About Manual (Read First!)

LWCAD 4's manual is distributed as a PDF file in text form with embedded YouTube videos for the most important parts.
If you have problems understanding anything in this manual or you think that some part is not sufficiently described, or have ideas for improvements for this manual, please send your feedback via:
http://wtools3d.com/support.php

What is New In LWCAD 4

Watch LWCAD 4.51 new tools video
Watch LWCAD 4.5 new tools video
Watch LWCAD 4.2 new tools video
Watch LWCAD 4.1 new tools video
Watch LWCAD 4.0 new tools video

UCS – Universal Coordinate System

Watch UCS video

The Universal Coordinate System, or UCS, allows you to create a user-defined adjustable workplane.
UCS settings are located in Snap Panel. There are three basic modes:
OFF - UCS is disabled
AUTO - automatic mode, workplane is created after the first mouse click
FIXED - fixed mode, workplane is fixed

UCS face
Tool for defining UCS workplane by clicking on a polygon.

UCS 3pnt
Command for defining UCS workplane with three points.

UCS off, UCS auto
Fast commands for switching UCS mode. Can be easily assigned to keyboard shortcuts.

Snapping & Grid

Video [Watch snapping & grid system video](#)

LWCAD uses its owns snap-to-object system which is fully integrated into all LWCAD tools.
Current snap engine works only with polygons and LWCAD NURBS curves. Other geometric entities are ignored.

Real-Time Boolean

Video [Watch Real-Time Boolean video](#)

Curve Boolean
All curve primitive tools can use real-time curve Boolean functions.
Boolean operations are calculated between objects created with tools and rest of the scene geometry that lies on the same UCS workplane as the current tool.
Boolean operations only work with LWCAD NURBS curves.

Polygon Slice
All Curve primitives also have the ability to slice polygons. Tool must be applied by clicking on polygon and then slice mode is enabled with **pol** button.

Polygon Boolean
All polygon-based primitive tools can use real-time polygon Boolean.
Polygonal Boolean operations preserve UV maps on objects.

Primitives (cur)

Video [Watch curve primitive tools video](#)

The Curve primitive group contains a set of tools for creating NURBS curve object primitives. Tools work with real-time curve Boolean and can also work in polygon slicing mode.

Line

Primitive tool for creating NURBS poly-lines and curves.

Rectangle

Primitive tool for creating a rectangular NURBS object. Works with Shape Library 1D and 2D.

Circle

Primitive tool for creating NURBS circle and ellipse objects.

Arc

Primitive tool for creating NURBS arc objects.

Primitives (pol)

[Watch polygon primitive tools video](#)

The Polygon primitive group contains a set of tools for creating UV-mapped polygonal object primitives. Tools can work in Real-Time Boolean or Drill mode.

Polygon

Primitive tool for creating a single polygon with as many vertices as needed. This does not create a UV map.

Box

Primitive tool for creating cuboid objects. Can create pyramid shapes and also use Lib3D forms. The predefined Lib3D forms have no UV maps, but any you create and add to the libraries yourself can.

Cylinder

Primitive tool for creating cylindrical objects. These can be Cylinders, Cones or tubes (cylinders with no end caps, but with user-defined wall thickness). This tool will create a UV map.

Sphere

Primitive tool for spheroid objects. Perfect spheres are created unless Elliptic Base Mode is chosen. This tool will create a UV map.

Pipe

Primitive tool for creating piping. A UV map will be generated if desired.

ArcSection
Primitive tool for creating NURBS poly-lines and curves with UV map.

UV map

The UV map group contain tools for making quick edits to UV maps on objects.

Rectangle UV
Interactive UV map edit tool for adjusting or creating UV maps with a bounding box.

Shape Library 3

Shape Library 3 is a repository of custom shapes for specialized tools in LWCAD.
It has seven basic types of shapes:
- Shape 1D: open curve
- Shape 2D: single or multiple closed curve(s)
- Shape 3D: polygonal object
- Window: polygonal window object with defined drill curve
- Door: polygonal window object with defined drill curve
- Fence: polygonal fence object
- Column: polygonal column object
- Element: polygonal element object
- Furniture: polygonal furniture object
- Shingle: polygonal shingle object

add to LIB1D
Interactive tool for importing 1D curve shapes into Shape Library 2.

add to LIB2D

Interactive tool for importing 2D curve shapes into Shape Library 2.

add to LIB3D

Interactive tool for importing 3D Shapes into Shape Library 2.

add To ArchViz

Interactive tool for importing Window, Door, Fence, Column and Shingles shapes into Shape Library 2.

Convert

[Watch Convert tools video](#)

The Convert group contains set of tools for conversions between NURBS curves, LightWave splines and polygons.

Curve To Poly

Complex tool for converting 2D floor plans defined by NURBS curves and Lines into polygons.

Curve To PolyLine

Tool for converting NURBS curves into Lines or 2-point polygons

Curve To LWcur

Tool for converting NURBS curves into LightWave splines.

LWcur To PolyLine

Tool for converting LightWave splines into lines.

Poly To Curve

Tool for converting polygon edges into lines.

Make Triple

Tool for converting multiple-point polygons (NGons) into Triangles.

Make Quad

Tool for converting multiple-point polygons into four-point polygons.

Make Convex

Tool for converting multiple-point polygons into convex polygons.

Dimension

The Dimension group contains basic measurement tools which can also create permanent dimension objects.

Distance

Measurement tool for calculating the distance between two points.

Angle

Measurement tool for calculating the angle between three points.

Area

Measurement tool for calculating the area of a single polygon or polygonal surface.

Volume

Measurement tool for calculating the volume of polygonal objects.

Modify

  Watch Modify tools video

A set of modify tools for the precise placement of geometry.

Drag & Weight

Tool for translating points or adjusting point weight parameter with holding SHIFT key.

Move Snap

Tool for translating selected geometry.

Rotate Snap

Tool for rotating selected geometry.

Scale Snap

Tool for scaling and stretching selected geometry.

Clone

  Watch Clone tools video

The Clone group contains a set of tools for cloning shape library objects or scene geometry.

Vector Clone

Clone tool for cloning objects along defined vector.

Array Clone

Clone tool for cloning objects in defined array or within polygon area.

Spray Clone

Clone tool for random cloning objects within defined circle area, polygon area or object surface.

Radial Clone

Clone tool for cloning objects along defined radial path.

Mirror Tool

Clone tool for mirroring scene geometry.

Rail Clone

Clone tool for cloning objects along a defined rail curve.

Random

 [Watch Random tools video](#)

A group of tools for randomizing geometry elements and attributes.

Jitter Tool

Tool for randomly moving, rotating and scaling geometry elements.

Select Random

Tool for randomly selecting points, polygons or objects.

Surface Random

Tool for randomly changing surfaces on polygons or objects.

Mass Edit (uni)

 [Watch Mass Edit tools video](#)

This group is a set of mass edit tools for editing polygons and NURBS curves.

Join and **Explode**

The Join tool is for connecting neighboring curve pieces into single curves and connecting neighboring polygons into connected objects.
The Explode tool is the reverse, curve segments are exploded into multiple single curves and objects are exploded into unconnected polygons.

Mass Offset

Tool for offsetting selected edges along the object surface or curves.

Mass Extrude

Tool for extruding selected polygons on complex objects

Mass Round

Tool for rounding edges of polygonal objects and corners between curves.

Reduce

Tool for removing redundant polygons and line segments.

Mass Edit (cur)

[Watch Mass Edit tools video](#)

Set of mass edit tools for editing NURBS curves.

Boolean 2D

Tool for Boolean operations on NURBS curves. It is applied to the whole scene.

Merge Curves

The Merge Curves tool deletes duplicated curves and line segments

Connect Curves

Tool for connecting curves with opened ends.

Edit (uni)

 [Watch Edit tools video](#)

Set of tools with simple edit operations on NURBS curves or polygonal objects.

Trim
The Trim tool removes ends of lines sticking out of objects.

Bool
Bool tool adds, subtracts or intersects clicked object with the rest of the scene

Knife Tool
Tool for slicing polygons and curves

Extrude
Tool for extruding selected polygons and curves.

Edit (cur)

 [Watch Edit tools video](#)

Set of tools with simple edit operations on single NURBS curves.

Extend
Extend operation.

Fillet Chamfer
Fillet and chamfer operation between two curves.

Blend
Blend operation between two curves.

Offset
Offset operation on single curves.

DelCurSeg
Tool for deleting curve segments with mouse click.

Fix & Analyze

Video   Watch Fix & Analyze tools video

Analyze Curves
Tool for analyzing errors in complex curve-based scenes.

Fix Polygons
Simple command for fixing common polygonal errors.

Line Magnet
Tool for moving nearest points to a defined line.

Archviz Basic

Video   Watch Archviz Basic tools video

Wall
Tool for creating walls.

Floor
Tool for creating floors and ceilings on existing walls.

Roofs

Video   Watch Roof tools video
Shingles tool video

Complete set of tools for creating the most common variations of roofs.

Line Roof
Line-based roof tool.

Rectangle Roof

Rectangle-based roof tool.

NGon Roof

Ngon-based roof tool.

Shingles

Automatic tool for placing shingles on complex roofs.

Elements

Watch Elements tools video

A set of advanced tools for creating architectural elements using the Shape Library.

WinDoor

Tool for placing door and window shapes from the Shape Library.

Fence

Tool for drawing fences using fence and column shapes from the Shape Library.

Stairs

Watch Stair tools video

Complete set of tools for creating most common stair types.

Line Stair

Line-based stair tool with platform/landing support.

Rectangle Stair

Tool for creating stairs based on a rectangular shape.

Spiral Stair

Tool for creating spiral staircases.

Arc Stair

Tool for creating arc staircases.

Cur To Stair

Tool for converting three or four connected NURBS curves into stairs.

Infrastructure

 [Watch Infrastructure tools video](#)

A set of tools for building infrastructure elements such as roads, sidewalks, road lines and crosswalks.

CrossWalk

Tool for creating five different types of crosswalks.

Road Lines

Tool for converting curves into various types of road lines.

Roads

Tool for converting road network defined by curves into roads.

Detail

 [Watch Detail tools video](#)

Two tools for advanced architectural details

Engraver

Engraver is a special tool for extruding sets or quad polygons using Lib1D shapes.

Profiler

Profiler is a special tool for creating custom profiles with the help of shapes from the 1D and 2D library along a defined NURBS curve.

DXF ImportExport

This duo of commands serves as a conduit between LightWave and professional CAD programs. Imported geometry is stored in the current selected layer and layer information from the DXF file is transformed into sketch color information.

When exporting, all geometry in selected layer is exported and each sketch color is exported as different layer.

DXF Import:

Supported entities:

- 3DFACE   triangle or square polygon
- ARC   circle arc
- CIRCLE   circle
- ELLIPSE   ellipse or elliptic arc
- LINE   simple line
- POLYLINE   polyline or polyface mesh
- LWPOLYLINE polyline or polyface mesh
- SPLINE   NURBS spline curve

There might be blocks in an imported DXF file. Blocks will be replaced by the geometry from which they are assembled. All unsupported entities or parameters are ignored

DXF Export:

Exported entities:

- 3DFACE   triangle or square (polygons with more than four points are triangulated).
- SPLINE   All curves will be stored as splines with appropriate parameters