

CAD/CAM Design Tools

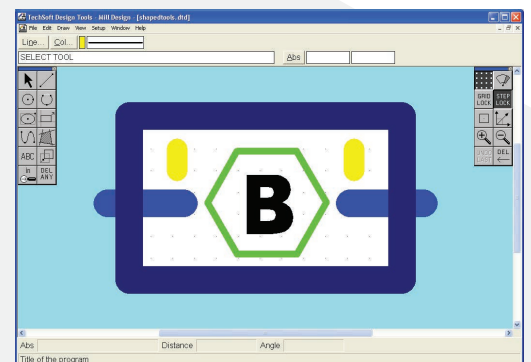
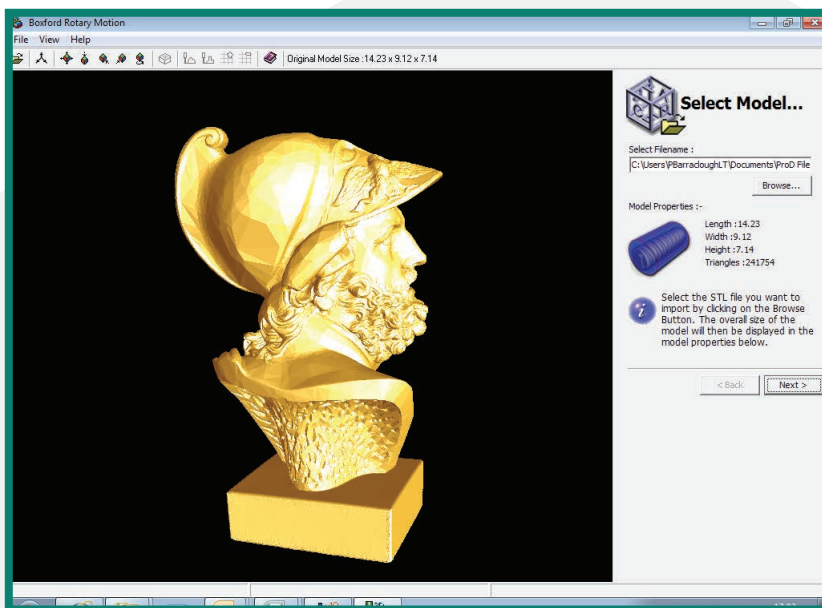
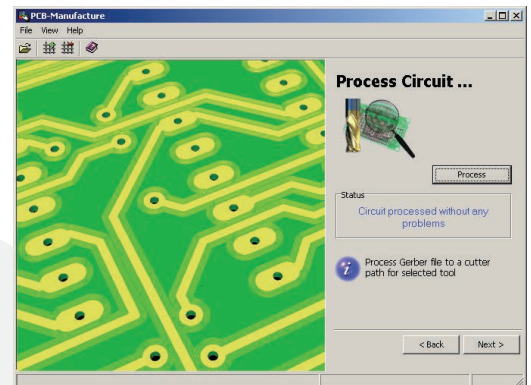
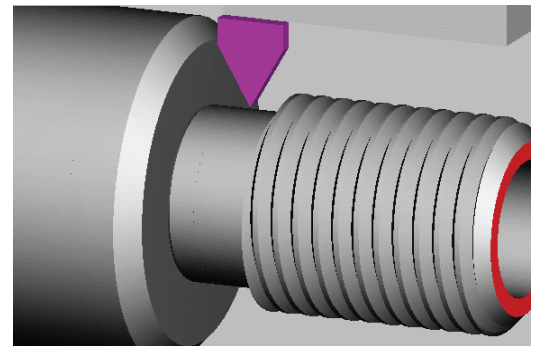
Software supplied with all new and upgraded Boxford Lathes, Mills and Routers.

The Boxford CAD/CAM Design Tools software is a unique suite of integrated CAD and CAM tools designed specifically to satisfy all educational, training and prototyping requirements, across the full spectrum of age and ability levels.

Supplied with all new and upgraded Boxford lathes, mills and routers, the software automatically creates programs conforming to industrial standards.

Main features include:

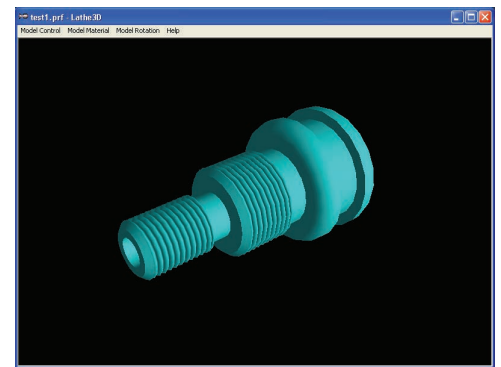
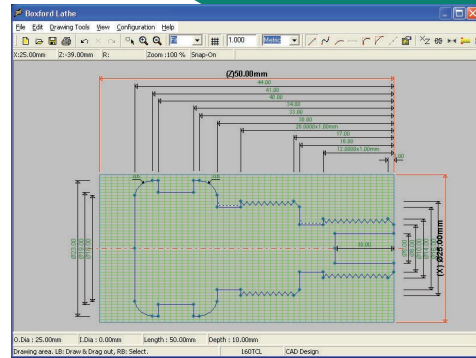
- 2D Design packages for turning and milling
- CAM Routines to machine 2D CAD drawings, 3D CAD drawings, 3D engraved photographs and printed circuit boards
- For industrial training, sophisticated conversational programming and a CNC program editor are also available



Turning

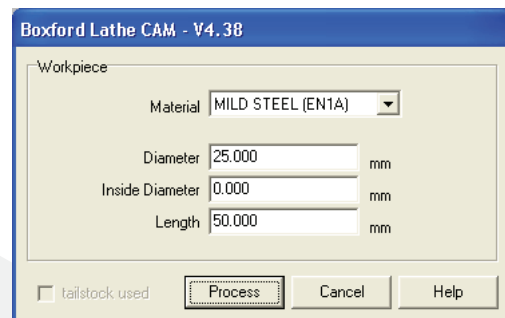
CAD

- Provides a number of tools which allows the input of straight lines, arcs and threads to define internal and external profiles.
- Manipulation tools allow existing entities to be edited, moved, deleted and new elements to be added
- Fillet and chamfer tools
- Automatic dimensioning in both incremental and absolute
- 3D view in either solid rendered or wire frame. Animated rotation of infinitely variable user defined rotation around any axes. Choice of rendered material.
- Print options on all 2D and 3D views
- Automatic error checking does not allow illegal entities (not conforming to turning conventions) to be defined.
- Alternatively, component profiles can be imported from a third party CAD package using either DXF or STL file formats.



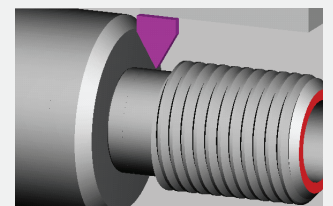
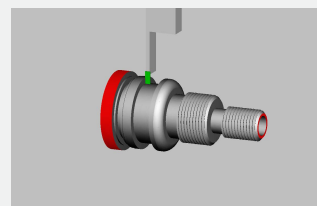
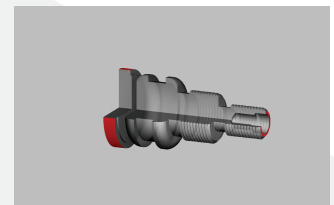
CAM

- The CAM processor automatically produces an error free G&M code listing to manufacture the designed component
- The CAM makes optimum use of the cutting tools available and assigns feeds, speeds and cut depths appropriate to the selected material and Boxford machine tool being used.



Graphical views and simulations

- The component produced by a program can be viewed in both 2D and 3D rendered models
- Tool profile is interacted with workpiece to display exact cut profile
- Zoom facility including pan facility
- Cross-sectional views at any defined point, in any plane
- Infinitely variable user defined workpiece rotation
- Machine status display, showing current status of all programmable machine options
- The manufacture cycle for programs can be simulated in either single block mode or continuous mode
- Current simulation view can be printed at any stage



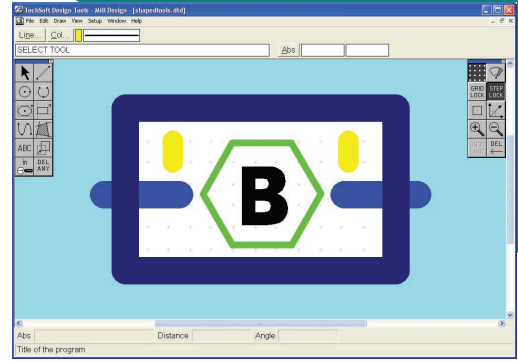
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Milling and Routing

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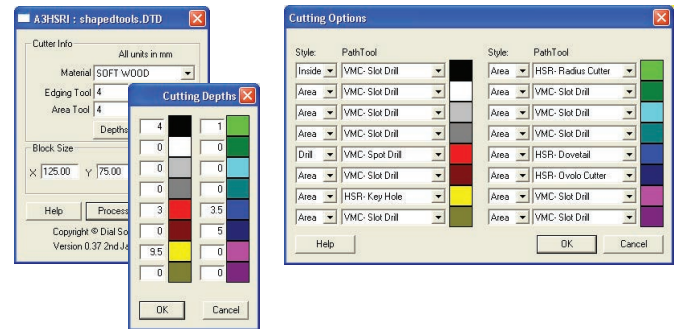
CAD

- The CAD package provides a number of tools which allow the input of straight lines, arcs, circles, bezier curves, various polygons and text (any available True Type Font)
- Manipulation tools allow elements to be moved, copied, mirrored rotated, distorted, trimmed and replicated in both rectangular and circular arrays (eg. PCD holes).
- A smart fill tool is provided to fill pocketed areas with colour, taking into account any islands that may exist.
- Alternatively, component profiles can be imported from a third party CAD package (eg. AutoCAD®) using DXF, WMF, EMF, HPGL or AFF file formats.



CAM

- Drawing colours are assigned a machine depth
- Pocketed areas (which may include multi-islands) to be removed or profiled, are assigned a machining strategy which includes remove area, profile inside only, profile outside only or peck drill
- Lines of a given width can be followed with a cutter of a specified type. Cutter diameter is automatically selected
- The CAM processor automatically produces an error free G&M code listing, making optimum use of the cutting tools available and assigning feeds, speeds and cut depths appropriate to the selected material and Boxford machine tool to be used



- Total cut depths assigned to each individual cutting tool will NEVER exceed the flute length of the cutter
- Depth and strategy settings can be saved with the drawing for easy reprocessing if required

Graphical views and simulations

- The component produced by a program can be viewed in both 2D and 3D rendered models
- Tool profile is interacted with workpiece to display exact cut profile
- Zoom facility including pan facility
- Cross-sectional views at any defined point, in any plane
- Infinitely variable user defined workpiece rotation
- Machine status display, showing current status of all programmable machine options
- The manufacture cycle for programs can be simulated in either single block mode or continuous mode
- Supports rectangle and circular billets aligned to the X, Y or Z plane
- Current simulation view can be printed at any stage

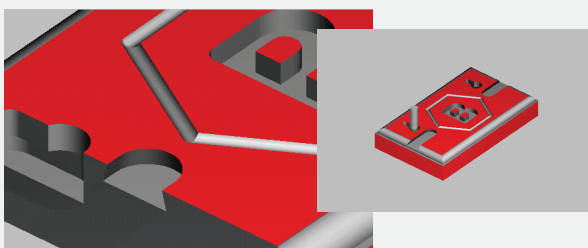
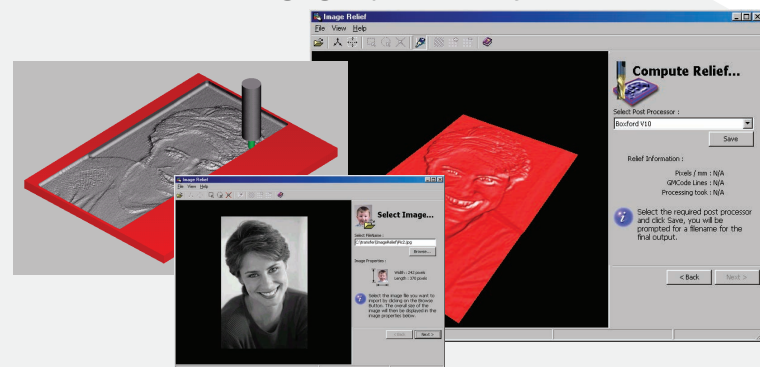


Image relief™ - 3D photo engraving wizard

- Allows any image in JPEG or BMP formats to be imported and machined
- A simple wizard allows the image to be cropped, resized and fitted to a work piece
- A 3D relief based on the greyscale is automatically created
- A machine routine is automatically created and simulated
- Backlighting the finished component produces an amazing hologram type effect
- The process is fun, easy and is guaranteed to be a success with all age groups and ability levels



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Milling and Routing

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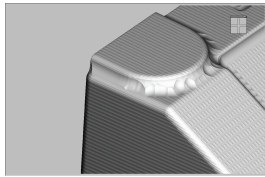
3D-GeoCAM™ - Solid Model Import Wizard

- Allows STL files to be imported from major solid model CAD packages including SolidWorks®, Pro/Desktop®, Pro/ENGINEER®, Creo Elements/Pro®, AutoCAD® and Autodesk Inventor®
- Optimised 3D & 2½D cutter paths
- Automatically creates multi-sided machining for complete component manufacture
- Improved component quality compared with other simple raster strategy only based packages, as shown on the right
- Multiple roughing and finishing machining strategies to suit all types of CAD models including:

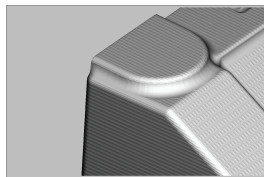
Roughing: Offset waterline and raster profile

Finishing: Raster, offset, true spiral, Z level and combination

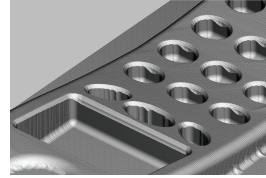
- Rest finishing cycle removes machining marks (cusps) left by previous machining at intersects of model geometry (eg. corners), as shown below



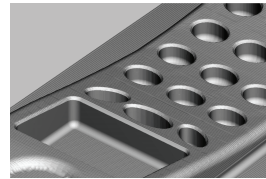
Before rest finishing



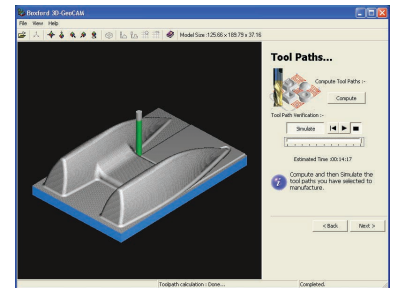
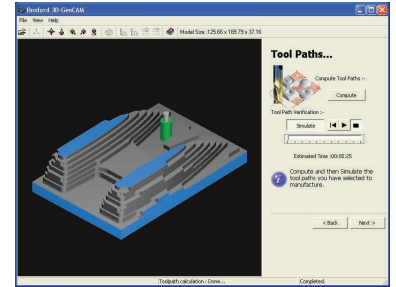
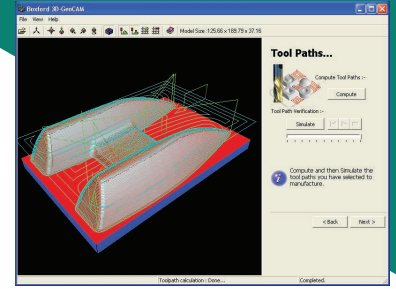
After rest finishing



Simple raster

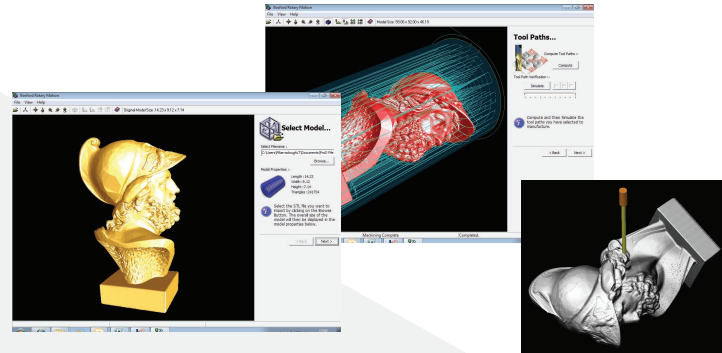


3D-GeoCAM



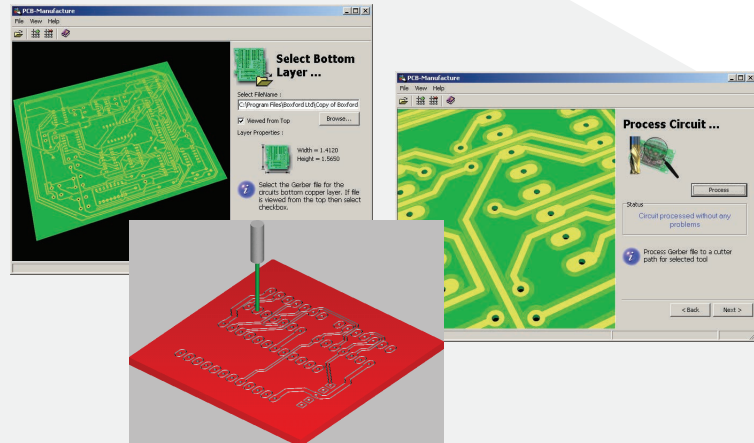
4D-GeoCAM™ - Cylindrical Solid Model Import Wizard

- Allows cylindrical STL files to be imported and machined on an automatic 4th axes
- Utilises advanced machining strategies to create 4D cutter paths
- Machining routine automatically created and simulated



Gerber Mill™ - PCB Import Wizard

- Allows Gerber files to be imported from major PCB design packages including PCB wizard™
- Machines around tracks and pads to isolate them and create a PCB
- Spots and drills holes
- Machining routine automatically created and simulated



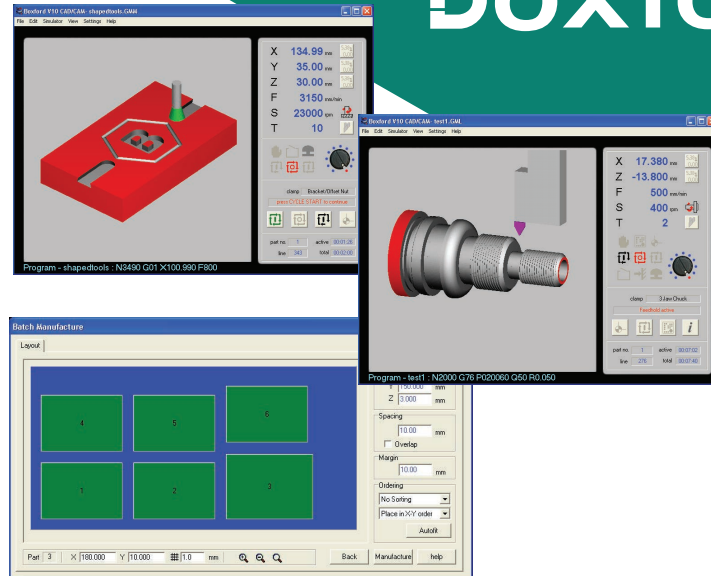
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Turning, Milling and Routing

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Manufacture

- Very simple cycle setup procedure requires the operator to make one measurement only. No manual machine control necessary
- 3D simultaneous simulation during manufacture
- Simultaneous feedback facility shows axis positions and machine status
- Multi-user definable clamp positions
- Batch manufacture allows multiple jobs to be machined
- Component manufacture allows multi-sided machining to be performed in one automatic cycle



CAD/CAM Design Tools User Modes

- The software has three modes of operation available to suit different age and ability levels. They are:

Standard User

All CAD, CAM, import, simulation and manufacturing functions as detailed on previous pages

Advanced User

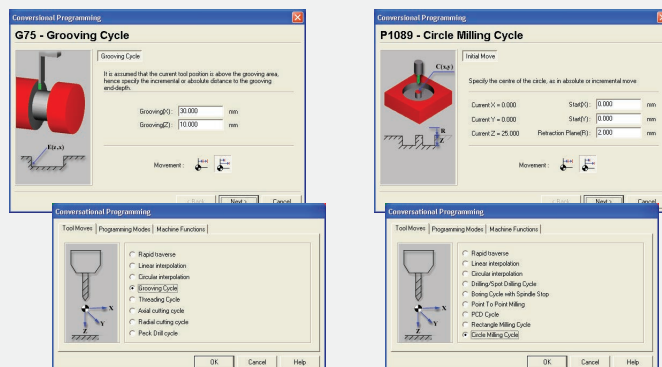
In addition to the standard user functions, Conversational Programming and Manual Data Input (MDI) programming functions are available

Administrator

In addition to the Advanced User functions, this password protected mode enables tool library editing, material library editing and a host of application preferences and settings functions

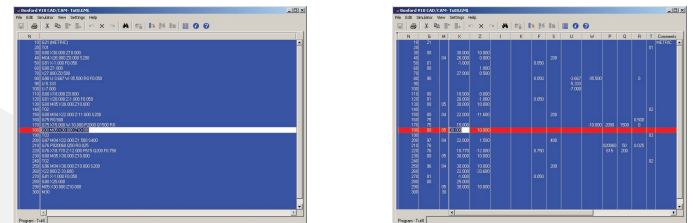
Conversational Programming

- Developed for engineering and other vocational training needs, the Conversational Programming option allows G&M programs to be created using a question and answer wizard
- The relevant machine codes to perform each operation are automatically output



Manual Data Input (MDI) Programming

- Advanced users can edit existing G&M code programs, or define new ones using the sophisticated CNC editor
- Blocks can be modified, inserted or deleted with the aid of the on-line programming code help facility
- When inputting new programs, each block entered produces a graphical simulation of the cutter path
- Automatic error checking ensures blocks with syntax errors and speeds, feeds and cut depths inappropriate to the material and machine tool are automatically detected
- Multi G code (from different group) single line programming
- Tabulated or compact editor program views



- Individual line text comments facility
- Automatic line renumbering
- Copy and paste of single or multi-blocks
- Subroutine programming with nesting of up to 10 routines
- Find and replace facility incorporates a number of search criteria options for batch changes of program data
- **Supported Lathe codes:** G00, 01, 02, 03, 04, 20, 21, 50, 75, 76, 80, 83, 90, 94, 96, 97, 98, 99
M00, 01, 02, 03, 04, 05, 08, 09, 30, 39, 40, 48, 49, 81, 97, 98, 99
- **Lathe columns used:** G, M, X, Z, I, K, F, S, U, W, P, Q, R, T
- **Supported Mill codes:** G00, 01, 02, 03, 04, 17, 18, 19, 20, 21, 40, 41, 42, 50, 51, 53, 61, 64, 65, 66, 67, 80, 81, 82, 83, 85, 89, 90, 91, 92, 107
M00, 01, 02, 03, 04, 05, 06, 08, 09, 30, 39, 40, 48, 49, 81, 97, 98, 99
- **Mill columns used:** G, M, X, Y, Z, I, J, K, F, S, P, Q, R, T, A

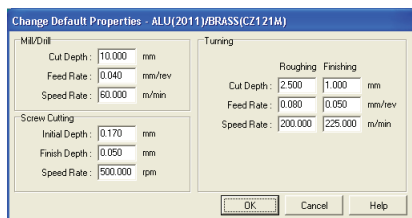
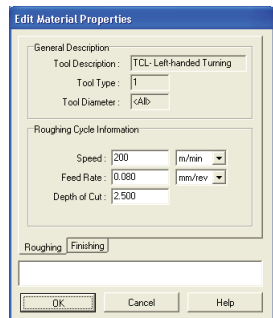
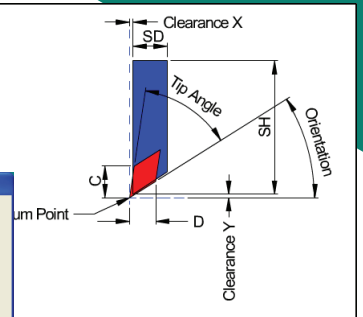
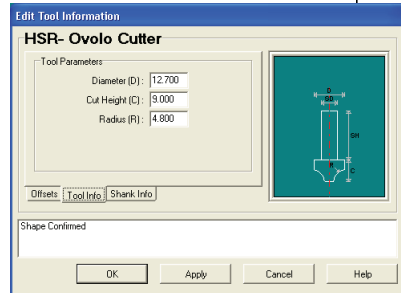
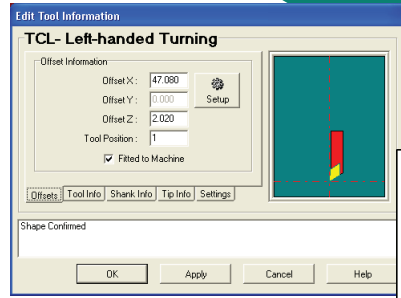
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Administrator Mode Functions

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Tool Library

- Central tool library holds all the tooling data for the currently selected machine. All CAM, Conversational Programming and MDI functions access the library
- Define new tools including user defined profiles
- Graphical dimensioned representation of each tool
- Printout options for all information and graphical views
- Tool offset setting wizard allows fast setup of new tooling

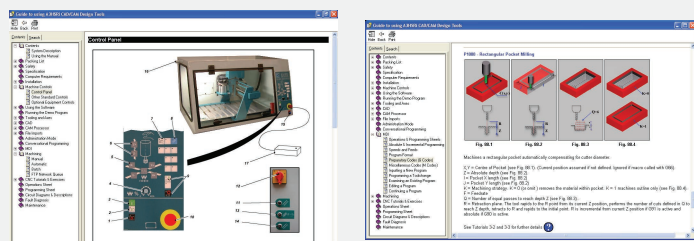
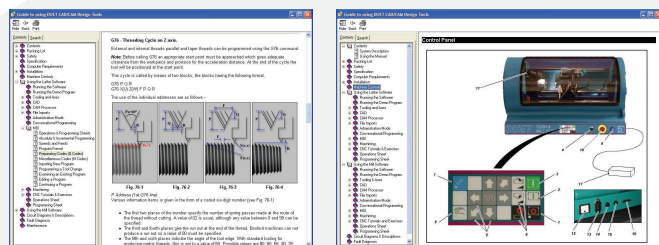


Material Library

- Central material library holds all the tooling data for the currently selected machine. All CAM, Conversational Programming and MDI functions access this library
- Define new materials including cut data
- Cut data overrides for individual tool types and individual tools
- Print out options for all information and graphical views

Context Sensitive Help Facility

- Comprehensive integrated help system provides help on software and hardware
- CAD, CAM and MDI programming examples
- Search facility



FMS and CIM Integration

- Remotely load or transfer programs using RS232 or network TCP/IP transfer protocols
- Remotely initiate manufacture cycles via optional machine robot connection port

Compatibility

- Microsoft Windows 7, 8, 10 and 11
- Standalone workstation or network installation

Options

- Available in a single seat and site license/network versions

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