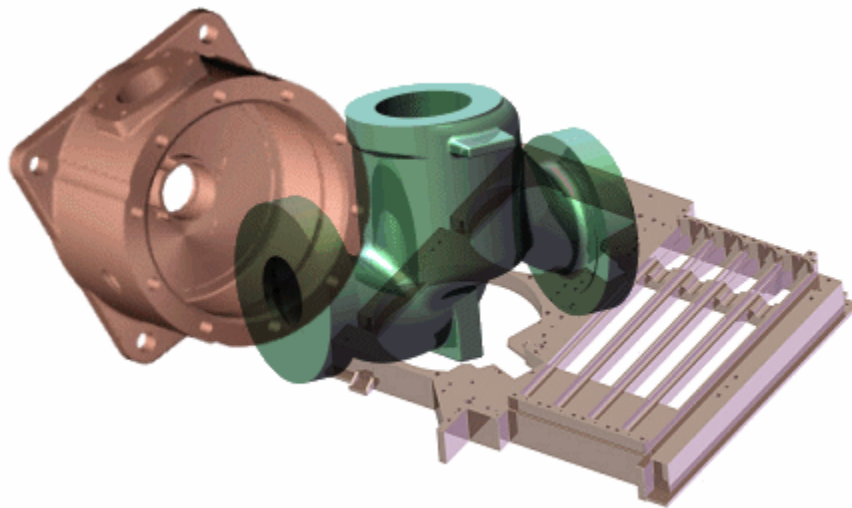




camworks
powered by SolidWorks

CAMWorks 2007 Installation & Quick Start Guide



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Chapter 1 Installing CAMWorks

CAMWorks is fully integrated into SolidWorks and works within the SolidWorks environment. As a result of the integration of SolidWorks and CAMWorks, you can:

- Use the same user interface (Windows) for design and CAM.
- Use the same part file for storing the design and the machining information (machinable features, operations and toolpaths).
- Eliminate file transfers using time-consuming standard file formats such as IGES, SAT and Parasolid. The IGES and SAT file formats are a close approximation of the part within a tolerance and as such are prone to errors.
- Generate toolpaths on the actual SolidWorks part, not on an imported approximation.
- Generate toolpaths that are associative with SolidWorks. This means that if the design model is changed, the toolpaths are changed automatically with minimal user intervention.

This chapter explains how to install CAMWorks and activate your CAMWorks license.

System Requirements

Because CAMWorks runs within the SolidWorks environment, the system requirements are basically the same as for SolidWorks with the following exceptions:

Hardware

- Platform: Intel® Pentium / AMD Athlon™ (Alpha is not supported)
- RAM: 256MB (512MB or more recommended)
- TekSoft License/Security Key – when using a hardware device for software protection (one for each CAMWorks license purchased)

Operating System

- If running SolidWorks 2006: Microsoft® Windows® 2000 and XP (32-bit version of XP)
- If running SolidWorks 2007: Microsoft® Windows® XP (32- and 64-bit versions of XP)

Required Software

- CAMWorks - The current version is CAMWorks 2007.
- SolidWorks®
CAMWorks 2007 runs in the 32-bit versions of SolidWorks 2006 and SolidWorks 2007. During the CAMWorks installation, a message displays indicating any additional SolidWorks version requirements. If you run CAMWorks with an older version of SolidWorks, unpredictable results may occur.
- Feed and Speed Library
The Feed and Speed Library provides over 1.7 million feed and speed combinations that represent over 1100 materials. Use of the feed/speed data is optional; however, CAMWorks uses non-feed/speed data from the library. The CAMWorks CD provides an option for installing this software.
- Microsoft® Access 2000, 2002 or 2003
Microsoft Access is required in order to edit the Technology Database and customize the data for your machining environment. We recommend that you purchase and install a full version of Access before installing CAMWorks; however, a runtime version of Access 2000 is included on the CAMWorks CD. For more information on the runtime version, see page 1-7.
- Sentinel Driver
If you are using a hardware device for CAMWorks software licensing and security, a driver is required in order for CAMWorks to read the key. The Setup program on the CAMWorks CD provides an option for installing the driver, if necessary.
- FlexLM License Manager
For new CAMWorks installations, if you are using the built-in software license instead of the key, you need to install the CWFlexLM License Manager and submit registration information to TekSoft.

Optional Software

- Adobe® Reader

The CAMWorks CD includes this manual, the *Mill and Turn Tutorial*, the *Mill-Turn Tutorial*, *Multiaxis Machining* and the *Wire EDM Tutorial* in Adobe Portable Document Format (PDF). The manuals can be viewed and printed using the Adobe Reader. You may already have the Reader installed on your PC. If the Reader is not installed, you can install it from the CAMWorks CD or from the Adobe web site: www.adobe.com.

- Predator CNC Editor

Predator CNC Editor includes CNC Editor, DNC, Backplotter and File Compare modules. The Setup program on the CAMWorks CD provides an option for installing this software.

- TekSoft Universal Post Generator

The Universal Post Generator allows you to customize your TekSoft post processors for both basic and complex code generation requirements. You can use this utility to configure the post processor to output NC code for sophisticated control requirements or to complement specific production methods. The Setup program on the CAMWorks CD provides an option for installing this software.

Installing CAMWorks

CAMWorks Setup Program

The CAMWorks installation program installs the following:

- CAMWorks system files and the Technology Database files.
- Sample parts (in the *\examples* folder inside the CAMWorks folder).
- Sample post processors (in the *\posts* folder inside the CAMWorks folder). These may or may not be suitable for your needs. Contact your CAMWorks reseller for information on making changes to these post processors or for obtaining other post processors.
- The manuals in Adobe PDF files (in the *\lang\English\manuals* folder).

Installation Procedure

The steps to install the CAMWorks software are listed below. If you are updating an existing CAMWorks installation, see page 1-15 before installing a new version.

1. Verify that you have the hardware and software required to run CAMWorks.
2. Make sure SolidWorks is installed.

Because CAMWorks depends on SolidWorks, a specific version of SolidWorks may be required. During the installation of CAMWorks, a message displays indicating the required SolidWorks version. If you run CAMWorks with an older version of SolidWorks, unpredictable results may occur.

3. Make sure Microsoft Access 2000, 2002 or 2003 is installed.

Access 2000, 2002, 2003 or Access 2000 Runtime must be installed *before* running the CAMWorks Setup program. Because CAMWorks uses Access, the Setup program searches for Access before completing the installation.

4. Insert the CAMWorks disc in the CD drive.
 - After a brief pause, the CAMWorks product menu should display.
 - If the menu does not display automatically, select Start on the taskbar and choose Run. In the Run dialog box, type d:\setup (or the letter of the CD drive) and click OK. You can also start the program from Windows Explorer by opening the CD folder and double-clicking setup.exe.

5. If you are using a hardware license/security key, click the Sentinel Driver button on the product menu to install the key driver.

Install this driver if you are installing CAMWorks for the first time or if you have upgraded an older operating system to 2000 or XP. Without this driver, CAMWorks cannot read the key and starts with many functions disabled. If you install the driver, reboot your PC before starting CAMWorks. Note that this driver is not required for the built-in software license.

6. Click the CAMWorks 2007 button on the product menu and follow the prompts to install the software.

7. Click the Feeds and Speeds button on the product menu.

Use of the feed/speed data is optional; however, CAMWorks uses non-feed/speed data from the library so you need to install this software.

8. Optionally, install the other programs.
9. Activate your CAMWorks license.
 - If you are using a license/security key for licensing and security, close the Setup program and attach the key to your computer.
 - If you are using the built-in software license instead of the hardware key, you need to install the CWFlexLM License Manager and submit registration information to TekSoft.

To install and enable a standalone license for a specific PC, see page 1-8.

To install and enable a floating network license, see page 1-10.

10. Start SolidWorks.

The CAMWorks logo displays to indicate CAMWorks is started and the Locate File: TechDB.mdb dialog box displays. The TechDB file shown in this dialog box is compatible with the CAMWorks version you just installed and you should click Open to link this database. If you have customized data in a previous version of the database, you can import the data into the new Technology Database as explained on page 1-18.

Installing Supplemental Programs

The CAMWorks CD contains a number of supplemental programs. Some of these products require licensing in order to run.

Feeds and Speeds

CAMWorks generates feed/speed values from a library based on the workpiece material, tool material, tool diameter, cutting depth, and operation type. The Technology Database provides access to the feed/speed library, so that you can review or modify the data. The Feed/Speed Editor and Material Library are explained in CAMWorks online help. Since CAMWorks uses non-feed/speed data from the feed/speed library, this software should be installed. The use of the feed/speed data is optional.

To install the Feed and Speed Library software, start the Setup program on the CAMWorks CD and click the Feeds and Speeds button on the Product menu. Follow the instructions on the screen.

Predator CNC Editor

The Predator CNC Editor includes 4 integrated modules:

- CNC Editor with dozens of CNC intelligent editing commands, Microsoft® Word compatible menus, toolbar, and shortcut keys.
- File Compare module with synchronized scrolling and line-by-line edit/change review.
- DNC module to send, receive and DNC to any RS-232 compatible CNC machine. Supports an unlimited number of different CNC machines with appropriate hardware.

- Backplotter module for backplotting any CNC program in a true 3D environment to graphically verify CNC code.

To install the software, start the Setup program on the CAMWorks CD and click the Predator CNC Editor button on the Product menu. Follow the instructions on the screen. Note that in order to run this program, the built-in software license or hardware key must be programmed for Predator.

TekSoft Universal Post Generator

CAMWorks uses a post processor to convert information into machine tool specific NC code. Each post processor is designed to generate quality NC code that meets the requirements of the machine control. The Universal Post Generator allows you to customize the post processor for both basic and complex code generation requirements. To install the Universal Post Generator software, make sure you have a version of CAMWorks installed, then start the CAMWorks Setup program on the CD and click the Post Generator button. Follow the instructions on the screen.

Adobe Reader (for CAMWorks Tutorials)

The Adobe Reader allows you to view, navigate, search and print the CAMWorks manuals. When you install CAMWorks, the Installation Guide and the Tutorials are installed automatically in the *\lang\english>manuals* folder inside the CAMWorks folder. If you do not have the Reader on your PC, you can install it from the CAMWorks CD by clicking the Adobe Acrobat Reader button on the Product menu or from the Adobe web site: www.adobe.com.

To start the Reader and open a file, select CAMWorks2007 on the Start|Programs menu, then select Installation & Quick-Start Guide or one of the CAMWorks Tutorials. You can also open the *\lang\english>manuals* folder in Windows Explorer, then double-click a pdf file.

Sentinel Driver

In order for CAMWorks to read the hardware key in Windows XP and 2000, a Sentinel driver must be installed. If this driver is not installed, CAMWorks starts with many functions disabled. You can install the driver automatically by clicking the Sentinel Driver button on the CAMWorks CD product menu or you can install the driver manually.

If you need to install the Sentinel driver manually:

1. Insert the CAMWorks disc in the CD drive. If the Setup program starts and the product menu displays, click the Close button.
2. In Explorer, select the CD drive and open the *\SentinelDrivers\7.3.0_Driver* folder.
3. Run the program in that folder. The Setup program automatically installs the driver.
4. Restart the PC before starting CAMWorks.

Access 2000 Runtime

CAMWorks requires Access 2000, 2002 or 2003 in order to edit and customize the Technology Database and the user defined setup sheets. It is strongly suggested that you purchase and use the full version of Access. However, an optional runtime version of Access 2000 can be installed from the CAMWorks CD. The runtime versions can be used at no charge, but these versions have the following limitations:

- Runtime versions are not fully supported by Microsoft. Updates to the runtime version are not always available.
- Runtime versions do not allow you to generate Setup Sheets using the Setup Sheet command on the NC Manager shortcut menu or customize the Report Database sheets.
- It has been reported that on some systems the runtime version does not install all the files required by CAMWorks. Unpredictable results may occur.

A full or runtime version of Access must be installed *before* running the CAMWorks setup program.

To install the runtime version:

1. Run the setup.exe program in the Access2000Runtime folder on the CAMWorks CD.
2. To select the installation location of the runtime version, click the Customize button and select a folder.

IMPORTANT! If a full, purchased version of Access 97 is currently installed on your PC, you *must* install the Access 2000 Runtime version in a different folder.

3. Click OK. The Microsoft Access 2000 Runtime: Ready to Install screen displays again.
4. Click Install Now.

To uninstall the runtime version:

1. Run the setup.exe program in the Access2000Runtime folder on the CAMWorks CD.
2. Select the option: Remove Microsoft Access 2000 Runtime.

Installing Customized Post Processor Files

CAMWorks provides several standard post processor files. These files are installed in the \Posts folder inside your CAMWorks folder. These may or may not be suitable for your needs. Contact your authorized CAMWorks reseller for information on making changes to these post processors or for obtaining other post processors. Additional post processor files (.lng and .ctl files) can be installed in any folder.

Installing & Activating a CAMWorks License

Your CAMWorks license defines the modules and versions that you are authorized to run. CAMWorks can be purchased with a fixed standalone license or with a floating network license.

Standalone License

A standalone license authorizes use of CAMWorks on a specific PC. CAMWorks provides two options for standalone licensing: software encryption or a hardware dongle (key). Each of these methods is designed to protect you and TekSoft from unauthorized use of CAMWorks.

- CAMWorks utilizes built-in software encryption technology as the default licensing method. After you install the CWFlexLM License Manager, you must submit the request for a CAMWorks license. You will receive a license file to enable your license.
- Optionally, a key can be used for licensing CAMWorks. This hardware device is connected to the parallel printer port or USB connector on the PC.

Installing the Software License Manager for Built-in Software Encryption

If you are using the built-in software license and you are installing CAMWorks for the first time, you need to install the CWFlexLM License Manager and submit a request for a license file to TekSoft.

- The license request file must be created directly on the PC where the license will reside. If the license request file is created when running the License Manager via remote communications software such as pcAnywhere (Symantic Corp.) and submitted to TekSoft, an invalid license will be generated.
- Installation of the FlexLM License Manager and activation of a license can be performed remotely.
- Do not install the License Manager or the license file in the CAMWorks program folder.

To install the License Manager:

1. Start the CAMWorks Setup program on the CAMWorks CD and click the Software License Mgr. button on the product menu.

The Setup Wizard starts.

2. Follow the directions on each screen. When prompted to choose the license location, use the default path or select a different folder.
3. When the installation is complete, click Finish.

Requesting and Activating Your Built-in CAMWorks License

After installing the CWFlexLM License Manager, you can apply for a permanent license.

Request the license

1. From the Windows desktop on the PC where the license will reside, select Start on the taskbar, then select Programs|CAMWorks License Manager|CWFlexLM License Manager.
2. Click the License Setup tab.
3. For the License method, make sure FlexLM Software is selected.
4. Click the Request License button.
5. Complete the form. An asterisk indicates a required field.
6. Email the request:
 - If you use Outlook for email, click the Outlook button and send the email with the attachment to register@teksoft.com.
 - If you use different email software, click the Other button. Note the location of the file containing your information, then email the file in an attachment to register@teksoft.com.
7. Click Close to exit the request form. You can also close the License Manager.

CAMWorks will not run until you receive the license file and activate the license.

Activate the license

1. When you receive the license file from TekSoft, copy the file to a folder on your PC. The license file must be on the same PC as CAMWorks. We recommend you put the license file in the same folder as the License Manager.
2. Start the License Manager and click the License Setup tab.
3. Make sure Select node locked (Standalone) license file is selected, then click the Browse button to the right.
4. Browse to the folder where you copied the license file, select the file and click Open.
5. Click the Status tab and verify that the information has been updated as follows:
 - Authorization status = Succeeded
 - License File Used = path to the file and the filename
 - License Type = Nodelocked
6. Click the Authorized Modules tab.

This tab lists the modules you are licensed to run and the version. The Expiration field indicates if the license has an expiration date or is permanent.
7. Click Close to exit the License Manager.
8. Start CAMWorks.

The CAMWorks functions are now enabled.

Using a Hardware Key

Optionally, CAMWorks can use a hardware key (dongle) for licensing and protection against unauthorized use. The key is programmed for the modules and versions you are licensed to run. A key is a small hardware device that fits on the parallel port or the USB connector of the computer.

IMPORTANT! The hardware key is essentially your license and you may want to insure it against loss. If the key is lost or stolen, you will be required to purchase a new license.

Installing the Key

If you have a 25-pin key for a parallel port, attach the 25-pin male connector on the key to the 25-pin female connector on the PC. This is the printer port. The key must remain on the computer at all times while CAMWorks is in operation. CAMWorks looks for and reads the configuration on the key during start-up and periodically while it is running.

If you have a USB key, plug the key into the USB connector on the PC. If all the USB connectors are being used, you can purchase a USB hub to add additional connectors.

Note that when the hardware key is used, you do not need to install the CWFlexLM License Manager software.

Attaching Devices to the Key on the Parallel Port

The key is a passive device. It receives the signal coming out the parallel port, reads it, and passes the signal through unchanged. This means that you can place the key on the parallel port and then attach another device. Any devices that are attached must be powered on in order for the key to function.

The key does not affect the parallel port or most other devices attached to it. Infrequently, the key may not function because of a conflict. You can also attach multiple keys on the same parallel port. If you attach multiple keys, attach the other keys first, then the TekSoft key.

Floating Network License

CAMWorks utilizes software encryption for the floating network license. This license defines which modules and versions you are authorized to run and how many copies of each module can be running simultaneously on CAMWorks client PCs. A floating license can be purchased with configurations supporting one or more users.

The floating network license consists of two installation types: Server and Clients.

- **Server**

One PC on the network must be designated as the license server. This PC is used to submit the license request, install and run the CAMWorks License Server and activate the floating network license. The Server PC should also be set up as a Client. This allows you to verify the license and optionally to run CAMWorks.

- **Clients**

The Client PCs are set up to run CAMWorks by accessing the floating network license on the Server.

Installing the CWFlexLM License Manager on the Network Server

Read This Section Before You Install

- The license request file must be created directly on the PC where the license will reside. If the license request file is created when running the License Manager via remote communications software such as pcAnywhere (Symantic Corp.) and submitted to TekSoft, an invalid license will be generated.
- Installation of the FlexLM License Manager and activation of a license can be performed remotely.
- The floating network license supports Microsoft Windows networks.
- *Before* setting up the license software on clients, the CWFlexLM License Manager **MUST** be installed on the Network Server PC and the license must be activated.
- The folder that you select for the License Manager software must be on a local drive of the current PC and have read permissions.
- If a firewall is running on the server PC, the firewall may need to be configured to allow the clients to see the CAMWorks License Service (see page 1-13).
- Do not install the license manager and the license file in the CAMWorks program folder.
- When installing on a PC running Windows XP, if the PC is on a network without a domain or the hard drive is not formatted as NTFS:
 - You should not install the license manager in a folder under the WINNT folder. By default, Windows XP enables a "simple file sharing" option. This option prevents the PC from sharing any folders under WINNT. To allow sharing folders under WINNT, you can disable simple file sharing by selecting Start|Control Panel|Appearance and Themes|Folder Options. Click the View tab and remove the check mark from the Use simple file sharing check box in the Advanced settings box.
 - If there is no domain controller, the username that will login remotely to share the folder must be defined as an authorized user with rights and permissions over the shared folder.

Installation Procedure

1. Start the CAMWorks Setup program on the CAMWorks CD and click the Software License Mgr. button on the product menu.
The Setup Wizard starts.
2. Follow the directions on each screen. When prompted to choose the license location, use the default path or select a different folder.
3. When the installation is complete, click Finish.

Requesting and Activating Your Floating Network License

After installing the CWFlexLM License Manager on the server PC, you can apply for the permanent license.

Request the License File

1. From the Windows desktop on the PC designated as the Server, select Start on the taskbar, then select Programs|CAMWorks License Manager|CWFlexLM License Manager.
2. Click the License Setup tab.
3. For the License method, make sure FlexLM Software is selected.
4. Click the Request License button.
5. Complete the form. An asterisk indicates a required field.
6. Email the license request file:
 - If you use Outlook for email, click the Outlook button and send the email with the attachment to register@teksoft.com.
 - If you use different email software, click the Other button. Note the location of the file containing your information. Email the file as an attachment to register@teksoft.com.
7. Click Close to exit the request form. You can also close the License Manager.

You cannot continue to install the CAMWorks License Service until you receive the license file.

Activate the License and Start the License Service

1. When you receive the license file from TekSoft, copy the file to a folder on the Server PC.

The license file must be on the PC that is running the CAMWorks License Service. The folder where the license file is copied can be read only.
2. Start the License Manager and click the Server Settings tab.
3. For the License file path, browse to the folder where you copied the license file, select the file and click Open.
4. Set the log file path.

The log file must be on the Server PC that is running the CAMWorks License Service. The log file folder does not have to be the same as the license file folder. The log file folder and the log file *must* have read/write permissions.
5. Click the Install CAMWorks License Service button. This installs the CAMWorks License Service.
6. Click the Start button. The status message at the bottom of the dialog box indicates the CAMWorks License Service is running.

Verify the License

Before setting up the license on the client PC's, you should make sure the floating license has been installed and activated successfully on the Server PC. You can do this by setting up the Server PC as a Client.

1. Install the latest FlexLM License Manager software on a client PC.
2. Start the License Manager on the client.
3. Click the License Setup tab and verify that FlexLM is selected for the License method.
4. In the Configure FlexLM license section, make sure the Set Server Host name and Port number of floating license option is selected.

IMPORTANT! The Host name that is specified must be the Host name of the **Server**, not the Host name of the client PC that is shown in the section at the top of the dialog box.

5. Click the Authorized Modules tab and verify that Yes displays in the Available column for modules.
6. Note the Host name that displays. You will need the Host name of the Server when you set up client PC's.
7. Click OK to close the License Manager.

You are now ready to set up the client PCs to run CAMWorks.

If the Authorized Modules tab is blank, the Server PC may have a software and/or hardware firewall that you need to configure to allow the clients to see the Server.

Configure Firewall on Server PC (if necessary)

If a firewall is running on the server PC, the firewall may need to be configured to allow the clients to see the CAMWorks License Service.

The following directions are for the Windows Firewall. If you are using different software and/or hardware firewalls, refer to the product documentation for directions.

1. Open the Windows Control Panel.
2. Open Windows Firewall.
3. On the General tab, make sure *Don't allow exceptions* is not checked.
If this option is checked, Windows Firewall blocks all unsolicited requests to connect to your computer, including requests to programs or services selected on the Exceptions tab.
4. Click the Exceptions tab.
5. Click Add Program, then click Browse.
6. Locate the CAMWorks License Manager folder, select lmgrd.exe and click Open.
7. Click OK and make sure the program is checked in the Exceptions list.
8. Click Add Program again and add teksoft.exe (follow steps 6 and 7).
9. Close the Windows Firewall and the Control Panel.

Installing the License on Clients

After the CAMWorks License Service is installed and running on the server PC, you can install the CWFlexLM License Manager on the PC's in the network that will be running CAMWorks. For client PC's, the installation of the FlexLM License Manager and activation of a license can be performed remotely.

1. On each PC that will be running CAMWorks, start the CAMWorks Setup program on the CAMWorks CD and click the FlexLM License Mgr. button on the product menu.
2. Follow the directions on each screen. When prompted to choose the license location, use the default path or select a different folder.
3. When the installation is complete, click Finish.
4. Select Start on the taskbar, then select Programs|CAMWorks License Manager|CWFlexLM License Manager.
5. Click the License Setup tab.
6. For the License method, make sure FlexLM Software is selected.
7. Make sure *Set Server Host name and Port number of floating license server* is selected.
8. Type the Server Host name and optionally enter the port number.
IMPORTANT! The Server Host name must be the Host name of the **Server PC**, not the Host name of the client PC that is shown in the section at the top of the dialog box.
9. Click Apply.
10. Click the Authorized Modules tab. The licensed modules are listed and the Lic. Type is Floating.
11. Click OK to close the License Manager. No additional information and actions are required for enabling a Client PC.

Run CAMWorks on a Client

1. Start CAMWorks and open a part file or a new part document.
2. Click Help on the SolidWorks menu bar, select CAMWorks 200x Help, then select License Info. The CAMWorks License Info dialog box displays.
 - In the Available column, the number indicates how many licenses are available for each module. When 0 displays, there are no available licenses.
 - The Module section lists the modules. A check mark indicates the module has been assigned to this client. To access the functions of an available module, check the box next to the available module.
 - The Refresh Licenses button can be used to update the availability of modules when other clients release modules.
 - In the Start Up column, you can specify which modules you want to run on this client when CAMWorks starts if a license is available. If a license is not available for one of the checked modules when CAMWorks starts, this message displays: *One or more floating licenses that were requested are not available.*

Updating an Existing Installation

Requirements

In order to update an existing CAMWorks installation, you must be currently enrolled in a CAMWorks Update Subscription Plan and your software license must be programmed to run this release. If you have any questions, contact your CAMWorks reseller before installing the software.

- Current Enrollment in an Update Subscription Plan

You must be enrolled in the CAMWorks Update Subscription Plan in order to keep your CAMWorks system up-to-date with new features and performance improvements. If you are not currently enrolled in a CAMWorks Update Subscription Plan, you can contact your CAMWorks reseller and purchase a plan.

- Current Software License

Whether using the built-in encryption software or the hardware copy protection device, you will be issued a new software license when an Update Subscription Plan is purchased. Before installing the latest version of CAMWorks, we recommend that you update your software or hardware license and verify the license status.

Updating the Built-in Software License

If you are updating from a previous release to the latest production release, you may need to update the built-in software license. This is done using a license file supplied by TekSoft.

Viewing the Current Built-in License Status

The CWFlexLM License Manager allows you to view the products and versions that the built-in license is authorized to run.

To view the current license status:

1. Click the Start button on the taskbar and select Programs|CAMWorks License Manager|CWFlexLM License Manager.
2. Click the Authorized Modules tab.

This tab lists the modules you are licensed to run and the version. The Expiration field indicates if the license has an expiration date or is permanent.

The number in the *Version* field must be the same as or higher than **20060701**. For example, if the number field is **20060301**, you need to update the license.

Updating the Built-in License

To update the built-in license, you need a new license file. Follow the procedure explained on page 1-9 to request the new license file.

Standalone Installation

If you are updating Standalone licenses on multiple PCs, you need a different license file for each PC. Make sure the correct license file is used on the applicable PC.

When you receive a new license file for a standalone (node locked) installation:

1. Copy the file to a folder on your PC.
2. Start the CWFlexLM License Manager and click the License Setup tab.
3. In the Configure FlexLM section, the *Select node locked (Standalone) license file* parameter displays the current path and license file.
4. Delete the current path and file name, then click the Browse button to the right.
5. Browse to the folder where you copied the license file, select the file and click Open.
6. Click the Status tab to verify the authorization succeeded.
7. Click OK to close the License Manager.

Floating Network Installation

If you are updating a floating network license, you will be issued a license file, which is used to update only the Network Server.

When you receive a new license file for a floating network installation:

1. Log off all clients.
2. On the server PC, start the CWFlexLM License Manager and click the Server Settings tab.
3. Click Stop to stop the CAMWorks License Service.
4. Click Remove to remove the License Service and the current license.
5. Close the License Manager and restart.
6. On the Server Settings tab, browse to the new license file.
7. Set the path for the log file.
8. Click the Install CAMWorks License Server button.
9. Click Start to start the License Server and enable the new license.
10. Click OK to close the License Manager.

No changes are required on the client PCs.

Updating the Hardware Key

If you are updating from a previous release to the latest production release, you may need to update the security/license key. This is done using a .COD file supplied by your CAMWorks reseller.

Viewing the Current Key License Status

The Key Manager utility allows you to view the products and versions that the key is programmed (licensed) to run.

To view the current key information:

1. Insert the CAMWorks CD in the drive.
2. On the CAMWorks Setup menu, click the Key Manager button.
3. In the Update Rainbow Protection Block window, select Update on the menu bar, then select View.

The Key Information dialog box displays the current programming of your key and the lists the modules, products and versions that require the key in order to run.

The date in the *CAMWorks Ver* field must be the same as or later than **07-01-2006**. For example, if the date in this field is **03-01-2006**, you need to update the key. If you do not have a new .COD file, contact your CAMWorks reseller.

Updating the Key License

To update the key, you need a .COD file (NNNNN.COD where NNNNN is the number of your key). This file is supplied by your CAMWorks reseller.

If you are installing software on multiple machines that have different keys attached, make sure the correct .COD file is used to update the key.

To transfer the information in the .COD file to the key:

1. Unzip the .COD file if necessary (the file extension must be .COD not .ZIP).
2. Make sure the key is attached to the PC.
3. Insert the CAMWorks CD in the drive.
4. On the CAMWorks Setup menu, click the Key Manager button.
5. In the Update Rainbow Protection Block window, select Update on the menu bar, then select Update on the menu.

The Open COD File dialog box displays. The .COD file that corresponds to your key is listed in the File name field.

6. Open the folder that contains the .COD file, then click Open.

Two dialog boxes display. The dialog box on the left displays the products and versions you are currently licensed to run. The dialog box on the right displays the changes that will be made.

7. Click the Update button.

The key is programmed based on the information in the .COD file.

Where to Install CAMWorks

The Setup program installs CAMWorks 2007 in a new folder and does not overwrite an existing installation of a previous CAMWorks release (e.g., CAMWorks 2006EX). We recommend that you keep your previous version temporarily to minimize potential upgrade problems and ensure a smooth transition. You can run either version by selecting the appropriate version in the SolidWorks Add-In manager. You can uninstall the previous version after verifying that you have a licensed CAMWorks 2007 version and after importing customized data from your current Technology Database into the CAMWorks 2007 Technology Database.

Service Packs are released periodically that may contain enhancements and bug fixes. These updates are not complete and are intended to update specific files for an existing CAMWorks installation. When a Service Pack is installed, existing CAMWorks files are overwritten.

Linking to the Correct Technology Database

If you update an existing CAMWorks installation with a Service Pack, the correct version of the Technology Database must be linked before CAMWorks can run. When you start SolidWorks, the Locate File: TechDB.mdb dialog box displays. The TechDB file that is shown in this dialog box is compatible with the CAMWorks version you just installed and you should select Open to link this database. If you have customized data in a previous version of the database, you can import the data into the new Technology Database as explained in the next section.

Updating the CAMWorks Technology Database

The Setup program automatically installs the CAMWorks Technology Database files in the *\Lang\xxxx* folder inside the CAMWorks folder where *xxxx* is the language (for example, *Program Files\CAMWorks2007\Lang\English*).

If you are updating an existing installation to a Service Pack release, before the Setup program removes your current files, copies of the existing TechDB.mdb and ReportDatabase.mdb files that are located in the *\Lang\xxxx* folder are stored in a backup folder.

Backup files are stored as follows:

- Each time the Setup program is run to update an existing installation, a new *\backup\xxxx\backupnn* folder is created inside the CAMWorks folder where *xxxx* is a language and *nn* is a number from 01-10 (for example, *Program Files\CAMWorks\backup\english\backup_01* through *Program Files\CAMWorks\backup\english\backup_10*).
- After 10 backups have been created, the Setup program deletes the *backup_01* through *backup_05* folders. The *backup_06* through *backup_10* folders are then renamed to *backup_01* through *backup_05* and the backup files for the next installation are stored in the *backup_06* folder.

New versions of CAMWorks will not run with previous CAMWorks Technology Databases. If you have customized the Technology Database for a previous release, you can run the Import Data Wizard to import data contained in either the backup TechDB.mdb or a TechDB.mdb located in a different folder into the new CAMWorks database. The Import Data Wizard is explained on page 1-20.

Updating the Technology Database

After you install CAMWorks, you can run the Data Import Wizard to import customized data in the Technology Database for the previous version into the new CAMWorks Technology Database. **CAMWorks will not run with a previous version of the Technology Database and you cannot copy the previous TechDB files instead of running the Import Data Wizard.**

Importing Data

Required Files

Customized TechDB.mdb

- When you install CAMWorks 2007 in a new folder and retain an earlier version, your customized TechDB.mdb is located in the folder specified as the location of the Technology Database on the Options|General tab in the earlier version.
- If you are running CAMWorks on a network, the customized data may be located in a TechDB.mdb that has been moved to a folder on a network drive.
- If you update an existing version to a Service Pack release, you can use the backup TechDB.mdb created by the Setup program. This file is in the `\backup\english\backupnn` folder inside the CAMWorks folder (e.g., *Program Files\CAMWorks2007\backup\English\backup02*). For more information on backup folders, see page 1-18.

If you are running CAMWorks in a language other than English, your customized TechDB.mdb may be located in the `\backup\xxxx\backupnn` folder where xxxx is the language (for example, `\backup\german\backup02`).

CAMWorks Technology Database Files Installed by the Setup Program

The CAMWorks TechDB consists of three files that are installed in the `\Lang\xxxx` folder inside the CAMWorks folder, where xxxx defines the language as English, German, etc.

TechDBForms.mde: This file is the interface for the TechDB and must remain in the `\lang\xxx` folder in the CAMWorks program folder (e.g., *Program Files\CAMWorks2007\Lang\English*).

TechDB.mdb: This file contains the data for the TechDB. You can move this file to a different folder (for example, if you want the TechDB in a folder on a network drive).

ReportDatabase.mdb: This file contains the forms and data for the Setup Sheet function. This file must be in the same folder as the TechDB.mdb.

Procedure to Import User Data into New TechDB

1. Install CAMWorks 2007, then start SolidWorks and CAMWorks 2007.
2. When the Locate File: TechDB.mdb dialog box displays, click Open.

When updating an existing CAMWorks installation, this dialog box displays to identify the location of the TechDB that should be linked. The TechDB file that is shown in this

dialog box is compatible with the CAMWorks version you just installed and must be linked to CAMWorks in order for CAMWorks to run.

3. After the linking process has completed, close CAMWorks and SolidWorks.
4. Use one of the following methods to start the new Technology Database:
 - In the CAMWorks 2007 program group, select the Technology Database option.
 - Select Start on the task bar and select Programs|CAMWorks2007|Technology Database.
 - In Windows Explorer, open the file TechDBForms.mde in the \Lang\xxxx folder in the CAMWorks program folder (for example, *Program Files\CAMWorks2007\Lang\English*).

Access starts and the Main Menu for the TechDB displays.

After installing CAMWorks, the new TechDB must be linked to the application. If you start the TechDB before you start SolidWorks, a message displays indicating that the database must be linked. Click Yes.

5. Expand the Maintenance item in the navigation tree and click Import Database.
6. After reading the first screen of the Import Wizard, click the Next button to continue.
The Step 2 dialog box displays the locations of the current database and the source database, which is the database that contains existing user defined data.
7. If the location of your source TechDB.mdb is not correct, use the Browse button to set the correct location, then click the Next button.
Step 3 allows you to create a backup of the new database in the event that the update procedure fails. The original database with user data is not changed during this process. However, we strongly recommend that you select and make a Backup.
8. Click the Backup button. A backup is created in the same folder as the TechDB.mdb and is named Backup of TechDB.mdb.
9. When the backup is done, click the Next button. Step 4 begins the data importing process.
10. Select the data to be imported (Mill and/or Turn), then click the Import button. The process may take a few minutes.
11. When finished, click the Next button, then click the Compact button.
Step 5 compacts the database to decrease the file size and improve performance. The process may take a few minutes.
12. When finished, click the Finish button. The Main Menu displays.
13. Click the Quit button. The new CAMWorks TechDB now includes data entered in the previous version of the TechDB.

Updating the Report Database

If you have created customized templates for Setup Sheets and/or you want to retain the Setup Sheet data for existing parts, you can import the information in the previous Report Database to the new Report Database.

Procedure to Import Data

To import Setup Sheet data that has been generated in the previous Report Database:

1. Close CAMWorks and SolidWorks.
2. In Windows Explorer, open the CAMWorks 2007 ReportDatabase.mdb in the \Lang\xxxx folder in the CAMWorks folder (e.g., \CAMWorks2007\Lang\English).
3. Select Setup sheet on the menu bar and choose Import Setup Sheets. The Import setup sheet wizard dialog box displays.
4. Type the path to the previous ReportDatabase.mdb or browse to locate the folder and click Import.
 - When you install CAMWorks 2007 in a new folder, the previous ReportDatabase.mdb file is located in the \Lang\xxxx folder under the main folder for the previous version.
 - If you update an existing CAMWorks installation, the Setup program creates a backup of ReportDatabase.mdb in the same \backup\xxxx\backupnn folder as the TechDB.mdb file (see page 1-18).
5. Click the Finish button when the process is finished.
6. Click the Setup Sheet Browser button and confirm the data has been imported.

Procedure to Import Customized Report Templates

To import customized report templates from a previous Report Database:

1. If you are also importing setup sheet data, import the data first as explained above.
2. Make sure each report template you want to import has a unique name that is not the same as one of the supplied templates.

Because the supplied templates cannot be imported, the recommended procedure for creating new templates is to create a new report or copy one of the provided templates and modify the copy.
3. Exit CAMWorks and SolidWorks.
4. In Windows Explorer, open the CAMWorks 2007 ReportDatabase.mdb in the \lang\xxxx folder in the CAMWorks folder (e.g., \CAMWorks2007\Lang\English).
5. Select Window on the menu bar, choose Unhide in the Unhide Window dialog box, then click OK.
6. Select File on the menu bar and choose Get External Data, then Import.
7. In the Import dialog box, locate the previous Report Database file and click Import (for information on locating the file, see step 4 in the Procedure to Import Data).
8. In the Import Objects dialog box, click the Reports tab, select the templates you want to import and click OK. The imported templates display in the list on the Reports tab.

Sharing the TechDB on a Network

If you are running CAMWorks on multiple PCs connected on a network, you can move the TechDB to a shared folder.

To move the TechDB:

1. Move the following two files from the *\Lang\xxxx* folder in the CAMWorks program folder (for example, *Program Files\CAMWorks2007\Lang\English*) to the new folder:

- TechDB.mdb
- ReportDatabase.mdb

The TechDBForms.mde file must remain in the *\lang\xxxx* folder.

2. Use one of the following methods to start the new Technology Database:
 - In the CAMWorks program group, select the Technology Database option.
 - Select Start on the Task bar and select Programs|CAMWorks2007|Technology Database.
 - In Windows Explorer, open the file TechDBForms.mde in the *\Lang\xxxx* folder (for example, *Program Files\CAMWorks2007\Lang\English*).
3. When Access starts:
 - If you moved the files in Step 1, a message window displays to indicate the database cannot find the files, then the Database Link Wizard starts.
 - If you copied the files in Step 1, the Main Menu for the TechDB displays. Under Maintenance in the navigation tree, click the Link Database item.
4. Read the information in step 1 of the Database Link Wizard, then click the Next button.
5. Use the Browse button to locate the TechDB.mdb that you moved, then click Next.
6. Click the Start Linking button.
7. When the linking is completed, click the Finish button.
8. Click the Exit button to close the TechDB.
9. Start SolidWorks and either select New on the File menu or open a part file.
10. Select Options on the CAMWorks menu.

The General tab should indicate the new location of the TechDB.

Starting CAMWorks

CAMWorks is fully integrated into SolidWorks and can be started automatically whenever you start SolidWorks.

1. Start SolidWorks. The CAMWorks logo displays to indicate that CAMWorks is started.
If CAMWorks does not start correctly or an error message displays, see the troubleshooting information in Appendix A.
2. Select New on the File menu and select Part in the New dialog box.

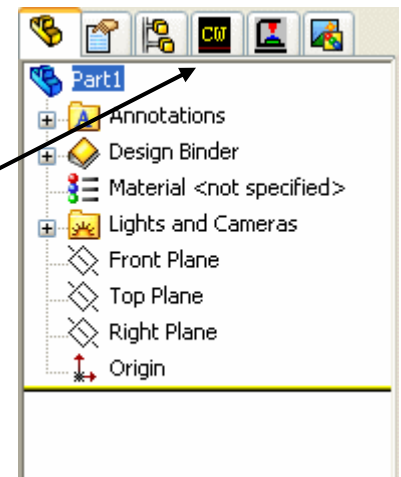
or

Select Open on the File menu and open a part file.

The tabs are for moving between the SolidWorks trees and the CAMWorks machining trees.

Optionally, you can adjust width of the tree. Position the cursor on the line that divides the tree from the graphics area. When the cursor changes to a bar, drag the bar to the right.

3. Click the CAMWorks Feature tree tab.
The CAMWorks Feature tree displays.



To learn how to use CAMWorks, we recommend that you go through the exercises in this manual and in the tutorials. To open a tutorial, select Start on the Windows Task bar, then select Programs|CAMWorks 2007|Manuals and pick the applicable tutorial.

Chapter 2 Getting Started in CAMWorks Mill

The information and exercises in this chapter introduce you to CAMWorks Mill. Comprehensive online Help and the CAMWorks tutorials are provided to answer your questions and to help you learn the features and functions available in CAMWorks.

The exercises are intended to show you how to use CAMWorks and may not correspond to actual machining practices.

IMPORTANT! CAMWorks uses a set of knowledge-based rules to assign machining operations to features. The Technology Database contains the data for the machining process plans and can be customized for your facility's machining methodology. When you do these exercises, your results may not be the same as described in the steps and illustrated in the figures. This is because the machining sequences and operations data in your Technology Database may be different from the database used to produce the documentation.

Generating 2 Axis Mill Toolpaths & NC Code

What You'll Learn

The following steps are used to generate Mill toolpaths and NC code in Part mode:

1. Model the part or open the part file in SolidWorks.
2. Change to the CAMWorks Feature tree.
3. Define the Machine and modify the controller parameters.
4. Define the stock.
5. Define machinable features.
6. Generate the operation plan and adjust operation parameters.
7. Generate toolpaths.
8. Post process the toolpaths.

The next series of exercises show you how to generate finish toolpaths on a SolidWorks part model. In order to give you a general understanding of how to use CAMWorks, you work with a part that was previously modeled in SolidWorks. When you define the operations and toolpaths, you will follow steps that are not explained in depth. This is done to show you the basics of generating toolpaths from start to finish without getting into the details at this time.

Sample parts are provided for the exercises in this manual. When you install CAMWorks, these files are installed automatically.

Step 1: Model Part in SolidWorks or Import Part

A part is a solid that is created with SolidWorks or imported into SolidWorks from another CAD system via an IGES, Parasolid, SAT file, etc. This exercise uses an existing SolidWorks part.

1. Start SolidWorks.
2. Open the part file **MILL2AX_1.SLDPRT** in the *\Examples\Mill* folder inside the CAMWorks folder (e.g., *\Program Files\CAMWorksxxxx\Examples\Mill*).

The FeatureManager design tree lists the features, sketches, planes and axes in the part.

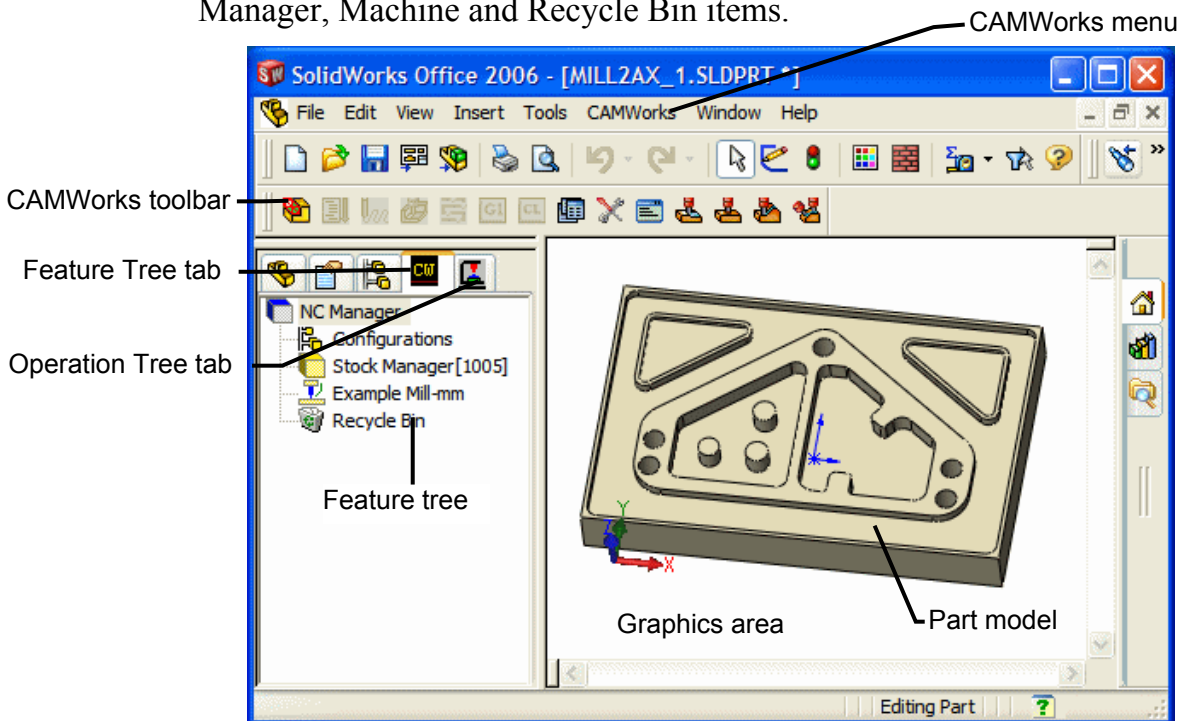
The tabs at the bottom or top of the tree are for moving between the SolidWorks trees and the CAMWorks trees.

If the CAMWorks tabs are not visible, you can expand the size of the tree. Position the cursor on the line that divides the tree from the graphics area. When the cursor changes to a bar, drag the bar to the right until the tabs display.

Step 2: Change to CAMWorks Feature Tree

1. Click the CAMWorks Feature Tree tab.

The CAMWorks Feature tree displays. Initially, the tree lists the NC Manager, Stock Manager, Machine and Recycle Bin items.



CAMWorks Machining Trees

The CAMWorks machining trees provide an outline view of the machining information for the model. The tabs are for moving between the SolidWorks trees and the CAMWorks trees. If you use the SolidWorks split panel display for the trees, the CAMWorks tabs are functional on both panels.

- **Configurations** - Multiple CAMWorks datasets are supported in part mode. Each dataset is called a configuration. You can use configurations to support multiple machines and SolidWorks configurations.
- **Stock Manager**: The Stock is the material from which the part will be machined. You can define the stock as a rectangular shape or as an extruded sketch. You can also specify the type of material.
- **Machine**: The Machine item defines the machine tool that the part will be machined on. The machine definition includes the type of machine (i.e., mill, turn, mill-turn, Wire EDM), tool definitions and the machine controller (post processor). The machines are set up in the Technology Database.
- **Recycle Bin**: The Recycle Bin is used to store machinable features that you do not intend to machine.

CAMWorks Menus

1. Click CAMWorks on the SolidWorks menu bar.
The CAMWorks menu lists the CAMWorks commands. The commands are explained in the CAMWorks online Help.
2. Right click on the NC Manager in the tree. This is a shortcut menu. The right-click shortcut menus provide access to a variety of frequently used commands.

CAMWorks Toolbar

The CAMWorks toolbar provides quick access to commands that are also found on the CAMWorks menu and shortcut menus. Clicking a toolbar button is the same as selecting a command from the NC Manager level, regardless of the active item in the tree.

1. Locate the CAMWorks toolbar and click the Options button.
2. In the Options dialog box, click each tab to view the options and settings that you can change in CAMWorks.
3. Click the Help button at the bottom of the dialog box. Each tab is explained in the online Help.
4. Click the Close button in the upper right corner of the Help window to close the window.
5. Click Cancel to close the Options dialog box.



Finding Answers and Learning More About CAMWorks

Online Help

Online Help in CAMWorks is similar to Help in other Windows applications. Help supplies information about commands, dialog boxes, keys and basic procedures for various tasks.

1. Click Help on the SolidWorks menu bar, select CAMWorksxxxxx Help, then click Topics.
The Help Topics window displays. The Contents tab provides a tree-structured arrangement of books and topics. The Index tab provides a keyword search. The Find tab enables a full-text search of the Help system.
2. Expand the Mill book on the Contents tab, expand the Quick-Tours book, then click one of the Quick-Tour topics. The topic window displays. The menus and buttons at the top of the Help window allow you to find specific information quickly; move easily to related topics; and print, annotate or bookmark the topic.
 - When you click words or phrases underlined with a solid line, the topic explaining those words displays. When you click words or phrases with a dotted underline, a pop-up window displays the definition.
 - To print the current help topic, click the Print button or choose Print Topic on the File menu. If the information you want to print is in a pop-up window, place the cursor in the window, then click the right mouse button and select Print Topic.
3. Click the Close button in the upper right corner of the Help window when you are done.

Tutorials

Comprehensive tutorials are provided to help you learn the features and functions available in CAMWorks. When you install CAMWorks from the CAMWorks CD, the CAMWorks manuals are copied into the `\Lang\English\Manuals` folder inside the main CAMWorks folder on your PC. The tutorials are in PDF files that can be viewed, searched and printed using the Adobe Reader.

To start the Reader and open the tutorial file:

1. On your desktop, click Start on the Windows Task bar.
2. Select Programs\CAMWorksxxxx, click Manuals and select *Mill & Turn Tutorial*.

If the file opens, you can search and print the exercises as required. If the file does not open, you need to install the Adobe Reader either from the CAMWorks CD or from the Adobe web site (www.adobe.com).

3. Click the Close button in the top right corner of the Adobe Reader window to close the window.

Step 3: Define the Machine

The machine includes information that identifies what to machine, how to machine it, and the format of the NC output. Important parameters of the machine definition include:

- Machine type – mill or turn: The machine type defines the machinable feature set that can be recognized automatically and defined interactively.

The icons that display in the tree identify the current machine:

 Mill
  Turn
  Mill-Turn
  Wire EDM

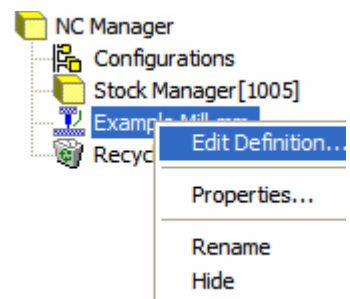
- Tool crib: A subset of tools from the tool library that are commonly loaded into or used with the current machine.
- Controller: Also called a post processor. This post processor identifies the format of the NC G-code output.

Define the machine:

1.  Right click Example Mill-mm in the CAMWorks Feature tree.

The shortcut menu displays. Right-click shortcut menus display commands that are appropriate for the item that is highlighted in the tree.

2. Select Edit Definition on the shortcut menu.



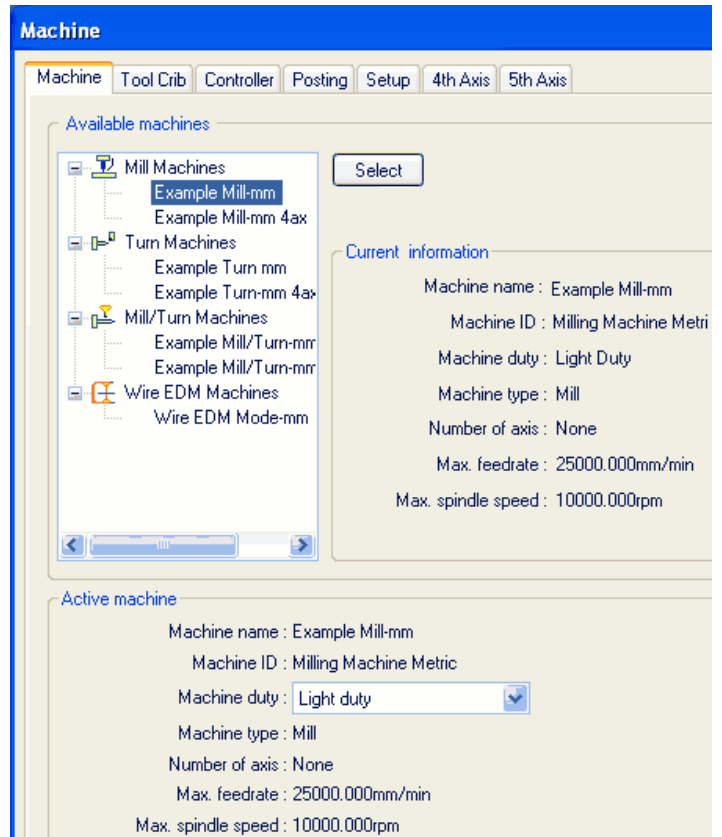
Did You Know ...

In the Feature and Operation trees, instead of right clicking items and selecting Edit Definition, you can double-click the following items to open the dialog box for editing the Stock Manager, Machine, Setup, Feature, and Operation.

The Machine dialog box displays the Machine tab. The default Active machine is specified in the Technology Database. Example Mill-mm is the default machine used for the metric parts in this manual. When you use CAMWorks to machine your own parts, select the machine tool you want to use to machine the part.

Machine tools are set up in the Technology Database. Before using CAMWorks to machine your parts, make sure you define the machine tools available in your facility.

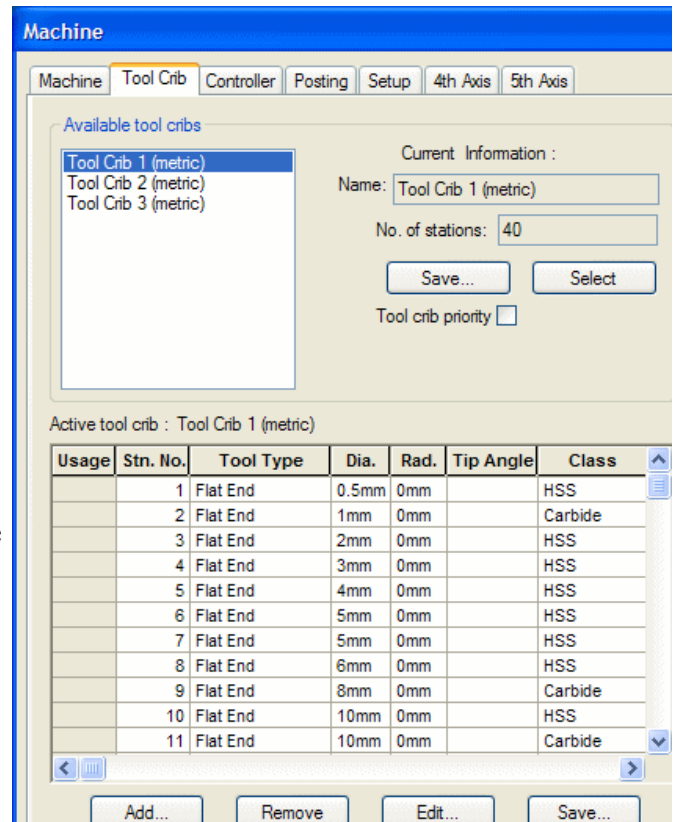
3. In the Available machines list, highlight Example Mill-mm and click the Select button.



4. Click the Tool Crib tab and make sure Tool Crib 1 (metric) is selected.

The Tool Crib page allows you to choose a Tool Crib, which is a set of tools or tool assemblies that are used with the machine you have chosen. These are not all the tools that are available, but a subset that you can modify to represent the actual set of tools that the machine has loaded.

Tool Crib 1 (metric) is a default tool crib that has been set up for the sample Mill machine. When you define your machine tools in the Technology Database, you can set up your own tool cribs.



5. Click the Controller tab.

The Controller tab allows you to select the post processor from a list of available controllers. The list that displays depends on the post processors that are installed on your system. CAMWorks is supplied with several default post processors that may or may not be suitable for your needs. Contact your CAMWorks reseller for information on making changes to these post processors or for other post processors.

If the controllers do not display, use the Browse button to locate the folder containing the controller files (*.ctl).

If FANTUTM (the tutorial post processor) is not highlighted, highlight it in the list and click the Select button. FANTUTM is the controller used for the exercises in this manual. When you use CAMWorks to machine your own parts, select your machine tool controller or post processor.

The Current information area displays information about the FANTUTM controller.

A short description displays in the window below the Current information. This window contains information only if an optional file has been created for the post processor.

6. Click the More button.

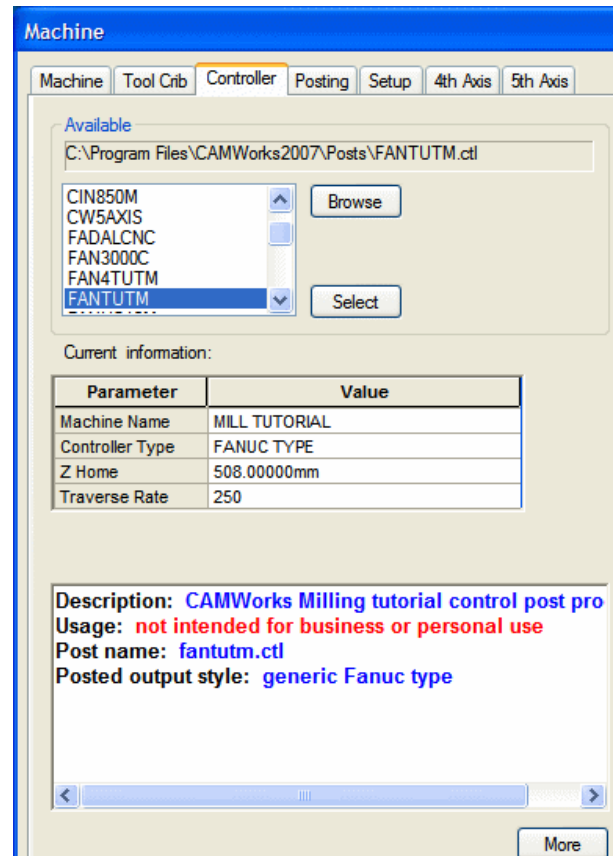
A longer description displays. The More button is activated only if a second optional file has been created. This information is intended for use in training or as a detailed description of post processor attributes that can be created.

Information files are provided for the sample FANTUTM post processor that is used for the exercises in this manual. Your TekSoft dealer or your company manager may be able to supply these files if they are available for your post processor. If files are not available, you can create post information files as explained in the online Help.

7. Click the Posting tab.

The parameters on this page are used for the following:

- To provide information required to generate the NC program. The parameters are machine-dependent and different parameters may display for your controller. The value for a parameter is output in the NC code if the machine requires it.
- To provide information for the Setup Sheet, a file that is created when the NC program file is generated. All of the controller parameters are included in the Setup Sheet.



8. Type **1001** for the Program Number and press the down arrow on the keyboard.
9. Type **Stainless** for the Material and press the down arrow.
10. Type **40mm** for the Part Thickness and click OK.

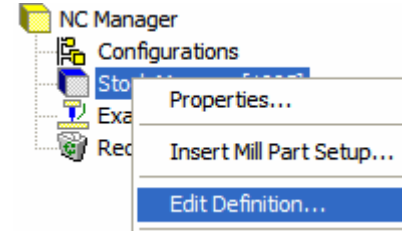
Machine	
Parameter	Value
Program number	1001
Material	Stainless
Part Thickness	40.00000mm

Step 4: Define the Stock

The stock is the material from which the part will be machined. The default stock is the smallest cube (bounding box) that the part will fit into. Typically, this is not the size of the actual stock. You can change the stock definition by offsetting the bounding box from the part or by defining the stock from a sketch and a depth.

In this exercise, you define the stock as a box offset from the part.

1. Right click Stock Manager in the CAMWorks Feature tree and select Edit Definition on the shortcut menu.



The Manage Stock dialog box displays.

2. For the Bounding box offset, type **1** for X+ and click the X+ button (Uniform X).
3. Repeat step 2 for Y+ and Z+
4. Click the Material down arrow and select 304L.
5. Click OK to close the dialog box.

Manage Stock	
Parts :	Stock type :
<div> <div>+</div> <div>NC Manager</div> </div>	<div> </div> <div> <input type="checkbox"/> Use optimized bounding box </div>
Stock :	Bounding box offset:
<div> <div>Stock [Bounding Box]</div> </div>	<div> <div> <div>X+</div> <div>1mm</div> <div>X-</div> <div>1mm</div> </div> <div> <div>Y+</div> <div>1mm</div> <div>Y-</div> <div>1mm</div> </div> <div> <div>Z+</div> <div>1mm</div> <div>Z-</div> <div>1mm</div> </div> <div>Get default</div> <div>Set default</div> </div>
<div> <div>Stock size</div> <div> <div>X : 402mm</div> <div>Y : 262mm</div> <div>Z : 52mm</div> </div> </div>	
Material :	Stock group :
<div> <div>1005</div> </div>	<div> <div>Others</div> </div>

Step 5: Define Machinable Features

In CAMWorks, machining can be done only on machinable features. You use the following two methods to define machinable features.

- Automatic Feature Recognition: AFR analyzes the part shape and attempts to define most common machinable features such as pockets, holes, slots and bosses. Depending on the complexity of the part, AFR can save considerable time in defining two-dimensional prismatic features.
- Interactively created features: If AFR does not recognize a feature you want to machine, you can define the feature using the Insert 2.5 Axis Feature command. If you have 3 Axis Milling, multi-surface features can be defined using the Insert Multi Surface Feature command.

The idea of AFR is to analyze the part for features that can be machined. This process is much the same as what you would do if you were to pick up a part that you had to machine. You would look it over, take measurements, and begin deciding how to define areas or features to machine and what machining processes you would need.

CAMWorks is not machining the SolidWorks features directly. It creates a separate list of Machinable Features instead. This is because a single SolidWorks feature may have several areas that need to be machined in different ways with different tools.

Using Automatic Feature Recognition (AFR)

Define machinable features automatically:

1. Select one of the following methods to extract features:

Right click NC Manager and select Extract Machinable Features on the shortcut menu.

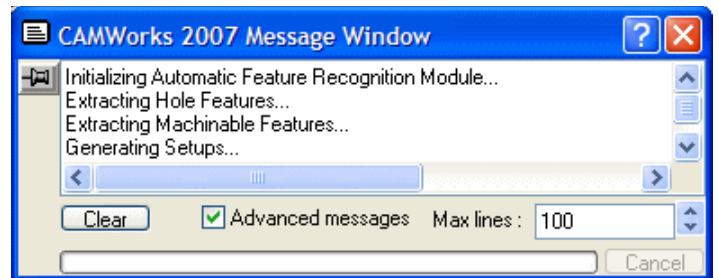
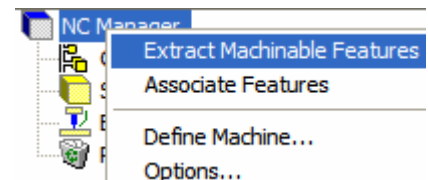
or

Click the Extract Machinable Features button on the CAMWorks toolbar.

The CAMWorks Message Window displays. This window displays automatically to report the progress and status of the current process. Generating Mill Part Setups is always the last item. When you see it, you know the AFR process is almost complete.

You can control whether this window displays temporarily or permanently by selecting the Options command on the CAMWorks menu and checking the Message Window option on the General tab in the Options dialog box.

CAMWorks generates the Mill Part Setup and machinable features. The items display in the CAMWorks Feature tree.

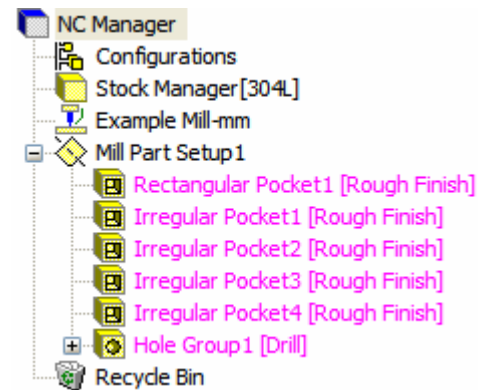


The Mill Part Setup is the 2 axis plane that the tool movement will be based on. It has an origin location, and X, Y, and Z direction vectors. The Mill Part Setup is created automatically; however, you can move the origin, and change the direction and angles of the X and Y axes.

A Mill Part Setup is created for each different tool orientation. There is only one Mill Part Setup for this part because all features can be machined using a single tool orientation. For each Mill Part Setup, the machinable features are listed in the order in which they were recognized.

The Feature tree allows you to:

- Copy, rename, suppress, delete and combine machinable features
- Change machinable feature parameters
- Change the order in which the features are machined
- Insert 2.5 Axis and Multi Surface features
- Search for a feature based on item name
- Hide or show feature display in graphics area
- Generate an Operation Plan and find the first operation for a feature



Did You Know ...

New features, interactively inserted features that have no operations and features that could not produce operations because the feature conditions have not been defined in the Technology Database display in a different color. You can set the color on the Display tab in the Options dialog box.

Most feature parameters are fixed; however, some parameters can be changed using the Parameters command on the feature shortcut menu.

2. Right click Hole Group1 in the tree and select Parameters on the shortcut menu.

The Hole Parameters dialog box displays the number of components and the hole parameters. Since there is no physical information about the type of hole, CAMWorks allows you to define an attribute for the hole (Drill, Bore, Ream, Thread or a user-defined attribute).

3. Click the down arrow next to Drill to see the choices.
4. Click Thread in the list.

The figure changes to reflect your choice and the Thread parameters are enabled.

5. Click the down arrow next to Thread and select Drill again, then click OK to close the dialog box.
6. Click the + next to Hole Group1 in the CAMWorks Feature tree.

The tree expands to display each individual hole.

7. Click the - next to Hole Group1.



Save the part with the machinable feature data:

8.  Click the Options button the CAMWorks toolbar.

Note that you can also click CAMWorks on the menu bar or right click NC Manager in the tree and select the Options command.

9. On the General tab, make sure the Save/Restore part option is checked, then click OK.
If this option is checked, when you save and close a part document, the machining data is saved. When the part document is opened again, the machining data is restored along with the part design information.
If this option is not checked, when you save and close a part document that contains at least one CAMWorks Setup, a message indicates that Save/Restore is disabled. If you click Yes, CAMWorks saves all CAMWorks data before closing the file. If you click No, CAMWorks closes the part and discards any new CAMWorks data since the last save.
10. Click Save As on the File menu.
11. In the Save As dialog box, type **cwex1** and click the Save button.

SAVE FREQUENTLY!

- When you open a file, you are actually working on a copy of the file. The original is still stored on disk. Periodically saving your file ensures that your latest work is retained.
- CAMWorks provides an Auto save option on the General tab in the Options dialog box for automatically saving your CAMWorks data.
- Frequent saves prevent having to redo a time-consuming model or CAM operation. If a power failure occurs, you will lose whatever you have been working on.

Defining Features Interactively

Automatic Feature Recognition can save a significant amount of time; however, AFR does have limitations. AFR cannot recognize every feature on complex parts and does not recognize some types of features. To machine these areas, you need to define machinable features interactively using the Insert 2.5 Axis Feature command.

In this exercise, you insert a Face Feature so that you can face the top of the part. In order to define a Face Feature, you select a face on the SolidWorks part that is at the depth you want to face the part to. In this example, the entire top of the part is the same height, so you can select any of the topmost faces.

1. Right click Mill Part Setup1 in the CAMWorks Feature tree and select Insert 2.5 Axis Feature on the shortcut menu.

The 2.5 Axis Feature Wizard: Feature & Cross Section Definition dialog box displays.

2. Click the down arrow next to the Type list box and select Face Feature.
3. Pick the main face.

The outline of the face is highlighted on the part and Face <1> displays in the Entities selected list.

4. If the Check for taper & fillets option is checked, remove the checkmark.

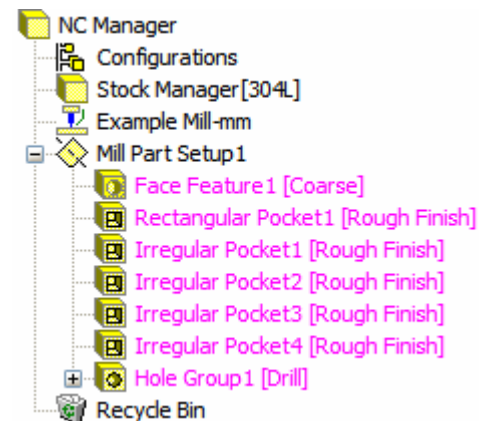
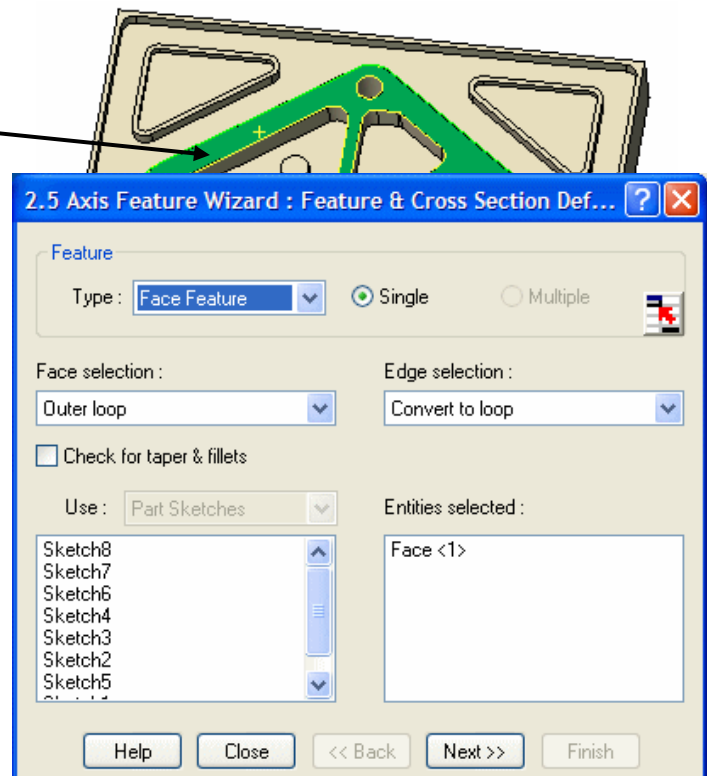
If the feature you are defining does not contain any fillets at the base of the feature, you can disable Check for taper & fillets to improve the performance of the wizard.

5. Click the Next button.

The 2.5 Axis Feature Wizard: End Conditions dialog box displays. This dialog box allows you to determine how CAMWorks calculates the depth of the feature and select an attribute that defines a unique machining sequence.

6. Leave the End condition Type set to Upto Stock.
7. Leave the Attribute set to Coarse.
8. Click Finish.
9. Click Close to close the 2.5 Axis Feature Wizard: Feature & Cross Section Definition dialog box. Face Feature1 displays in the CAMWorks Feature tree.

You have now defined all the machinable features in this part and you are ready to generate the Operation Plan.



Step 6: Generate Operation Plan and Adjust Operation Parameters

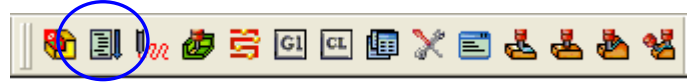
An Operation Plan contains information on how each machinable feature is to be machined and how the NC code will be output. When Generate Operation Plan is run, operations for each machinable feature are created automatically based on information in the Technology Database. In some situations, the operations defined for a feature in the Technology Database may not be sufficient and additional operations may be required. You can insert operations interactively. The commands for inserting operations are explained in the CAMWorks online Help.

1. Select one of the following methods to generate an operation plan:

Right click Mill Part Setup1 in the CAMWorks Feature tree and click Generate Operation Plan on the shortcut menu.

or

Click the Generate Operation Plan button on the CAMWorks toolbar.



Clicking this toolbar button is the same

as selecting the command from the NC Manager level, regardless of the active item in the tree.

CAMWorks generates the operation plan for all the machinable features in Mill Part Setup1. The operations are listed in the CAMWorks Operation tree.

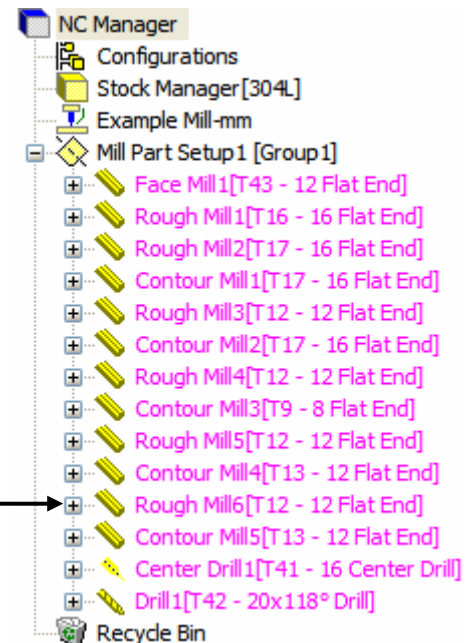
The CAMWorks Operation tree provides an outline view of the operations for the machinable features. Operations are listed under the Mill Part Setup in the same order as the machinable features. At the top of the tree is the NC Manager. The Stock Manager and Machine items function the same as in the CAMWorks Feature tree. You can change the stock size and shape and the controller definition used by CAMWorks to produce G-code.

The CAMWorks Operation tree allows you to:

- Insert, rename, suppress, and delete operations
- Drag and drop copy operations, features, contain/avoid areas
- Change operation parameters
- Combine operations
- Sort operations and change the machining order
- Generate and simulate toolpaths
- Post process the toolpaths
- Hide or show toolpath display
- Search based on an item name

To the left of each toolpath operation is a plus sign (+).

Clicking a plus sign displays the name of the feature that this operation is going to machine. These feature items can be used to view geometric information and to modify the machining depth of the feature.



Did You Know ...

If an operation displays in a color instead of black, then toolpaths have not been generated. This occurs when you insert a new operation interactively, you insert a new feature interactively and generate operations for the new feature, or CAMWorks cannot generate the toolpath for an operation because of an error in the toolpath algorithm or a parameter is not correct. You can set the color on the Display tab in the Options dialog box.

The operations that are generated by CAMWorks are based on information stored in the Technology Database. These operations are intended to be used as a starting point. Each operation contains parameters that affect how the toolpath is created and specific parameters that will be output to the NC program. These parameters can be edited before generating the toolpaths and post processing the part.

Edit operation parameters using the Edit Definition command on the shortcut menu:

1. Right click on Rough Mill4 (the operation generated for Irregular Pocket2) in the CAMWorks Operation tree.
2. Select the Edit Definition command on the shortcut menu.

The Operation Parameters dialog box displays. This dialog box gives you access to all the parameters used to define the toolpath. General parameters for the type of toolpath include the method of machining, depth of cut, step over, stock allowance, retract height, speeds and feeds. This dialog box also gives you access to all the parameters for the tool you are using and allows you to select a different tool.

3. Click the Roughing tab and change the Pocketing Pattern to Zigzag.
4. Click the Feature Options tab and change the Entry type to Entry Hole.
5. Click OK.

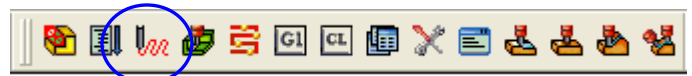
Step 7: Generate Toolpaths

CAMWorks calculates toolpaths using the operation parameters and the feature's size and shape.

1. Select one of the following options to generate toolpaths:

Right click Mill Part Setup1 in the CAMWorks Operation tree and click Generate Toolpath on the shortcut menu.

or



Click the Generate Toolpath button on the CAMWorks toolbar. Clicking this toolbar button is the same as selecting the command from the NC Manager level, regardless of the active item in the tree.

CAMWorks calculates the toolpaths for each operation in the Mill Part Setup.

You can also generate toolpaths for each operation individually by right clicking on an operation and clicking Generate Toolpath on the shortcut menu.

2. Highlight the first operation in the tree, hold down the Shift key, then highlight the last operation.

The toolpaths for all the operations display on the part showing the centerline of the toolpath.

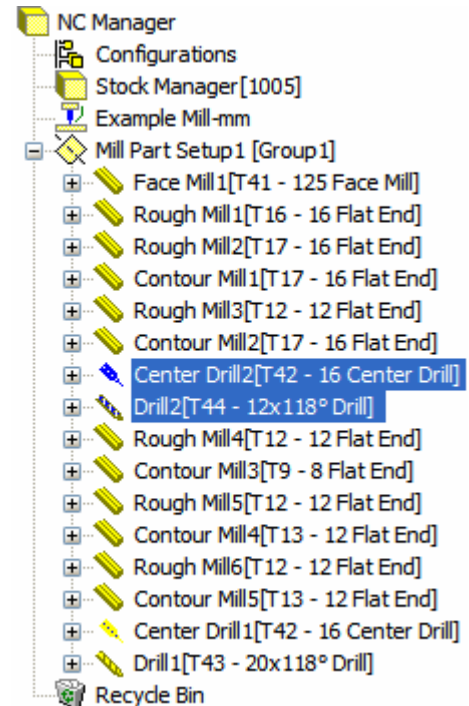
3. Click an operation in the CAMWorks Operation tree.

The toolpath for that operation displays. As you click each operation, the toolpaths for that operation are displayed.

4. Notice that Center Drill and Drill operations were created automatically for Rough Mill4 because you set the Entry Method to Entry Hole.

When using the Entry Hole method, control is provided to:

- Specify any number of machining processes in the Technology Database to machine the entry hole (i.e., Center Drill and Drill).
- Tool type selection is expanded based on what each operation supports.
- Tool diameter selection can be customized from within the Technology Database.
- Operation parameters can be defined in the Technology Database.



CAMWorks provides the ability to simulate the toolpath showing the tool movement and the resulting shape of the part.

5. Right click on Mill Part Setup1 and select Simulate Toolpath.

The Simulate Toolpath toolbar displays.





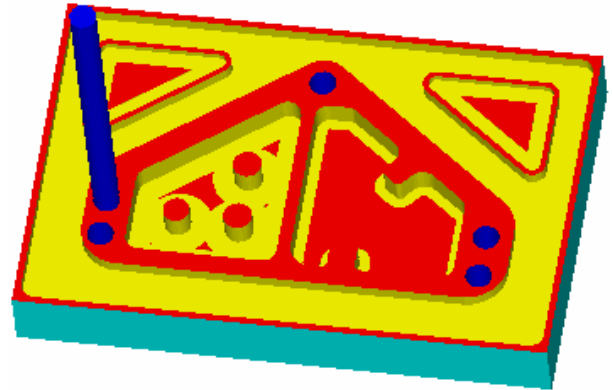
The toolbar controls allow you to:

- Run the simulation in Tool or Turbo mode.
- Display the simulated part, the design part and a comparison of the two.
- In Tool mode, customize the display of the stock, tool and tool holder (wireframe, translucent, shaded, or no display).
- Run the simulation for all or selected operations.
- When simulating an operation, the simulation can be for the current operation or for all previous operations up to the selected operation.
- Pause the simulation in either Tool or Turbo mode and dynamically change the orientation of the part using zoom, pan, rotate, etc.
- Control the simulation speed by dragging the Simulation Speed Control slider up or down.

If you want to simulate only the toolpath for a given operation, you can right click that operation, then select Simulate Toolpath.

6. Set the toolbar buttons as shown in the figure above.

7.  Click the Run button.
The simulation runs in Tool mode with the tool displayed during simulation.
8.  Click the X button in the upper right corner to cancel the simulation and return to the SolidWorks display.



Step 8: Post Process Toolpaths

Post processing is the final step in generating the NC program file. This step translates generalized toolpath and operation information into NC code for a specific machine tool controller. CAMWorks creates NC code for each toolpath in the order the operation appears in the CAMWorks Operation tree. When you post process a part, CAMWorks creates two files: the NC program and the Setup Sheet. These are text files that you can read, edit and print using a word processor or text editor.

In this exercise, you post process all the operations and generate the NC program:

1. Click the Post Process button on the CAMWorks toolbar.



or

Right click NC Manager in the Operation tree and click Post Process on the shortcut menu.

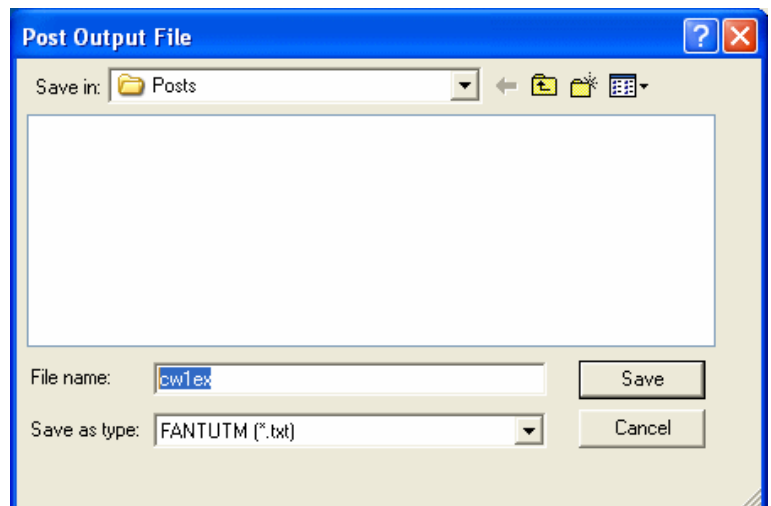
The Post Output File dialog box displays so you can name the NC program file.

Typically, the NC program and Setup Sheet files are stored in the folder that contained the last part that was opened. If you want these files in another location, you can change the folder.

If you are running CAMWorks in Demo mode, the Post Output File dialog box does not display because you cannot save NC code in Demo mode.

If the Post Process command is grayed out on the CAMWorks menu or on a shortcut menu, make sure that you have selected a post processor and generated the toolpaths.

2. Click the down arrow to the right of the Save as type box. CAMWorks provides a list of commonly used extensions that you can select. For this exercise, use the *txt* extension.



**Did You Know ...**

If you want change the default extension from *txt* to one of the ones in the list or if you want a different file name extension for NC program files, you can edit or create a .pinf file and specify the new extension. For more information, see the online Help.

3. If *cwex1* is not in the File name text box, type **cwex1**, then click Save.

You do not have to type the extension if you are using the default *.txt*. Naming the post output file the same as the part file is the most common way of saving parts and NC programs. Both files can have the same name because they have different extensions.

4. In the Post Process Output dialog box, click the Step button on the control bar at the top.

CAMWorks starts to generate the NC program and the first line of NC code displays in the NC code output view box. The post processing mode is set to post process one line of code at a time (Step mode).

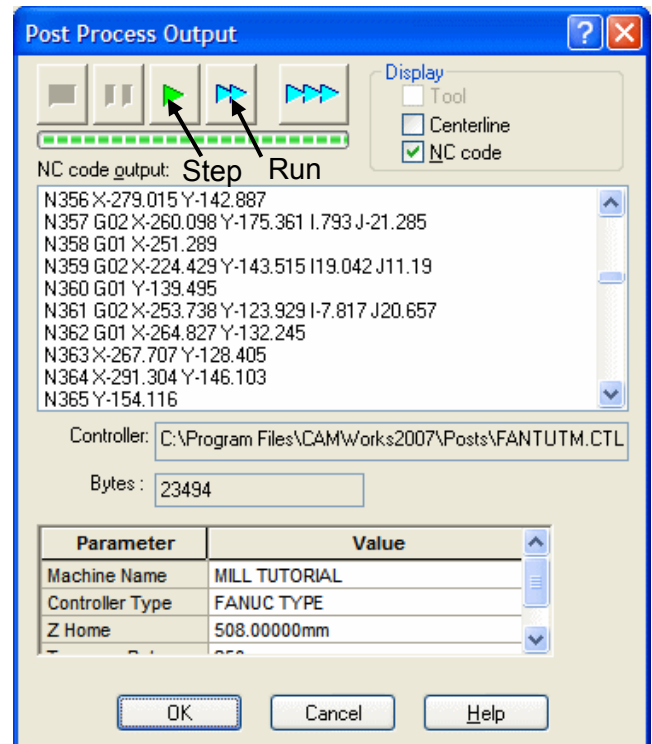
5. Click the Step button.

The next line of NC code displays.

6. Click the Run button.

Post processing continues until it is completed. When the post processing is finished, you can view the code using the vertical scroll bar.

7. Click OK to close the dialog box.

**More About Setup Sheets**

The Setup Sheet is a printable file that contains information the machine tool operator can use to set up the part and the tools required to produce a part. The information includes the machine, the controller, estimated machine time, the part material, and the tooling used to machine the part.

CAMWorks provides two methods for creating Setup Sheets:

- During post processing, CAMWorks automatically creates a simple text file with a .set extension.
- The Setup Sheet command on the NC Manager shortcut menu allows you to generate a Setup Sheet that is based on an Access database report template and store the information in the Report Database to view at any time. CAMWorks supplies several report templates that can be used as is. You can also open the Report Database in Access and create customized reports based on these templates or design your own original reports.

Generating 3 Axis Mill Toolpaths & NC Code

This exercise introduces you to generating toolpaths and NC code for 3 axis machining.


What You'll Learn

Defining the Machine, Stock and Machining Direction

1. Open the part file **MILL3AX_1.SLDPRT** in the *\Examples\Mill* folder inside the CAMWorks folder (e.g., *\Program Files\CAMWorksxxxx\Examples\Mill*).

2.  Click the CAMWorks Feature Tree tab.

Define the machine:

3.  Right click Example Mill-in in the Feature tree and select Edit Definition.

The Machine dialog box displays.

On the Machine tab, Example Mill-in is the Active machine.


This machine definition has been created for the CAMWorks exercises. When you use CAMWorks to machine your own parts, select the machine tool you want to use to machine the part.

4. Click the Tool Crib tab and make sure Crib 1 is the Active tool crib.
5. Click the Controller tab and make sure FANTUTM is selected.

FANTUTM is the controller used for the exercises in this manual. When you use CAMWorks to machine your own parts, select your machine tool controller or post processor.

6. Click OK to close the Machine dialog box.

Define the stock size and shape:

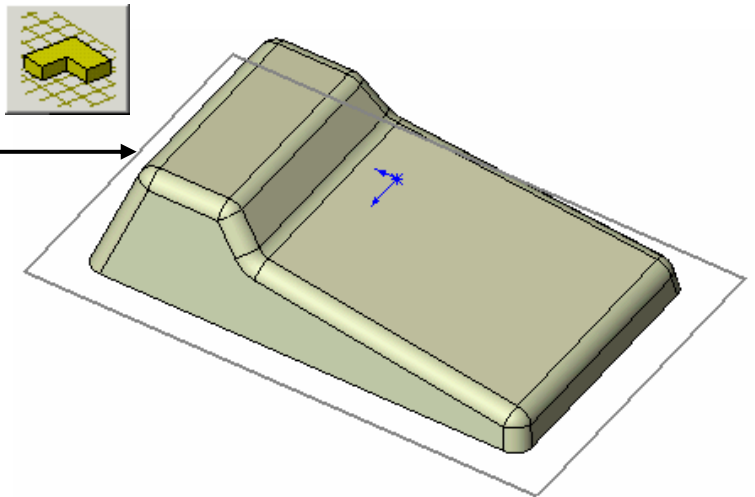
7.  Right click the Stock Manager and select Edit Definition on the shortcut menu.

8. In the Manage Stock dialog box, click the Extruded Sketch button.

9. Pick the rectangular sketch representing the perimeter of the stock.

10.  Click the Reverse Direction button.

11.  Set the Depth to 1.5in and click OK.

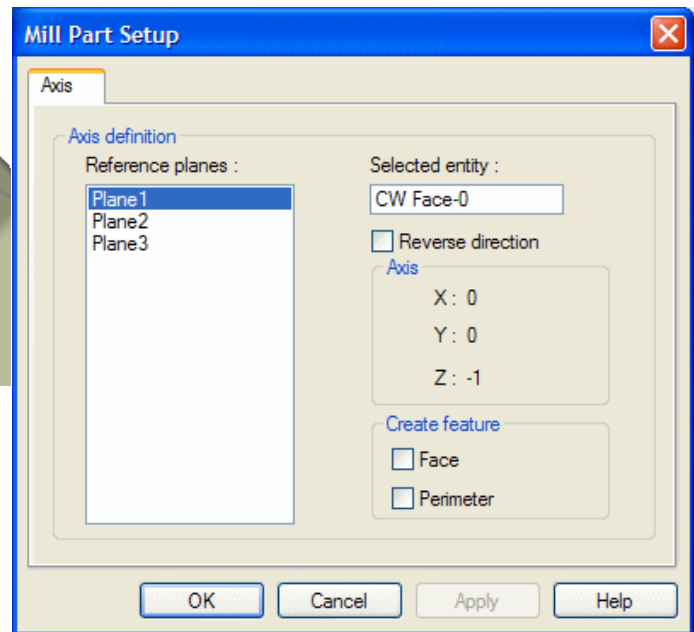
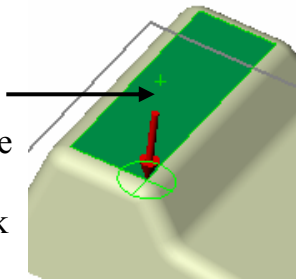


Define the machining direction, which will be normal to the face indicated below:

12. Right click Stock Manager in the Feature tree and select Insert Mill Part Setup on the shortcut menu.

13. Pick the top face.
14. Make sure the Face option is not checked, then click OK.

Mill Part Setup1 is added to the tree.



Creating a Multi Surface Feature

In this exercise, AFR is not used since there are no 2.5 axis features on the part for AFR to find. You add the Multi Surface feature interactively.

1. Right click Mill Part Setup1 and select Insert Multi Surface Feature on the shortcut menu.

The Insert Multi Surface Feature dialog box allows you to create and modify a multi-surface feature.

2. Click the Select all and associate option.

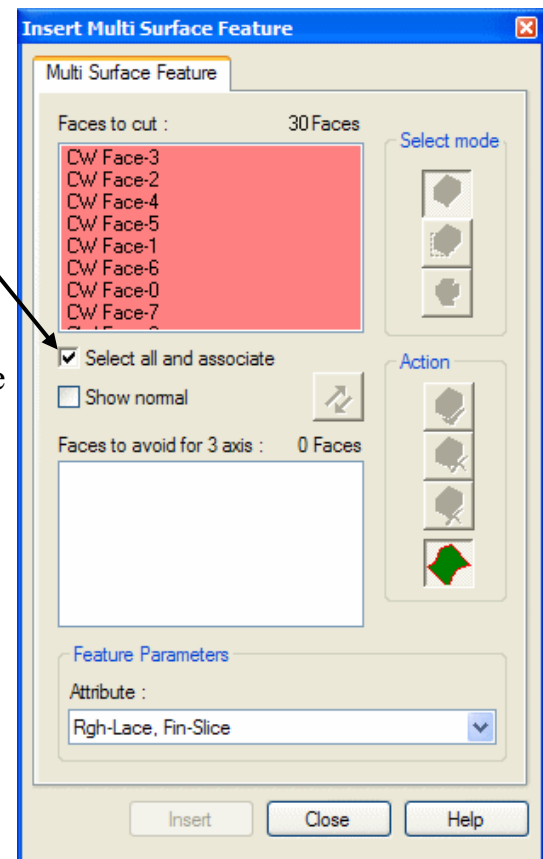
The Faces to cut box lists the selected faces.

3. Set the Attribute to Rgh-Lace, Fin-Slice. This attribute is defined in the Technology Database to generate an Area Clearance operation with a Lace Pattern and a Pattern Project operation with a Slice Pattern.



Did You Know ...

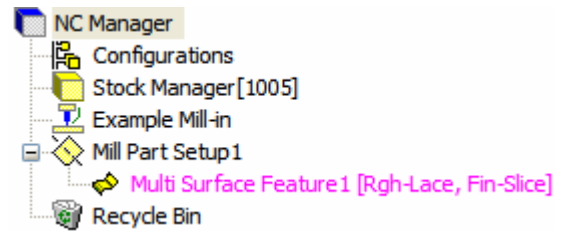
When you define Multi Surface features for 3 Axis operations (except 3 Axis Rough and Finish), the most reliable results are usually obtained by picking all model faces as Faces to Cut. Using Faces to Avoid is not recommended. If you need to restrict machining to specific areas, use the Insert Contain and Insert Avoid commands at the operation level.



- Click OK. Multi Surface Feature1 is listed in the Feature tree.


New features, interactively inserted features that have no operations and features that could not produce operations because the feature conditions have not been defined in the

Technology Database display in a different color. You can set the color on the Display tab in the Options dialog box.



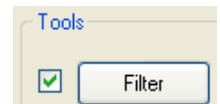
Generating an Operation Plan

Generate machining operations for the Multi Surface feature:

-  Click the Generate Operation Plan button on the CAMWorks toolbar or right click Mill Part Setup1 in the Feature tree and select Generate Operation Plan. The Operation tree lists Area Clearance and Pattern Project operations.

Modify operation parameters:

- Double click Area Clearance1 in the tree.
- Click the Tool Crib tab.
- Click the check box to the left of the Filter button, then click the Filter button.



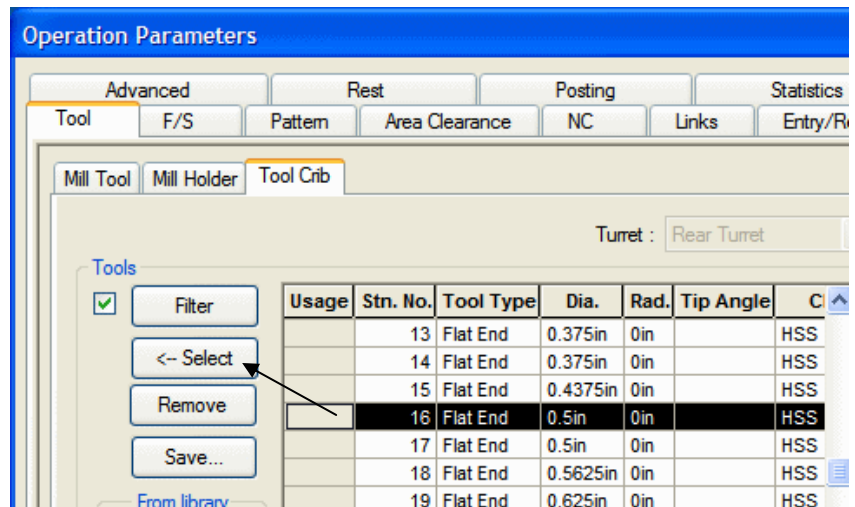
The Tool Select Filter dialog box displays. This dialog box allows you to set filters for displaying and selecting tools.

- Click the check box for the Filter by option to the right of the Type list box.
- Select Flat End for the Tool type and click OK.

The tool list on the Tool Crib tab changes to display only Flat End tool types.

When you set a tool filter for an operation, the setting is stored and becomes the default for that type of operation. You can change the filter settings as required or turn off the filter by clearing the check box.

- Select a 0.5in diameter flat end, then click the < - Select button.
- Click Yes to replace the corresponding holder.



9. Click the Area Clearance tab.

10. Set the Mach. deviation to .005in.

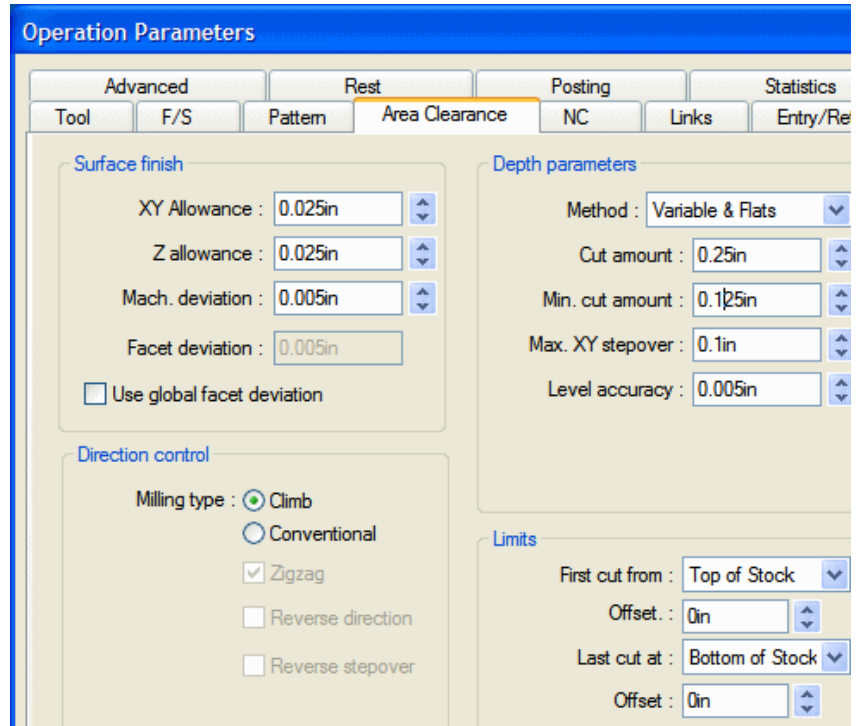
This parameter defines a tolerance that is used to condense or shorten the 3 axis toolpath.

11. Set the Depth parameters Method to Variable & Flats.

12. Leave the Cut amount set to 0.25in.

13. Set the Min. cut amount to 0.125in and the Max XY stepover to 0.1in, then click OK.

14. Double click Pattern Project1 in the tree.



15. On the Pattern tab, notice that the Pattern is set to Slice as defined for the Rgh-Lace, Fin-Slice attribute in TechDB. This pattern generates a series of linear parallel cuts across the part and is appropriate for semi-finishing almost any part shape and finishing non-vertical areas.

16. Set the following parameters on the Pattern tab:

- Cross machining = Standard (This option allows you to automatically generate a second perpendicular toolpath on areas that are not machined or on poorly finished faces. The second toolpath is calculated by rotating the previous toolpath 90 degrees. The Standard option generates a perpendicular toolpath after the Slice toolpath.)
- Extension = 0.01in (Specifies the length a pass extends past the edge of the boundary to allow the tool to move into the cut at machining feedrate rather than rapid feedrate.)
- Staydown = checked (This parameter affects how the tool transitions within contain areas and around avoid areas. When checked, tool retracts are minimized, however, additional feed motion is possible.)

17. On the Finish tab, make sure the XY and Z Allowances are 0in. This value represents the amount of material left on the part after generating the toolpath.

18. Set the Mach. deviation to .005in.






19. On the Entry/Retract tab, set the Retract Method to Skim.

With this method, the tool rapids vertically to the minimum Z height needed to clear the faces in the feature, moves horizontally, then feeds vertically down to the start of the next pass. The minimum height of the retract is determined by the Skim clearance parameter.

20. Click OK.

Generating Toolpaths and Post Processing

Generate toolpaths, simulate material removal and post process:

1.  Click the Generate Toolpath button on the CAMWorks toolbar.
2. Right click Mill Part Setup1 and select Simulate Toolpath.
3.  Click the Turbo mode button on the Simulate Toolpath toolbar.
Turbo mode provides ultra-fast simulation of toolpaths on a single Mill Part Setup.
4.  Click Run.
5.  Click the X button to exit the simulation.
6.  If you were generating the NC program for the toolpaths, the last step would be to click the Post Process button on the CAMWorks toolbar and post process the part (see page 2-16).



Generating NC Code in Assembly Mode

What You'll Learn

CAMWorks Assembly mode allows you to position multiple parts and/or multiple copies of a part in an assembly document and generate long code or subroutine output to machine each part. The following steps are used to generate Mill toolpaths and NC code in Assembly mode:

1. Model the components (parts, clamps, vises, fixtures) and create the assembly document (.sldasm) in SolidWorks.
2. Change to the CAMWorks Feature tree.
3. Define the Machine and Fixture Coordinate System (fixture origin and X,Y,Z axis machining directions).
4. Select parts to be machined.
5. Define the stock (separate or common).
6. Extract machinable features and interactively insert features at Part Setup level.
7. Generate the operation plan and adjust operation parameters.
8. Define G-code program zero location (Part Setup origin or Setup origin).
9. Identify fixtures and clamps.
10. Generate toolpaths.
11. Post process the toolpaths.

Defining the Machine and Fixture Coordinate System

1. Open the assembly file **MILLASM_1.SLDASM** in *\Examples\Assemblies* inside the CAMWorks folder (e.g., *\Program Files\CAMWorksxxxx\Examples\Assemblies*).
2.  Click the CAMWorks Feature Tree tab.
3.  Right click the Example Mill-in in the Feature tree and select the Edit Definition command.

On the Machine tab, use the default Example Mill-in.

4. Click the Setup tab.

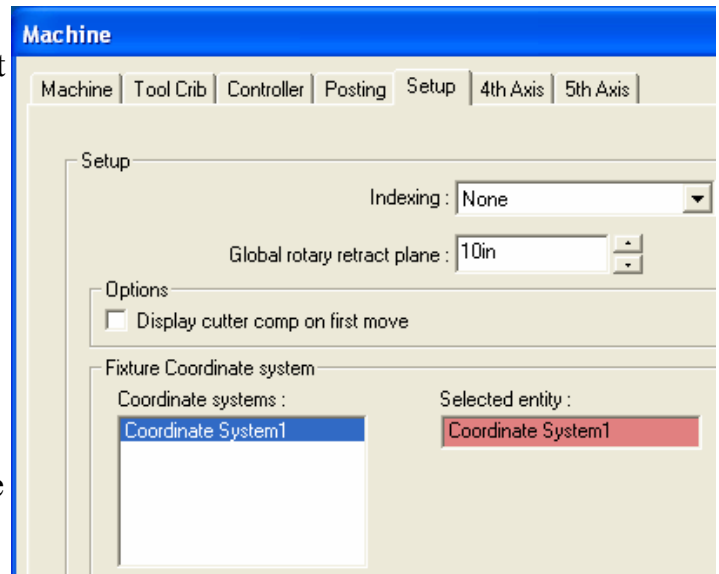
The Setup tab allows you to set a Fixture Coordinate System. This refers to the "home point" or main zero position on the machine. While G-code output can be based on this point, it is meant to be used as a reference point. Setting the position does more than set the location; it also sets the positive X, Y, and Z directions to be used for all moves on this machine.

When the code is output in subprogram format, an alternative part setup origin is referenced; however, the X, Y, and Z directions set by the Fixture Coordinate System are still used. The Fixture Coordinate System should be set first, before extracting machinable features.

5. Select Coordinate System 1 in the Fixture Coordinate System list.


The Fixture Coordinate System is defined from a SolidWorks coordinate system entity.

6. Click OK.



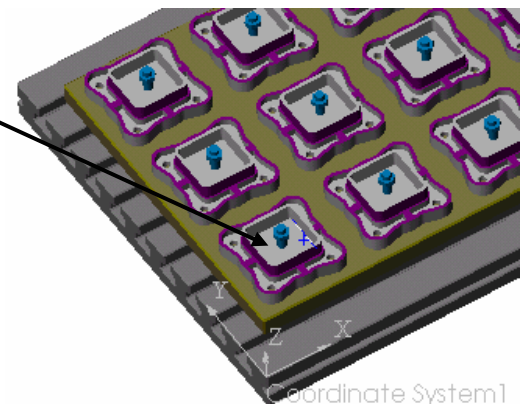
Selecting the Parts to be Machined

The Assembly mode document can contain different part model documents. In addition to the parts that are going to be machined, the document can also include clamps to avoid and other fixture and machine components that are included to assist in the layout of the parts and shop documentation. The parts that are to be machined must be identified to CAMWorks by adding them to the Part Manager. When machining multiple instances of the same part, you must add all instances to the Part Manager.

1.  Right click the Part Manager in the tree and select Manage Parts on the shortcut menu.
2. Select the part in the lower left corner of the assembly.

For each unique part in the assembly, the first instance that you select is called the seed part. When an action is performed on the seed part, the same action is applied to every instance of that part in the assembly.

3. Highlight the part in the Selected Parts list and click the Add All Instances button.





The parts will be listed in the order they are in the file. You can also pick the parts individually either in the graphics area or in the SolidWorks FeatureManager tree. Later in this exercise, you learn about using the Sort Instances function to change the machining order of the parts.

Part instances can be added at any time. You can select only one instance of a part (the seed part) to work on first and then add other instances later. Any features, operations and toolpaths that have been generated for the seed part are automatically transferred to instances of the same part when they are added in the Manage Parts dialog box.

- Click OK to close the Part Manager dialog box.


 The part name is listed under the Part Manager in the CAMWorks Feature tree.

 A Feature Manager, which is created for each part, is used to define the Mill Part Setups and machinable features associated to the seed part.

 For each unique part, all the instances are listed under the Instances item.

Defining the Stock

When you add parts in the Manage Parts dialog box, a default Stock is created for each part based on a 0.00 bounding box offset. The Stock Manager allows you to customize the stock associated to the parts.

-  Right click on the Stock Manager in the tree and select Edit Definition on the shortcut menu.

The Manage Stock dialog box displays. This dialog box allows you to modify existing stock or create new stock for single parts and common stock for multiple parts.

- Click the first part in the Parts list box. This is the seed part.

The associated stock is highlighted in the Stock list and in the graphics area. The current settings for the Bounding box offset display.

- Change the +Z to **.1in** and click the Apply Current Stock Definition to All Parts button.





The change is applied to the stock for all part instances.

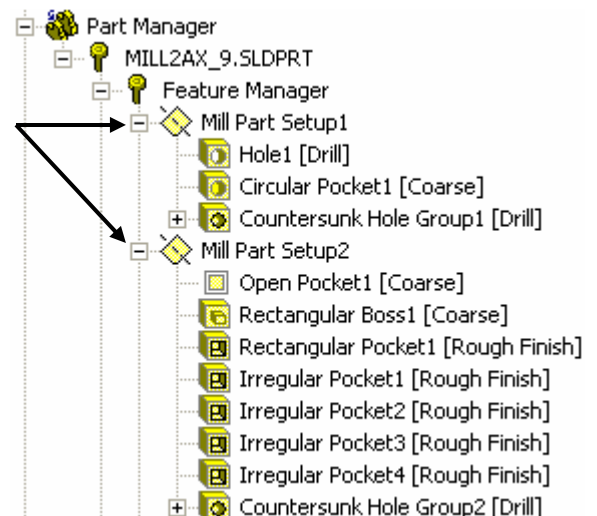
- Click OK to close the dialog box.


Defining Machinable Features

You can now extract the machinable features. For this exercise, you insert one feature to complete the part. Machinable Features are added in the Feature Manager area of the tree. When a feature is created at the Mill Part Setup level using the Insert 2.5 Axis or Insert Multi Surface Feature commands, the feature is inserted on the first instance of the part (called the seed part) and on every occurrence of that part in the assembly.

-  Click the Extract Machinable Features button on the CAMWorks toolbar.
-  Click the plus sign next to the Feature Manager in the tree.

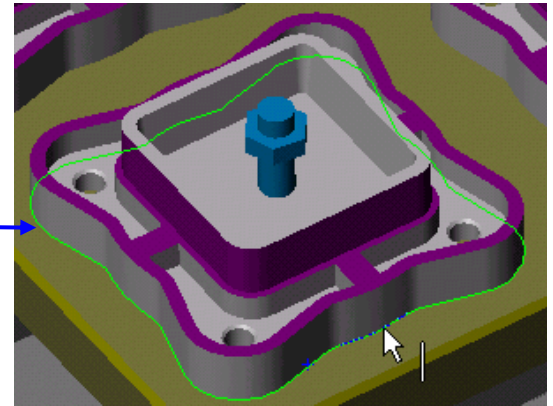
The Feature Manager displays all the Mill Part Setups and features that can possibly be machined on this part regardless of the machine setup. If the Hole1 feature is listed in Mill Part Setup2, drag it to Mill Part Setup1. This exercise assumes the hole has already been drilled.



3.  Right click Mill Part Setup2 under the Feature Manager and select Insert 2.5 Axis Feature.

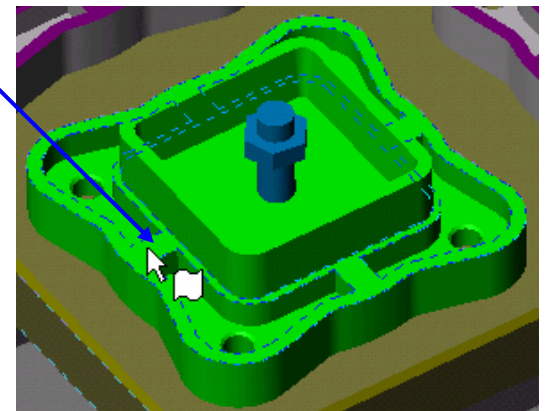
The 2.5 Axis Feature Wizard: Feature & Cross Section Definition dialog box displays.

4. Change the Feature type to Boss.
5. Make sure the Edge selection is set to Convert to loop.
6. Zoom up on the seed part (the first part you picked when you picked the parts to machine) and pick the bottom edge of the part.
7. Click the Next button.



8. Pick the top face of the lower portion of the seed part.
9. Click the Finish button.
10. When the Wizard returns to the start, click Close.

The Irregular Boss feature is added to the seed part and to every instance of the part.



11. Expand Setup1 at the bottom of the tree.

When you ran AFR, CAMWorks created the Setups that define the machining directions that will actually be approached for the current CAMWorks machine. For 3 axis machines, the maximum number of Setups is one.

Setup1 at the bottom of the tree lists all features that can be machined perpendicular to the Z axis that was specified in the coordinate system.




Sorting Part Instances to Determine Machining Order

When you add part instances individually or using the Add All Instances button, the instances may not be listed in the best machining order. CAMWorks provides options for sorting part instances to be processed in a more efficient order.

1. Under Setup1 in the tree, click the + symbol next to several features.

The order that the part instances are listed under each feature is the processing order for that feature. For all features, the parts are currently listed in the order the parts are in the file. You can change the order globally for all features or for individual features.

2.  Right click the Part Manager in the tree and select Manage Parts on the shortcut menu.
3. Click the Sort Instances button in the Part Manager dialog box.
The Sort Instances dialog box displays options for sorting the part instances for features in the Setup either manually or automatically.
 - The Part Manager instances option automatically sorts part instances for all features in the Setup based on the user-defined order of instances listed in the tree under the Part Manager. To set the order using this option, expand the Part Manager and Instances items, then drag and drop the part instances.
 - Grid pattern automatically sorts part instances for all features in the Setup based on the start corner, processing direction and process order.
 - The Feature instances option allows you to manually sort the part instances listed under each feature in the Setup. To set the order using this option, expand a feature in the Setup, then use drag and drop to move the part instances.





Did You Know ...

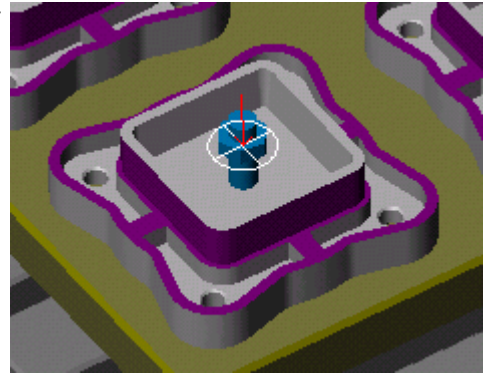
You can use one of the automatic methods, then if necessary, select the Feature instances option and make changes to the part order for individual features.

4. Select the Grid pattern option.
When you use the Grid pattern option, the order is changed for the part instances under every feature in the Setup.
5. Select the following grid options, then click OK:
 - Start corner = Bottom left
 - Processing direction = Horizontal
 - Process order = Zigzag
6. Click OK to close the Manage Parts dialog box.
7. Click the + symbol next to a feature in the Setup and click each part instance to view the machining order on the assembly in the graphics area.
8. Try to drag and drop a part instance under the feature to a different position in the list and notice that the order does not change.
In order to change the order manually for an individual feature, you need to open the Sort Instances dialog box and select Feature instances, then you can drag and drop the instances under the feature. For this exercise, you can use the grid pattern order.

Generating the Operation Plan


1.  Right click Mill Part Setup2 in the tree and select Edit Definition on the shortcut menu.
The Mill Part Setup dialog box displays.

2. On the Origin tab, select Top center for the location of the origin for all parts, then click OK.
The origin marker displays on the seed part.
3.  Click the Generate Operation Plan button on the CAMWorks toolbar or right click the NC Manager at the top of the tree and select Generate Operation Plan. In the Operation tree, the Setup lists the operations.




Defining G-code Program Zero Location

Toolpaths can be output relative to the Part Setup origin or a global Setup origin. In this exercise, you use the Part Setup origin. The Part Setup origin specifies only the toolpath zero point, not the X,Y,Z machining direction. The machining direction is based on the Fixture Coordinate System. When machining multiple instances of the same part, the origin is defined relative to the first (seed) part and referenced for all other instances of the same part.

1.  Right click Setup1 in the tree and select Edit Definition.
2. On the Origin tab in the Setup Parameters dialog box, make sure Part Setup origin is selected for the Output origin.
3. Click the Offset tab. The order of the parts on this page affects only the assignment of the offsets, not the machining order.
4. In the Sort by section, select Grid pattern.
When this option is selected, the parts are sorted in a grid pattern. When you pick this option, the parts in the table are automatically reordered based on the current settings for Start corner, Direction and Pattern.
5. Set the Grid pattern parameters to the same settings you used when sorting part instances for the machining order (page 2-27):
 - Start corner = Bottom left (specifies which part, based on a grid layout, will be assigned the register equal to the Start Value)
 - Direction = Horizontal (relative to the Start corner part, the Direction defines which part will be assigned the next offset register value)
 - Pattern = Zigzag (defines the order the offsets are assigned)
6. Notice that the part order is updated in the table. You can specify a programmable coordinate offset and assign an offset to each part.
7. Set the Work coordinate offset to Work Coordinate. This option will output G54, G55, etc.
8. Set the Start value to 54 and the Increment to 1. For the Start value, specify only the numerical value of the offset and not the G-code prefix.
9. Click the Assign button. The numbers update in the Offset and Sub columns in the table.
10. Click OK to close the Setup Parameters dialog box. If a warning message displays, you can click No to continue.



Identifying Fixtures and Clamps



Clamps and fixture components are added on the Fixtures tab in the Setup Parameters dialog box. This dialog box allows you to define clamps, bolts, etc., so that machining toolpaths will avoid these areas and to specify the clamps and fixtures that you want displayed during simulation. Fixtures identified to Avoid apply only to 2 Axis Rough and Contour toolpath calculations.

1.  Right click the Setup item in the tree and select Edit Definition again.
2. Click the Fixtures tab in the Setup Parameters dialog box.
3. In the graphics area, pick the bolt holding the seed part, then pick the fixture plate and the machine table. The part names display in the Fixtures list and will display during simulation.
4. Highlight the bolt in the list and click the Add All Instances button. All the bolts in the assembly are listed and will display during simulation.
5. Click the Avoid check box for the first bolt you picked that holds the seed part.
You need to check the Avoid check boxes only for clamps, bolts, etc., that touch the seed part. For all other instances of the part, CAMWorks automatically avoids whatever you select to avoid for the seed part.
6. Make sure the Avoid check boxes are *not* checked for the fixture plate and the table.
Although fixtures are 3 dimensional SolidWorks parts, CAMWorks considers the outside silhouette or XY bounding box of avoid fixtures as islands to avoid in 2 Axis Rough and Contour operations. Therefore, parts such as vices, the machine table, or rotary fixtures whose silhouettes are larger than the part must not be selected to avoid, otherwise no toolpath will be generated.
7. Set the Avoid area type to Exact. When this option is selected, CAMWorks avoids the exact shape of the part. The Simplified option creates a bounding box around the part that will be avoided.
8. Click OK to close the dialog box. If a warning message displays, you can click No.

Generating Toolpaths

After generating toolpaths, you can sort the operations in a logical machining sequence and simulate the material removal.

1.  Click the Generate Toolpath button on the CAMWorks toolbar or right click Setup1 in the tree and select Generate Toolpath.
2.  Right click Setup1 in the tree and select Sort Operations.
3. On the Process tab, remove the check mark from the Process complete feature option.
4. On the Sort tab, drag and drop operations so that Rough Mill is at the top of the list, followed by Contour Mill, Center Drill, and Drill.
5. Click Apply, then click OK. The operations under Setup1 are sorted based in the order on the Sort tab.

6. Right click Setup1 in the tree and select Simulate Toolpath on the shortcut menu.
7. Optionally, click the buttons in the second row of the Simulate Toolpath toolbar and change the display of the stock, tool, tool holder and fixtures (shaded, wireframe, translucent, no display).
8.  Click the Run button on the Simulate Toolpath toolbar.
9.  When you are finished, click the X button to exit the simulation.

Chapter 3 Getting Started in CAMWorks Turning

The information and exercises in this chapter introduce you to CAMWorks Turn. Comprehensive online Help and the CAMWorks Tutorial manual are provided to answer your questions and to help you learn the features and functions available in CAMWorks.

The exercises in this chapter are intended to show you how to use CAMWorks and may not correspond to actual machining practices.

IMPORTANT! CAMWorks uses a set of knowledge-based rules to assign machining operations to features. The Technology Database contains the data for the machining process plans and can be customized for your facility's machining methodology. When you do these exercises, your results may not be exactly the same as described in the steps and illustrated in the figures. This is because the machining sequences and operations data in your Technology Database may be different from the database used to produce the documentation.

Generating 2 Axis Turn Toolpaths & NC Code

What You'll Learn

The following steps are used to generate Turn toolpaths and NC code:

1. Model the part or open the part file in SolidWorks.
2. Change to the CAMWorks Feature tree.
3. Define the Machine and modify the controller parameters.
4. Edit the Stock definition.
5. Define machinable features and adjust feature parameters.
6. Generate the operation plan and adjust operation parameters.
7. Generate toolpaths.
8. Post process the toolpaths.

The next series of exercises show you how to generate finish toolpaths on a SolidWorks part model. In order to give you a general understanding of how to use CAMWorks, you work with a part that was previously modeled in SolidWorks. When you define the operations and toolpaths, you will follow steps that are not explained in depth. This is done to show you the basics of generating toolpaths without getting into the details at this time.

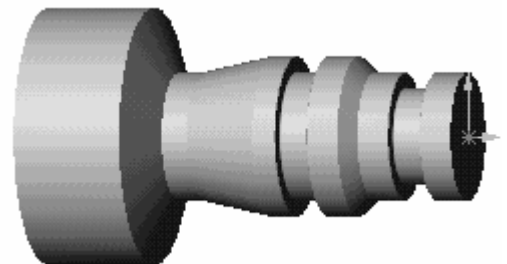
Sample parts are provided for the exercises in this manual. When you install CAMWorks, these files are installed automatically.

Step 1: Model Part in SolidWorks or Import Part

A part is a solid that is created with SolidWorks or imported into SolidWorks from another CAD system. This exercise uses an existing SolidWorks part.

1. Start SolidWorks.
2. Open the part file **TURN2AX_1.SLDPRT** in the `\Examples\Turn` folder inside the CAMWorks folder (e.g., `\Program Files\CAMWorks\Examples\Turn`).


The FeatureManager design tree lists the features, sketches, planes and axes in the part. The tabs are for moving between the SolidWorks trees and the CAMWorks trees.



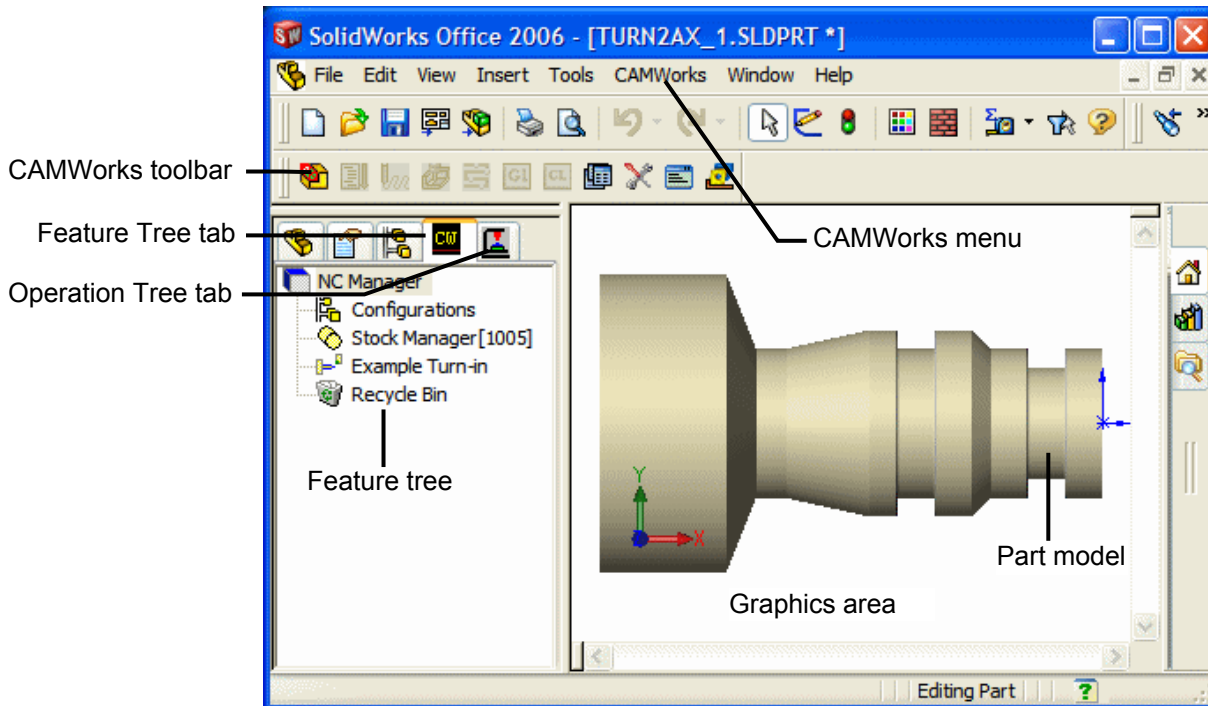
Step 2: Change to CAMWorks Feature Tree

1. Click the CAMWorks Feature Tree tab.

The CAMWorks Feature tree displays. Initially, the tree lists Stock Manager, Machine and Recycle Bin items.

 The icons that display for the Stock Manager and Machine may indicate that a mill machine is currently selected. Step 3 on page 3-5 explains how to change the machine to a turn machine.





CAMWorks Machining Trees

The CAMWorks machining trees provide an outline view of the machining information for the model. Initially, the CAMWorks Feature tree shows only the NC Manager, Configurations, Stock Manager, Machine and Recycle Bin items. As you follow the steps to generate an NC program, this tree expands to include Turn Setups and machinable features. The tabs are for moving between the SolidWorks trees and the CAMWorks trees.

- Configurations - Multiple CAMWorks datasets are supported in part mode. Each dataset is called a configuration. You can use configurations to support multiple machines and SolidWorks configurations.
- Turn Stock Manager Mill Stock Manager
The turn Stock is the material from which the part will be machined. You can define the Stock as a cylinder (for bar stock) or as a closed sketch (for a forging or casting) and specify the type of material.
- Turn Mill Mill-Turn Wire EDM
The Machine item defines the machine tool that will be used to machine the part. The machine definition includes tool definitions and the post processor. The machines are set up in the Technology Database.
- Recycle Bin - The Recycle Bin in the CAMWorks Feature tree is used to store machinable features that you do not intend to machine.

CAMWorks Menu

1. Click CAMWorks on the SolidWorks menu bar. The commands on the CAMWorks menu are explained in the CAMWorks online Help.

2. Right click on the NC Manager in the tree. A menu of commands displays. This is a shortcut menu. The right-click shortcut menus provide access to a variety of commands.

CAMWorks Toolbar

The CAMWorks toolbar provides quick access to commands that are also found on the CAMWorks menu and shortcut menus. Clicking a toolbar button is the same as selecting a command from the NC Manager level, regardless of the active item in the tree.

1. Click the Options button on the CAMWorks toolbar.
2. In the Options dialog box, click each tab to view the options and settings that you can change in CAMWorks.
3. Click the Help button at the bottom of the dialog box. Each tab is explained in the online Help.
4. Click the Close button in the upper right corner of the Help window to close the window.
5. Click Cancel to close the Options dialog box.



Finding Answers and Learning More About CAMWorks

Online Help

Online Help in CAMWorks is similar to Help in other Windows applications. Help supplies information about commands, dialog boxes, keys and basic procedures for various tasks.

1. Click Help on the SolidWorks menu bar, select CAMWorks xxxx Help, then click Topics.

The Help Topics window displays. The Contents tab provides a tree-structured arrangement of books and topics. The Index tab provides a keyword search. The Find tab enables a full-text search of the Help system.

2. Expand the Turn book on the Contents tab, expand the Quick-Tours book, then click one of the Quick-Tour topics. The topic window displays. The menus and buttons at the top of the Help window allow you to find specific information quickly; move easily to related topics; and print, annotate or bookmark the topic.
 - When you click words or phrases underlined with a solid line, the topic explaining those words displays. When you click words or phrases with a dotted underline, a pop-up window displays the definition.
 - To print the current help topic, click the Print button or choose Print Topic on the File menu. If the information you want to print is in a pop-up window, place the cursor in the window, then click the right mouse button and select Print Topic.
3. Click the Close button in the upper right corner of the Help window when you are done.

Tutorial

A comprehensive tutorial is provided to help you learn the features and functions available in CAMWorks.

When you install CAMWorks from the CAMWorks CD, the CAMWorks manuals are copied into the \Lang\English\Manuals folder inside the main CAMWorks folder. The tutorials are PDF files that can be viewed, searched and printed using the Adobe Reader.

To start the Reader and open the tutorial file:

1. On your desktop, click Start on the Windows Task bar.
2. Select Programs\CAMWorksxxxx and click Manuals, then Mill & Turn Tutorial.

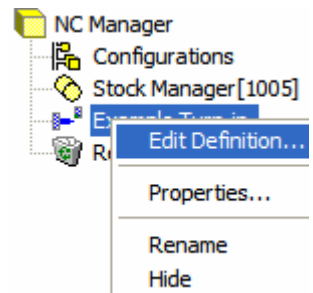
If the file opens, you can search and print the exercises as required. If the file does not open, you need to install the Adobe Reader from the CAMWorks CD or from the Adobe web site (www.adobe.com).

3. Click the Close button in the top right corner of the Adobe Reader window to close the window.

Step 3: Define the Machine

The machine definition specifies the type of machining that will be done for the current model (i.e., mill or turn) and the associated machine tool control (post processor) for proper generation of the NC program. Based on the selected machine, the Extract Machinable Features command will recognize either mill or turn features. The icons that display in the tree identify the machine.

1. Right click the Machine item in the CAMWorks Feature tree.
The shortcut menu displays. Right-click shortcut menus display commands for the item that is highlighted in the tree.

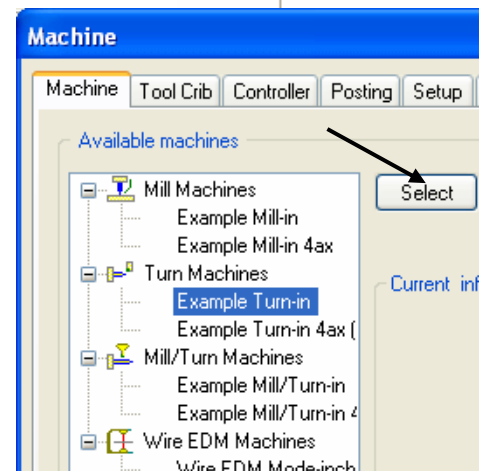


2. Select Edit Definition on the shortcut menu.
The Machine dialog box displays.
3. Select Turn Machine – inch in the list of Available machines and click the Select button.

When you use CAMWorks to machine your own parts, select the machine tool you want to use to machine the part.

Machine tools are set up in the Technology Database. Before using CAMWorks to machine your parts, make sure you define the machine tools available in your facility. For more information, see the CAMWorks online Help.

4. Click the Tool Crib tab and make sure Inch Turret 1 is selected.



The Tool Crib page allows you to choose the set of tools that is used with the machine you have chosen. These are not all the tools that are available, but a subset that you can modify to represent the actual set of tools that the machine has loaded.

Inch Turret 1 is a default tool crib that has been set up for the sample turn machine. When you define your machine tools in the Technology Database, you can set up your own tool cribs.

5. Click the Controller tab.

The Controller tab allows you to select the post processor. The list that displays depends on the post processors installed on your system. CAMWorks supplies several default post processors that may or may not be suitable for your needs. Contact your CAMWorks reseller for information on making changes to these post processors or for other post processors.

If the controllers do not display, use the Browse button to locate the folder containing the controller files (*.ctl).

If FANTUTL (the tutorial post processor) is not highlighted, highlight it in the list and click the Select button. FANTUTL is the controller used for the exercises in this manual. When you use CAMWorks to machine your own parts, select your post processor. The Current Information area displays information about the FANTUTL controller. A short description displays in the window below the Current information. This window contains information only if an optional file has been created for the post processor.

Machine

Machine | **Tool Crib** | Controller | Posting | Setup

Available tool cribs

Inch Turret 1
Front 4 Axis Turret

Turret type: Rear Turret

Select Save...

Current Information:

Name	Inch Turret 1
No. of Station	16

Active tool crib: Inch Turret 1

Usage	Stn No.	Type	Inser	Incl	Insc	Radiu	Radiu	Width	Ra
	1	Turn Tool	Diamo	80deg	0.5in	0.031			
	2	Turn Tool	Diamo	55deg	0.5in	0.031			
	3	Turn Tool	Diamo	35deg	0.5in	0.031			
	4	Turn Tool	Groov			0.007	0.007	0.062i	
	5	Turn Tool	Threa	60deg		0.006			
	6	Turn Tool	Diamo	80deg	0.125i	0.002i			
	7	Drill							
	8	Drill							
	9	Turn Tool	Groov			0.007	0.007	0.125i	

Add... Remove Edit... Save...

Machine

Machine | Tool Crib | **Controller** | Posting | Setup

Available

C:\Program Files\CAMWorks2007\Posts\Fantutl.ctl

FANTUTL
FANTUTL4

Browse

Select

Current information:

Parameter	Value
Machine Name	LATHE TUTORIAL
Controller Type	FANUC TYPE
Traverse Rate	250

Description: CAMWorks Turning tutorial control post processor
Usage: not intended for business or personal use
Post name: fantutl.ctl
Posted output style: generic Fanuc type

More

6. Click the More button.

A longer description displays. The More button is activated only if a second optional file has been created. This information is intended for use in training or as a detailed description of post processor attributes that can be created.

Information files are provided for the sample FANTUTM post processor. Your TekSoft dealer or your company manager may be able to supply these files if they are available for your post processor. If files are not available, you can create post information files as explained in the online Help.

7. Click the Posting tab.

These parameters provide information required to generate the NC program. The parameters are machine-dependent and different parameters may display for your controller. The value for a parameter is output in the NC code if the machine requires it.

Machine	
Machine Tool Crib Controller Posting Setup	
Parameter	Value
Program number	1
Material	
Z Preset	10.00000"
X Preset	10.00000"
Maximum RPM	3000

If you have installed the Feed and Speed Library, you can specify a material on this tab or when you define the Stock.

The Maximum RPM defines the maximum RPM that your machine allows when running Constant Surface Feed per Minute (CSFM). This prevents an overspeed spindle alarm as the tool moves to centerline. If necessary, you can set a lower maximum RPM for individual operations.

The Z and X Preset values are used by the system for a return position. These values are absolute numbers from X0,Z0. If your machine requires an absolute preset to be output in the program, these values are used. If you always change tools at the same position, setting these values saves you time later.

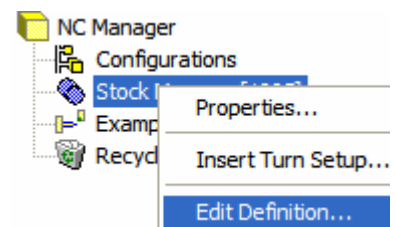
8. Type **1001** for the Program Number, then click OK to close the Machine dialog box.

Step 4: Edit the Stock Definition

The Stock is the material from which the part will be machined. The default Stock is the smallest cylinder (bar stock) that the part will fit into. Typically, this is not the size of the stock you will be using. You can change the Stock definition either by offsetting the length and/or diameter of the bar stock from the part or by defining the Stock from a closed sketch (for a casting or forging). Currently, the sketch has to be in the same plane as the Stock in terms of the X and Z plane and must be a closed profile. No revolve line is needed for the geometry.

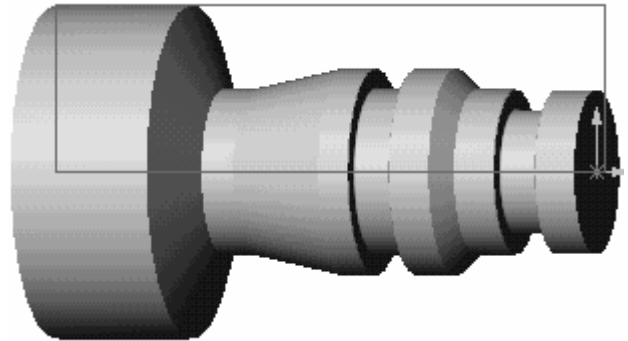
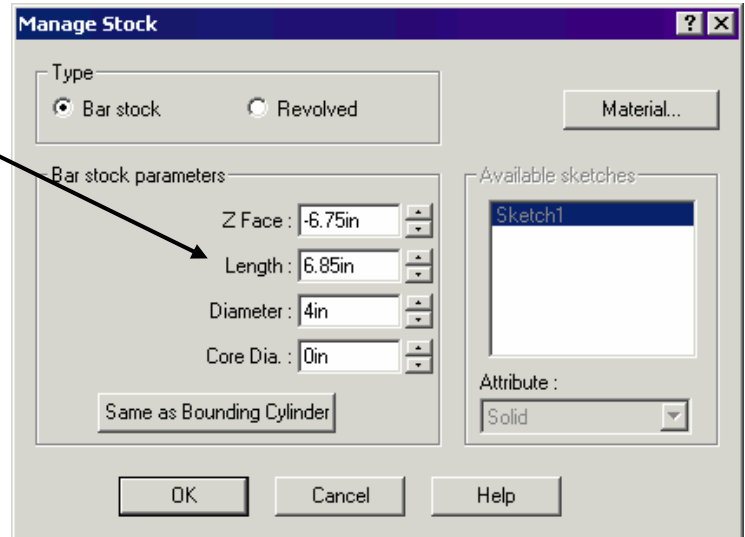
In this exercise, you define the Stock as a cylinder (bar stock) offset from the part in length.

1. Right click Stock Manager in the Feature tree and select Edit Definition on the shortcut menu.



2. In the Manage Stock dialog box, leave the Type set to Bar stock.
3. Change the Length dimension to **6.85in**.
4. Click the Material button.
5. In the Stock Material dialog box, click the down arrow button and select 304L for the Common name, then click OK.
6. Click OK to close the Manage Stock dialog box.
7. Click the Stock Manager item in the tree.

The Stock display is updated in the graphics area. Notice the Stock line moved out from the face by .100 (in the +Z-axis direction).



Step 5: Define Machinable Features

In CAMWorks, machining can be done only on machinable features. You use the following two methods to define machinable features.


- Automatic Feature Recognition: AFR analyzes the part shape and attempts to define most common machinable features such as grooves, outside and inside profile features, and face features. Depending on the complexity of the part, AFR can save considerable time in defining turn machinable features.
- Interactively created features: If AFR does not recognize a feature you want to machine, you can define the feature interactively using the Insert Turn Feature command.

Using Automatic Feature Recognition (AFR)

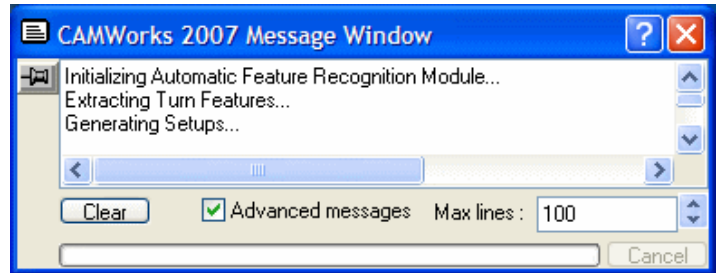
Automatic Feature Recognition is one of CAMWorks' most powerful features. The idea of AFR is to scan the part for features that can be machined. This process is much the same as what you would do if you were to pick up a part that you had to machine. You would look it over, take measurements, and begin deciding what machining processes you would need.

CAMWorks is not machining the SolidWorks features directly. It creates a separate list of Machinable Features instead. This is because a single SolidWorks feature may have several areas that need to be machined in different ways with different tools.

Define machinable features automatically:

1.  Click the Extract Machinable Features button on the CAMWorks toolbar or right click NC Manager in the tree and select Extract Machinable Features on the shortcut menu.

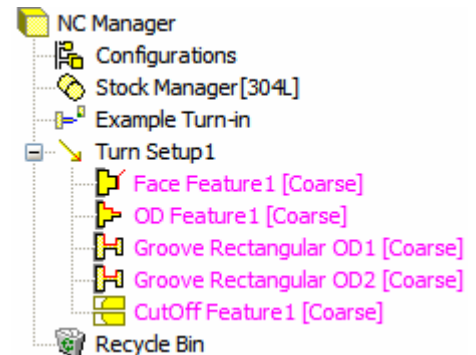
The CAMWorks Message Window displays. This window displays automatically to report the progress of the current process. Generating Setups is always the last item in AFR. When you see it, you know the process is almost complete.



You can control whether this window displays temporarily or permanently by selecting the Options command on the NC Manager shortcut menu or the CAMWorks menu and checking the Message Window option on the General tab in the Options dialog box.

CAMWorks generates the Turn Setup and the machinable features. The items display in the Feature tree.

The Turn Setup is the 2 axis (X and Z) plane that the tool movement will be based on. It has an origin location and X, Y, and Z direction vectors. The Turn Setup is created automatically; however, you can move the origin and change the direction and angles of the axis. Most turning applications work in the X and Z plane, which is relative to the SolidWorks Y and X axis plane respectively.



When you define the Stock as bar stock, only one Turn Setup (X and Z) is created and all features will be machined using tool orientations that are relevant for a rear turret machine configuration.

The Feature tree allows you to:

- Copy, rename, suppress, delete and combine machinable features
- Change machinable feature parameters
- Change the order in which the features are machined
- Insert Turn features
- Search for a feature based on item name
- Hide or show feature display in graphics area
- Generate an Operation Plan and find the first operation for a feature



Did You Know ...

Features that have no operations and features that could not produce operations because the feature conditions have not been defined in the Technology Database display in a different color. You can set the color on the Display tab in the Options dialog box.

Most feature parameters are fixed; however, some parameters can be changed using the Parameters command on the feature shortcut menu.

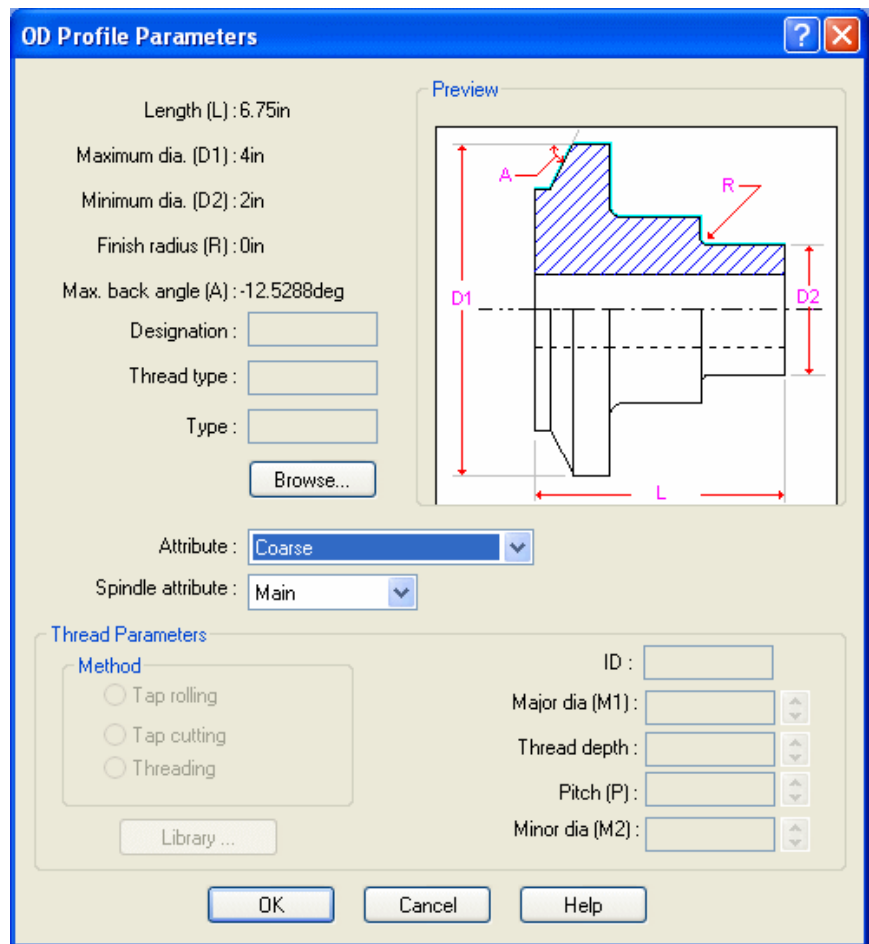
2. Right click OD Feature1 in the tree and select Parameters on the shortcut menu.

The OD Profile parameters include the length, maximum and minimum diameter and maximum back angle. Since there is no physical information about the type of profile, CAMWorks allows you to define an attribute for the profile.


3. Click the down arrow next to Coarse to see the choices.

Coarse, Taper, Reverse Taper and Thread are system attributes. User-defined attributes are also listed. For example, RF80-80 is a shortcut name for roughing and finishing the profile using 2 tools (80 degree diamond tools).

4. Leave the Attribute set to Coarse and click OK or Cancel to close the dialog box.



Save the part with the machinable feature data:

5.  Click the Options button the CAMWorks toolbar. Note that you can also click CAMWorks on the menu bar or right click NC Manager in the tree and select the Options command.
6. Make sure the Save/Restore part option on the General tab is checked, then click OK.
If this option is checked, when you save and close a part document, the machining data is saved. When the part document is opened again, the machining data is restored along with the part design information.
If this option is not checked, when you save and close a part document that contains at least one CAMWorks Setup, a message indicates that Save/Restore is disabled. If you click Yes, CAMWorks saves all CAMWorks data before closing the file. If you click No, CAMWorks closes the part and discards any new CAMWorks data since the last save.
7. Click Save As on the File menu.

8. In the Save As dialog box, type **cwturn1** and click the Save button. Make sure you save frequently. When you open a file, you are actually working on a copy of the file. The original is still stored on disk. Periodically saving your file ensures that your latest work is retained.

Defining Features Interactively

Automatic Feature Recognition can save a significant amount of time; however, AFR does have limitations. AFR cannot recognize every feature on complex parts and does not recognize some features such as certain types of grooves. To machine these areas, you need to define machinable features interactively using the Insert Turn Feature command.

CAMWorks also provides the flexibility to edit machinable features to accommodate machining requirements. For example, if you want the OD machined in segments to take into account possible machining rigidity, you can define features for the segments in the OD Feature as shown in the following exercise.

In this exercise, you insert an OD Feature so that you can rough turn the first OD step of the part. This OD segment will be finished in the Turn Finish operation for OD Feature1.

1. Right click OD Feature1 in the Feature tree and select Insert Turn Feature on the shortcut menu.

The Insert Turn Feature dialog box displays. The profile of the part is shown. If necessary, move the dialog box to view the part.

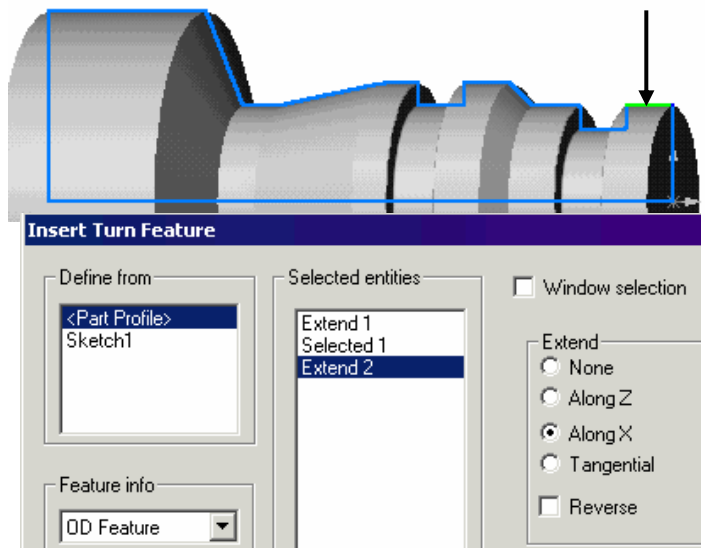
2. Pick the first OD profile segment to the right of the groove closest to the face to select it.

The single segment is highlighted.

3. Click the down arrow next to the Feature info list box.

The turn machinable features that can be inserted are listed.

4. Select OD Feature.

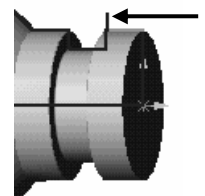


5. Click on Extend 2 in the Selected entities list, then select Along X in the Extend group.

This terminates the feature at the end of the segment and up to the Stock major OD.

6. Click OK to close the Insert Turn Feature dialog box.

OD Feature2 displays in the Feature tree. You have now defined all the machinable features in this part.




7. Drag OD Feature2 above OD Feature1 in the tree.

You need to reorder these features because you want to rough OD Feature2 before cutting the entire OD. If you generated operations and toolpaths without reordering, CAMWorks would generate toolpaths for OD Feature1 first, which includes the segment in OD Feature2. Toolpaths would not be generated for OD Feature2 since there would be no material left to remove.

Step 6: Generate Operation Plan and Adjust Operation Parameters

An Operation Plan contains information on how each machinable feature is to be machined and how the NC code will be output. When Generate Operation Plan is run, operations for each machinable feature are created automatically based on information in the TechDB.

1.  Click the Generate Operation Plan button on the CAMWorks toolbar or right click Turn Setup1 in the Feature tree and click Generate Operation Plan on the shortcut menu. CAMWorks generates the operation plan for all the machinable features in Turn Setup1. The operations are listed in the Operation tree.

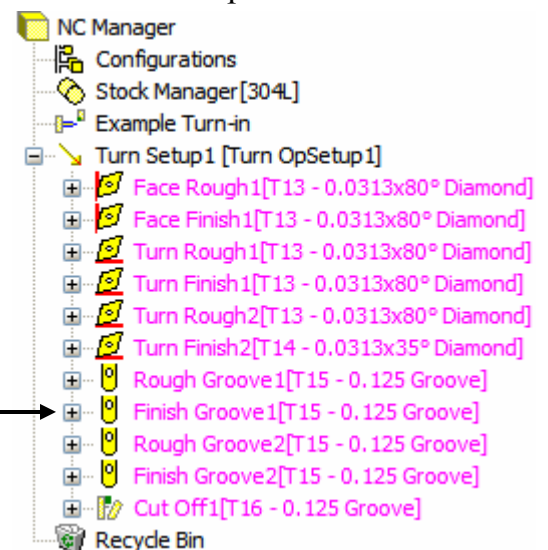
The Operation tree provides an outline view of the operations for the machinable features. Operations are listed under the Turn Setup in the same order as the machinable features. At the top of the tree is the NC Manager. The Stock Manager and Machine items function the same as in the Feature tree. You can change the definition of your material block and the controller definition used by CAMWorks to produce G-Code.

The Operation tree allows you to:

- Insert, rename, suppress and delete operations
- Change operation parameters
- Edit the feature list
- Change the machining order
- Generate and simulate toolpaths
- Hide or show toolpath display
- Post process the toolpaths
- Search based on an item name

2. Click the plus sign (+) next an operation.

Clicking a plus sign displays the name of the machinable feature that this operation is going to machine.



Did You Know ...

If an operation displays in a color instead of black, then toolpaths have not been generated. This occurs when you insert a new operation interactively, you insert a new feature interactively and generate operations for the new feature, or CAMWorks cannot generate the toolpath for an operation because of an error in the toolpath algorithm or a parameter is not correct. You can set the color on the Display tab in the Options dialog box.

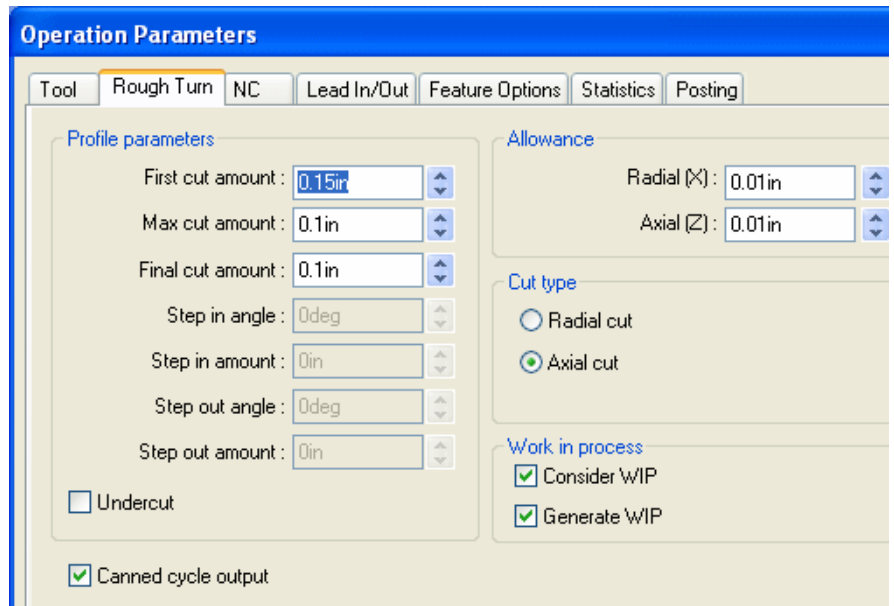
- Right click Turn Finish1, select Delete on the shortcut menu and click Yes to confirm the deletion.

Based on the information in the TechDB, rough and finish operations were generated for OD Feature2. In this exercise, you want to finish turn this OD segment in the finish operation for the entire OD (Turn Finish2) so you can delete the finish operation. If you typically machine the OD in segments, you can customize the TechDB and set up an Attribute to generate only a rough turn operation for this type of OD feature.

The operations that are generated by CAMWorks are based on information stored in the Technology Database. Each operation contains parameters that affect how the toolpath is created and specific parameters that will be output to the NC program. These parameters can be edited before generating the toolpaths and post processing the part.

- Right click on Turn Rough1 (OD Feature2) and select Edit Definition on the shortcut menu.

The Operation Parameters dialog box gives you access to all the parameters used to define the toolpath. This dialog box also provides access to the parameters for the tool you are using and allows you to select a different tool.




- Click the Rough Turn tab and change the First cut amount to .15in.
- Click the other tabs and view the parameters.

When you cut your own parts, you can adjust these values for your machining requirements.

- Click OK to close the dialog box.

Step 7: Generate Toolpaths

CAMWorks calculates toolpaths using the operation parameters to define how to machine each machinable feature.

-  Click the Generate Toolpath button on the CAMWorks toolbar or right click Turn Setup1 in the Operation tree and select Generate Toolpath on the shortcut menu.

CAMWorks calculates the toolpaths for each operation in the Setup.


- Select the first operation in the tree, hold down the Shift key and select the last operation. The toolpaths for all the operations display on the part showing the centerline of the toolpath.

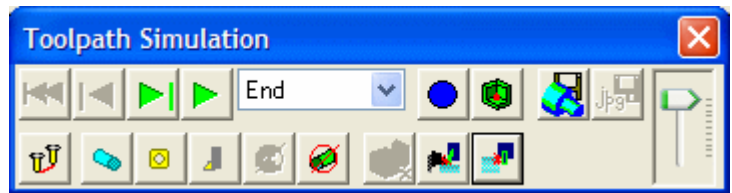
- Left click an operation in the Operation tree. The toolpath for that operation displays. As you click each operation, the toolpaths for that operation display.

Turning operation parameters can be edited and the operation can be renamed, moved, suppressed, deleted, etc. after toolpaths have been generated. If you make any changes, the toolpaths must be updated. We recommend that you regenerate toolpaths at the Setup level, so the work in process can be updated correctly.

Simulate Toolpaths

CAMWorks provides the ability to simulate the toolpaths showing the tool movement and the resulting shape of the part.

1.  Click the Simulate button on the CAMWorks toolbar or right click on Turn Setup1 and select Simulate Toolpath.




The Turning Simulation toolbar

displays. Some of the options you can select to customize the simulation include:


- Update the Stock after each cut or show the completed part at the end of the simulation.
- Change the display of the stock, tool, tool holder, and target part (wireframe, translucent, shaded, or no display).
- Run the simulation to the end or advance by single step or by feature.
- Compare the design part and the simulated part during simulation.
- Show a cross section of the material removal.
- Show holder and fixture collisions.
- Control the simulation speed by dragging the Simulation Speed Control slider up or down.

If you want to simulate only the toolpath for a given operation, you can right click that operation, then select Simulate Toolpath.

2. Set the toolbar buttons as shown in the figure above.


3.  Click the Run button.

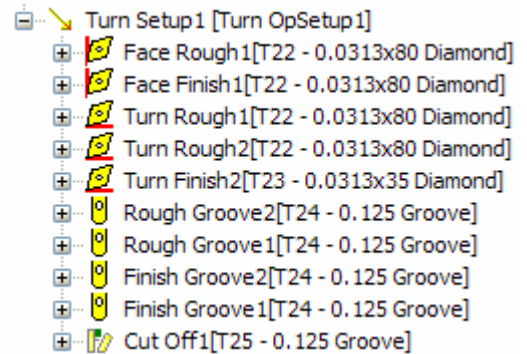
The simulation runs with the tool displayed during simulation.

4.  Click the X button in the upper right corner to exit the simulation and return to the SolidWorks display.

Change the Machining Order

Operations are generated in the same order that the machinable features are listed in the tree. This may not cut the part in the order you think is most efficient or practical for your machining requirements. You can drag and drop operations in the tree to reorder them.

1. Drag and drop the Groove operations in the order shown in the tree on the right.
2. Right click Turn Setup1 in the Operation tree and select Generate Toolpath on the shortcut menu.
If you change the order after you generate toolpaths, you must re-generate the toolpaths so that the work in process can be updated.
3. Right click Turn Setup1 and select Simulate Toolpath.
4.  Run the simulation and notice that the groove closest to the face is cut first and both grooves are rough cut, then finished.



Step 8: Post Process Toolpaths

Post processing is the final step in generating the NC program file. This step translates generalized toolpath and operation information into NC code for a specific machine tool controller. CAMWorks creates NC code for each toolpath in the order the toolpath operation appears in the Operation tree. When you post process a part, CAMWorks creates two files: the NC program and the Setup Sheet. These are text files that you can read, edit and print using a word processor or text editor.

The steps to post process a part are explained in Chapter 2.



Generating 4 Axis Turn Toolpaths & NC Code

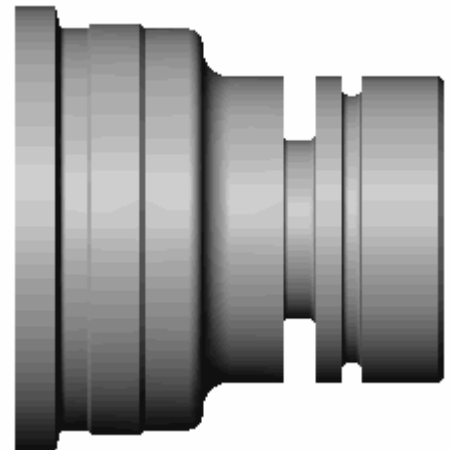
CAMWorks uses the Rear turret for 2 Axis Turn machining and as the default for 4 Axis Turn machining. All tool motion and output is displayed and output from a Rear turret perspective. CAMWorks provides support for machines with front and rear turret configurations allowing 2+2 axis machining. For machines that are defined as 4 axis in the Technology Database, an option is provided to select either Front or Rear turret for each operation. Sync codes are manually provided by the user.

What You'll Learn

- Defining a 4 Axis machine
- Defining machinable features
- Editing features
- Generating operations and adjusting parameters for front turret
- Generating toolpaths


There are 5 grooves on the part in this exercise: 2 face grooves, 2 OD grooves and 1 ID groove. There is also an OD thread that will be machined.

1. Open part file **TURN4AX_1.SLDPRT** in the *\Examples\Turn* folder inside the CAMWorks folder (e.g., *\Program Files\CAMWorksxxxx\Examples\Turn*).
2.  Click the CAMWorks Feature Tree tab.
3.  Right click the Machine in the tree and select the Edit Definition command on the shortcut menu.
4. Highlight Example Turn-in 4ax (2+2) and click Select. This machine has been defined as a 4 axis machine in the TechDB. Before using CAMWorks to machine your parts, make sure you define the machine tools available in your facility.
5. Click the Tool Crib tab and click the down arrow next to the Turret type. When you select a 4 axis machine, you can choose a tool crib to use with each turret. For this part, you can use Inch Turret 1 as the Active tool crib for both Rear and Front turrets.
6. Click the Controller tab and make sure FANTUTL4 is selected, then click OK to close the Machine dialog box. This tutorial post processor supports 2+2 axis output. When you use CAMWorks to machine your own parts, select your machine tool controller or post processor.
7. Right click the Stock Manager in the tree and select Edit Definition.
8. Leave the Type set to Bar stock.
9. Set the Z Face to -4.05in, the Length to 4.05in, and the Diameter to 4.25in, then click OK.



Defining Machinable Features Automatically and Interactively

In order to define the machinable features on this part, you run the Extract Machinable Features command and insert the OD Thread feature.

1.  Click the Extract Machinable Features button on the CAMWorks toolbar or right click NC Manager and select Extract Machinable Features.

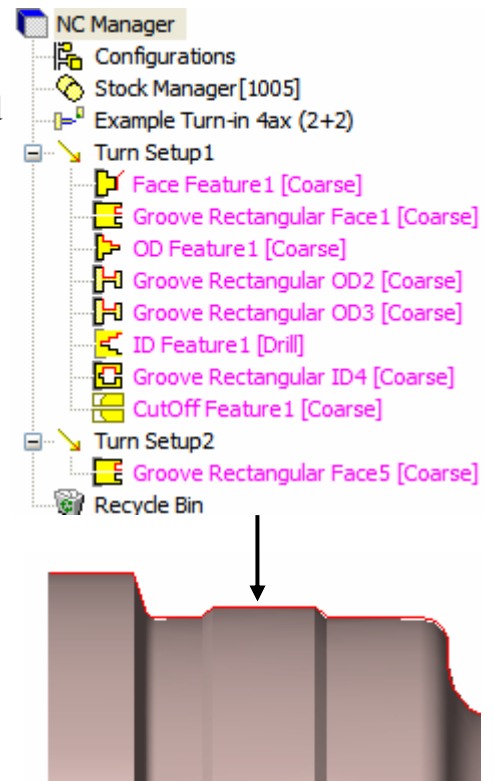
Two Turn Setups are created and AFR recognizes the features that can be machined in each Setup.

2. Since you are chucking, delete Cutoff Feature1.
3. Right click on Groove Rectangular OD3 in the tree and select Insert Turn Feature.

The Insert Turn Feature dialog box displays.

4. For the Feature info, select OD Feature.
 5. For the Attribute, select Thread from the list.
 6. Pick the horizontal segment shown in the figure.
- The selected entity and two extend entities display in the Selected Entities list. You do not need to extend either end of the segment.

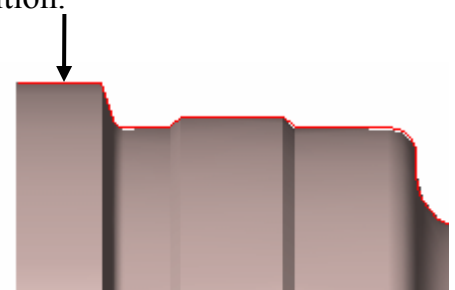
7. Click OK. OD Feature2 is listed in the tree.
8. Right click on OD Feature2 and select Parameters.
9. In the OD Profile Parameters dialog box, set the following thread parameters:
 - Major dia = 3.85in
 - Thread depth = 0.05in
 - Pitch = 0.05in
 - Minor dia = 3.75in
10. Click OK to close the OD Profile Parameters dialog box.



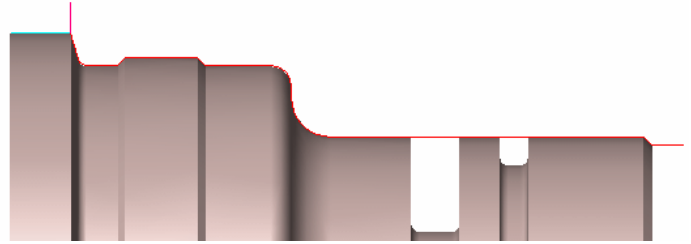
Editing Machinable Features

When you machine a part, the length of the stock may change. Because CAMWorks uses WIP (work in process), you can edit the definition of the OD and ID profiles to make sure these features are cut completely if the stock changes.

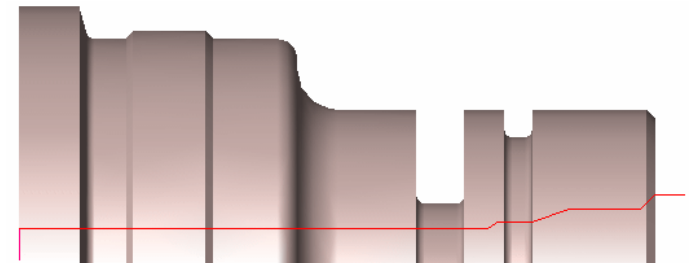
1. Right click OD Feature1 in the tree and select Edit Definition.
2. Pick the segment shown in the figure to remove it from the feature.
3. Pick Extend 1 and select Along Z.



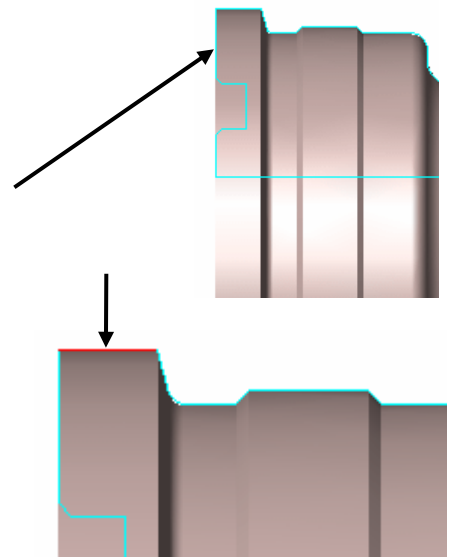
4. Pick Extend 2 in the Selected entities list and select Along X for the Extend option, then click OK.




5. Right click ID Feature1 and select Edit Definition.
6. Pick Extend 1 in the Selected entities list and select Along X.




7. Click the Reverse option to point the line down.
8. Pick Extend 2 in the Selected entities list and select Along Z, then click OK.
9. Right click Turn Setup 2 and select Insert Turn Feature.
10. For the Feature info, select Face.
11. Pick the vertical edge shown in the figure, then click OK.
12. Right click Face Feature2 and select Insert Turn Feature.
13. Leave the Feature info set to OD Feature and the Attribute set to Coarse.
14. Pick the horizontal edge shown in the figure.
15. Click OK.



Generating Operations and Adjusting Parameters for Front Turret

1.  Click the Generate Operation Plan button on the CAMWorks toolbar or right click NC Manager in the Feature tree, select Generate Operation Plan.
Operations are created for the machinable features in the Turn Setups.
2. Right click Turn Rough1 in the Operation tree and select Edit Definition.
3. On the Rough Turn tab, check the Undercut option and click OK.
This option defines whether the toolpath can create an undercut up to the back angle of the tool. When checked, the toolpath follows the entire toolpath observing the back angle.
4. Right click Turn Finish1 and select Edit Definition.
5. On the Finish Turn tab, check the Undercut option and click OK.
6. Right click on Rough Groove2 (Groove Rectangular OD2) and select Edit Definition.

7. On the Rough Groove tab, make the following changes:
 - Change the Groove peck type to Constant. With this option selected, the tool feeds in the First peck amount, then continues feeding in the Sub peck amount until the depth is reached.
 - Set the First peck amt. and the Sub peck amt to .05in.
 - Make sure the Groove style is set to Normal. This option generates a toolpath where the tool plunges perpendicular to the bottom of the groove. Multiple parallel plunge cuts will be produced when the width of the groove is wider than the tool. The sequence of the cuts is based on the specified order. Using the optional Deep groove cycle, the tool can be retracted between each depth of cut to allow chip removal.
 - Check the Deep groove cycle option. With this option selected, the tool pecks at a specific depth (much like in the Cutoff cycle). This cycle is used for machining grooves that are unusually deep and require using a thin insert that would break if you could not peck the groove.
8. Click the Tool tab.
9. On the Tool Crib page, select Front for the Turret option.
10. Highlight the tool in Stn No. 4 and click Select.
11. On the Groove Insert page, set the Length to 1in.
12. Click the Holder page and click OK when this message displays: The current insert/holder is not allowed for the Main Spindle while using the Front Turret. CAMWorks has selected a valid orientation. Please review this selection on the Holder page and change if required.
13. On the Holder page, make sure the Orientation is set to Up right or Up left, set the Protrusion to .65in and click OK.
14. Right click Finish Groove2 in the tree, select Edit Definition.
15. On the Tool Crib page, select Front for the Turret option.
16. Highlight the tool in Stn No. 4 and click Select.
17. Click the Holder tab and click OK when the holder orientation message displays.
18. Make sure the Orientation is set to either Up right or Up left and click OK.
19. Right click Rough Groove4 (Groove Rectangular ID4) and select Edit Definition.
20. On the Rough Groove tab, change the Radial (X) and Axial (Z) allowances to 0.0 and click OK.
21. Right click Finish Groove4 in the tree, select Delete and click Yes to confirm the deletion.
22. Right click Drill1 and select Edit Definition.
23. On the Feature Options tab, change the Machining length to 4.5in, check the Add tip length option and click OK. Increasing this length ensures that the full diameter of the drill will pass through the back of the part.
24.  Click the Generate Toolpath button on the CAMWorks toolbar or right click NC Manager and select Generate Toolpath.

Defining the Chuck Location for Setup1

Define chuck to use for toolpath simulation:

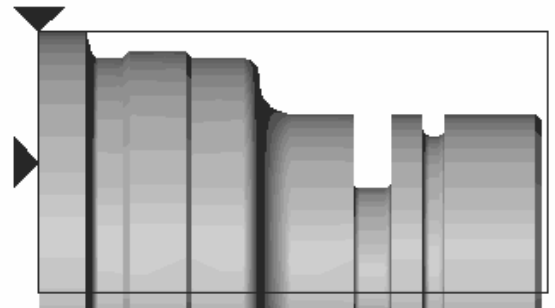
1. Right click Setup1 in the tree and select Edit Definition.
2. Click the Chuck Definition tab.
3. Click the down arrow to the right of the Select configuration input box and select 8in_2Step_Chuck.

This is one of several chuck configurations that has been saved in the TechDB. You can define additional configurations by setting the parameters on this tab, then typing a name in the input box and clicking the Save button.

4. Click the Chuck Location tab.
5. Pick the OD line on the work-in-process (WIP) sketch, then pick the vertical line representing the back (locating) face.

The triangles move as shown in the figure.

6. Click OK.



Changing the Origin and Defining the Chuck Location for Setup2

1. Right click Turn Setup2 in the tree and select Edit Definition.
2. On the Origin tab, change the Origin Defined from option to Automatic.
3. Click the Other end option.

The origin marker displays as shown in the figure.

4. Click the Chuck Definition tab and select 8in_2Step_Chuck.
5. Click the Chuck Location tab.
6. Locate the triangles by picking the OD line on the work-in-process (WIP) sketch near the small OD on the right side and the WIP sketch at the back vertical edge of the small diameter for the chuck face.

Note that you may need to zoom in to this area in order to pick easily.

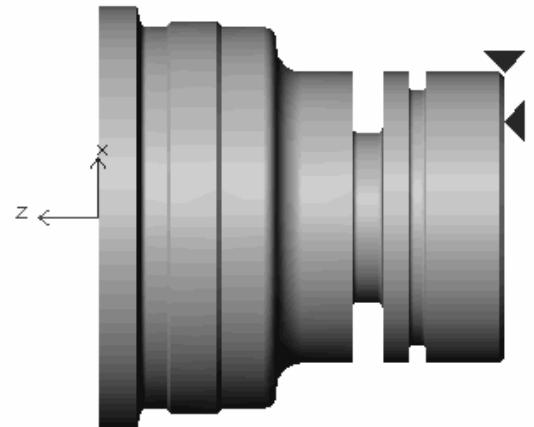
7. Click the Reverse direction option.
8. Click OK.

9.  Click the Generate Toolpath button on the CAMWorks toolbar to regenerate toolpaths for both Setups.



Did You Know ...


If you change the Chuck Definition, you need to pick the chuck location again on the Chuck Location tab.



Simulating the Toolpaths for Turn Setup1 and Setup2

1. Right click Thread1 in the tree and select Suppress.

This toolpath does not need to be simulated for this exercise and suppressing it speeds up the simulation.

2.  Click the Simulate Toolpath button on the CAMWorks toolbar.



The Fixture Display button is enabled and the chuck defined for Turn Setup1 displays.

3. Click the down arrow next to End and select Next Setup.

4. Select the following display options:



Stock Translucent Display



Tool Shaded Display



Holder Shaded Display



Target Shaded Display

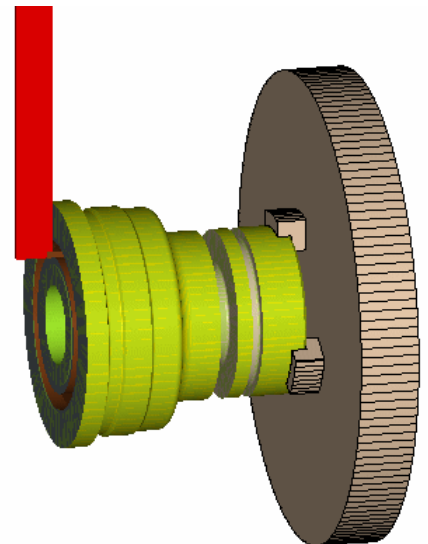
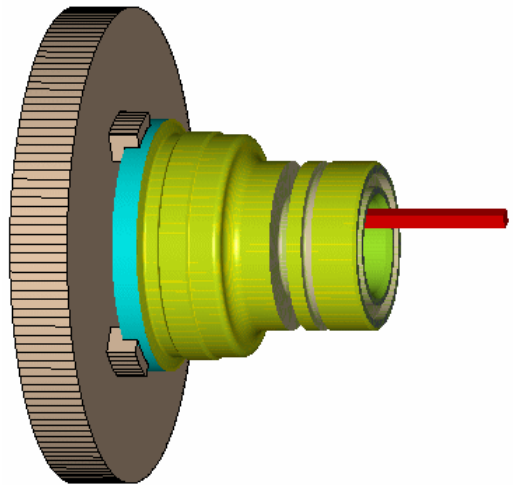
5.  Click Run.

The simulation runs through the operations in Turn Setup1, then the chuck display changes to Turn Setup2.

6. Rotate the part so you can see the face with the groove.

7.  Click Run.

The operations in Turn Setup2 are simulated.



Appendix A Troubleshooting

As a result of the complexity of the PC operating environment, conflicts and problems can occur.

This chapter provides suggestions for you to resolve problems with the following:

- Valid License Not Detected
- Floating Network License Problems
- CAMWorks Startup Problems
- General Operation Problems
- CAMWorks Solids Startup

If you are unable to resolve a problem using the available information, the Getting Help section of this chapter explains how to obtain assistance.

Valid License Not Detected

When a valid purchased CAMWorks license is not detected for either the built-in software license or the hardware key, CAMWorks starts with many functions disabled making the software unusable.

If Your Subscription Plan and License Do Not Support this Version

In order to update an existing CAMWorks installation, you must currently be enrolled in a CAMWorks Update Subscription Plan and your software license must be programmed to run this release. When CAMWorks detects that your current license has expired for the built-in software license or the hardware key, the following message displays the following message before the "0 days remain" message:

CAMWorks security failed. Not licensed for this version.
(CAMWorks version yyyyymmdd Current version yyyyymmdd)

You need to contact your CAMWorks reseller to re-activate your Update Subscription Plan and receive a new code to update your hardware or software license key. If you have received your code, update the license in the TekSoft License Manager as explained in Chapter 1.

If You are Using the CWFlexLM Software License

When a valid purchased CAMWorks license is not detected for the built-in FlexLM software, the following message displays:

CAMWorks security failed! CAMWorks could not find valid FlexLM license. Please specify correct license file location or verify that the license server is running.

CAMWorks starts with functions disabled making the software unusable.

Below are some causes and possible solutions for a standalone installation. For troubleshooting a floating network installation, see page A-6.

- **CWFlexLM Software License Manager is not installed.**
For more information on installing the License Manager and activating the license, see Chapter 1.
- **Temporary License has expired.**
You have a license that has an expiration date and the temporary license has expired.
 - If you want to obtain a permanent license, contact your CAMWorks reseller.
 - If have received the permanent license file, follow the directions in Chapter 1 for activating the permanent license.
- **The location identifying the software license file is not correct.**
Make sure the specified location is correct on the License Setup in the CWFlexLM License Manager.
 - If installed as a Standalone license, the license file must be on the same PC that is running CAMWorks.

- If installed as a floating network license, the license file must be on the Server PC that is running the CAMWorks License Service. The folder where the license file is copied can be read only.
- **The license file may be invalid.**
If the license file has been modified, the license may be invalid.
- **The CWFlexLM License Manager has been uninstalled.**
If the CWFlexLM License Manager is uninstalled, the license is also removed and CAMWorks will no longer run on that machine until a new license has been applied for and activated. Contact your CAMWorks reseller.
- **You may be using a hardware dongle (key) for licensing instead of software licensing.**
If you are using a dongle, check the License method on the License Setup tab in the CWFlexLM License Manager and make sure Hardware dongle is selected. The CWFlexLM License Manager is not used for hardware licensing.
- **CAMWorks starts without the error message; however, the functions are disabled.**
You may not have a license for the module you are trying to use. You can verify the licensed modules by selecting CAMWorks 200x Help on the SolidWorks Help menu, then selecting License Info.

If You are Using the Hardware Key

When a valid purchased CAMWorks license is not detected for the hardware key, the following message displays:

0 day(s) remain on your license to run CAMWorks. 0 days indicates that no active license is found. Click the Help button for troubleshooting information.

CAMWorks starts with many functions disabled making the software unusable.

Listed below are some suggestions for troubleshooting if you are using a hardware key instead of the built-in software license. After trying each suggestion, start SolidWorks/CAMWorks and see if the problem has been corrected.

- **Verify the Key is installed correctly.**
The first step in troubleshooting this problem is to make sure the key is connected to the computer, then start SolidWorks/CAMWorks.
 - If you have a 25-pin key for a parallel port (this is the printer port), attach the 25-pin male connector on the key to the 25-pin female connector on the PC.
 - If you have a USB key, plug the key into the USB connector on the PC. If all the USB connectors are being used, you can purchase a USB hub to add additional connectors.
- **Check the CWFlexLM License Manager for an incorrect option setting.**
If you have installed the FlexLM License Manager, the License method on the License Setup tab may be set to FlexLM Software. Start the CWFlexLM License Manager and make sure the License method is set to Hardware Dongle.

- **Check the communication between computer and Key.**

If a valid license is not detected after you try the first two suggestions, run the Key Manager on the CAMWorks CD.

To run the Key Manager:

1. Insert the CAMWorks CD in the drive.
2. On the Setup menu, click the Key Manager button.
3. In the Update Rainbow Protection Block window, select Update on the menu bar, then select View.
 - If the PC is communicating with the key, the Key Information dialog box will display the current license.
 - If the key is not communicating, an error message displays indicating the security block is not detected. Use the information below to continue troubleshooting.

Troubleshooting Communication Between the Computer and the Key

Listed below are some causes and possible solutions when the computer is unable to communicate with the hardware key. After trying each suggestion, run the Key Manager program as explained above.

- **The Sentinel driver is not installed or is corrupt.**

Make sure the Sentinel driver is installed. This driver is required for the key to communicate with the Parallel or USB port. To check for installation, look for the Sentinel System Driver in the Control Panel\Add/Remove Programs list.

- If it is not listed, you need to install the Sentinel driver from the CAMWorks CD main menu.
- If it is listed, use the Add/Remove Programs function to uninstall the Sentinel System Driver, reboot, then reinstall the driver. Note that when using a USB key, the key should not be connected when you install the driver.

- **The key may have failed.**

Keys do not have batteries to run down; however, they occasionally fail.

You can check the key if you have multiple computers. Connect the key to another computer. You do not need to have CAMWorks installed on this PC. Install the Sentinel Driver from the CAMWorks CD. Then, run the Key Manager program as explained above.

Keys are very sensitive and have been known to fail if used with certain PC hardware. Some multifunction boards that contain disk controllers, serial, parallel and game ports have been known to burn out the key. If you think this has occurred in your system, contact your CAMWorks reseller.

If you are a licensed user, you can return the key to your CAMWorks reseller for a replacement. Replacement is free during the warranty period. After the warranty period, there is a nominal charge.

- **If you have a license/security key connected to a parallel port and a device such as a printer is attached to the key:**
 - Make sure the device is powered on.
 - Remove the device and see if the key functions. Note that some older printers and plotters cannot be attached to the key.
- **If you have multiple security keys attached to the port:**
 - Remove all keys except the CAMWorks key.
 - Attach the keys so that the CAMWorks key is the last one.
 - Vary the order in which the other keys are attached (keeping the CAMWorks key last).
- **The LPT (parallel) port mode configuration in the BIOS is not compatible.**

You may need to change the BIOS setting and configure the port to make it communicate with the key.

As the computer is booting, enter the BIOS setup and change the Parallel port mode setting. If bi-directional is an option, try this first. After making a BIOS change, if you have the Sentinel System Driver installed for Windows 2000 and XP, we recommend you uninstall the driver, reboot, then reinstall the driver. If the Key Manager still does not find the key, you may need to try several settings to find the correct mode for your computer.

This problem has been reported on some laptop computers and may also occur on desktop computers.

Floating Network License Problems

Cannot activate license on Client

When the Authorized Modules tab is blank and the Authorization Status on the Status tab indicated Failed:

- The Server Host name may be incorrect in the CWFlexLM License Manager on the client PC.

Start the CWFlexLM License Manager on the client PC and verify that the Server Host name is correct on the License Setup tab.

The firewall on the Server PC may not be allowing the client to access the CAMWorks License Service.

Configure the firewall to allow the clients.

- The CAMWorks License Service may not be running on the Server PC.

Verify the License Service is running. The License Service must be running continuously in order for the clients to run CAMWorks.

CAMWorks functions are disabled on client

- The module you are trying to use may not be assigned to the client or all licenses for that module may be in use by other clients.

Check the licensed modules by selecting CAMWorks 200x Help on the SolidWorks Help menu, then selecting License Info. If the module you want to use has an available license, check the box next to the module name. If no licenses are available and another client releases one, click the Refresh Licenses button to update the list so you can select it.

Install CAMWorks license service button not activated

- The license file and/or log file path may not be specified on the Server Settings tab.
A license file and a log file path are required to install the license service.

Unable to specify path to replace current floating license file

- The current floating license has not been removed completely.

Follow the directions to remove the CAMWorks License Service and the current license, then select the new license file and reinstall the License Service.

Check Hard Drive Format Type

For Windows 2000 and XP, you cannot install the License Manager on a hard drive that has been formatted as a dynamic disk. The hard drive must be formatted as a basic disk.

Check your hard drive:

1. From your desktop, select Start|Control Panel. Then select Administrative Tools and Computer Management.
2. In the Computer Management dialog box, double-click the Disk Management folder in the tree on the left.
3. On the right side of the dialog box, locate the Volume where the License Manager is installed and make sure the Type is Basic.
4. If the Type is Dynamic, uninstall the License Manager and re-install the software on a basic drive.

CAMWorks Startup Problems

This section describes some possible startup complications and provides suggestions for you to resolve the problems.

Camworks.dll Cannot be Loaded

If you start SolidWorks and a message displays indicating that the camworks.dll cannot be loaded, CAMWorks may be trying to open two versions: the previous version and CAMWorks 2007.

To correct the problem:

- 1 Close all part models.
- 2 Select Add-Ins on the SolidWorks Tools menu.
- 3 In the Add-Ins dialog box, remove the check mark from the previous versions of CAMWorks, then click OK.
- 4 Close SolidWorks.
- 5 Restart SolidWorks.
- 6 Select Add-Ins again and check CAMWorks 2007, then click OK. CAMWorks 2007 should start.
- 7 Open a part model.

Jet DAO Engine is Unable to Initialize

DAO is a Microsoft utility that CAMWorks uses to extract information from the Technology Database. This utility is installed by a variety of Microsoft products, including Office 2000 and Access 2000. If DAO 3.5 is not installed, when you try to start CAMWorks in SolidWorks, an error message displays indicating the Jet DAO Engine is unable to initialize. The CAMWorks CD includes DAO 3.5 and you can install it if necessary.

To install DAO 3.5 manually:

1. Insert the CAMWorks disc in the CD drive. If the Master Setup menu displays, click the Close button.
2. In Explorer, select the CD drive and open the \dao35\disk1 folder.
3. Run the Setup program in that folder.
4. In the Select Components dialog box, make sure the Jet 3.5 checkbox is checked. Do not install the ODBC Direct option (the checkbox should not be checked).
5. Click the Next button.
6. In the second Select Components dialog box, leave all the optional formats selected and click Next. The Microsoft setup program installs the files.

General Operation Problems

This section describes some common complications and provides suggestions for you to resolve the problems.

Machining Data Is Not Restored

If you open a SolidWorks part file or assembly and the machining data (machinable features, operations and toolpaths) that you thought you had saved previously is missing:

- If the Save/Restore part option or Save/Restore assembly option on the General tab in the Options dialog box was checked when the part or assembly was saved and you open the part or assembly when the applicable option is unchecked, a message indicates Save/Restore is disabled and you can choose to restore the part model or assembly with or without the CAMWorks data.
- You may have saved the part when CAMWorks was running in demonstration mode. Files saved in demonstration mode can be opened in a licensed version; however, the machining data will *not* be restored.
- You may have saved the part in a newer version of CAMWorks and are opening the part document in an older version.

Post Process Command is not on the Shortcut Menu

If you are ready to generate the NC program and the Post Process command is not displayed on the shortcut menus, make sure you have selected a controller (post processor) and generated the toolpaths. The controller is selected by right clicking Machine in the tree and selecting Parameters on the shortcut menu, then clicking the Controller tab in the Machine dialog box.

Adobe Reader Displays PDF File Incorrectly

You may need to update the version of the Adobe Reader on your PC. You can install the most recent version from the CAMWorks CD or from the Adobe web site: www.adobe.com.

CAMWorks Solids Messages

The following messages indicate a problem has been encountered when starting CAMWorks Solids.

- **101**
License not available. Either it is expired or the dongle (key) is not attached.
- **102**
Dongle found, but the license is expired.
- **103**
SolidWorks executable not found.
CAMWorks Solids installation stores the SolidWorks exe path at
HKEY_LOCAL_MACHINE\SOFTWARE\Teksoft\CAMWorks\CAMWorks Solids
2006Ex\InstPath.
A 103 error occurs when this registry value is not there.
- **104**
The launcher application failed to create a process. This may happen if:
 - a. The registry key mentioned in 103 above has the wrong path.
 - b. Any SolidWorks dll is missing and it is unable to run the process because of that.
 - c. The computer does not have enough resources to run SolidWorks (this is a rare case).
- **105**
SolidWorks does not recognize the OEM key passed to the SW process by the launcher application. This may happen when SolidWorks has given two different OEM strings for L1 and L2.
CAMWorks Solids has to be run once by Administrators to set proper license level (L1 or L2) OEM strings. If that was not done, then this error will occur based on whether or not the proper key was written to the registry.
- **106**
Registry key HKEY_LOCAL_MACHINE\SOFTWARE\CAMWorksSolids\Security is not accessible (either it is not there or user does not have permission to read it).
- **107, 108, 109, 110, 111, 112**
These errors occur only in debug mode when the content at
HKEY_LOCAL_MACHINE\SOFTWARE\CAMWorksSolids\Security is not correct.
These are rare issues.
- **113**
This error occurs when the user loses the license after starting CAMWorks Solids. This will happen when the user tries to jump-start CAMWorks Solids.

Getting Help

Troubleshooting sections in the manuals often provide solutions to common problems. If you are unable to find a solution to your problem using the available information, and you are reasonably certain the problem is in CAMWorks, you can get assistance as explained on the next page.

Doing some basic troubleshooting can save you time. If you can determine the software or peripheral that seems to be causing the problem, you can contact the applicable manufacturer for help. For example, if your mouse is not functioning correctly, the problem may be caused by the mouse or by Windows. You may be able to correct the problem quickly by contacting Microsoft or the mouse manufacturer's customer support.

Start With Some Basic Troubleshooting

Before you call for assistance, there are a number of areas you can check. The following list is designed to help you discover common problems or direct you toward problem areas that may have been overlooked. In some cases, your problem may be caused by something as simple as a loose cable.

☒ **Make sure your hardware and software meet the minimum system requirements listed in Chapter 1.**

Windows requires a considerable amount of computing power, memory and disk space. When you try to run Windows applications such as CAMWorks, you may find your computer is unable to handle the demand.

☒ **Make sure your hardware and peripherals are set up correctly and you have the most recent critical operating system updates and driver updates.**

If Windows, the mouse, printer or video card is not operating correctly, you need to troubleshoot Windows or the peripheral equipment, not CAMWorks.

☒ **Check all cable connections.**

A loose cable may cause your problem.

☒ **Consult your manuals and online help.**

Read the manuals and the online help for your equipment and verify that you have followed all the instructions.

Defective Software or Equipment

The TekSoft Warranty warrants that for ninety (90) days from the date of purchase, the software and the hardware key will perform substantially in accordance with the description in the documentation. If you are reasonably certain your problem is covered under the TekSoft Warranty, contact your CAMWorks reseller. If you have a problem with any other equipment, such as a printer, mouse or the computer, please contact the appropriate manufacturer.

Still have a Problem?

When you have questions about the operation of CAMWorks or you cannot find a solution to a problem that you are reasonably certain is caused by CAMWorks, call for assistance as explained below.

Contact Your CAMWorks Reseller

TekSoft products are sold and distributed by a network of dealers and distributors who are trained by TekSoft to provide technical support. CAMWorks resellers have in-house professional support staffs that have a thorough knowledge of the product and provide friendly and timely support.

Please be able to provide as much of the following information as you can. This information will be used to analyze your problem:

- Product name, version, and build number.
- Customer I.D. # and License/Security Key # (if using hardware license/security)
- Windows version including Service Pack (e.g., Windows 2000, XP SP2)
- Description of hardware (CPU, RAM, Video adapter)
- Additional Windows applications in your system (e.g., Microsoft Office XP)
- Exact error message, if any
- Steps to re-create the problem
- Sample part model to demonstrate the problem

Accessing TekSoft's Web Site

The TekSoft web site, **teksoft.com**, is designed to provide information for both new and current customers including:

- information about new releases
- hints and tips for getting the most out of your CAMWorks system
- information about special software offers
- software to download (service packs, supplemental programs, utilities, etc.)

Appendix B Crypkey Software License

This appendix explains how to install and use the built-in Crypkey software license. This type of security was used with older versions of CAMWorks and is being replaced by FlexLM software licensing. Support for the Crypkey software license will be discontinued in a future version of CAMWorks.

If you are using software licensing and installing CAMWorks for the first time, install the CWFlexLM License Manager and activate the FlexLM license as explained in Chapter 1.

Installing & Activating a CAMWorks License

Your CAMWorks license defines the modules and versions that you are authorized to run. CAMWorks can be purchased with a fixed standalone license or optionally with a floating network license.

Standalone License

Installing the Software License Manager for Built-in Software Encryption

If you are using the built-in Crypkey software license and you are installing CAMWorks for the first time, you need to install the Software License Manager and submit registration information to TekSoft.

- The folder that you select for the License Manager software must be on a local drive of the current PC and must have full read/write permissions for the client PCs that will be running CAMWorks.
- Do not install the license in the CAMWorks program folder.
- You must install the license software directly from each PC. Do not install using terminal emulators or remote communications software such as pcAnywhere (Symantec Corp.).
- For Windows 2000 and XP, to avoid possible problems with activating your license, we recommend that you install the Software License Manager on a drive that has been formatted as a basic drive instead of a dynamic drive. If installed on a dynamic drive, the License Manager may not generate a Site Code, which is required to issue a software license.

To install the License Manager:

1. Start the CAMWorks Setup program on the CAMWorks CD and click the Software License Mgr. button on the product menu.
2. When prompted to select the install type, select Standalone.
3. When prompted to choose the license location, use the default \program files\crypkey or select a different folder.
4. When the installation is complete, click Close to exit the Setup program.

Registering and Activating Your Built-in CAMWorks License

After installing the TekSoft License Manager, you can register your CAMWorks system, activate your temporary license and apply for permanent authorization codes.

1. From the Windows desktop, select Start on the taskbar, then select Programs|CAMWorks License Manager|License Manager.
2. Complete the information requested on the Registration tab in the License Manager.
 - If you are registering a purchased version, select the Purchased version option.
 - If submitting for a demo evaluation version, select Evaluation/demo version.
 - If you are moving your license to another PC, select License Transfer.

- If your reseller provided you with a User ID and Seat ID, enter this information in the applicable fields. If not, leave these fields blank.
- 3. Click the Register Online button to submit the registration by email.
If you are unable to email the registration from the current PC, click the File Registration button. A message displays indicating the location of the registration file. Copy this file to a PC with email capability and email the file to TekSoft (register@teksoft.com).
- 4. If you registered for a Purchased version or License Transfer, a message displays notifying you that your temporary license has been activated. Click the OK button.
- 5. Click the Close button to exit the License Manager.
When software license installation and registration is complete, you can start SolidWorks and run CAMWorks. Within the temporary license period, TekSoft will email or fax you a Site key and Subscription key. Note that additional steps are required for a License Transfer. See page B-10.
- 6. When you receive the key codes, start the License Manager (see step 1).
- 7. Click the CAMWorks License tab and enter the applicable codes into the Site key and Subscription key fields.
- 8. Click the Activate/Update license button. The License type, Version and Licenses fields will be updated to identify the current license status.
- 9. Click Close.

Floating Network Licenses

CAMWorks utilizes software encryption for the floating network license. This license defines which modules and versions you are authorized to run and how many copies of CAMWorks can be running simultaneously. A floating license can be purchased with configurations supporting one or more users.

The floating network license consists of two installation types: Network Server and Network Client.

- **Network Server**

One PC on the network must be designated as the license server. This PC will be used to submit the registration and activate the floating network license. Optionally, CAMWorks can be installed on this PC.

- **Network Client**

All other PCs in the network that will be running CAMWorks are designated as Network Clients.

Installing the Software License Manager on the Network Server

Read This Section Before You Install

- The floating network license supports Microsoft Windows networks.
- The Software License Manager **MUST** be installed on the Network Server PC *before* installing the license on the Network Client PCs.
- You must install the license software directly from each PC. Do not install using terminal emulators or remote communications software such as pcAnywhere™ (Symantec Corp.).
- For Windows 2000 and XP, you cannot install the License Manager on a hard drive that has been formatted as a dynamic disk. The hard drive must be formatted as a basic disk.
- The folder that you select for the License Manager software must be on a local drive of the current PC and have full read/write permissions for the client PCs that will run CAMWorks.
- CAMWorks user logins must have full read/write permissions to the crypkey license folder on the client and server machines and be members of the Power Users group for the client and server machines.
- Do not install the license in the CAMWorks program folder.
- When installing on a PC running Windows XP, if the PC is on a network without a domain or the hard drive is not formatted as NTFS:
 - You should not install the license manager in a folder under the WINNT folder. By default, Windows XP enables a "simple file sharing" option. This option prevents the PC from sharing any folders under WINNT. To allow sharing folders under WINNT, you can disable simple file sharing by selecting Start|Control Panel|Appearance and Themes|Folder Options. Click the View tab and remove the check mark from the Use simple file sharing check box in the Advanced settings box.
 - If there is no domain controller, the username that will login remotely to share the folder must be defined as an authorized user with rights and permissions over the shared folder.

Installation Procedure

1. On the PC that is the designated Network Server, start the CAMWorks Setup program on the CAMWorks CD and click the Software License Mgr. button on the product menu.
2. When prompted for the install type, select Network Server.
3. When prompted to choose the server license location, select a folder on the current PC.
4. When the installation is complete, click Close to exit the Setup program.

Registering and Activating Your Built-in CAMWorks License

After installing the TekSoft License Manager on the server PC, you can register your CAMWorks system, activate your temporary license and apply for permanent authorization codes.

1. From the Windows desktop on the PC designated as the Network Server, select Start on the taskbar, then select Programs|CAMWorks License Manager|License Manager.
2. Complete the requested information on the Registration tab in the TekSoft License Manager.
 - If you are registering a purchased version, select the Purchased version option. If submitting for a demo evaluation version, select the Evaluation/demo version option.
 - If your reseller provided you with a User ID and Seat ID, enter this information in the applicable fields. If not, leave these fields blank.
3. Click the Register Online button to submit the registration by email.
 If you are unable to email the registration from the current PC, click the File Registration button. A message displays indicating the location of the registration file. Copy this file to a PC with email capability and email the file to TekSoft (register@teksoft.com).
4. If you registered for a Purchased version or a License Transfer, a message displays notifying you that your temporary license has been activated. Click the OK button.
5. Click the Close button to exit the License Manager.
 After submitting the CAMWorks registration on the Network Server, a temporary license is activated automatically. This means you can use CAMWorks immediately.
 Within the temporary license period, TekSoft will email or fax you a Site key and Subscription key to enable the permanent license.
6. When you receive the key codes, start the License Manager on the Network Server PC (see step 1).
7. Display the CAMWorks License tab and enter the applicable codes into the Site key and Subscription key fields.
8. Click the Activate/Update license button.
 The License type, Version and Licenses fields will be updated to identify the current license status.
9. Click Close.

Installing the License on Network Clients

After the Software License Manager is installed on the server PC, you can install the Software License Manager on the PCs in the network that will be running CAMWorks. You must install the license software directly from each PC. Do not install using terminal emulators or remote communications software such as pcAnywhere™ (Symantec Corp.).

1. On each PC that will be running CAMWorks, start the CAMWorks Setup program on the CAMWorks CD and click the Software License Mgr. button on the product menu.
2. When prompted for the install type, select Network Client.
3. When prompted to choose the server license location, specify the folder that you designated for the server license when you installed the Software License Manager on the Network Server PC.

Installing & Activating a CAMWorks License

Each client PC must have full read/write permissions for this folder.

4. When the installation is complete, click Close to exit the Setup program.
5. From the Windows desktop, select Start on the taskbar, then select Programs|CAMWorks License Manager|License Manager.

Only the CAMWorks License tab displays. This allows you to view the license and validate the Network Server License location.

6. Click Close to exit the License Manager.

No additional information and actions are required for Network Client PCs.

Updating an Existing Installation

Requirements

In order to update an existing CAMWorks installation, you must be currently enrolled in a CAMWorks Update Subscription Plan and your software license must be programmed to run this release. If you have any questions, contact your CAMWorks reseller before installing the software.

- Current Enrollment in an Update Subscription Plan

You must be enrolled in the CAMWorks Update Subscription Plan in order to keep your CAMWorks system up-to-date with new features and performance improvements. If you are not currently enrolled in a CAMWorks Update Subscription Plan, you can contact your CAMWorks reseller and purchase a plan.

- Current Software License

Whether using the built-in encryption software or the hardware copy protection device, you will be issued a new software license code when an Update Subscription Plan is purchased. Before installing the latest version of CAMWorks, we recommend that you update your license with this code and verify the license status.

Updating the Built-in Crypkey Software License

If you are updating from a previous release to the latest production release, you may need to update the built-in software license. This is done using a Subscription key code supplied by TekSoft or your CAMWorks reseller.

Viewing the Current Built-in License Status

The TekSoft License Manager allows you to view the products and versions that the built-in license is authorized to run.

To view the current license status:

1. Click the Start button on the taskbar and select Programs|CAMWorks License Manager|License Manager.
2. Display the CAMWorks License tab.

The number in the *Version* field must be the same as or higher than **20061201**. For example, if the number field is **20060901**, you need to update the license. If you did not receive a new Subscription key code, contact your CAMWorks reseller.

Updating the Built-in License

To update the built-in license, you need a Subscription key code. This code is supplied by your CAMWorks reseller or TekSoft.

If you are updating Standalone licenses on multiple PCs, you will be issued a different code for each license. Make sure the correct Subscription key code is used on the applicable PC. If you are updating a floating network license, you will be issued a single code, which is used to update only the Network Server.

To update the Subscription key:

1. Click the Start button on the taskbar and select Programs|CAMWorks License Manager|License Manager.
2. On the CAMWorks License tab, type or copy/paste the supplied code in the Subscription key field.
3. Click the Update Subscription button.

The number in the Version field will update to reflect the new license.

4. Click Close.

Running the Evaluation/Demo Version

When CAMWorks starts, the software checks for a valid license. A valid license can be for a purchased version or for an evaluation/demonstration version. If you would like a license for a demonstration version, please complete and submit the registration information in the License Manager utility. Make sure you select the Evaluation/demo version option.

Restrictions

In demonstration mode, CAMWorks is fully functional except for these restrictions:

- Files saved with CAMWorks machining data:
 - Can be opened in a licensed version; however, the machining data will *not* be restored. SolidWorks data is not affected.
 - Can be opened again in demonstration mode with the machining data restored.
- NC code generated during post processing (.txt files) cannot be saved.

Moving the CAMWorks License

Although the CAMWorks license is issued to a single PC, you can move the license to another PC if necessary.

If Using the Built-in Software Encryption

If you are using the built-in software license, follow these steps:

1. Install CAMWorks on the new PC.
2. In the TekSoft License Manager, select the License Transfer option, then complete and submit the registration information.
3. On the original PC, start the TekSoft License Manager.
4. Display the CAMWorks License tab and click the Remove License button.
A code will display in the Verification code field.
5. Copy/paste or type this code in an email and send to TekSoft at register@teksoft.com.

The Verification code from the original PC must be received and validated before the license will be issued for the new PC.

6. When you receive your new codes, activate the license on the new PC as described on page 1-2.

Troubleshooting

Valid License Not Detected

When a valid purchased CAMWorks license is not detected for either the built-in software license or the hardware key, the following message displays:

0 day(s) remain on your license to run CAMWorks. 0 days indicates that no active license is found. Click the Help button for troubleshooting information.

CAMWorks starts with many functions disabled making the software unusable.

If You are Using the Built-in Crypkey Software License

Below are some causes and possible solutions:

- **Software License Manager is not installed.**
For more information on installing the License Manager and activating the license, see Chapter 1.
- **Temporary License has expired.**
The temporary license has expired and the permanent license codes have not been entered in the TekSoft License Manager.
 - If you have received the codes, follow the directions in Chapter 1 for activating the permanent license.
 - If you have not received the codes, make sure you submitted the registration.
 - If you have submitted the registration and have not received the codes, contact your CAMWorks reseller.
- **The Key location identifying the software license folder is not correct.**
 - Make sure the specified location is correct on the CAMWorks License tab in the TekSoft License Manager. If installed as a Standalone license, the location should be the CrypKey folder in the Windows folder. If installed as a Network server or Network client, the folder is user-defined during installation.
 - If the license folder has been copied or modified in any way, the license is invalidated. If this is the case, contact your CAMWorks reseller for a new license.
- **The authorized Evaluation/Demo license period has expired.**
Contact your CAMWorks reseller to purchase a licensed version.
- **The License Manager has been uninstalled.**
If the License Manager is uninstalled, the license is also removed and CAMWorks will no longer run on that machine until a new license has been applied for and activated. Contact your CAMWorks reseller.
- **If you have a floating network license, all authorized licenses are in use.**
Wait until another user has finished using CAMWorks. If this occurs often, you may want to increase the number of licensed users. Contact your CAMWorks reseller.

Site Code Does Not Display

When you start the License Manager to register CAMWorks, a code should display in the CAMWorks Site Code field at the top right of the Registration tab. This code is required in order to issue a software license.

If the code does not display, you can troubleshoot by going through the procedures below in order.

Remove and Reinstall License Manager

1. From your desktop, select Start|Control Panel, then select Add/Remove Programs.
2. Pick CAMWorks License Manager in the list of installed software, then click the Change/Remove button.
3. Follow the prompts to remove the License Manager.
4. Reboot the PC.
5. Insert the CAMWorks disc in the CD drive.
6. On the CAMWorks product menu, click the Install License Mgr. button.
7. Follow the prompts to install the License Manager.
8. Start the License Manager.

In most cases, this procedure results in the site code displaying. If the site code still does not display, follow the steps below.

Check Hard Drive Format Type

For Windows 2000 and XP, you cannot install the License Manager on a hard drive that has been formatted as a dynamic disk. The hard drive must be formatted as a basic disk.

Check your hard drive:

1. From your desktop, select Start|Control Panel. Then select Administrative Tools and Computer Management.
2. In the Computer Management dialog box, double-click the Disk Management folder in the tree on the left.
3. On the right side of the dialog box, locate the Volume where the License Manager is installed and make sure the Type is Basic.
4. If the Type is Dynamic, uninstall the License Manager and re-install the software on a basic drive.

Verify License Manager Program is Started as a "Service"

1. From your desktop, select Start|Control Panel. Then select Administrative Tools and Computer Management.
2. In the Computer Management dialog box, click the + next to Services and Applications in the tree, then click Services.
3. Locate Crypkey License in the list of services on the right and make sure the Status indicates Started.

If the Status is Stopped, double-click Crypkey License, click the Start button in the Crypkey License Properties dialog box, then click OK.

4. Close the Computer Management dialog box.

Make Sure Path to License Manager is Correct

1. From your desktop, select Run on the Start menu.
2. In the Run dialog box, type CKCONFIG and click OK.
3. Click the OK button in the message box.
4. In the NT Server Configure dialog box, make sure the path is pointing to the folder where the License Manager (tekreg.exe) is installed.

Typically, the License Manager folder is \Program Files\crypkey\ or \WINNT\crypkey\. If you specified a different folder during the License Manager installation, that folder should be the path.

If the folder is not correct, click Remove, then click Add. In the Open dialog box, browse to the folder where the License Manager program (tekreg.exe) is located. Pick tekreg.exe and click Open. Click Close in the NT Server Configure dialog box.

Remove and Add License Manager Drivers

Remove the drivers:

1. From your desktop, select Run on the Start menu.
2. In the Run dialog box, browse to the folder the License Manager is in, pick setupex.exe and click Open.

Typically, the folder is \Program Files\crypkey\ or \WINNT\crypkey\. If you specified a different folder during the License Manager installation, browse to that folder.

3. In the Run dialog box, add /d to the end of the path and click OK.

For example, C:\Program Files\crypkey\setupex.exe /d

4. Reboot the PC.

Add the drivers:

5. From your desktop, select Run on the Start menu.
6. In the Run dialog box, browse to the folder the License Manager is in, pick setupex.exe and click Open.
7. In the Run dialog box, add /f to the end of the path and click OK.

For example, C:\Program Files\crypkey\setupex.exe /f

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