b>	<b>50</b>
<b>Raster to raster conversion.....</b>	<b>50</b>
<b>Running as ObjectARX inside AutoCAD.....</b>	<b>50</b>
<b>DWG Version conversion (save back to older) .....</b>	<b>50</b>
<b><i>Appendix 1 - Supported formats.....</i></b>	<b><i>51</i></b>
<b>Raster-file formats.....</b>	<b>51</b>
<b>Vector-file formats.....</b>	<b>52</b>
Standard vector formats .....	52
HPGL Plotter files.....	52
<b><i>Appendix 2 - Creating Paper View Templates .....</i></b>	<b><i>53</i></b>
<b>Overview.....</b>	<b>53</b>
<b>Creating new frames .....</b>	<b>53</b>
<b><i>Appendix 3 – Imperial to Metric conversion table.....</i></b>	<b><i>55</i></b>
<b>Inches to Millimeters .....</b>	<b>55</b>
<b><i>Index.....</i></b>	<b><i>57</i></b>

# SECTION 1: INTRODUCTION

---

## Why one document for two applications?

As *TracTrix* software builds on and extends the functionality of *Trix DrawingCenter* the two applications share common instructions. The first three sections of this document are applicable to both applications. The final Section 4 is only applicable to *TracTrix* users.

- Section 1 - Introduction: describes the software and licensing
- Section 2 - Functions: a table of reference for the controls provided in each tab
- Section 3 - Procedures: describes how to use the functions to perform common tasks in both *Trix DrawingCenter* and *TracTrix* applications
- Section 4 - *TracTrix* specific Procedures: describes how to use the functions that are only available in the *TracTrix* application

## What does Trix DrawingCenter do?

The basic function of a viewer is to open files and display them. *Trix DrawingCenter* can do much more than this. It is designed so you can access and use the information contained in raster and vector engineering drawings in your everyday work.

With *DrawingCenter* you can print, measure, scale, markup and compare files. At the same time it protects the original files from change. It is not editing software. If you mark up the drawing the mark up information is saved in a separate file by the program (with a .TRX extension). The original file is never changed.

## What does TracTrix do?

*TracTrix* software adds the following additional features:

- Create and drop Symbols/Approval Stamps into drawings
- Save Redline, Symbols/Approval stamps into DWGs without needing CAD
- Vector to raster conversion
- Raster to vector conversion with Text Recognition
- Raster to raster conversion
- DWG Version conversion (save back to older)
- Raster editing
- Orthogonal adjust, de-skew, calibrate
- Despeckle/Fill holes in rasters
- Runs as ObjectARX inside AutoCAD

## Installation and Licensing

### Activate your license

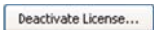
Licensing is initiated with the serial number that you received in your product delivery email. You must complete the activation process upon registering your license in the *Trix Systems License Manager*. If activation fails, you should receive an error message. The application will run in demo mode until the license is fully activated.

### Installation instructions

Follow the instructions you received with your serial number. If you need help please contact support@trixsystems.com. Keep copies of the instructions and installation files you received.

### Moving the license to another computer

Use these instructions to deactivate the license on the original computer so it can be installed on another computer. Before you shut down your original computer you must do the following.

- If you do not have a record of your serial number, open the application and go to **Help**, click **About**, then copy and save the serial number. You'll need it to reinstall the program.
- Start the *Trix Systems License Manager* application. Select . Complete the on-screen deactivation. You will then receive an email notifying you that your license has been successfully deactivated.
- On the new computer use the original installation instructions you received as though you were making the installation for the first time to install and then reactivate the license.

## Image types

*Trix DrawingCenter* and *TracTrix* handle three different types of image files. It is important to understand their differences because each type contains different information.

The first type is the **raster** image, produced when you scan a document or take a picture with a digital camera or phone. It is usually a single layer of information stored in the computer file as rows of 'dots'.

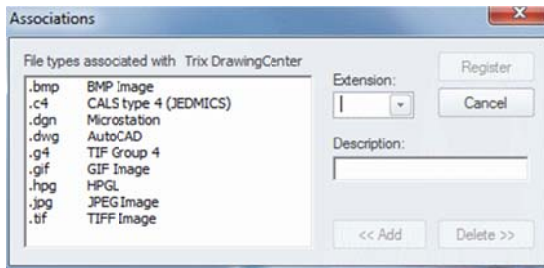
The second type is the **vector** image. This can be a DWG, DXF or DWF file created in a CAD application such as AutoCAD, a DGN created in Microstation or an HPGL file (usually with the extension .plt) created by a traditional plotter driver in a CAD application. All vector formats are mathematically based. Vector files can contain more information than raster files and are usually much smaller files – they aren't rows of dots. There may be multiple layers and views in a single vector file. Vector files may use font descriptions stored elsewhere on your computer as TrueType or AutoCAD SHX fonts. One vector file may 'call' other vector or raster files to display as part of the overall image. These are called external references or X-ref files.

The third type is the Acrobat **PDF** image. These can be either raster or vector or a hybrid mix of both.



The Trix applications enable you to simultaneously open raster, vector and PDF files. The tools available at any one time will differ according to the type of file that is open and active.

## First Use - Registering file types



The first time you launch your application the **Associations** dialog box appears allowing you to register file extensions that you wish to open with our program. The list on the left shows file types already associated with the application. The drop-down menu shows standard file extensions to add. Alternately, you can enter your own extension and

description. This dialogue is also accessible from the **Settings** tab under **File types**.

*Note:* Adding a file extension here doesn't mean the application can open it. See [Appendix 1 - Supported formats](#)

## Program Settings



The settings for the application are accessible from the **Settings** tab under **Program Settings**.

### Default Unit

This sets the default units for measurements. You can also manually change units when using the measuring tools.

### When opening a file

#### Show markup

When checked, the application displays markup by default when it is opened. This is the equivalent of toggling the **Show markup** icon.

#### Ask for missing X-ref in DWG/DXF

Check this box to be warned if required X-ref files cannot be found.

#### Ask for missing font or SHX files in DWG/DXF

The application looks for the TrueType and SHX fonts called by AutoCAD files in order to display text as originally intended. Check this box if you wish to be prompted when a font cannot be located.

See Page 23 for details about how the application looks for X-refs and SHX fonts.

#### Only show plot layers in DWG/DXF

This switches off display of layers set in AutoCAD as non-printing.

#### Show HPGL files black/white

The application displays color HPGL and PLT files as black and white.

## DWG/DXF/DWF

### *Dark background*

The application defaults to displaying vector files with a black background.

### *Black/White*

Display all lines as black-on-white (or white-on-black if combined with Dark Background checkbox).

### *Pen widths set by Pen File*

Checking this box enables you to print colored vector lines with widths determined by line color. See Page 26 for more information about how to use Pen Files.

### *Font files directory*

AutoCAD SHX fonts are not stored in the Windows operating system. If you have drawings that use SHX fonts and you wish to have them display correctly in the application you must point to the directory that stores them. To do this, check the box, then click on the ... button to browse to the directory where you have stored your SHX fonts. See Page 23 for details.

## Hover

### *Mark objects automatically / Show object information*

With these options enabled, information about markup entities is automatically displayed in the form of a bubble.

## Fast Printing

Leave this checked, unless you experience problems printing. Turning off **Fast Printing** may resolve printing issues.

## Markup directory

To store all .TRX markup files in a single directory so your markup is private to you, check the box and navigate to the directory you created to store .TRX files. Typically this directory is set up to be local to your computer.

## Software updates


You can check for updates by clicking **Search for updates**, located under the **Help** menu.

**Search for updates..**

## SECTION 2: REFERENCE

---

### Using the Mouse

- Right-click/Hold & Drag for the **Pan** tool  to position the drawing in the window.
- Roll the mouse wheel to zoom in and out without using the **Zoom** tool.
- Scroll the mouse wheel over the menu Ribbon (or tabbed menus) to switch menus.
- Right-click to find hidden menus






### Menu Shortcuts

New	[Alt – F – N ]
Open	[Alt – F – O ]
Close	[Alt – F – C ]
Save As	[Alt – F – A ]
Acquire	[Alt – F – Q – I ]
Print	[Alt – F – R – R ]
Print Preview	[Alt – F – R – V ]
Print Setup	[Alt – F – R – S ]
Publish PDF	[Alt – F – P ]
Properties	[Alt – F – E ]
Exit	[Alt – F – X ]

### The Quick Access Toolbar



This toolbar is always available in the upper left corner. You can customize it to add the tools you use most often. The tools shown by default are:

	Save markup (Ctrl+S) Markup files have the file extension .TRX.
	Undo Undo the previous action (may be repeated for multiple undos).
	Zoom in Mouse click and drag to select the required area to view. Mouse wheels can also be used for zooming in and out.
	Zoom all Removes zoom so that the entire image fits in the window.
	Select (Alt+5) Select Area. Use to select regions or items in a document for copying, printing, and manipulating. Left-click and drag to select the required area. To add additional areas to the selection hold down the Shift key and





continue to drag. Similarly you can use the Control key to subtract areas from the selection.



Select markup

Click on markup objects to select them for editing, moving or deletion.

## Customize the Quick Access Toolbar

Use the down arrow  and select  if you prefer the bar to appear lower down. Use  to toggle the Ribbon (or tabbed menus) on and off. Choose  to select and add tools to the bar.

## Tools in the File Menu



Open...

Ctrl+O

Opens a file.



Save

Ctrl+S

Save markup. For more information on saving markup, see Page 26.



Save raster as...

Use this for saving an existing raster file out to another raster format. The raster formats available are in the **Save As Type** drop-down menu.



Publish PDF

Make a PDF of the current document (with option to save to PDF or start an email with the PDF attached). See Page 30.



Acquire

Scanning using TWAIN interfaces. See Page 21 for details.



Print

Ctrl+P

Access Print menu-controls, including setup and preview.



Close

Close the current document.

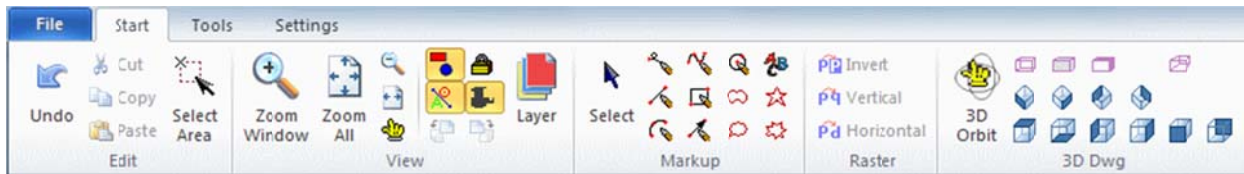


Properties...

Displays dimensions and other details about the file (see Page 22).

---

## Start



Undo

Undo the previous action (may be repeated for multiple undo).



Cut

Ctrl+X

For deleting markup and placing it in the clipboard.



Copy

Ctrl+C

For copying selected markup to the clipboard.



Paste

Ctrl+V

For pasting markup from the clipboard onto the markup layer.



Select Area

Alt-5. Add another area with SHIFT.  
Remove part of area with Ctrl.

Use to select rectangular regions in a document for printing.

## Start - View



Zoom Window

Zoom in  
(or use scroll wheel)

When you open a file the zoom tool is automatically selected. Click and drag to create the zoom. Note: this click and drag method is different from the less precise single-click zoom used in other applications. The zoomed-in region is delineated by a dashed rectangle.



Zoom All

Removes zoom so that entire image is displayed in the window.



Zoom out

(or use scroll wheel)

Click to zoom out to previous magnification.



Adjust to width

Fit the image in the window's width.



Lock Zoom

Newly opened drawings will be displayed at the current level of zoom.



Pan

Hold down left mouse button to pan inside window.



Filled objects

Turns display of fills on or off.



Markup

Toggles display of markup and symbols on or off.



Drawing

Toggles display of CAD image on and off.



Rotate tools

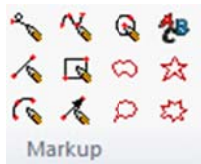
Rotates raster images in 90° increments CW or CCW.

## Start - Markup (Redline)

Markup is also described on Page 26.

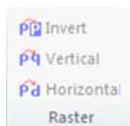


In order to Select an Object this tool must be active.



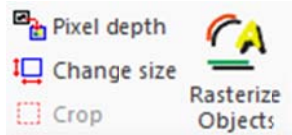
Markup drawn with these tools never changes the content of the original file. Markup is saved into a separate file with extension .TRX.

## Start - Raster



Invert the color values in the raster image (e.g. black becomes white).  
Rotate the raster image on either vertical or horizontal axis.

## Start – Raster Editing (TracTrix only)



Reduce or increase the bit depth of an image.



Use to edit the sheet size and resolution of a raster image. Select a new size from the list or enter a new width and height to size the raster.



Crop the image. This is only enabled when a raster area has been selected using the **Select Area** tool.



Use to convert vector lines or markup onto the raster layer.

Add items with + SHIFT  
Remove items with +  
Ctrl



## Start - 3D

This group is inactive for 2D files.



3D Orbit rotates 3D files for viewing from all perspectives.

Right-click to pan the 3D image. 3D Orbit must be selected to access the 3D tools shown below.



Display a wire frame image without surfaces.



Remove hidden lines.



Shade surfaces fully.



Show the model in perspective.



Top, side or end view.

## Tools



### Tools - Dimension

Scaling procedures are described on Page 23.

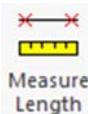


Use this to set the scale of the drawing if you already know the scale.



(with optional Snap)

If you do not know the scale of a drawing and there are dimensions shown in the drawing use this tool to calculate the scale.



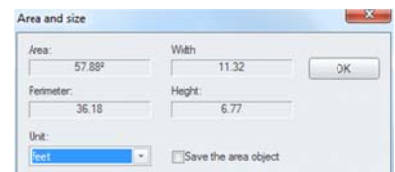
(with optional Snap)

Once a scale has been set in a drawing you can take off a length by clicking on two points in the drawing. Then right-click/**Exit** to display the length.



Add area with **SHIFT**  
Deduct area with **Ctrl**

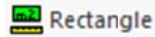
This tool automatically seeks out boundaries, such as in a room, and measures area and perimeter. When the area you wish to measure has been found, right-click and **Create an area object**. If the tool misinterprets the desired area try starting from another point. To retain the area as visible, hatched, markup, check the **Save the area object** box.





### Polygon

Use this tool to take measurements of a non-rectangular region. Click successively on nodes, and then close the polygon by right-clicking/**Close**. Completed polygon shapes can be edited by selecting a node and dragging. To retain the area as visible, hatched, markup, check the **Save the area object** box.



### Rectangle

Use this tool to define and take measurements of a rectangular region. To retain the area as visible, hatched, markup, check the **Save the area object** box.

## Tools – Dimension (TracTrix only)



Height

Check

Angle

Use these tools to take off heights of buildings, measure angles such as roof pitches and check accessibility space.

## Tools - Utilities



DWG  
Size

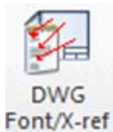
DWG  
Font/X-ref

Compare  
Utilities



DWG  
Size

Resize DWG, DXF or DWF files for printing by selecting a pre-set document size (e.g. ANSI C), entering dimensions or changing the scale. *Note:* this will not change the size of the image on screen.



DWG  
Font/X-ref

Displays names of fonts and X-refs called by DWG or DXF files, and names of font substitutions made if any fonts are unavailable. If an X-ref is missing the panel displays a message to this effect. Resize the panel to reveal long path names.



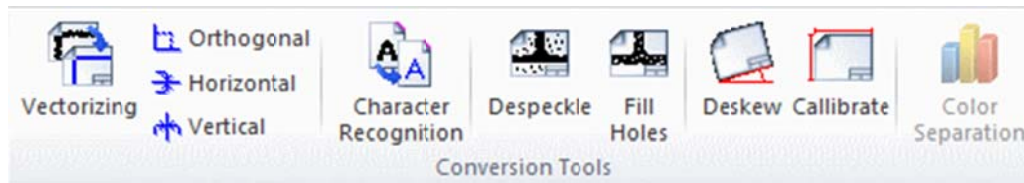
Compare

When two revisions of the same drawing are open, use **Compare** to display the differences between the two. Select the original and revised versions with the round buttons and click on **Compare**. The application will create a new drawing showing deletions in red and additions in blue. If the drawings are different sizes, use the Manual Adjustment to align content before starting the comparator. Check the 'Fix origin' box if two DWG files are to be compared in Model Space.





## Tools – Conversion (TracTrix only)



Launches the dialog box to begin vectorizing. (Raster images only).



Use on vector/markup layer after vectorizing to 'square-up' vector line corners and intersections.



Realigns (deskews) vector lines horizontally and vertically.



Launches the OCR program to convert raster text to ASCII text. (Raster images only).



Despeckle cleans images by removing small clumps of pixels that are not required in the drawing. (Only available for 1-bit images)



Fills in white pixels in black regions. (Only available for 1-bit images)



Rotates raster entities to deskew a crooked drawing.



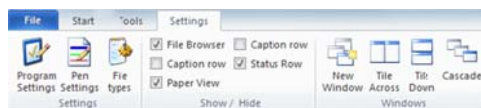
Calibrate adjusts the image size and scale on both x and y axes.



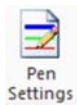
Use to reduce the bit depth of the image to a limited range of spot colors.



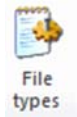
## Settings



**Program Settings** are applied to the entire application. They are described on Page 9.



Use **Pen Settings** to set specific line weights for corresponding colors in a vector file. Instructions for how to use Pen Settings are detailed on Page 26.



Used to manage file type associations (by file extension). See Page 9 for details on registering and de-registering file extensions.

## Settings - Show/Hide



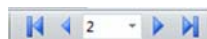
**File Browser** Displays **Explorer** tab on the left to enable the **File Browser** and slide shows. See Page 21.



**Caption row** Displays information about drawing above main window. The same information is also displayed when cursor is rolled over the file name tab at the foot of the main window.



**Status Row** Displayed at the foot of the main window the **Status Row** provides access to viewing and navigation tools, and key points of reference:



Navigate pages or layouts in multi-page documents.

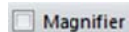


Navigate between documents (if multiple documents are open).



Use with scroll wheel

In multi-page documents, this control toggles the activation of the scroll wheel between page navigation mode and zoom mode. In navigation mode, the scroll wheel tool can instead be used to pan.



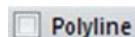
Keyboard Toggle: Z

Enables the **Magnifier**. The cursor will act as a hovering magnifying glass. For details on using the **Magnifier** and other viewing techniques, see Page 21. The **Magnifier** automatically disables after one click.



Keyboard Shortcut: S

Check **Snap** to have your markup and measuring tools snap (jump to) lines and nodes on the drawing.



Keyboard Shortcut: P

Use **Polylines** to join vector-line end points to form a continuous polyline. A key icon appears, enabling the points to snap together.

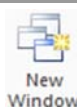


Displays the cursor coordinates. 0,0 is top left.



Displays the name and color of the active markup layer.

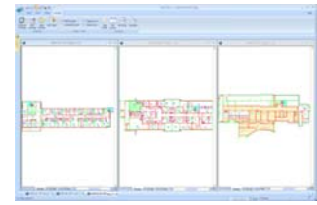
## Settings - Windows



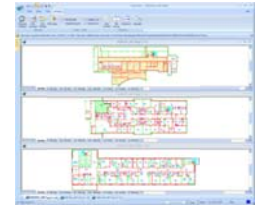
Opens a new window containing a copy of the current document. Use this to zoom in to details in different regions of a drawing and view them side by side.



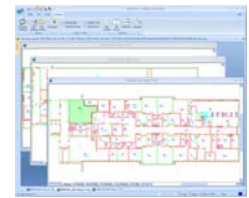
Displays open windows in vertical tiles.



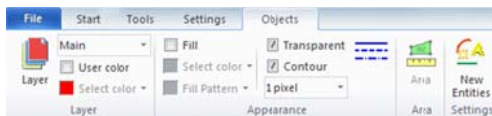
Displays all open windows in horizontal tiles.



Cascades tiles in window.



## Objects (only visible when object selected)



### Objects - Layer

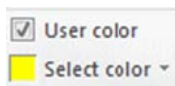
The Objects tab is visible whenever a markup object is selected.



Opens the Layer Control. Assign objects to a different layer and/or color here. See Page 23.

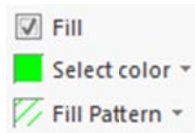


Use this drop-down menu to assign the selected object(s) to a specific markup layer. See procedures for markup layers on Page 24.



Use to change the color of an entity from the default (which is set by the Layer properties) to a user-selected color.

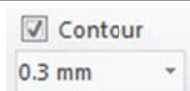
### Objects - Appearance



Use this box to select a fill color and pattern for entities with boundaries (i.e. rectangles, polygons). When the Fill box is checked, Select color and Fill Pattern become available.



Set transparency on markup entities.



The edges of filled entities are displayed as solids if the Contour box is checked. Use the sizing window below to set the width of the edge.

## Objects - Area

---



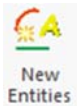
SHIFT  
to select  
multiple entities

Sum areas. For use when you have multiple area-markup objects. Shift select each area object in succession and then click on the Area icon to display the total area for all the selected objects.

---

## Objects - New Entities

---



objects.

Record the characteristics of the selected object and use these for all future markup, either of the same type or for all new

---

## SECTION 3: FUNCTIONS AVAILABLE IN BOTH TRIX DRAWINGCENTER AND TRACTRIX APPLICATIONS


---

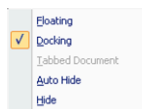
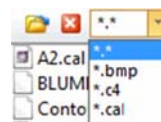
If a topic has been covered in Section 2 it is not repeated here.

### General Viewing, Navigation, and Printing

#### Opening files






Roll-over the orange **Explorer** tab and select the **Push Pin**  to dock the Explorer window. Access directories in the top frame and individual files in the bottom frame. Double-click on a directory to open/close. Use the drop-down box to filter for file type.



To reposition the Explorer, right-click the lower panel for a menu. Float the window off to make more workspace available.



You can 'slide show' files that are in a single directory. Use the **Start** button  to start a slide show. Each image in the folder will successively display for 3 seconds. Duration can be changed with the drop-down menu. Use the Stop button  to end the show. Reduce memory use by using **Close Previous** . Otherwise all the files will stay open in the application.

#### Scanning

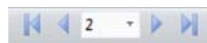
Scan directly into the application from a scanner with a TWAIN interface using **File – Acquire**. You can then markup and save the scan as a raster file.

Before you can scan you must establish a connection to your scanner by choosing **Select Source**. If your scanner has a TWAIN interface, you will see its name listed. Select it.



Your choices are then to use the scanner manufacturer's interface or the application's interface to make the scan.

#### Moving between pages and layouts



Arrows at the foot of the main window enable you to move between pages and layouts.

#### Zooming

When you open a file, the **Zoom Window** tool is automatically activated. Click and drag to define the zoom area. Click **Zoom All** to display the entire image in the window. An alternative for zoom control is to roll the mouse wheel.

On-the-fly magnification can be done using the **Magnifier** toggle. Press the Z key to activate the magnifier. A circular area around the cursor will act as a magnifying glass. Moving the mouse moves the position of the glass.


If you use the **Magnifier** in conjunction with a measuring tool and you click the mouse, the click point is registered, and the magnification disappears. This assists with precise measurement.

## Displaying Shortcut Reminders

View the keyboard shortcuts by pressing the Alt button. The text or digits corresponding to keys appear over the controls. After you use a shortcut (or Alt) the shortcut cues will disappear.



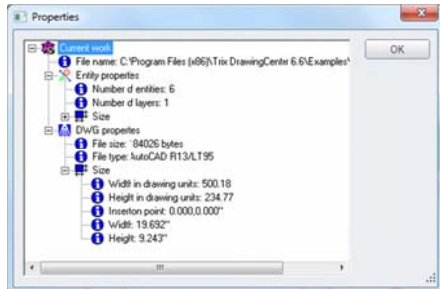
## Snapping

 **Snap** is used to automatically snap (jump) to lines and nodes on the underlying image. This means you do not have to spend time positioning the cursor precisely over a desired point. Instead, as you move close to the point, the cursor will automatically find it and snap to it. Snap activation can be toggled on the keyboard by pressing the S key or by clicking the checkbox in the **Status Row** at the base of the window. Enable/disable the Status Row via the checkbox in the **Settings** tab.

The size of the aperture (the little red square) can be adjusted. Right-click, then click **Properties** to access the panel. Increase the aperture to widen the snap area and decrease it to tighten the snap area. Snap works best when the drawing is zoomed out.



## File Properties



Select **Properties** in the **File** menu to display information about the selected file.

## Raster file functions

### *Capturing raster clips (to paste into Word, etc.)*

Use **Select Area** to define an area to copy. Then right-click the selection and select **Copy**. An image of the area is now on the computer's clipboard. Use this to paste detail into reports or presentations.

### *Erasing regions*

Since the original file cannot be changed the approach is to white-out the area to be hidden by marking it up with a white rectangle. You can then cover this with new detail or text markup. To do this, select the **Rectangle** tool. Create the rectangle and change the fill color to white.

### *Saving raster files*

Depending on the format of the original raster image opened you may be able to save it other raster formats using **Save raster as**, accessible from the **File** menu. The raster formats available are listed in the **Save As Type** drop-down menu.

### Vector file functions

#### *X-refs and SHX fonts*

X-refs and SHX fonts are fully supported. The program looks for Xref files in three ways:

- Using the absolute path specified in the source DWG file;
- If the path is not found, using the specified path applied relative to the directory now containing the source DWG (for X-ref's with filenames like ...\\...\\X-ref.dwg);
- If still not found, searching the directory containing the calling AutoCAD file.

In **Program Settings** you can enable a warning about missing X-refs and fonts when opening a file.

To view the X-refs and fonts called-for in a file, select DWG Font/X-ref under the **Tools** tab. Substitute fonts used are shown here if the original font is not available. If an X-ref is missing the panel displays a message to this effect. The panel may be resized to view long path names.

SHX fonts are used only in AutoCAD files. These font files are not stored in the DWG file. A path to your SHX font directory should be specified in the **Program Settings**. If you do not have a required SHX font the application substitutes another font. TrueType fonts are also used in AutoCAD files. The application will use whatever TrueType fonts are available in your operating system and make substitutions for any that are missing.

#### *DWG layers*

DWG/DXF layers are defined in the original AutoCAD file. They cannot be altered in the application but you can use the check boxes in the **Layer** control panel to control the visibility of each layer. There are also **Show all** and **Hide all** buttons.



To save a selection of layers for repeated use click the **Read in** button. This will create a file containing the selection with the file extension 'LST'. This file may be given any name you choose. To reuse a layer file click on the **Edit** button and select the file you require.

### Scaling Functions

#### Why scale?

A drawing must be accurately scaled in order to obtain accurate measurements. The application provides the functionality to measure lengths, perimeters, and areas in real world units (e.g. millimeters, inches, square-yards). In order to measure accurately, you must scale.

Most raster-images need to be scaled because they do not contain scale data, and are assigned a 1:1 ratio by default. Vector files, on the other hand, usually have some scale ratio information built-into the file. To see it, go to the Modelspace tab and click **Set Scale** from the **Tools** tab.

Scales work only in drawings that represent a single plane, typically a front, side or top view. Scaling will not operate in drawings presenting isometric (3D) perspectives.



## Calculating the scale of a raster image

Scale tools are under the **Tools** tab. There are two ways to scale your drawing:

- Use **Set Scale**, and then enter the decimal value of the drawing's scale in the **Document** scale panel that appears (assuming the drawing was scanned at 100% if it is a raster image). A drawing showing a scale of [  $\frac{1}{4}'' = 1' - 0''$  ] translates to a decimal scale of [1:48]. A fraction/decimal conversion table is in [Appendix 3](#) on Page 55.
- Use **Check Scale** to set the scale using a known distance between two points. Click once on the starter point—a visible line appears and moves with your cursor (if needed, press Z to activate the magnifier)—then click again at the end point. The document scale dialogue box opens, enabling you to enter distances and specify the unit of measurement. Then round the scale to the closest decimal (i.e. 1: 48.065 would be correctly rounded to 1:48).

Scale need only be set once for each file. The application will store the scale (and markups created for the image) in the .TRX file associated with the original file.

## Cross-checking a scale

You can also cross-check your scale with the **Measure Length** tool under the **Tools** tab. Measure off a known distance. If the measurement shown in the window matches the line dimension on a drawing, then your scale setting is correct.

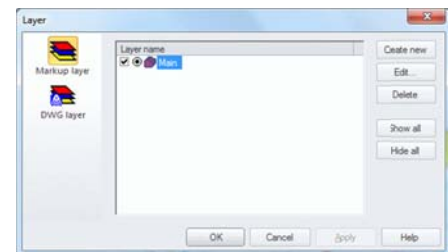
*Note:* The scale may change within a drawing—different parts of a drawing can contain detail drawn at different scales. Check to see that the scale you have set is appropriate to the detail you are measuring.

## Markup (Redline)

### Markup layers

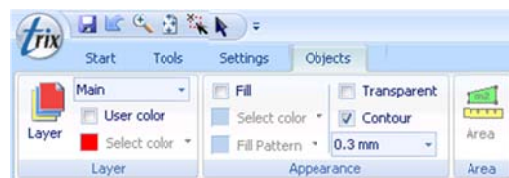
When a file is first opened a single empty markup layer is created, named 'Main'. Access the **Layer** control switch in the **Start** tab (or if Markup is currently selected, in the **Objects** tab).

Additional layers can be added using **Create New**. Set the color of the layer using **Edit**.



Create different markup layers for each user or team. The checkboxes are used to set layers to be visible.

While many markup layers can be seen at the same time, only one markup layer can ever be *active* at a time—the *active* layer being the one currently in use for markups. Use the radio buttons to select the active markup layer. The active layer is also indicated in the status row at the bottom right of the main window where you see an 'L'—the status bar (page 19) must be turned on for this to be visible.





Layer management is accessible under the **Objects** tab. This is active only after markup is selected. You can assign markup layers to selected objects here.

## Markup tools









The markup tools are available by clicking on their respective icons under the **Start** tab. With the **Hover** option enabled in **Program Settings**, object information is automatically displayed in the form of a bubble on rollover.

### *Setting the default color and pen width for markup*

There are two choices for the default color used by the markup tool. You can either have the color defined by the color of the markup layer in which you are working, or choose a color irrespective of layer. Go to the **Objects** tab and click on **User Color**. Select the color to use.

### *Editing Markup Objects*

Use the **Select tool** to select the markup to edit (use with Shift to choose multiple objects or **Ctrl+A** to Select All). To resize an entity click on a control point (a square box on a corner of a markup element) and drag with the mouse. Right-click on the markup to access a menu of editing tools. Edit options will vary depending upon the type of object selected (text, rectangle, line, clipart, etc.).

-  **Rotate** Outlines the markup and transforms the cursor into a crank. Drag the mouse to turn the crank and rotate the markup.
-  **Move side** Enabled only for polylines, this tool allows you to grab and skew a segment of a polyline, leaving some points intact.
-  **Insert corner** Adds an additional control point to a line. Click on the point where the insertion is to be made. Right-click/Insert corner. See Page 22 for a description of how these tools work.
-  **Cut** Cuts the markup and places a copy on the clipboard.
-  **Copy** Copies markup or the selected area to the clipboard. All or part of the image can be copied to the computer's clipboard for pasting into other images in the application or into external applications, such as Microsoft Word or PowerPoint.
-  **Paste** Pastes markup from the clipboard. If pasting into *Trix DrawingCenter* or *TracTrix* the drawing into which you paste must be active. To activate an image, click inside it using the arrow cursor. Not all applications accept pasting and some may accept pasting of raster clips but not markup.
-  **Delete** Deletes the selected markup.
-  **Properties...** For markup shapes this displays the aperture for the **Snap** feature and a switch to **Create polylines**; for markup text this enables editing of the text; for raster clips this displays properties of raster entity/region.

## Sharing markup

If your colleagues also have *Trix DrawingCenter/TracTrix* and you are on the same network using files on a file share you can see one another's markup when you open the file.

For users without Trix software you can share files, complete with markup, by publishing the file as a raster PDF using the **Publish to PDF** option in the **File** menu. Choose **Send as e-mail** to automatically open a new email message with the PDF of your file, complete with any visible markup, already attached, or save the PDF file locally. The size of the PDF you create, as well as the dpi and other attributes, can be adjusted in PDF Settings.

## Saving markup and .TRX files

Markup and settings created in the application is saved into a separate file. This file is automatically given a name identical to the original with the addition of a new file extension .TRX. For many users the only noticeable effect of this is the appearance of what appears to be a duplicate file in the directory containing the image files. If the original file extension has been associated with the application, clicking on either file will open the file.

If a drawing's file name is changed you must also change the name of the related .TRX markup file. For example, if file *<original name.tif>* is changed to *<new name.tif>* you must also change *<original name.tif.trx>* to be *<new name.tif.trx>*.

To save markup as you work click on the  **Save Markup** icon on the **Quick Access Toolbar**.

By default the application saves .TRX files to the same directory in which the original image file is stored. This is the most logical place to store the markup data when working collaboratively with other users of the application as this enables them to see the same markup when they open the file from the same directory.

Alternately, you can designate a separate directory for the storage of the .TRX files. This setting is applied to single workstation installations of the application. It enables you to maintain individualized mark up for the images<sup>1</sup>.

Use **Program Settings**, accessible from the **Settings** tab, to specify a path to the directory where you wish to store your .TRX files. Click the ... button to browse to and identify the directory.

## Printing

### CAD files

Use **DWG Size** under the **Tools** tab to specify a unit of measure and select a document size. Changing the document size automatically adjusts the height, width, and scale in the fields below. Manual entry of the desired width, height, or scale is allowed—the application automatically adjusts the document size to fit.

### Pen Settings

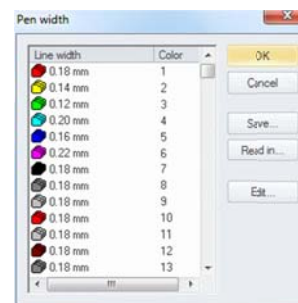
The line work in DWG, DXF and HPGL files is typically in a variety of colors, making it easy to distinguish between design elements when viewing it on screen. Any given CAD or HPGL file can contain up to 255 different colors.

---

<sup>1</sup> Advanced sharing and collaborating using markup is supported in Trix FastDoc and Trix Organizer document management software, available separately from Trix Systems.

If you print to a monochrome (black and white) output device or printer the color distinctions are lost. To recreate the distinctions in the form of varying line widths (or line weights) the application uses **Pen** files. Access the control panel for this using **Pen Settings** under the **Settings** tab.



The **Pen width** window displays the current pen widths. By default all colors are assigned the same pen width (0.18 mm). The application always uses millimeters as the unit of measure for pen widths. To alter the **Pen Settings** click once on the line item to highlight it, and then click **Edit**.



Click **Save** to store a set of pen widths for future use. This creates a file with the extension .PEN which contains the values of the widths as you defined them—the first line contains a width for color 1, the second for color 2 and so on. Pen files are simple text files that can be opened and edited in Notepad.

To re-use a previously created pen file select **Read in**. Multiple pen files can be created and saved.

## Hiding markup

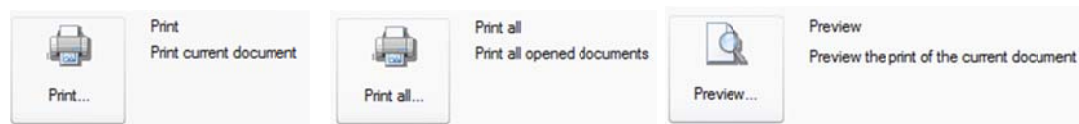
Use the **Vectors and Markup** on/off toggle  to display or hide markup before printing. The **Drawing** icon  can be used in a similar fashion to print out only markup. (These controls also apply when creating a PDF.)

## Printing a partial detail

To print a sub-portion of a drawing use the **Select Area** tool. Click and drag to select the region to be printed. Use **Ctrl+P** or **File—Print—Print** and choose **Selected Area** in the print control box.

## Printing Choices

The **File – Print** menu provides the options to



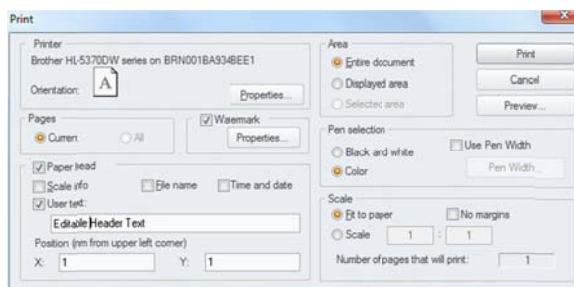
There is also the option to change **Printer Settings**, such as orientation (Portrait vs. Landscape) or paper size/source.

## Drawing Specific Controls

Options in the **Print** control box are:

### Printing Pages

If the file is a multi-page document, this round button gives you the choice of printing just the current page or all the pages in the document.

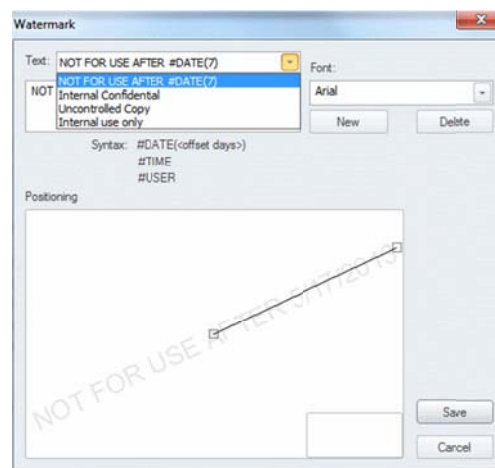


### Watermarking

Checking the **Watermark** box includes the currently selected watermark in the print. Clicking on **Properties** brings up the **Watermark** control panel where you can select the Watermark and create new ones.

### Paper head

By using the appropriate check boxes, you can include the scale, date and time, file name or a user text string at the head of the print. You can also position the heading on the page using the **Position** settings.



### Select area for printing

Use the round button to select the entire image, the extent of the image as seen in the main window, or a selected area (see [Printing a partial detail](#), page 33, for how to select an area).

### Pen selection

Use the **Black and White** or **Color** round button to set use of color in the print. In DWG, DXF and HPGL files, the width of lines can be set according to their original color values using a pen file (for information on how this is created see Page 26). To use a pen file, check the **Use pen widths** box and click on **Pen Widths** to select the pen file to be used.

### Print Scale

To use as much of the printable area as possible, select **Fit to paper**. To use a scale which is in a fixed proportion to the original scale of the image, check the **In relation to the original document** box. Then enter the ratio that you want to use to scale the image. (For example, to quadruple the size, enter 4:1. To halve the size enter 1:2.) When the ratio is entered, the number of printed pages that will be produced is indicated below the scale. By default, a small margin is added around the edge of each image. To switch this off check the **No margins** box.

HPGL and raster files are opened 'actual size'--this means that if you print them at a scale of 1:1, they will print just as they were originally intended. DWG/DXF/DWF files are much more complex as they may not contain any size information. DWG, DXF and DWF files are described as 'unitless'. Nevertheless the application attempts to best establish a size for you. You can view and change the sheet size in the main program window using **Tools—DWG Size**.

## Printing using Paper Views



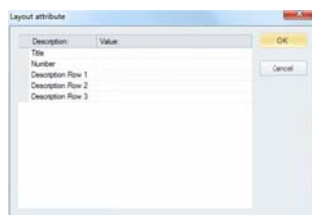
The **Paper View** tab in the left hand margin expands to show pre-stored frames that can be used to create and print framed drawings when there is no existing frame in the drawing or detail being viewed. The frame may contain a title block. Essentially these are local layouts.

If the frame contains text elements these fields are used to add textual information describing the drawing. When a frame is added the user is prompted to enter text to populate these fields.

The frames appear as thumbnails in a column to the left when the **Paper View** tab is clicked.

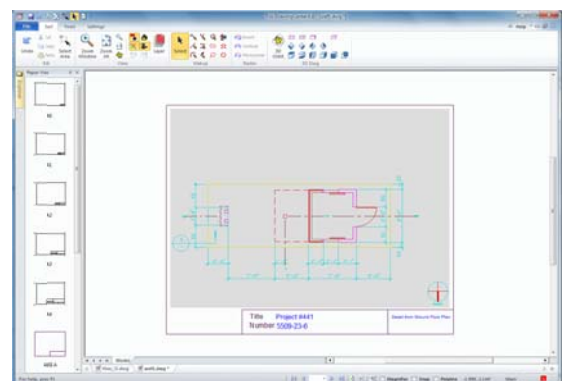
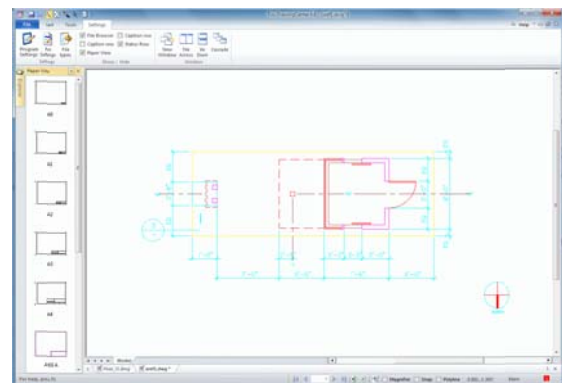
For example: you have a drawing containing a detail and no frame. You want to make a PDF of this but it needs the type of information added that would normally be found in a title block.

Drag a preformed frame from the **Paper View** panel onto the drawing. You will be prompted to enter text to fill the information fields.



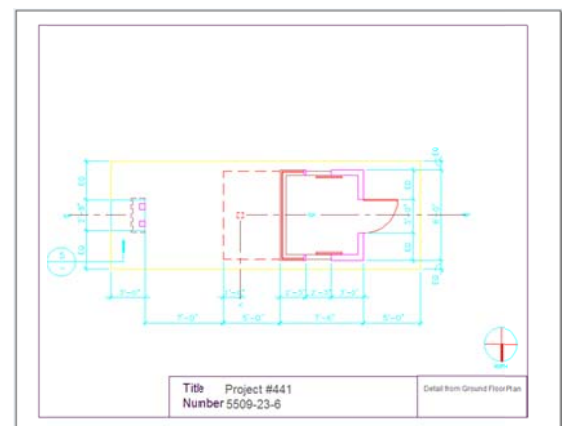
The frame appears in the drawing with the portion of the drawing that will be included shown in translucent grey.

Drag the frame to position it to cover the required area.



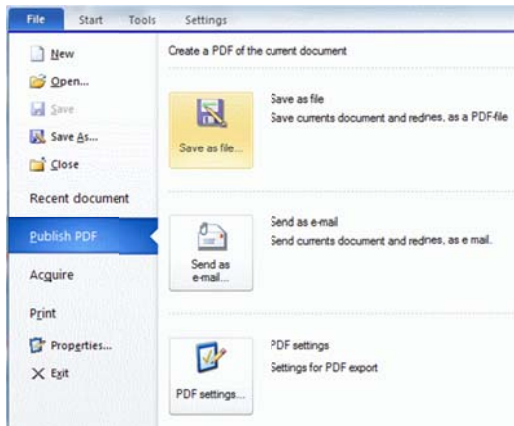
Now create a PDF (or print) as usual. The resulting output made will then appear with a frame and text.

The frame can be manipulated and deleted like a markup object.



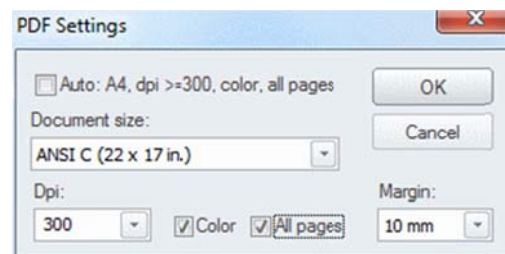
# Creating a PDF

## PDF Settings



Before using the **Save as file** or **Send as email** functions under **File – Publish PDF** you should create the settings that govern the creation of the PDF file.

When you first select **File – Publish PDF – PDF Settings** uncheck the Auto check box.



Choose **Document Size** and **DPI** (dots-per-inch, the resolution of the file). To prevent reverse engineering of intellectual property, the application produces archival quality PDF/A PDFs. These are raster images so the higher the resolution the greater the detail that can be captured.

The **All pages** check box controls whether the PDF contains all the pages from the drawing or just the displayed image.

## Controlling what is in the PDF

Before creating your PDF use the toggle buttons from the **View** menu to display or hide Markup, Fills, Raster content and CAD content.

If you previously selected the **Watermark** check box in the print dialog the Watermark will be included in any PDFs created.

To limit the extent of the drawing use the **Select Area** tool and check the **Only selected area** box in the **Save as** dialog.



## Advanced Functions

### DDE Commands

Dynamic Data Exchange (DDE) provides a way for Windows programs to share data and interact with one another within your Windows operating system. Using DDE commands, Windows exchanges information by requesting data from one application and instructing another application to do things. Here is a list of the DDE commands available and an explanation of usage for each:

**#Open(File name[;File2;File3;...])** Opens one or many files in the application.

**#Close([File name])** With no filename all files will be closed.

**#Exit()** Exit the application.

**#Print(Filename;Scale;Printer;Paperhead;Scaleinfo;Showname;Time;Textinfo;Text)**

Filename File to print

Scale 0=Fit(default), 100=1:100

Printer "Printer name"

Paperhead 0=No, 1=Yes

Scaleinfo 0=No, 1=Yes

Showname 0=No, 1=Yes

Time 0=No, 1=Yes

Textinfo 0=No, 1=Yes

Text "User text"

Examples of how it could look in the Explorer:

Open: #Open(%1)

Print: #Open(%1)#Print(%1)#Close(%1)  
// Default printer and fit to page and no paperhead info


Printto: #Open(%1)#Print(%1;1;%2)#Close(%1)  
// Selected printer, 1:1 no paperhead info

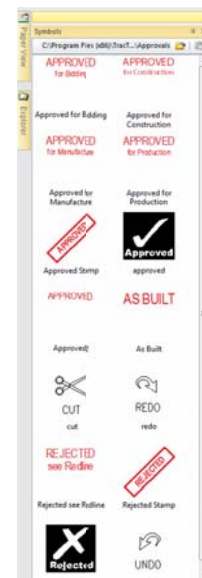


## SECTION 4 – TRACTRIX SPECIFIC FUNCTIONALITY

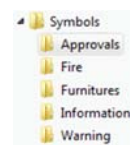
### Symbol/Approval Stamps

#### Using the Symbol Library

 *TracTrix* is supplied with a basic library of symbols that may be inserted into drawings. To access the symbols click on the tab in the left hand border. This opens the current folder of symbols. Select the symbol you wish to insert and drag it into position on your drawing. Once the symbol is in position it can be resized by selecting and stretching. Use a right mouse click to rotate.



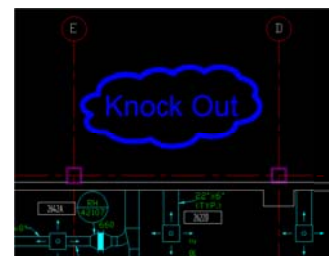
Symbols displayed in *TracTrix* are stored in a separate **Symbols Layer**. You can use the **Layer** panel display of symbols on an off. EMF files are used to store symbols in regular folders. To access a different folder select the folder icon at the top of symbol panel and navigate to the required folder. The supplied set of symbols can be found in the **Symbols** folder in the *TracTrix* application folder.



#### Creating your own symbols and stamps

You can create a symbol by copying an area from an existing CAD file displayed in the viewer or markup created using *TracTrix* and pasting this into the symbol library.

In this example the *TracTrix* markup Tools have been used to create a Knock Out cloud.



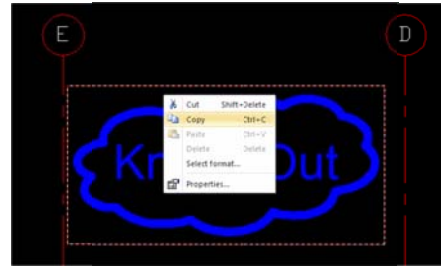
To make the Knock Out cloud into a reusable symbol use the **Select Area** tool to draw a boundary around the cloud.





Right mouse click and select **Copy**.

The clipboard icon above the **Symbol** panel is activated.



Fill in a name for the new symbol.



The new symbol appears in the **Symbol** panel.

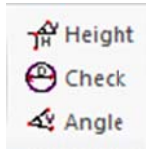


## Saving Markup and Symbols into DWGs

Markup and symbols that have been inserted into DWG files using *TracTrix* can be saved into Model Space in the DWG so that they are visible and available when the file is opened in CAD. To do this use 'File – Save As' and choose a DWG format. You will be prompted to allow markup and symbols to be stored in the newly created DWG.

NOTE: Symbols created from raster images (scans) will not display when saved into CAD files.

## Taking off Heights and Angles

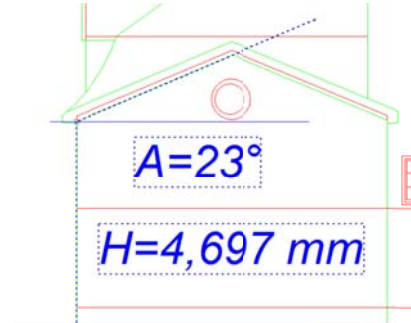


The **Height** and **Angle** tools place the measurements as regular markup on the drawing. This can be stored and manipulated in the same way as other markup objects.

### Heights and Pitches

The **Height** tool is positioned over a wall with the blue upper and lower lines top and bottom. The height is displayed in the  $H=$  box. The upper blue arm can then be rotated to take off the angle of a roof pitch. This is displayed in the  $A=$  box.

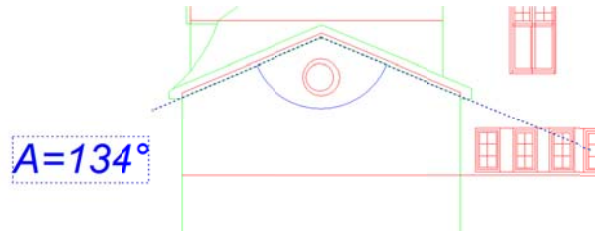
Both boxes can be selected and moved.



### Angles

The **Angle** tool provides a digital protractor. Drag it into position and manipulate the arms to encompass the required angle. The measurement is shown in the adjacent box.

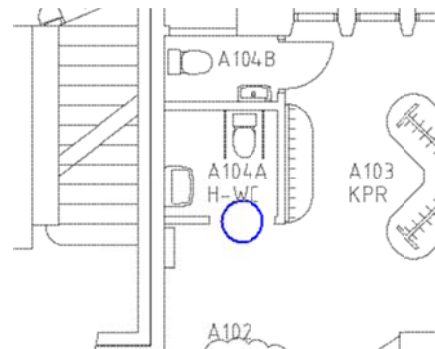
You can move the measurement box by selecting and dragging.



### Check


This tool creates a circle with a specified diameter. This is typically used to check for adequate space for handicapped access. Select the tool, enter the scale and the required diameter and the circle will appear.

The circle can be moved around to check whether apertures and areas have sufficient room.



## Orthogonal adjust, de-skew, calibrate

### Orthogonal adjustment


 Use **Orthogonal** to straighten lines in the horizontal/vertical plane or baseline.

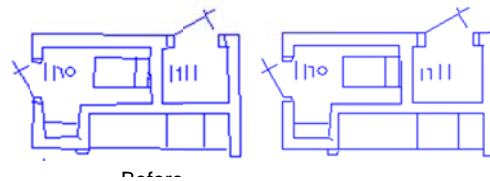
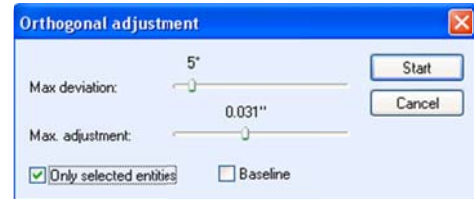
A dialog box is displayed in which the deviation angle and adjustment distance can be adjusted.

Maximum deviation sets the degree for which those lines lying within the set value will be orthogonally adjusted.

Maximum distance gives the maximum distance a line segment can be lengthened or shortened to achieve the adjustment.

If **Baseline** is unchecked, the horizontal plane is used as baseline.


Use with **Select**  to identify a group of vectors to be adjusted—other vectors will remain untouched.



### Horizontal and vertical adjustment



Use these buttons to align all vectors to be on the same horizontal or vertical axis as an entity you select—all vectors will be simultaneously rotated so that they maintain the same spatial relationship with the selected vector. If you select a point on a Bezier curve *TracTrix* will use a tangent to that point in determining the proper horizontal or vertical axis.


This action adjusts all vectors in a file. To adjust specific vectors, select them with **Select** , and check **Only selected entities** in the action dialogue box.

## Raster Editing

Use to select regions of, or items in, a document for copying, printing, manipulating or deleting. Left-click and drag to select the required area.

Select [Alt – 5]  
Add area with + SHIFT  
Deduct area with + Ctrl



Right-click/  **Properties...**  
to adjust line weight in pixels.  
Images must be 8-bit or less (see Page 40).

Works well with Snap.

Draws a freehand line of pixels.

Freehand pen



Draws a straight line.

Line pen



Deletes pixels.

Raster eraser



Invert the color values in the raster image (e.g. black becomes white).

 **Invert**

Rotate the raster image on a vertical or horizontal axis.

 **Vertical**  
 **Horizontal**

## Despeckle/Fill holes in rasters



### Despeckle

'Dirt' in the form of clumps of pixels can be automatically removed using the **Despeckle** tool. From left to right, the slider adjusts from removing small pixel clumps of 0.10mm, to removing larger clumps of 2.00mm.



### Fill

For faded, broken, thin, or broken lines and gaps, use **Fill**. The slider adjusts for filling pixel gaps from 0.10mm up to 2.00mm.



*Cycle **Despeckle** and **Fill** to enhance thin lines*

When a raster image contains lines less than three pixels wide a cycle of **Despeckle** and **Fill** can fill the holes and enhance the line edges. To obtain the best possible results when you start with this less-than-ideal original, try **Despeckling** an image to remove dirt, then **Fill** to add back 'body' to faint lines or lines with white holes. Sometimes it works better to **Fill** first, and then **Despeckle**.

## Raster to Vector Conversion

### Introduction

Raster to vector conversion is used to create vector lines from the lines on a raster image and vector text from the characters on the raster image. The results are saved out to a CAD file format.

**CAUTION:** The results from raster to vector conversion are rudimentary compared to drawing in a CAD application itself. The functionality is most useful when applied to simple drawings that are very clear<sup>1</sup>.

The raster-to-vector conversion process includes five steps:

- Raster editing and clean-up to define boundaries for *TracTrix* to trace.
- Converting the text (otherwise they convert to unnecessary vectors).
- Vectorizing the image, adjusting settings and re-tracing as necessary.
- Vector editing and clean up.
- Saving the vectors in a CAD file format.

The **required** steps are scanning, vectorizing and exporting—raster-editing is required if your image is more than 8-bit—the others steps are optional.

---

<sup>1</sup> For the conversion to 2D or 3D CAD of detailed, large or degraded drawings, Trix Systems offers a manual conversion service at [www.formatconversion.com](http://www.formatconversion.com). This service produces CAD perfect results.

PDF files must first be converted to raster files before any raster editing and vectorizing can be done. Each step is described in greater detail in this section.

A comprehensive tutorial is provided as a separate document and we recommend you read this before attempting vectorization.

## What images work best for vectorizing?

*TracTrix* creates vectors in or along the boundaries of two spot colors (or grays). A spot color is an area of color where every pixel has the exact same color. True spot colors have no gradation between colors. Take a look at the following images:


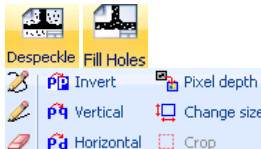






The grays in this image move gradually from very light on the left to very dark on the right. It is impossible to say where to put a boundary line because there are no boundaries. There are no spot grays in this image. Like a photograph, it is entirely tonal. Contrast this with the image below where there is a clear boundary between the two spot shades of gray.




In this image it is easy to see where to draw a line down the boundary, or line of demarcation. And, just like our eyes, *TracTrix* prefers a well-defined boundary in order to know where to create the vector line.

## Quick start

Use Example Files:	Logo.tif	Plan1.tif
 [Ctrl + O] or use the Explorer File Browser	Open the <b>TracTrix 6/Examples</b> folder (usually in the <b>Program Files</b> folder). Select...	
	Logo.tif	Plan1.tif
 Despeckle Fill Holes Invert Pixel depth Vertical Change size Horizontal Crop	Notice the dirt on the drawing. Clean the image with <b>Despeckle</b> in <b>Tools</b> tab. Accept defaults and click <b>OK</b> . Notice how dirt is automatically cleaned.	This image is clean.
 Vectorizing	Select <b>Vectorizing</b> on the <b>Tools</b> tab. From there, drop-down the setting menu and choose...	
	<b>Outline</b>	<b>Architecture</b>
	Notice the green progress bar at the foot of the window.	
	<i>TracTrix</i> creates blue vectors around the black logo.	<i>TracTrix</i> creates blue vectors along the centerline of the plan.
	<b>Ctrl+S</b> to save it as a .TRX file.	
 Drawing	Clicking the <b>Drawing</b> tool will temporarily hide the raster underneath the vectors. Click it again to bring back the raster.	
 Orthogonal	The logo does not require orthogonal adjustment.	Notice how many of the lines are crooked. Use <b>Orthogonal</b> to straighten lines and square-up corners automatically.

	Save the vectors using <b>Save As</b> and choose <b>Ctrl+S</b> to save the .TRX file. (DWG, DXF, IGES, HPGL, etc).
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------

Use **Select Area**  to export a specified area; switch on ☒ **Only selected area** in the export dialogue.

## Functions

### *Scanning a drawing into TracTrix*

#### *Pre-scan checklist*

It's assumed that you are scanning to vectorize the raster image in *TracTrix*.




- Prepare the original document to be as clean and sharp as possible.
- Avoid scanning from a glossy paper—it creates noise, uneven lines, and/or mirroring effects on the scan; instead use a copy machine to generate a print on a flat-finished paper.
- Make sure that the original is placed in the upper right corner of the scanner, or in the corner marked by 0,0 and that it is straight. Ensuring that the image is scanned straight eliminates the need to deskew it later—one less task.

#### *Advice for vectorizing photographs*

Photographs create images full of subtly blending tones. The processing power of the human brain enables us to render objects in photographs as discrete objects, but, as previously described, vectorizing software works best with distinct breaks between colors. If you want to convert a photograph into CAD vectors we recommend that you split the task between what the human brain does best and what *TracTrix* does best.

Take a piece of tracing paper. Place it over the photograph. Take a solid black pen and trace the lines you want to have represented in CAD, then scan the tracing paper into *TracTrix* as a 1-bit image and convert the lines to vectors. Your brain will do a much better job of analyzing shades and tones than any computer software will. *TracTrix* will convert your interpretations to the vector format(s) you require.

## Scanning settings

*TracTrix* enables you to scan directly into the program from a desktop scanner and save the scan in a variety of raster formats, including TIFF, CALS, JEDMICS, C4, and more. Within *TracTrix*, you can choose to proceed using the built-in software or your own scanning software. Establish a connection to your scanner by choosing   **Acquire** **Select Source**. If your scanner has a TWAIN interface, you will see its name listed; select it (most desktop scanners are supported). Use  **Acquire** to access the scanning software, where you can adjust scanning settings.

Use the scan **Preview** repeatedly until you achieve the best possible quality.

**Do not scan to PDF.** This requires additional processing prior to conversion.

We suggest you start as follows:

Monochrome Images Examples: line art, drawings, schematics	Gray Scale/Color Images Examples: photos, blueprints, sepias
300 dpi	300 dpi
1-bit	8 bit
TIFF CCITT Group 4	TIFF with LZW compression


- Turn off dithering (or anti-aliasing). Dithered images look well on screen, but we want defined boundaries along which *TracTrix* can create vectors. Dithering destroys these boundaries. It may also be necessary to turn off any 'Color Enhancement' settings.
- Scan at 100% scale.
- If the lines on your drawing are light (pencil drawing), the reflectivity of the penciled lines varies considerably and the scanner creates a raster image with black lines full of white gaps. To compensate for this, adjust the Brightness.

## Raster editing and clean-up

### *Techniques for selected areas*

Everything visible in the raster image will convert to vectors.

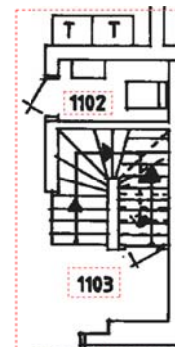
You can choose either to vectorize an entire drawing or only a specific area.

To vectorize a specific area use the Select Area tool .

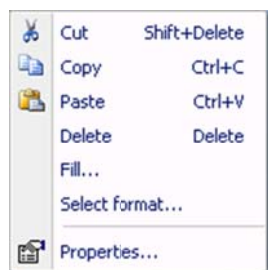
A selected area can be adjusted to accommodate your needs.

Use hot keys to add to, deduct from, or invert a selected area.

Add area to selection	<b>+</b>	<b>SHIFT</b>
Deduct area from selection	<b>-</b>	<b>Ctrl</b>
Invert selection		<b>Ctrl + I</b>



Selected areas can be deleted, edited, or vectorized, leaving the areas outside of the selection untouched. Right-clicking on a selected area provides access to standard editing functions, including cut, copy, paste, and delete.





**Fill...** enables you to fill the selected area with a chosen color. 1-bit images can only be filled with black or white. To add a solid colored shape to a 1-bit or grayscale raster image, use the Vector and Markup tools.


You can resize the moving red-dashed boundary to a specific paper size with the **Select format...** button. This reveals a menu of standard paper sizes—the selection resizes to the sheet size you select. This makes it easy for printing an area of a big drawing to a small letter size sheet.



## Erasing content

To erase large areas of the raster image (such as unwanted text areas) use **Select Area**, then press the **Delete** key. Use the **Raster eraser**  for relatively small areas and detailed line editing. Right-click/ **Properties...** to increase or decrease eraser size.

## Bit-depth


When you open your image file in *TracTrix*, hover the mouse over the filename tab at the bottom to see the file settings (or use  **Properties...**).

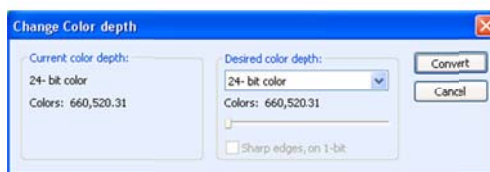
**File Properties** displays file name, type, path, and size on disk, as well as the dpi, bit depth, and dimensions.

*TracTrix* can vectorize images up to 8-bit—anything higher requires down-sampling. *TracTrix* has a **Color Separation** tool to do this. When a grayscale or color image is scanned in as 1-bit to 8-bit in the beginning, the scanner does the down-sampling for you. If your image is color or grayscale, consider rescanning if you have access to the original document.

Avoid using JPG images—they are too imprecise for vectorization because their lines are deliberately blurred with grey tones to give our eyes smoother edges.

## Automatically reduce bit depth

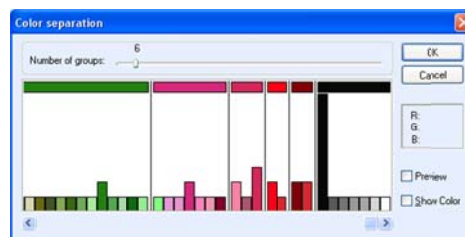
Use  **Pixel depth** to automatically and quickly reduce bit depth. For more control over reducing the color depth, use **Color Separation** instead.



## Manually reduce bit depth



**Color Separation** categorizes every single pixel color into groups (adjusted with the slider on top) and displays them as a histogram. Each color group is separated by a vertical line called a delimiter. The height of each colored bar represents the relative quantity of pixels of that color.



Here, you can edit the hues within each group, categorizing the colors in a way that makes sense to the human eye.

The bar at the top of each group indicates the spot color that will be used to replace the original colors in the group. **Change the group color** by clicking on the color you wish to edit to open the color palette.



To **edit a bar location**, drag it to a target group and release—in effect graphing the distribution of colors.

With **Show Colors** checked, *TracTrix* will find the corresponding color bar in the histogram and indicate its location by flashing a solid bar around it.

Alternately, to locate the areas in an image that match the color of a color bar, position the cursor over a color bar.

*TracTrix* will find and display the corresponding colored pixels in the original image.





To **split a group**, right-click/**Insert delimiter** on the bar where you want the split.

To combine groups, move the delimiters.

The **Preview** switch immediately updates the image to reflect your edits.

## Edit lines and edges for optimal vectorization

### *Fixing imperfections on the pixel paths*

In the example on the right there are two problems:

- there is a gap in the lower line of the original raster, and
- two lines 'touch' near where they meet the vertical line.



If left untouched, vectors will be created to perfectly reflect the imperfections in the original raster.



Use the **Raster Pen**, **Line**, and **Eraser** to perform raster edits. In this image, the pixel clumps between the lines were erased and the broken line was repaired. This task produces a better quality raster

image to trace, which in turn produces higher-quality vectors.

### *The Raster Pen, Line and Eraser*



The **Pen** and **Eraser** tools draw and erase freehand.




The **Line** tool draws straight lines.



Use these tools to fill smooth edges.




Right-click/ **Properties...** to change the tool width or color for the *Pen* or *Line* tools. Use the Objects tab.

Use the raster tools with **Snap** (Page 22) to enhance faint lines, smooth edges, and fill pixels. Snap is best used when zoomed out.

## Character Recognition


### *Text conversion options*



Text should be converted before vectorizing linework; otherwise all your text will be converted to vectors. It can be done manually with the **Text** tool  or, if the quality of the raster text is good enough, semi-automatically with the **OCR** tool.

Examples of both good-quality and poor-quality text are shown below. Notice how the characters in the poor-quality text touch each other, versus the well-spaced characters in the good-quality text. Then notice how the text would convert using *TracTrix*' default text library.

	Good-quality text	Poor-quality text
Original raster text.	COUPLING	COUPLING
OCR conversion with <i>TracTrix</i> default text library.	COUPLING	C???

The text converted from the poor-quality raster is virtually useless—converting the text manually using the Text tool would be best in this instance (see next section).

An alternate technique is to use **Select Area**  to select good quality text to convert with the automatic **OCR/Character Recognition**, and manually enter the rest. Vectorizing the text is also an option. This is what it might look like based on the example above:

	Vectorized with an Outline setting.
	Vectorized with a Centerline setting.

Step-by-step instructions for **Character Recognition** are contained in the tutorial on Page **Error! Bookmark not defined.**

## Manual text conversion

Use this instead of the character recognition capability for images in which there is only a small amount of text. Zoom the text you wish





to replace. Position the cursor at the top of the tallest letter.

Note the Y coordinates in the status bar when the cursor is

both at the top of the raster text character and at the bottom. Subtract to determine the appropriate text height.

Point Size	Height (inches)	Height (mm)
8	0.07	1.9
10	0.09	2.4
12	0.11	2.8
14	0.13	3.3
16	0.15	3.8
18	0.17	4.2
24	0.22	5.6
36	0.33	8.5
72	0.44	16.9

Select the **Text** tool —the cursor changes to a cross hair with an 'A' beside it. Click the upper left corner of the first character to launch the text editor. After entering text and clicking **OK**, proper ASCII text is placed on the vector layer of the image. Delete the underlying raster text so it doesn't convert to vectors when you vectorize. Right-click/ **Properties...** to change the text font and size.

## Using built-in OCR feature



**Character Recognition** has a default database of raster characters and their ASCII equivalent. It will work with the demo images provided with *TracTrix*, but it should be replaced with a text recognition database of your own making before you use OCR for your drawings. This is done by “training” to interpret new characters. Click on **Character Recognition** to launch the OCR function box.

### Start

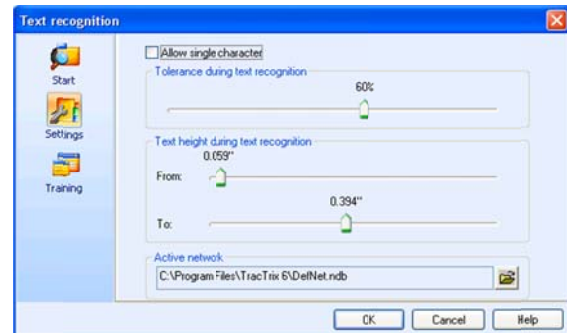
- **Current font**—displays the currently selected font. Change this to resemble the text on your drawing.
- **Font**—click to change.



- **Text height**—shows the text height of the currently selected text.
- **Lock**—sets the same text height for all new text.
- **Only errors**—only shows the text that *TracTrix* couldn't identify.
- **Change**—change the found text to the text in the text box. You may have typed in the text, or it may appear based on the OCR Training.

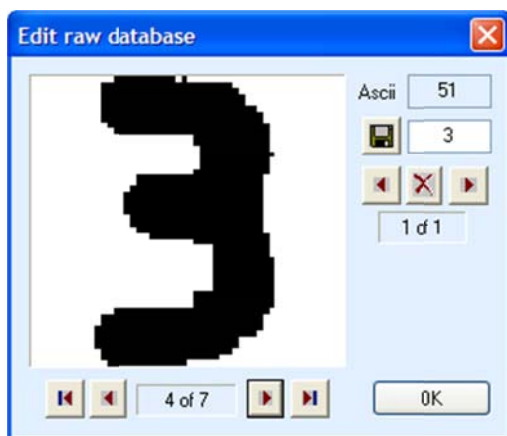
## Settings

- **Allow single characters**—finds single characters. If not selected text found has to consist of at least two characters in order to be recognized and converted.
- **Tolerance during text recognition**—sets the acceptance value for a character. Increasing the value requires the program to have a higher confidence that it has correctly recognized a raster character before it will convert it. Experiment with this adjustment to find what setting works best with your recognition database and drawing portfolio.
- **Tolerance for text heights**—sets the highest and lowest character height to be accepted.
- **Active network**—the character recognition database that is currently in use.



## Training

- **Show database**—shows which database will be used. Open a different database using the OCR Settings.
- **Create net**—creates a new database.
- **Save character**—saves the classification of the character to the raw database.



- **Number of ex.**—shows how many example characters are in the raw database.

**Show database** displays this window to view and edit the characters in the raw database.

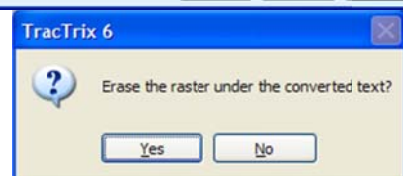
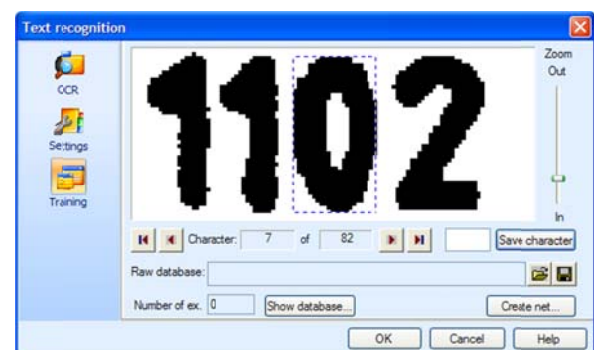
**ASCII** shows the ASCII value of the character in the window, while the Edit field shows the actual character equivalent. Press the disk to save a new value for the character.

Use the **Arrows** to

browse the different raster images stored for the character, and the **X** to delete a character image from the database.

Use the bottom arrows to browse the different text characters.

Once you have gone through each text area in the

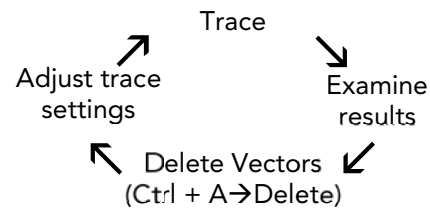


document with the **OCR** tab, click **OK** to convert the raster text to vector text as identified.

*TracTrix* will ask if you want to delete the raster text underneath. It is a good idea—otherwise the text will convert to vector lines in addition to the true text.

## Vectorizing

The quality of the vector *TracTrix* creates is greatly affected by the raster file attributes and the settings with which they were traced. Accurate trace settings combined with a good-quality, well-scanned image do a near perfect job.

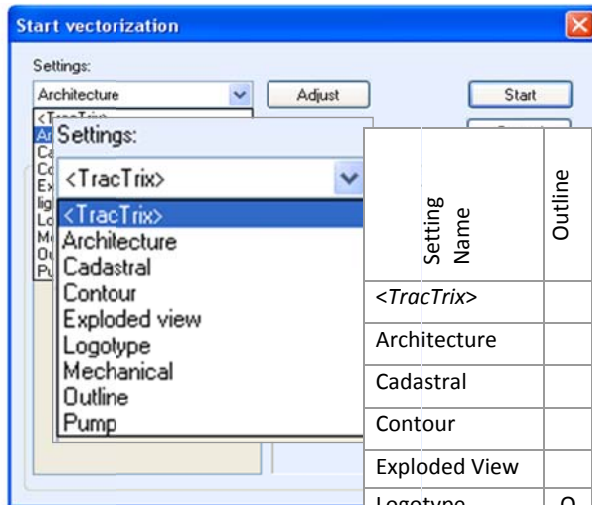


### Start vectorization



To begin vectorization, choose **Vectorizing** in the **Tools** tab.

Clicking **Adjust** provides access to the **Trace Settings** where they can be edited, added to, and saved.



The chart below shows the different pre-defined trace settings and their trace setting properties, for reference.

Setting Name	Outline	Centerline	LPB	Layer setting	Max. arc	Maximum line width (mm)	Precision (mm)	Noise (mm)
<TracTrix>		C	L		100	1.2	0.70	0.2
Architecture		C	L			1.2	0.40	0.2
Cadastral		C	L		10	0.8	0.20	0.2
Contour		C	B	Yes	100	1.2	0.50	0.2
Exploded View		C	B			1.2	0.40	0.2
Logotype	O		B		100	-	0.20	0.2
Mechanical		C	L			1.2	0.60	0.2
Outline	O		B		100	-	0.20	0.2
Pump		C	L		100	1.2	0.60	0.2



If a specific area has been selected with the **Select Area** tool, only this area will be vectorized—the areas outside of the selection remain untouched.

If no area has been selected the entire drawing will be vectorized.

## Trace settings

### Trace method

The **Centerline** method traces the center of raster lines in the image; the **Outline** method traces the solid edge of an image.

**Maximum line width** sets a tolerance for thick lines. Lines thicker than the width dimension shown on the slider will be vectorized on the outline.

### Drawing entities

Choose which is best for your needs.

### Tolerance

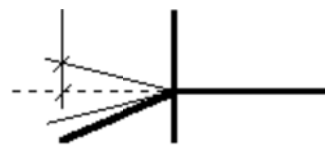
**Precision** sets how far the vectors can deviate from the original raster line (higher value settings tend to reduce number of vectors created).

**Noise** sets the diameter of the clump of pixels to be vectorized. Smaller clumps will be ignored. With a **Noise** setting of 0, *TracTrix* will process every single pixel, reducing the likelihood of 'steps'.

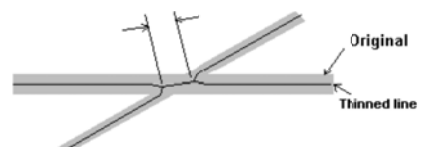
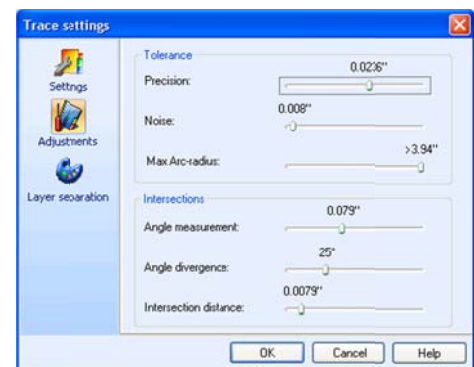
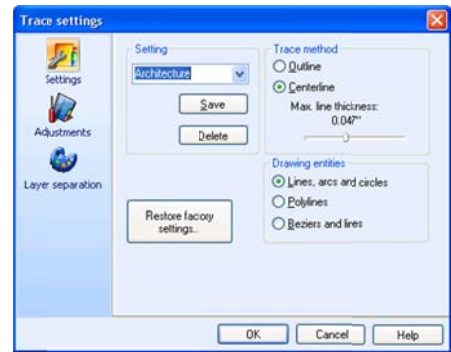
**Max Arc radius**—sets largest arc you will allow on the drawing. By setting this value to 0, infinitely large arcs can be created.

### Intersections

**Angle measurement** is used to adjust the direction coefficient for the lines in an intersection. Drawings with small details (e.g. exploded views having radii under 2-3 mm) may be improved by reducing this value. The disadvantage is that long straight lines could become hard to connect in the intersection. This can be compensated for by increasing the angle divergence (next setting).



**Angle divergence** is used to adjust the angle at the intersection between two close lines that will make the lines connect. Lines within the divergence are connected but lines outside the divergence are not. Too large an angle divergence could give the unwanted effect of lines that do not intersect.



**Intersection distance** gives the maximum distance between 2 intersections that will still allow them to be drawn together to one point. This is necessary to be able to connect the lines at the intersection

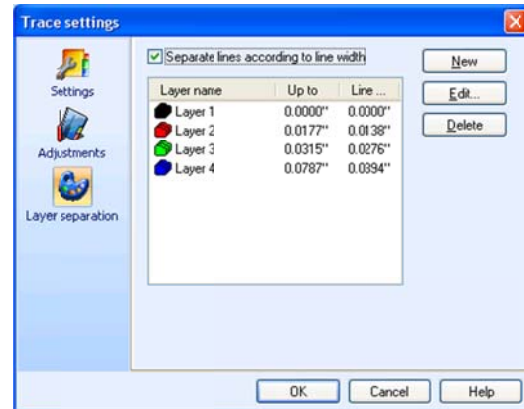
### Layering separation



Layer separation

When a 1-bit color depth raster image is vectorized, a single vector layer is created and all the vectors are placed on that layer.


When a color image is vectorized, a new layer is created for each vector color. Vectors can be moved from one layer to another. New layers can be defined prior to vectorization. Once defined you can make a layer active and select raster areas to vectorize onto the active layer.



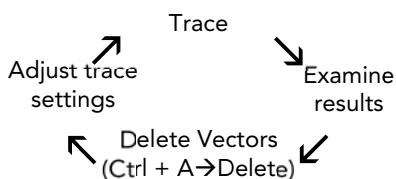
*TracTrix* enables you to place vectors on different layers based on the widths of the original raster lines with "Separate lines according to line width". The **Layer name**, **Up to**, and **Line weight** are saved together with the current trace setting. A new layer is sorted on the value given for **Up to**. The layer is not created until **New** is clicked.

### Trace the lines and examine the results

Click **Start** when you are ready to trace. You will see a green progress bar at the bottom left of the screen; vectors will appear when tracing is finished, blue for monochrome drawings, colored on colored drawings.

Look at the vector quality close-up to see what adjustments can be made to improve them. To show only the outline and hide the fill, click **Filled objects** , or hide the raster layer altogether.

Pay attention to the raster image too, as it may need additional editing. *TracTrix* clean-up tools help to automatically tidy up the vector entities. See next section for details.




*Restart the cycle if necessary*

### Ctrl + A, Delete


If you wish to adjust settings and re-trace, you must delete all of the vector entities first, providing an empty vector layer to work on.

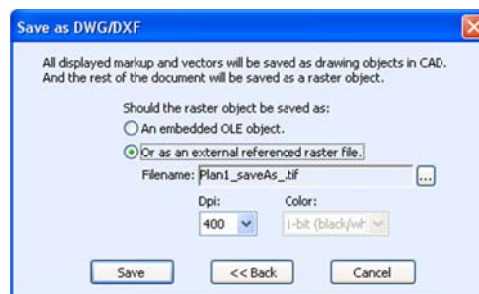


## Saving the vectors in .TRX files


 *TracTrix* vectors, markup, and settings are saved to a file named the same as the original file but adds the file extension .TRX. While you work, click on the **Save** icon on the **Quick Access Toolbar**.

## Saving as a DWG/DXF

To save a vector file, use  **Save As...**. Once the file has been saved you can open it or import it to your CAD, NC, GIS or other program.




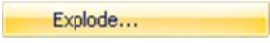
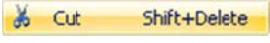




When saving vectors to a DWG or DXF file, *TracTrix* will embed the raster layer as an x-ref.

To exclude the raster image from the exported CAD file, turn off the raster layer first. Or, if you want to save only some of the vectors, select them first with **Select**  and save **Selection only**.

## Editing vector lines and objects

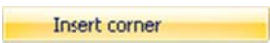

Right-clicking on a vector entity displays a menu of standard editing tools<sup>1</sup>.

These tools are available for editing all vector types:

-  **Rotate** Outlines the markup and transforms the cursor into a crank. Drag the mouse to turn the crank and rotate the markup.
-  **Explode...** Breaks vector lines into smaller pieces where indicated.
-  **Cut** **Shift+Delete** Cuts the markup and places a copy on the clipboard.
-  **Copy** **Ctrl+C** Copies markup or selected area to the clipboard. All or part of the image can be copied to the computer's clipboard for pasting.
-  **Paste** **Ctrl+V** Pastes markup clipped from *TracTrix*.
-  **Delete** **Delete** Deletes the selected markup.
-  **Properties...** For markup shapes, displays the aperture for the **Snap** feature, and a switch to **Create polylines**; for markup text, enables editing of the text; for raster clips it displays properties of raster entity/region.

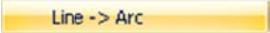







## Standard editing functions

These tools are available for straight line, arc, and Bezier curve vectors:

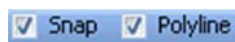
-  **Insert corner** Insert corner enables you to insert a corner (add a node) anywhere on the line or entity. To remove a corner, select the node and press the Delete key. New corners are always unlocked.
-  **Break**

---

<sup>1</sup> Options available in this menu will vary depending upon the type of entity selected (text, rectangle, line, Bezier, etc).

-   Provides a means to select and change a single vector line to either an arc or Bezier curve.
-   Provides a means to select and change a single vector arc to either a line or Bezier curve.
-   Provides a means to select and change a single Bezier curve to either an arc or vector line.
-  Provides a means to select and change a single circle to an arc.
-  Enabled only for polylines, this tool allows you to grab and skew a segment of a polyline, leaving some points intact.

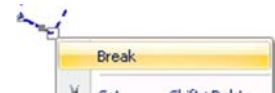
### Join points to form polylines



With both the **Snap** and **Polyline** options enabled in the **Status Bar**, you can snap two points together to form or add to a polyline. The “key” cursor indicates that the two lines will be connected upon releasing the click.

### Disconnect lines

To disconnect (add a “break” in a line), select the point on the vector line where you want the break, then right-click/**Break**. The line is broken into separate pieces at the break point specified, but the end points of the two separate lines remain coincident at the point where the break was created.

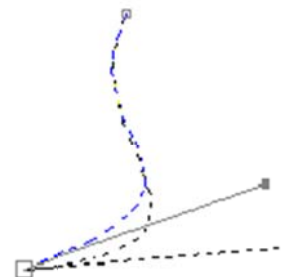


### Control Bezier curves

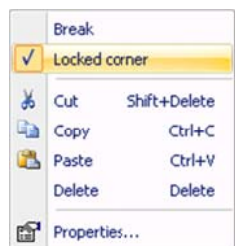
You control the shape of a Bezier curve in three ways:

- the location of the end points;
- the direction of the handle;
- and the length of the handle.

The creation and manipulation of Beziers is best understood by practice. Experiment with them on a new, blank document.



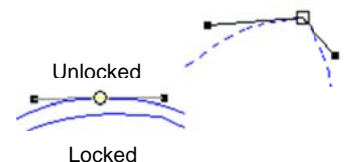
Corners on Beziers can be locked to maintain the shape of the curve on either side of the corner.



To lock a corner on a Bezier, select the node and

Right-click/ .

The same action applies to unlock a Bezier corner.



Locked corner nodes on Beziers appear as circles. On unlocked corners they are square.



## Object properties

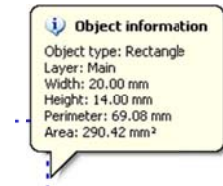


### Select vector entities

Use **Select** arrow to select the markup that you wish to edit (use with **Shift** to choose multiple entities, or **Ctrl+A** to select all markup). To resize an entity click on a control point (a square box on a corner of a markup element) and drag with the mouse.

### View object information

An object information bubble displays size and entity detail, like the one on the right, when the cursor hovers over a vector entity. This feature is enabled by default; it can be toggled in the **Program Settings**.



Here you can edit and define layer assignments, colors, and other properties. Colors can be set by vector/markup layer (active layer shows with the L in the lower right-hand corner of the window) or by a color you assign.



The **Fill** option is only available when a closed or completely bounded vector area has been selected. Various fill colors and patterns are available and will transfer to any CAD package that supports fills. For fills, transparency and frame weight can also be specified.

### Set the default color and pen



From the **Settings** tab you can set a default colors for all new entities:

- by the color of the active Vector/Markup layer (evident with the L at the lower right of the screen **L**), or
- choose a color to regardless of layer.




Use the round buttons in the window that appears to select **Color by layer** or **Custom**.

If **Custom** is selected the **Select color** button is enabled. Unless otherwise configured, new vectors are placed on the default layer titled 'Main'; it is blue in color.

For more information about how *TracTrix* manages layers, see page 23.


## Vector to Raster Conversion

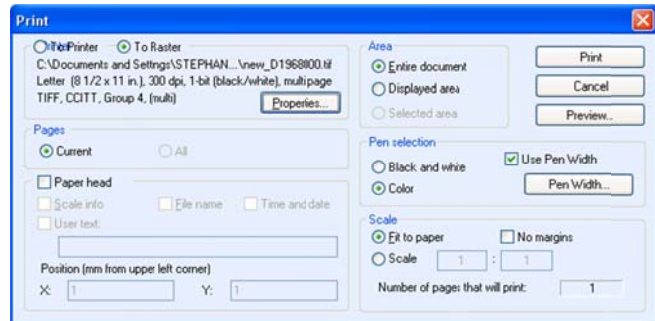
Use this to create PDF or other raster format files from your CAD files. This is useful for protecting your intellectual property, making archive copies and creating images for Web sites.

Use   Print or  Print... Print the current document or [Ctrl+P] to access the **Print** panel.

Turn on  **To Raster** round button.

Make adjustments in this panel for any settings you wish to change.

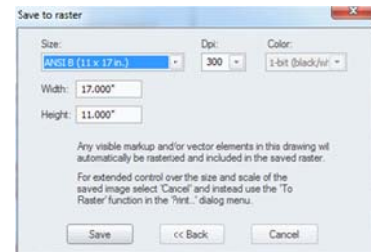
Use  **Properties...** to specify the sheet size, dpi, and bit depth of the export file. **Pen selection** options enable you to convert color vectors to different line widths for output to 1-bit raster files (see Page 26 for details).



## Raster to raster conversion

A raster image open in the application may be saved out to a different raster format using **File – Save as** and selecting the new format. Some raster formats degrade the original image so the new image should be inspected for usability.

When converting to C4 JEDMICS (listed as CALS C4) be aware that the JEDMICS specification calls for 200 dpi resolution images. Set this when you save to C4.



## Running as ObjectARX inside AutoCAD

To start TracTrix in AutoCAD, start your AutoCAD and run the command 'APPLOAD', then load one of the following modules depending on your platform.

Module:	Platform:
TTA6_7_32.arx	AutoCAD 2007-2009, 32-bit.
TTA6_10_32.arx	AutoCAD 2010-2012, 32-bit.
TTA6_10_64.arx	AutoCAD 2010-2012, 64-bit.
TTA6_13_32.arx	AutoCAD 2013-2014, 32-bit.
TTA6_13_64.arx	AutoCAD 2013-2014, 64-bit.



































































































## DWG Version conversion (save back to older)

Open a DWG or DXF file and use **File - Save as**. Select the older DWG or DXF version from the list of formats.

# APPENDIX 1 - SUPPORTED FORMATS

## Raster-file formats

Raster files of this type are supported (including =Multipage files or =color if indicated as such):

AFP		IBM Presentation PTOCA (AFP)*			Portable Pixelmap, Binary
ANI		Windows Animated Cursor		PSP	 Paint Shop Pro
AVI		Windows AVI*			 Paint Shop Pro, RLE
AWD		Microsoft Fax			 Photoshop (Adobe)
BMP		 OS/2 Bitmap, v1 and v2		PTK	 IBM Presentation PTOCA*
		 Windows BMP Uncompressed		RAS	 Sun Raster
		 Windows BMP RLE		RAW	Raw BitField*
C2		CALS Type 2			 Raw Packbits*
C4		C4 JEDMICS			 Raw RLE4* & RLE8
CAL		CALS Type 1			 Raw uncompressed data
CIN		Kodak Cineon		RTF	 RTF Format*
CIT		Intergraph CCITT G4		SCT	 Scitex continuous tone
CLP		Microsoft Windows Clipboard		SFF	 Structured Fax File Format
CUR		 Windows cursor		SGI	 Silicon Graphics Image
CUT		Dr. Halo			 Silicon Graphics Image - RLE
DCR		Kodak PDC*		SID	 Mr. Sid*
DCS		Kodak PDS*		SMP	 Xionics
DJV		DjVu*			Xionics CCITT Group 3 1D/2D
ECW		Enhanced Compressed Wavelet			Xionics CCITT Group 4
EPS		EPS (Encapsulated PostScript)		TFX	Tiff -FX CCITT Group 3 1D
		EPS with Embedded TIFF file			Tiff -FX CCITT Group 3 2D
FAX		FAX, raw, CCITT Group 3 1D			Tiff -FX CCITT Group 4
		FAX, CCITT Group 3 1D, no eol			Tiff -FX JBIG black/white*
		FAX, CCITT Group 3 2D			 Tiff -FX JBIG color/gray*
		FAX, CCITT Group 4 1D			 Tiff -FX JBIG color/gray 2
FPX		 FlashPix			 Tiff -FX JPEG*
		 FlashPix, JPEG		TGA	 Targa
		 FlashPix, Uncompressed			 Targe RLE
GIF		 GIF (Compuserve)		TIF	 Exif TIFF, Uncompressed
ICA		IOCA, CCITT Group 3, 1d, -MO			 Exif TIFF, Uncompressed, YCC
		IOCA, CCITT Group 3, 2d, -MO			  GeoTIFF
		IOCA, CCITT Group 3, 1d			 Tiff - CCITT Group 3 1D and 2D
		IOCA, CCITT Group 3, 2d			 Tiff, CCITT Group 4
		IOCA, CCITT Group 4, 1d			 Tiff, CCITT Huffman
		IOCA, CCITT Group 4, 1d, -MO			 Tiff, JBIG
		IOCA, IBM MMR (+MO/-MO)			  Tiff, JPEG 2000
		IOCA, uncompressed (+MO/-MO)			 Tiff, JPEG 4:2:2
ICO		 Windows icon			 Tiff, LZW compression
IFF		 Interchange File			 Tiff, Uncompressed CMYK
		 Interchange File, RLE*			 Tiff, Uncompressed YCC
		 Interchange File - uncompressed			 Tiff, Uncompressed
IMG		GEM Image			 Tiff, Packbits CMYK/YCC
ITG		Intergraph RLE			 Tiff, Packbits
JPG		Exif JPEG			 Tiff, Uncompressed
		Exif JPEG 4:1:1			 Tiff, Wavelet CMP
		JPEG		WBM	 Wireless Bitmap file
		JPEG (4:1:1 and 4:2:2)		WFX	Winfax, CCITT Group 3 2D
		JPEG CielAB			Winfax, CCITT Group 4
		JPEG CielAB (4:1:1 and 4:2:2)		WPG	 Word Perfect Graphics
KDC		Kodak DC*		XBM	 XBitMap
LSD		Laser Data*		XPM	 XPicMap
MAC		Mac Paint		XWD	 X Window Dump (v10-11)
MSP		Microsoft Paint			
NIF		CALS Type 3			
PCD		Kodak PhotoCD*			
PCT		MacPict			
PCX		ZSoft PCX			
PDF		Adobe Acrobat			
PGM		Portable Greymap ASCII			
		Portable Greymap Binary			
PNG		Portable Network Graphics			
PPM		Portable Pixelmap, ASCII			

\*Read Only files of this type cannot be exported

## Vector-file formats

### Standard vector formats

Vector files of this type are supported

- AutoCAD DXF and DWG  
Versions 12, 13, 14, 2000 - 2014
- Autodesk DWF
- 3D DWF, and DWG
- Microstation DGN V7 and V8
- HPGL, HPGL/2 and PLT files (*Read important information below regarding PLT files.*)
- Acrobat PDF

### HPGL Plotter files

Typically these have .hpgl, .hpg, .gl, .hp2, .plt, or .pl2 extensions.

PLT and HPGL files are plot files normally created with the Hewlett Packard Graphics Language—a printer-control language that The Hewlett-Packard Company developed in 1989 to drive their new line of pen plotters (commonly found in engineering departments and typical to the industry). The simplicity of HPGL commands made it a desirable language to all plotter manufacturers, and HPGL went on to set the standard for pen plotters of the day.

Plotters print their output by moving a pen across the surface of a piece of paper. The quality of the pen plotters was impressive with the crisp lines it produced, and the precise, mechanical movement of the pens, but this made it draw very slowly. Ultimately the pen technology restricted plotters to printing only line art (no raster art), and a slow pace at that, so they faded out with the introduction of laser and ink-jet printers

These days you'd be hard pressed to find a plotter—they have been replaced with faster and more adaptable wide-format ink-jet and laser-jet printers. HPGL/2 was developed to enable printers to act as plotters; to read, print, and create HPGL/PLT files of their own. Third-party HPGL/2 drivers were created, and while these variants are usually based on standard HPGL, they also contain additional commands that do not conform to the original H-P specification. Having said that, HPGL files that have been created with a plot driver which employs original HP commands are fully supported.

Note: The application does not support Gerber plot files, even though these may use the same file extensions.

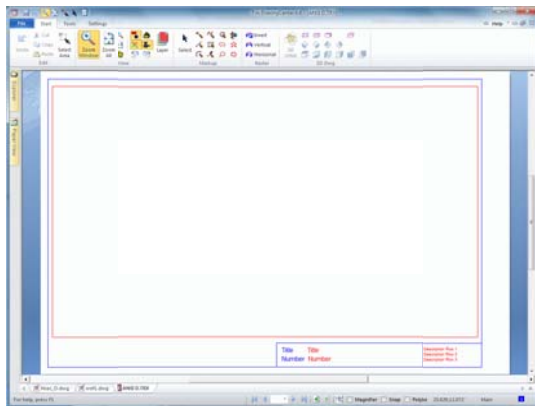
## APPENDIX 2 - CREATING PAPER VIEW TEMPLATES

Paper View frames are .TRX files stored in the folder named **Paper View** in the *Trix DrawingCenter* or *TracTrix* application folder.

### Overview

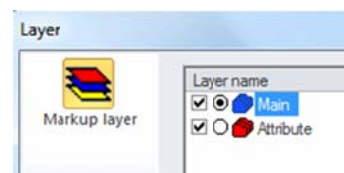
Paper View .TRX files must contain two layers

- The *Main* layer contains the line work for the frames and descriptions for any text fields in title blocks you create. You can create this using the markup tools.
- The *Attribute* layer contains
  - A single markup rectangle that defines the extents to which the original drawing will display when the frame is printed
  - Text Markup fields which will be filled with the text you enter each time you use the Paper View.



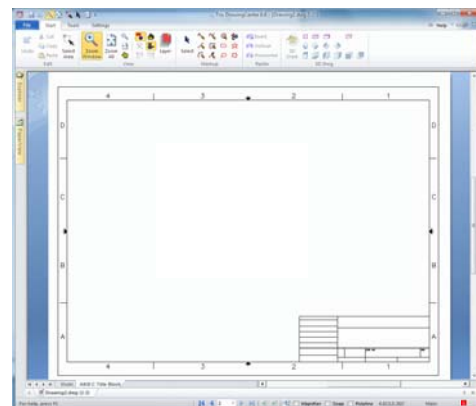
In this example of a Paper View .TRX opened in *Trix DrawingCenter* the **Main** layer objects are in blue and the **Attribute** layer objects are in red.

You must create the **Attribute** layer yourself each time you create a new Paper View .TRX file.



### Creating new frames

To start creating a new Paper View you will need to open a scanned or PDF drawing which is already dimensioned to the size you want for your new Paper View.



Begin by creating the new **Attribute** layer.



Then use the markup tools to draw the elements of the new Paper View. If you are using an existing drawing you might trace some of its frame using the rectangle tool in conjunction with Snap to capture the corners.

At this stage all your markup uses the Main layer. Hide the DWG layers and your draft Paper View might look like the illustration on the left. The hatched line represents the extents of the drawing you want to capture.

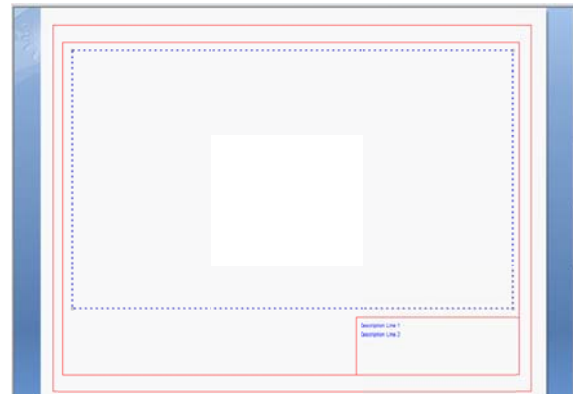


Next change the extents rectangle and the text elements that will be the prompts to the **Attribute** layer.



**Shift-select** the elements so you can change them all at once. They will now appear in the color you created for the **Attribute** layer.

Close out of the drawing and save the changed markup information when prompted. This will create a .TRX file named the same as the drawing you opened in the first place. Rename the .TRX file with the description for the Paper View and then move it to the **Paper View** folder in the Trix application folder.



When you reopen the application your new Paper View will be displayed under the **Paper View** tab.

## APPENDIX 3 – IMPERIAL TO METRIC CONVERSION TABLE

### Inches to Millimeters

To convert inches to mm, multiply inches by 25.4. To convert mm to inches, multiply mm by 0.03937.

Inches FRACTION	DECIMAL	mm
.	0.0039	0.1000
.	0.0079	0.2000
.	0.0118	0.3000
1/64	0.0156	0.3969
.	0.0157	0.4000
.	0.0197	0.5000
.	0.0236	0.6000
.	0.0276	0.7000
1/32	0.0313	0.7938
.	0.0315	0.8000
.	0.0354	0.9000
.	0.0394	1.0000
.	0.0433	1.1000
3/64	0.0469	1.1906
.	0.0472	1.2000
.	0.0512	1.3000
.	0.0551	1.4000
.	0.0591	1.5000
1/16	0.0625	1.5875
.	0.0630	1.6000
.	0.0669	1.7000
.	0.0709	1.8000
.	0.0748	1.9000
5/64	0.0781	1.9844
.	0.0787	2.0000
.	0.0827	2.1000
.	0.0866	2.2000
.	0.0906	2.3000
3/32	0.0938	2.3813
.	0.0945	2.4000
.	0.0984	2.5000
7/64	0.1094	2.7781
.	0.1181	3.0000
1/8	0.1250	3.1750
.	0.1378	3.5000
9/64	0.1406	3.5719
5/32	0.1563	3.9688
.	0.1575	4.0000
11/64	0.1719	4.3656
.	0.1772	4.5000
3/16	0.1875	4.7625
.	0.1969	5.0000
13/64	0.2031	5.1594
.	0.2165	5.5000

Inches FRACTION	DECIMAL	mm
.	0.5512	14.0000
9/16	0.5625	14.2875
.	0.5709	14.5000
37/64	0.5781	14.6844
.	0.5906	15.0000
19/32	0.5938	15.0813
39/64	0.6094	15.4781
.	0.6102	15.5000
5/8	0.6250	15.8750
.	0.6299	16.0000
41/64	0.6406	16.2719
.	0.6496	16.5000
21/32	0.6563	16.6688
.	0.6693	17.0000
43/64	0.6719	17.0656
11/16	0.6875	17.4625
.	0.6890	17.5000
45/64	0.7031	17.8594
.	0.7087	18.0000
23/32	0.7188	18.2563
.	0.7283	18.5000
47/64	0.7344	18.6531
.	0.7480	19.0000
3/4	0.7500	19.0500
49/64	0.7656	19.4469
.	0.7677	19.5000
25/32	0.7813	19.8438
.	0.7874	20.0000
51/64	0.7969	20.2406
.	0.8071	20.5000
13/16	0.8125	20.6375
.	0.8268	21.0000
53/64	0.8281	21.0344
27/32	0.8438	21.4313
.	0.8465	21.5000
55/64	0.8594	21.8281
.	0.8661	22.0000
7/8	0.8750	22.2250
.	.8858	22.5000
57/64	.89063	22.6219
.	.9055	23.0000
29/32	.90625	23.0188
59/64	.92188	23.4156
.	.9252	23.5000

Inches FRACTION	DECIMAL	mm
.	1.8898	48.0000
.	1.9291	49.0000
.	1.9685	50.0000
2	2.0000	50.8000
.	2.0079	51.0000
.	2.0472	52.0000
.	2.0866	53.0000
.	2.1260	54.0000
.	2.1654	55.0000
.	2.2047	56.0000
.	2.2441	57.0000
2 1/4	2.2500	57.1500
.	2.2835	58.0000
.	2.3228	59.0000
.	2.3622	60.0000
.	2.4016	61.0000
.	2.4409	62.0000
.	2.4803	63.0000
2 1/2	2.5000	63.5000
.	2.5197	64.0000
.	2.5591	65.0000
.	2.5984	66.0000
.	2.6378	67.0000
.	2.6772	68.0000
.	2.7165	69.0000
2 3/4	2.7500	69.8500
.	2.7559	70.0000
.	2.7953	71.0000
.	2.8346	72.0000
.	2.8740	73.0000
.	2.9134	74.0000
.	2.9528	75.0000
.	2.9921	76.0000
3	3.0000	76.2000
.	3.0315	77.0000
.	3.0709	78.0000
.	3.1102	79.0000
.	3.1496	80.0000
.	3.1890	81.0000
.	3.2283	82.0000
.	3.2677	83.0000
.	3.3071	84.0000
.	3.3465	85.0000
.	3.3858	86.0000

Inches FRACTION DECIMAL		mm
7/32	0.2188	5.5563
15/64	0.2344	5.9531
.	0.2362	6.0000
1/4	0.2500	6.3500
.	0.2559	6.5000
17/64	0.2656	6.7469
.	0.2756	7.0000
9/32	0.2813	7.1438
.	0.2953	7.5000
19/64	0.2969	7.5406
5/16	0.3125	7.9375
.	0.3150	8.0000
21/64	0.3281	8.3344
.	0.3346	8.5000
11/32	0.3438	8.7313
.	0.3543	9.0000
23/64	0.3594	9.1281
.	0.3740	9.5000
3/8	0.3750	9.5250
25/64	0.3906	9.9219
.	0.3937	10.0000
13/32	0.4063	10.3188
.	0.4134	10.5000
27/64	0.4219	10.7156
.	0.4331	11.0000
7/16	0.4375	11.1125
.	0.4528	11.5000
29/64	0.4531	11.5094
15/32	0.4688	11.9063
.	0.4724	12.0000
31/64	0.4844	12.3031
.	0.4921	12.5000
1/2	0.5000	12.7000
.	0.5118	13.0000
33/64	0.5156	13.0969
17/32	0.5313	13.4938
.	0.5315	13.5000
35/64	0.5469	13.8906

Inches FRACTION DECIMAL		mm
15/16	.93750	23.8125
.	.9449	24.0000
61/64	.95313	24.2094
.	.9646	24.5000
31/32	.96875	24.6063
.	.9843	25.0000
63/64	.98438	25.0031
1	1.000	25.40
.	1.0039	25.5000
.	1.0236	26.0000
.	1.0433	26.5000
.	1.0630	27.0000
.	1.0827	27.5000
.	1.1024	28.0000
.	1.1220	28.5000
.	1.1417	29.0000
.	1.1614	29.5000
.	1.1811	30.0000
.	1.2205	31.0000
1 1/4	1.2500	31.7500
.	1.2598	32.0000
.	1.2992	33.0000
.	1.3386	34.0000
.	1.3780	35.0000
.	1.4173	36.0000
.	1.4567	37.0000
.	1.4961	38.0000
1 1/2	1.5000	38.1000
.	1.5354	39.0000
.	1.5748	40.0000
.	1.6142	41.0000
.	1.6535	42.0000
.	1.6929	43.0000
.	1.7323	44.0000
1 3/4	1.7500	44.4500
.	1.7717	45.0000
.	1.8110	46.0000
.	1.8504	47.0000

Inches FRACTION DECIMAL		mm
.	3.4252	87.0000
.	3.4646	88.0000
3 1/2	3.5000	88.9000
.	3.5039	89.0000
.	3.5433	90.0000
.	3.5827	91.0000
.	3.6220	92.0000
.	3.6614	93.0000
.	3.7008	94.0000
.	3.7402	95.0000
.	3.7795	96.0000
.	3.8189	97.0000
.	3.8583	98.0000
.	3.8976	99.0000
.	3.9370	100.0000
4	4.0000	101.6000
.	4.3307	110.0000
4 1/2	4.5000	114.3000
.	4.7244	120.0000
5	5.0000	127.0000
.	5.1181	130.0000
.	5.5118	140.0000
.	5.9055	150.0000
6	6.0000	152.4000
.	6.2992	160.0000
.	6.6929	170.0000
.	7.0866	180.0000
.	7.4803	190.0000
.	7.8740	200.0000
8	8.0000	203.2000
.	9.8425	250.0000
10	10.0000	254.0000
20	20.0000	508.0000
30	30.0000	762.0000
40	40.0000	1016.000
60	60.0000	1524.000
80	80.0000	2032.000
100	100.0000	2540.000



# INDEX

---

- .trx files, 38, 39
- 3D Orbit, 15
- Accessibility
  - checking, 35
- add
  - area to selection, 40
- angle
  - max. deviation, 36
  - orthogonal adjustment, 36
- Angles
  - taking off, 35
- Aperture, 22
- Approval Stamps, 33
- Area
  - fills, display on/off, 13
- AutoCAD, 8
  - versions supported, 54
- Boundary
  - autofind, 15
- Calibrate image, 17
- Caption row, 18
- Cascade, windows, 19
- Centerline
  - trace setting, 45
- Character Recognition, 42
- Clipboard, 22
- Color
  - invert, 14
  - printing, 28
  - Separation, 17
- Command Line control. See DDE Commands
- Compare drawings, 16
- Contour, around markup, 20
- Coordinates, cursor, 18
- Copy, 13
- Crop, 14
- DDE Commands, 32
- Default characteristics
  - save, 20
- Deskew
  - orthogonal adjustment, 36
  - raster, 17
  - vectors, 17
- Despeckle, 17, 37
- Directory
  - TRX files, 26
- DWF, 8
- DWG, 8
  - line width, 28
  - resize, 16
  - versions supported, 54
  - Xrefs, 23
- DWG Version
  - save back, 51
- DXF, 8
- Email PDF from file, 26
- Erasing, 22
- Explorer, 21
- File
  - advance, 18
  - browser, 18
  - properties, 22
- Fill, 17, 20, 37
- Font, 16, 23
- Frames, 30
- Gerber
  - not supported, 54
- Heights
  - taking off, 16, 35
- Horizontal Adjust
  - vectors, 36
- HPGL, 8, 54
- Image types, 8
- Installation, 8
- Invert color, 14
- Keyboard shortcuts, 22
- Layer
  - in DWG/DXF, 23
  - markup, 24
  - navigating, 21
  - selection, 19
- Layout, navigating within files, 21
- Licensing
  - activation, 8
- Magnifier, 18, 21
- Markup, 24
  - display on/off, 13
  - editing, 25
  - hiding for printing, 27
  - penwidth*, 25
  - rotate, 25
  - save into DWG, 34
  - sharing, 26
  - tools, 25
  - transparency, 20
- Measure, 15
- Menu Shortcuts, 11
- Mouse actions, 11
- ObjectARX inside AutoCAD, 51
- OCR, 17
  - database, 44
- Orthogonal adjustment, 17
- Page
  - advance, 18
  - navigating within files, 21
- Pan, 13
- Paper head, 28
- Paper Views, 30
  - template creation, 55
- Paste, 13
- PDF, 8
  - creating, 31
- Pen Settings, 27
- Photographs, vectorizing, 39
- PLT, 54
- Polygon, markup and measure, 16
- Polylines, 18
- Powerpoint, paste detail into, 22
- PowerPoint, paste detail into, 25
- Printing, 26
  - partial detail, 27
- Program Settings, 9
- Quick Access Toolbar, 11
- raster
  - snap, 42
- Raster, 8

- despeckle, 37
- editing, 36
- fill, 37
- formats supported, 52
- rotate, 13
- specific functions, 22
- toggle on/off, 13
- Raster to Raster conversion, 23, 51
- Raster to Vector Conversion, 37
- Rectangle
  - markup and measure, 16
- Registering file types, 9
- Resize, 16
- Roof
  - Measure Pitch, 16
- Scale, 23
  - check, 15
  - Printing, 28
  - set, 15
- Scan, 21
  - pre-scan checklist, 39
  - settings, 39
- Select, 14
  - area, 13
- Shortcuts, 22
- SHX font, 23
- Snap, 18, 22
- Spot color, 38
- Sum areas, 20
- Symbol Stamps, 33
- Symbols
  - save into DWG, 34
- Thin lines, enhance, 37
- Tile, 19
- Title block, 30
- Truetype font, 23
- TRX files, 26
- Undo, 11, 13
- Vector, 8
  - Drawing tools, 14
  - formats supported, 54
  - specific functions, 23
  - vertical adjustment, 36
- Vector to Raster Conversion, 51
- Version differences. *See* Compare
- Watermarking, 28
- Width, zoom to, 13
- Window, new-duplicate, 19
- Word
  - paste detail into, 22
- Word, paste detail into, 25
- Xref, 16, 23
- Zoom, 13