Technical Installation Guide

SEER for Manufacturing

GALORATH INCORPORATED

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Technical Installation Guide

SEER for Manufacturing

Introduction

This installation guide describes the available options for installing the SEER for Manufacturing and/or the SEER-Pro application. It includes topics such as basic system requirements, general installation options, and technical installation details.

It is intended to guide the reader through the process of installing and maintaining SEER for Manufacturing (SEER-MFG) on either of the following 64bit operating systems:

- Windows 10 or 11 64-bit
- Windows Server 2016, Windows Server 2019, or Windows Server 2022

Icons are used throughout the installation guide to highlight important points in the installation, configuration, and deployment process. Below is a list of the icons you will encounter:

 Hints

 Useful Information

 Caution

 Warning

 Good practice

 Bad practice

SEER for Manufacturing Product Line

The software products you receive depend on your SEER for Manufacturing Edition.

SEER For Manufacturing	Estimator Edition	Pro Edition
SEER for Manufacturing Core (SEER-MFG)	✓	✓
PRO		✓
Estimate by Comparison *(standard edition)**	✓	✓
SEER-HD (both Access and SQL)*	✓	✓
SEER-HDA *	✓	✓

**** Installation details provided in separate guides.***

Edition Installation Order

Installing a complete SEER edition typically requires that you follow a specific installation order. Assuming you have a set of SEER Edition installation files on your computer, the installation order is described below.

1) Install SEER-MFG - Run the 'Setup.exe' in the SEER-MFG folder. Once the SEER-MFG installation is complete, proceed to install SEER_Compare.

2) Install Estimate By Comparison (SEER_Compare) – Run the 'Setup.exe' in the SEER_Compare folder. The SEER-HD installation should automatically start during the installation of Estimate By Comparison, if it does not; you can manually begin the process after the Estimate By Comparison installation is complete.

   SEER Estimate by Comparison requires Microsoft .NET Framework runtime version 2.0 to run. You will be prompted during installation if you need to install it.

   For detailed installation information please review the ***SEER_Compare installation guide***.

3) Install SEER-HD – if installation did not begin during the SEER_Compare installation, you can manually start the process by runing the 'Setup.exe' in the SEER-HD folder

   For detailed installation information please review the ***SEER-HD installation guide***.

4) (OPTIONAL) Install SEER-HDA – Run the 'Setup.exe' located in "SEER-HD\SEER-HDA" subfolder.

   For detailed installation information please review the ***SEER-HDA installation guide***.

What you Need ()

- Administrative Privileges.
- Minimum System Requirements.
- The SEER for Manufacturing installation files; usually downloaded from www.SEERbyGalorath.com/oss8/users/, or supplied on a CD-ROM.
- A valid SEER license file; usually sent to users via email with an attached SEER License Utility.exe file, or supplied on a CD-ROM with the installation files.

Minimum System Requirements

Item	SEER-Pro
Disk Space	260 MB
Memory	>1 GB
Operating System	Windows 64-bit 11,10, and Windows 64-bit Server (2016, 2019, 2022) Microsoft Visual C++ Redistributable for Visual Studio 2022.
Optional	MS Project 2000 or higher (for exporting projects to MS Project) MS Excel 2000 or higher (for using/running the Custom Calculations feature) For the **OPTIONAL** Enterprise Shared Database (refer to the SEER Database Admin

Guide for details); SQL Server SQL Server (2012, 2014, 2016, 2017, 2019, 2022)

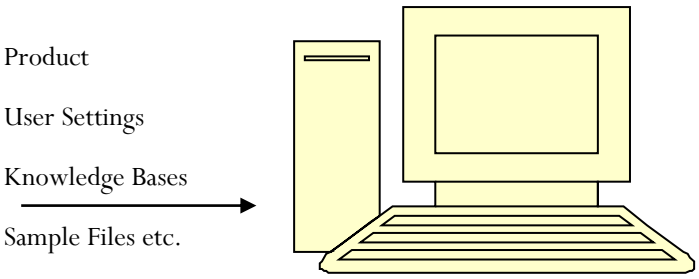
General Installation Options

Choosing the best configuration for your organization will depend on several factors. For example, the number of users, requirement for shared data, integration with other systems, and organizational IT policies may influence the decision. As you begin the installation process, you will be required to choose one of the following installation options.

Options	Description
Local	All files are installed to the local PC. All the work is done on the local PC.
Server	All files are installed onto the Server. The SEER application is then typically executed from a remote computer either through a Client install (see below), or through a thin client application such as Citrix.
Client	Individual user settings, shortcuts and links to the networked server are setup on the local machine. The SEER executable, knowledge bases, project files, etc. remain on a networked server.

Local

The local install option installs all aspects of the solution to the local machine.



The default configuration of a local installation places the Sample Projects, Tools, Knowledge Bases, and Flexible Export Templates (classed as Document files) on each user machine.

If you plan to have a small number of local install users, or a small number of users running SEER on a single machine, Galorath recommend configuring the product so that Application Data and Document Data files are stored in a common area on the machine or on a network server.

SEE ALSO:

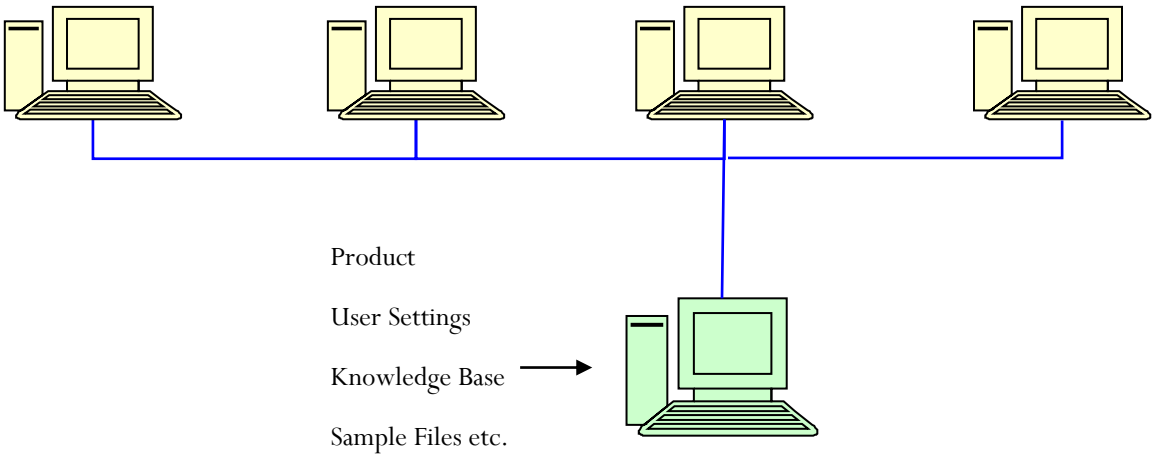
LOCAL INSTALLATIONS

Server

In this option, all aspects of the main product are installed on a networked server. A server installation is generally done for one of two reasons:

1. To support a networked/client configuration (see next option)
2. To run the SEER product as a "server" to other applications

The product, user settings, project files, and knowledge bases are installed on a shared server location. This option is equally valid for one user or multiple users. A fully remote installation means that no setup or full installation of the SEER product is needed on local machines; only Client installs are needed on the local machines (see next section).



This option allows for uniform knowledge bases, project files, and export templates among a large group of users (Clients). During maintenance upgrades, only the Server copy of SEER requires updating making maintenance easier when there are multiple users. Issues related to read / write access (for connected clients), and security need to be considered.

See Also:

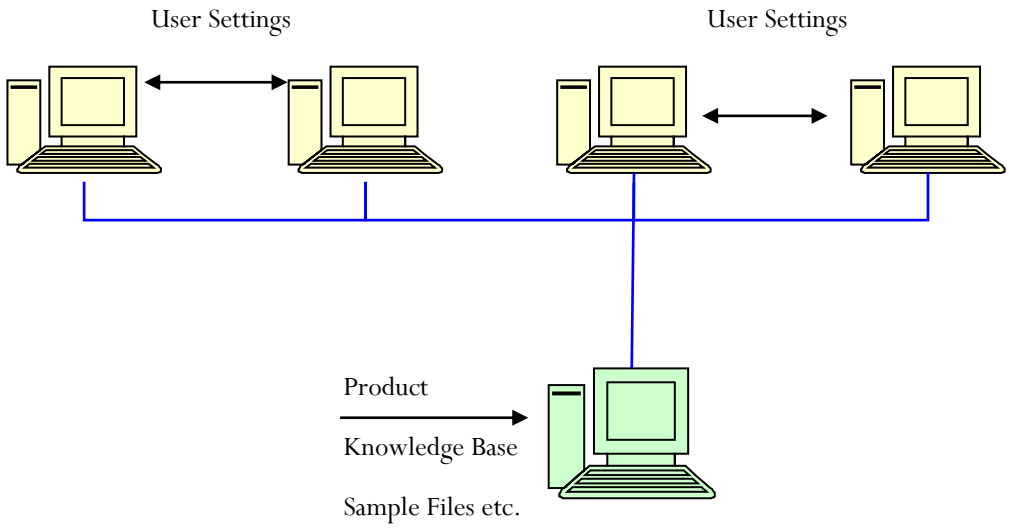
Server Installations

Client

In this option, it is assumed that the main SEER product already exists and is installed on a remote machine, typically a networked server (see previous section). If not, the Client cannot complete the installation. This installation sets up a user area on the local machine to manage client specific user settings. The client install registers the location of the remote server installation on the client machine, so SEER can be invoked as an automation call from the remote computer. This "Client" install is not true server/client architecture. The executable is read from the remote computer, but is loaded and executed from the memory of the local PC. This isolates the CPU load to the local PC, minimizing the demands on the server. This option is equally valid for one user or multiple users.

See Also:

Client Installations



Pre-Installation Configuration Options

Before starting installation, there are some setup options you may wish to consider. This sort of customization is optional, and typically done before distributing software to a group of users. You can customize how Document files (Knowledge Bases, Export Templates, Project files, Tools files etc.) are installed, and configure the default program paths and other settings.

Document Files

The default installation configuration will install a complete set of Document files into the chosen installation directory. If you have additional and/or custom document files that you would like to include with the new installation, you may copy them into the respective Document folders before installation:

[INSTALLATION FILES PATH]	Comments
\DOCUMENTS\KBASES	Copy custom KBase files into the KBases folder.
\DOCUMENTS\TOOLS	Copy custom Tools files into the Tools Folder
\DOCUMENTS\SAMPLE PROJECTS	Copy custom Project files into the Sample Projects Folder
\DOCUMENTS\EXPORT TEMPLATES	Copy custom Export Template files into the Export Templates Folder
\DOCUMENTS\INFLATION TABLES	Copy custom Inflation Table files into the Inflation Tables Folder
\DOCUMENTS\SCENARIOS	Copy custom Scenario files into the Scenarios Folder
\DOCUMENTS\IMPORT TEMPLATES	Copy custom Import Template files into the Import Templates Tables Folder

You can modify the *[INSTALLER FILES PATH]\SETUP.INI* file to customize how custom document files are to be installed.

SETUP.INI	Options
CustomKbases	OFF [default setting] = Will install files from the Data1.CAB file, and any additional files in the Documents\Kbases folder. ON = Will only install files from the Documents\Kbases folder, no additional KBase files will be installed from the Data1.CAB file.
CustomExportTemplates	OFF [default setting] = Will install files from the Data1.CAB file, and any additional files in Documents\Export Templates folder. ON = Will only install files from the Documents\Export Templates folder, no additional Export Template files will be installed from the Data1.CAB file.
CustomProjects	OFF [default setting] = Will install files from the Data1.CAB file, and any additional files in Documents\Sample Projects folder. ON = Will only install files from the Documents\Sample Projects folder, no additional Sample Project files will be installed from the Data1.CAB file.
CustomToolFiles	OFF [default setting] = Will install files from the Data1.CAB file, and any additional files in Documents\Tools folder. ON = Will only install files from the Documents\Tools folder, no additional Tools files will be installed from the Data1.CAB file.

Help Files

If you have custom html help files that you would like to be installed, you may copy the html help files into the respective Help and/or ParameterHelp folders. Your custom help files will overwrite the default SEER help html files.

[INSTALLATION FILES PATH]	Comments
\HELP	Copy custom Help files into the Help folder.
\PARAMETERHELP	Copy custom Parameter Help files into the ParameterHelp folder.

AppData

The default installation configuration will install the default *SEER-MFG SETTINGS.INI* from the *DATA1.CAB* file. If you want to configure the *SEER-MFG SETTINGS.INI* before installation you need to:

a) Modify the *[INSTALLER FILES PATH]\SETUP.INI* by changing the CustomINIs flag to ON.

SETUP.INI	Options
CustomINIs	ON = Installs the SEER-MFG Settings.INI file from the [INSTALLER FILES PATH]\AppData folder.

OFF [default setting] = Installs the default SEER-MFG Settings.INI file from the Data1.cab file.

b) Modify the ***SEER-MFG SETTINGS.INI*** in the ***[INSTALLER FILES PATH]\APPDATA*** folder.

Caution. If you set ***[FIRST-TIME-INIT-AND-UPGRADES]*** conditions, be sure they match the type of install you plan on using. For Local installs, all options are typically set to 1. For Server and Client installs, all options are typically set to 0.

Local Installations

Choose this option to install all aspects of SEER-MFG onto a single machine.

Quick Install Process ( )

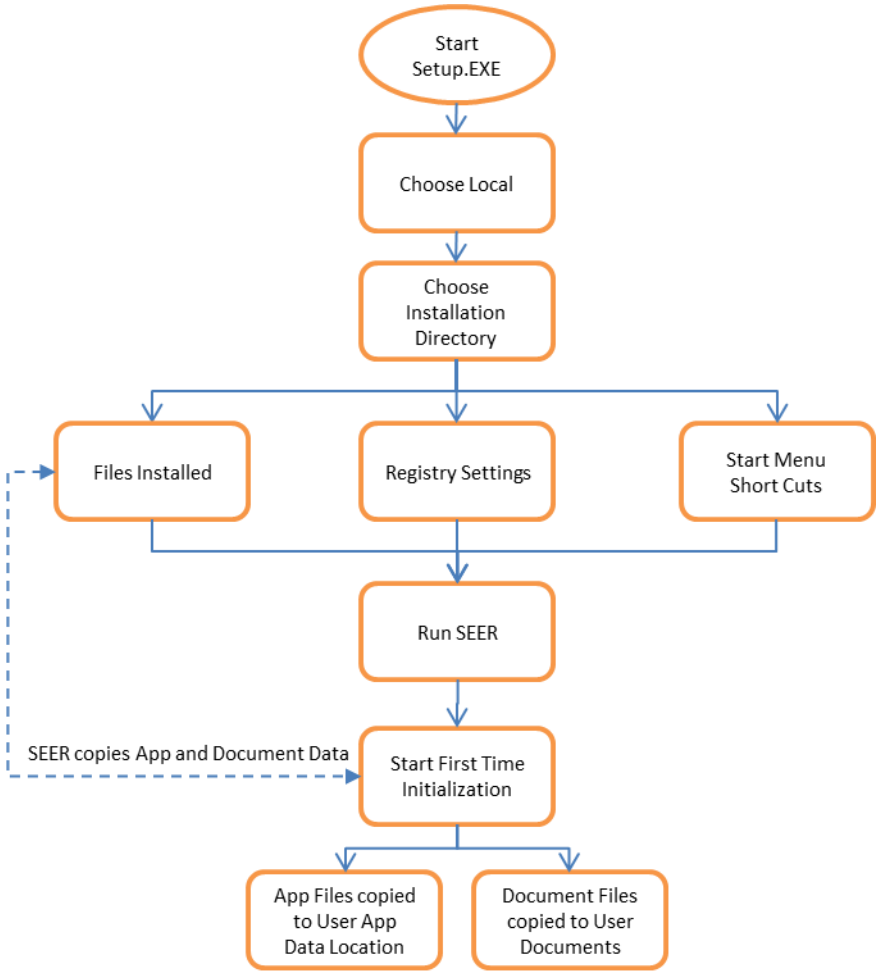
1. Optional (see Pre-Installation Configuration Options)
2. Start the SETUP.EXE file
3. Choose the Local option
4. Choose an installation directory (default = ***c:\Program Files\SEER\SEER-MFGX.X***)
5. The installation package manages the entire process, once complete you can begin using SEER.

Detailed Information

During the installation process, the installer installs all the necessary application files, writes registry settings, and creates start menu short cuts. The following details explain the entire installation process, and what happens during first time initialization of the SEER application.

SEE ALSO:

OTHER TECHNICAL INSTALLATION DETAILS



Default Installation Configuration

The default configuration of a local installation is to install all files into the chosen installation directory. When a user logs onto the machine and runs SEER, SEER copies a complete set of Application Data and Document Data files from the installation directory to the user's local profile.

Each user that runs SEER on the machine will get their own set/copy of Application Data and Document Data files during first time initialization. By default each user will use their set of Application and Document data. This may or may not be preferable. Administrators can configure the SEER application so that all users share a common set of Application Data and Document Data files (see details below).

Galorath recommend that multiple users share a common set of Application Data and Document Data files to promote consistency when developing estimates and sharing models.

See Also:

Appendix – SEER-MFG 8.5 File Manifest

Application Data, Program Data, and Document Data Files

Application, Program Data, and Document Data are files that the application and/or users configure or write to. By default, SEER insures that each user gets a set of these files copied to a user writable location.

Application Data and Document Data files are initially installed in the chosen installation directory in the respective AppData and Documents directories i.e.

[installation directory]\SEER\SEER-MFG X.X\AppData

[installation directory]\SEER\SEER-MFG X.X\Documents

Program Data files are initially installed in the chosen installation directory. i.e.

[installation directory]\SEER\SEER-MFG X.X

Document Data includes the following Directories

Item	Files
Sample Projects	SEER-MFG Sample Projects to learn from
Tools	Extra Utilities, INI File Manager Spreadsheet, PDF copies of release notes, user guide etc.
Export Templates	Flexible Export Templates
Inflation Tables	Inflation Table Templates
Import Templates	Import Templates
Scenarios	Scenario Files
KBases	SEER-MFG Knowledge Bases

Application Data files include the following files

Files	Notes
SEER-MFG Settings.INI	User Settings file. This is a unique file for each user. It is used to store user application preferences e.g. font sizes, colors, project parameter settings, paths etc.
Material.INI	Material Data
Composites.INI	Detailed Composites Material and Process data
MFGData.INI	MFG process specific data
SEER-MFG.LRC	Labor Rate Database
CAIData2.dat	Binary format file of Pro material and process data
CAITool2.dat	Binary format file of Pro default tool set data
Tooling.INI	Tooling data.

Program Data includes the following Directories

Item	Files
MFGParts.xls	A catalog/ database for Additional Items and Purchased Parts.

First Time Initialization

The default first time initialization configuration for a local install is for SEER to copy all Application Data and Document Data from the installation directory to a Local User SEER profile. This insures all users have full read and write privileges to SEER related files.

Note. The installing user can configure the installed SEER-MFG Settings.ini file to change this default first time initialization behavior

See Also:

Configuring SEER before installation

Document Files are copied from the installation directory to the following location during first time initialization:

OS 64bit	Default Local User Document Files Path
10/11	*\Users\[USER NAME]\Documents\SEER\SEER-MFG X.X*

Application Data Files are copied from the installation directory to the following location during first time initialization:

OS 64bit	Default Local User Application Data Files Path
10/11	*\Users\[USER NAME]\AppData\Local\SEER\SEER-MFG X.X*

Configure SEER so all Local Users Share a Common Data Set ( )

If there are multiple local users, or multiple users on a single machine, the *SEER-MFG Settings.INI* file can be configured to point to a shared set of Application Data files and Document files.

Configuring SEER before installation

See Pre-Installation Configuration Options

Configuring SEER after installation, and before first time initialization

During first time initialization, the *SEER-MFG Settings.INI* file is copied from the installation directory to the local user application data folder. If it is configured before first time initialization, then all users that later run SEER, will start with the same exact configuration.

1. Copy Document and Application Data files from the installation directory to a location that all future users will have read and write access to.

   Note. Application Data files must be treated as a set and stored in the same folder location.
2. Configure the *[PATHS]* section of the installed *SEER-MFG Settings.INI* file to point to the new application data and document data locations.
3. Configure the *[FIRST-TIME-INIT-AND-UPGRADES]* section of the installed *SEER-MFG Settings.INI* file.

Configuring SEER after first time initialization

1. Admin should copy the Document and Application Data files from the installation directory to a location that all users have read and write access to.
2. Each local user then needs to configure their *[PATHS]* section of the *SEER-MFG SETTINGS.INI* file to point to the new application data and document data locations, this is most easily accomplished through the SEER application:
    a. From the SEER Options menu select Set Paths – browse to the shared Application Data and Document data.
    b. From the SEER Options menu select 'Save Configuration' to store the path information in the local user *SEER-MFG SETTINGS.INI* file.

Server Installations

All files are installed onto the Server. The SEER application is then typically executed from a remote computer either through a Client install (see below), or through a thin client application such as Citrix.

Quick Install Process ()

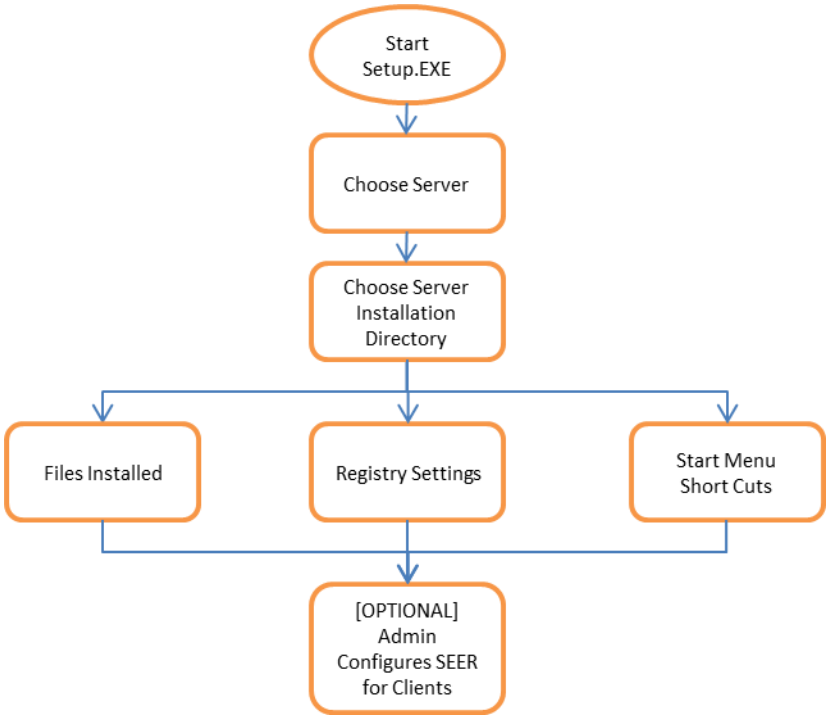
1. Optional (see Pre-Installation Configuration Options)
2. Start the SETUP.EXE file
3. Choose the Server option
4. Choose an installation directory (default = *c:\Program Files\SEER\SEER-MFGX.X*)
5. The installation package manages the entire process
6. Provide Write access to the AppData and Document data folders
7. Distribute the SEER Client installer

Detailed Information

During the installation process, the installer installs all the necessary SEER application files, writes registry settings, and creates start menu short cuts on the server. The following details explain the entire installation process, and what happens during first time initialization of the SEER application.

SEE ALSO:

OTHER TECHNICAL INSTALLATION DETAILS,
APPENDIX – SEER-MFG 8.5 FILE MANIFEST



Default Installation Configuration

The default configuration of a ***SERVER INSTALLATION*** is to install all files into the chosen installation directory. If you run the SEER application on the server, then it will operate just the same as a local installation (see Local Installations above).

By default, a Server install is configured such that all Client/Remote SEER users connecting through a network or via a thin client interface such as CITRIX receives a copy of the ***SEER-MFG SETTINGS.INI*** file.

The ***SEER-MFG SETTINGS.INI*** file is a unique file for each user. It is used to store user application preferences e.g. font sizes, colors, project parameter settings, paths etc.

The ***SEER-MFG SETTINGS.INI*** file is installed on the server in the following location:

[server installation directory]\SEER\MFGX.X\AppData\SEER-MFG Settings.INI

During first time initialization of SEER, SEER copies the ***SEER-MFG SETTINGS.INI*** file from the server to the following location for each Client/Remote user:

SEE ALSO:

CLIENT INSTALLATIONS

OS 64bit	Client User Application Data Files Path
10/11	*\Users\[USER NAME]\AppData\Roaming\SEER\SEER-MFG X.X*

For client/server configurations, the Roaming user application data location is used. This insures that the ***SEER-MFG SETTINGS.INI*** file will roam with the user if required to do so.

Server Application Data and Document Data Files

By default, all Client/Remote users point to and use the Application Data files and Document Data files installed on the server.

Administrators should insure that ***CLIENT USERS HAVE WRITE ACCESS*** to the Application Data and Document Data folder on the Server.

These locations may be configured via the ***SEER-MFG SETTINGS.INI***. See next section for details.

The Application Data and Document folders are installed on the server in the following locations:

[server installation directory]\SEER\MFGX.X\AppData

[server installation directory]\SEER\MFGX.X\Documents

By default, Client/Remote users will not get copies of Application Data or Document files copied to their machine or any user profiles on the server. Administrators may choose to reconfigure this via the ***SEER-MFG SETTINGS.INI***. See next section for details.

SEER-MFG Settings.INI Client Configuration

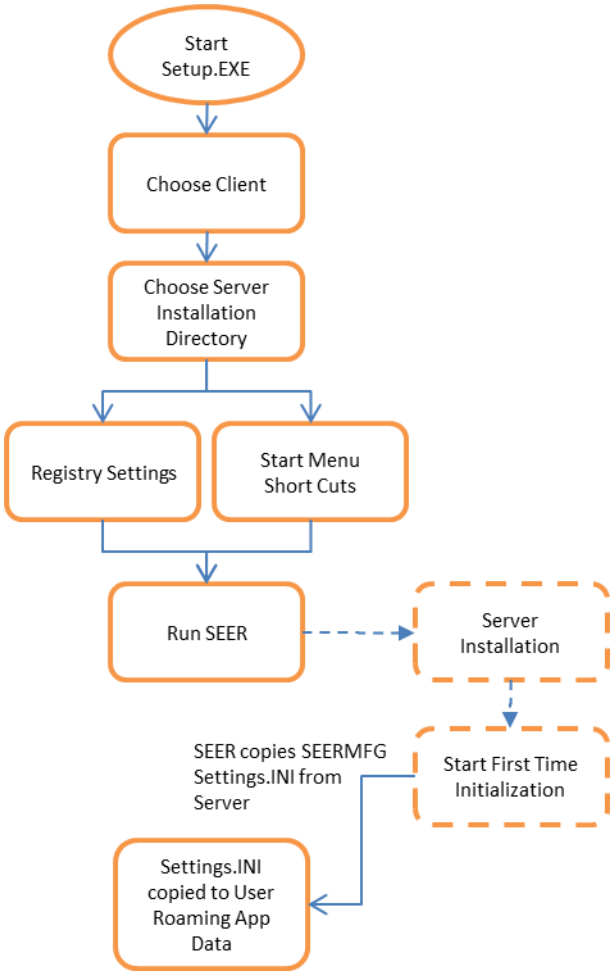
The ***SEER-MFG SETTINGS.INI*** file is a unique file that gets copied to each user's roaming profile during first time initialization of SEER. It is used to store user application preferences e.g. font sizes, colors, project parameter settings, paths etc.

Configuration of the ***SEER-MFG SETTINGS.INI*** file should be completed before remote/client first time initialization of SEER.

1. Copy Document and Application Data files from the installation directory to a location that all Client/Remote users will have write access.
2. Configure the ***[PATHS]*** section of the ***SEER-MFG SETTINGS.INI*** file to point to copies of the Application data and Document data in another location on the server, or networked drive. You can use a drive letter path, or a UNC path. Insure that paths end with a back slash.
3. ***[OPTIONAL]*** Configure the ***[FIRST-TIME-INIT-AND-UPGRADES]*** table with respect which data you would like SEER to copy for each Client/Remote user (default is set to not copy data).

Client Installations

Individual user settings, shortcuts and links to the networked server are setup on the local machine. The SEER executable, export templates, knowledge bases, project files, etc. typically remain on a networked server.



Quick Install Process (👉)

1. Start the SETUP.EXE file
2. Choose the Client option
3. Link to SEER-MFG installed on a Networked Server
4. The installation package manages the entire process, once complete you can begin using SEER.

Detailed Information

During the installation process, the installer writes registry settings, and creates start menu short cuts. The following details explain the entire installation process, and what happens during first time initialization of the SEER application.

See Also:

Other Technical Installation Details,
Appendix – SEER-MFG 8.5 File Manifest

Default Installation Configuration

The default configuration of a Client installation is to set registry values, and create a start menu shortcut. When the Client first runs SEER, SEER is by default configured to only copy the ***SEER-MFG Settings.INI*** file to the Client roaming application data location.

Client/Remote User First Time Initialization

During first time initialization of SEER, SEER creates a user profile, and copies the ***SEER-MFG SETTINGS.INI*** file to this profile. This insures all Client users have a unique file for setting the SEER application interface in a way that suits them e.g. font sizes, colors, default reports etc.

The ***SEER-MFG SETTINGS.INI*** file is copied by SEER to the following location:

OS 64bit	Client User Application Data Files Path
10/11	*\Users\[USER NAME]\AppData\Roaming\SEER\SEER-MFG X.X*

Silent Installations

Silent installation requires the creation of a "response" file (setup.iss). This file records your selections as you run the installer in Record mode and must be referenced on the command line from which you run the silent installation. You may edit the response file with a text editor to change input values, if necessary. You may also create more than one response file to deploy for different kinds of installation, as long as you give them different names.

To record a response file from the ***RUN COMMAND DIALOG***:

<path to setup directory>\Setup.exe /r

The default location for the created setup.iss is the Windows or WinNT directory. You must move it to the setup directory before you run setup.exe in silent mode:

<path to setup directory>\setup.exe /s

Or you may explicitly specify the location and a different name for the response file using the f1 flag:

Create the response file:

<path to setup directory>\setup.exe /r /f1"<path to setup directory>\mysetupconfig.iss"

Run the silent installation:

<path to setup directory>\Setup.exe /s /f1"<path to setup directory>\mysetupconfig.iss"

Other Technical Installation Details

Registry Settings

During installation modifications are made to the computer registry settings. The settings vary slightly depending on the installation type and are noted below.

Registry Location HKEY_LOCAL_MACHINE\SOFTWARE\Galorath\SEER-MFG

Name	Data
Path	If a ***LOCAL/SERVER INSTALL***, this will point to the installation directory specified. If a ***CLIENT INSTALL***, this will point to the Server location of SEER

Registry Location: HKEY_LOCAL_MACHINE\SOFTWARE\Galorath\SEER-MFG\X.X

Where X.X is used denote the product version.

Name	Data
InstallDir	This will point to the installation directory specified
InstalledBy	1 = Admin; records privileges of the user installing the program
InstallerVersion	x.x.xx
NetworkPath	IF *LOCAL/SERVER INSTALL*, this will point to the installation directory specified. IF *CLIENT INSTALL*, this will point to the networked server location of SEER-MFG.
ReleaseName	Pro/MFG
SetupType	IF Local Install = Local, IF Client Install = Client, IF Server Install = Network

Start Menu Short Cuts

The installer creates a Start Menu short cut to the SEER application. The shortcut is installed in the following location:

OS 64bit	Installed Start Menu Shortcuts
10/11	*\ProgramData\Microsoft\Windows\Start Menu\Programs\SEER\SEER for Manufacturing\SEER for Manufacturing X.X.lnk*

For Client installations, the start menu shortcut points to the SEER application installed on the server.

In a Windows Terminal Server environment, where users have roaming profiles, administrators may need to create or add to any user-log-on scripts. The script should copy the SEER start menu shortcuts and merge them into the user roaming profile as they log onto the server.

Disk Space Sizing

Disk space sizing varies enormously with the amount of users, the amount of files created, and the type of data used to create files. As a rough sizing guide we provide the following example. This can be used to help plan what project file storage space is required either on your PC or on a Server.

Storage requirements for SEER-MFG can be measured by the number of projects that will be planned with SEER-MFG. Given the following scenario:

Typical project size = 100 elements

SEER-MFG element compressed size = 4.1KB

Number of projects per year = 100

Number of project revisions = 5

Disk Space Required = 100 * 4.1KB * 100 * 5 = 205,000KB = (205MB)

Of course, these assumptions can be fine-tuned to your organization.

Memory RAM Sizing

RAM required depends primarily on the number of work elements used. SEER allocates enough RAM to hold up to 8000 work elements in Memory (up to approximately 8GB of RAM). This allocation can be changed if required.

An Example scenario:

SEER Application RAM Required = 50MB

Typical project size = 100 elements

SEER-MFG RAM per element (approximate) = 1MB

Element RAM Required = 100 * 1MB = 100MB

Total RAM Required = 50MB + 100MB = 150MB

Of course, these assumptions are approximate and can be fine-tuned to your organization.

Repair/Remove Installation

You can invoke the Repair/Remove installation dialog via the operating system Control Panel:

Programs and Features option in 10/11

Options	Description
Repair	Choosing this option will proceed to reconfigure registry settings, Start Menu Short cuts, and reinstall AppData and Document data files in the original installation directory. ⚠ Note. This ***will not update individual user copies*** of AppData and Document data which were copied by SEER during first time initialization.
Remove	Choosing this option shall proceed to • remove all files that were installed by the installer. • remove registry entries set by the installer. • remove start menu short cuts. ⚠ Note. This ***will not remove individual user copies*** of Document data which were copied by SEER during first time initialization. ⓘ The remove option will cycle through all user profiles on the machine where SEER was installed and remove the ***SEER-MFG SETTINGS.INI*** file. This insures that should the installer be rerun, each user will get a new ***SEER-MFG SETTINGS.INI*** file. ⚠ The remove option will not remove ***SEER-MFG SETTINGS.INI*** files from Roaming profiles.

Upgrade Installation

Periodically you will receive information about a new version of SEER, along with information on how to get the latest installation files. Upgrades may be minor or major depending on the content of the update.

Minor Upgrades

Minor upgrades occur more frequently than major upgrades. Typically the program will contain updates to exiting processes and/or program features. To begin the upgrade process:

1. Log on with administrative privileges
2. Locate and Start the SEER-MFG SETUP.EXE file
3. The installation package manages the entire process, once complete you can begin using SEER.

The minor upgrade installation process assumes all settings of the initial/previous installation.

After upgrade installation is complete, and the next time SEER is run, SEER begins an upgrade initialization process. During this process, SEER copies updated document files (such as release notes) from the installation directory to the local user document location. SEER upgrades/copies files according to the settings defined in the [FIRST-TIME-INIT-AND-UPGRADES] table of the installed SEER-MFG Settings.INI file.

 During upgrade initilization user copies of Application Data files are preserved. Thus, all/any customizations in the application data files are retained.

Major Upgrades

Major upgrades occur less frequently than minor upgrades. Major upgrade versions may be installed alongside existing installations of SEER. Thus, users can if they wish, have multiple major versions of SEER installed on a single machine. A major install is a completely new install so all of the available installation options described in this guide are available to choose from.

You can begin a major upgrade and use a currently installed license from another major installation. During the installation process, you will be asked to point to the location of your currently installed SEER version. The installer will make a copy and use this license file for the major upgrade.

Installation FAQ

Q: ***What is involved in installing and maintaining SEER Applications on a Server?***

A: The SEER applications are end-user business applications that require a Wintel-standard PC running on Microsoft Windows (i.e. Windows 10/11). The applications are distributed as a collection of executable files (.exe) and dynamic link libraries (.dll) and other supporting data and user files.

Installation involves a standard process that places program and data files in the appropriate places, sets up user program menus, and takes care of program registration. Removing the program involves a similar uninstall process.

Use of SEER-MFG results in the creation of one or more project files, which can be accessed locally or shared across a network. With respect to network resources, the SEER applications resemble spreadsheet or word processing applications rather than large client-server or transaction processing applications. They can be run from an application server or as standalone applications on a client machine.

Q: *Do the SEER applications require any unique or extreme resources from the network or user workstations?*

A: No. We make every effort to ensure that SEER applications conform to the general guidelines and recommendations specified by Microsoft. Each application will run well in under 2GB MB of RAM. At least 260 MB of disk space and 1GB MB of RAM are required. For optimal use, at 2GB of RAM or higher is recommended.

Q: *As a network administrator, what are my choices when deploying SEER applications?*

A: You have a great deal of flexibility as to how your organization uses SEER applications. Install a single copy of each application on each workstation for the ultimate in performance and total elimination of network traffic. If you want to centralize administration and maintenance of the applications, you can install them on an application/file server. For network installations, a workstation setup routine must be run from each client machine to install required system files to the local workstation.

Q: *My organization has offices throughout the world. What type of configuration would you suggest?*

A: To achieve a balance between having to keep track of multiple copies of the applications and having to rely on wide area communication links, we suggest that you install one copy of SEER at each office location, and let the users run the program from the local area network. If you have 10 locations, then install on the 10 different sites and let the users run locally.

Q: *What about upgrades and maintenance? What should we expect with respect to having to re-deploy bug fixes and upgrade releases?*

A: To minimize the overhead involved in upgrading and re-deploying our applications, Galorath has adopted the following strategies:

Project files from previous versions of SEER are now automatically upgradeable. That means that users will be able to preserve their custom settings, presentations.

An upgrade installation of a SEER application requires that you have that SEER application installed with a current license. Depending on the type of upgrade, the install process will do one of two things.

For minor updates, the installer automatically detects the existing installation and updates it.

For major upgrades, the installer will ask you for the location of the previous version of SEER and use license information contained in the earlier SEER version. After you have installed the new version, you may uninstall the earlier version.

Updates can be downloaded from our http://www.seerbygalorath.com/oss8/users/web site.

Q: *As a network administrator, will I be getting a lot of support calls about use and functionality of the SEER applications?*

A: The SEER applications feature on-line help and built in links to the Galorath web site (www.galorath.com) as well as the ability to e-mail support staff at Galorath. In addition to the normal telephone support and in-class training Galorath provides, these features should go a long way in directing users to take advantage of the proper resources at Galorath. A link to the help list of Frequently Asked Questions is also built into the SEER applications.

If you want to contact Galorath Incorporated for technical support or any other reason, we can be reached at:

Phone: (310) 414-3222

FAX: (310) 414-3220

Email: support@galorath.com

WWW: http://www.galorath.com

Please have your serial number ready for technical support. This serial number is found in the Help / About dialog box.

A Technical Notes library found on our web site reflects ongoing research and program development, and provides more detailed and theoretical explanations of various aspects of the program. Individual articles are available upon request, without charge.

Q: ***What about sharing of files?***

A: The SEER applications allow you to email project files to other users or to store them on a network directory. If you are building custom knowledge bases, it is recommended that they are stored in a common area accessible to all users. Users may specify the location of the knowledge base files in the program under Options/Set Paths. Project files may be shared in a similar way.

Q: ***What kind of Setup program do you employ?***

A: All of the Setup programs we use were developed with InstallShield, so they have a very common look and feel for users, and work well with the various file systems and configurations in existence today.

Q: ***Does SEER-MFG 8.5 work with 32bit Windows?***

A: No, SEER-MFG 8.5 is designed to work with a 64bit operating system.

Q: ***Do your programs work with older operating systems such as NT and 2000?***

A: All of our applications were built from the ground up on Windows NT and 2000 under a network environment. However, we are no longer developing or testing on these operating systems. We fully support 64bit Windows 10/11.

Appendix – SEER-MFG 8.5 File Manifest

[Installation Path]\SEER\SEER-MFG 8.5

Filename	Notes
AppData	
Documents	
es	New to 8.3, language resource files
fr	New to 8.4, language resource files
Help	
ParameterHelp	
Styles	new to 8.1
BOM_ODBC.DLL	
BOM_ODBC_SA.DLL	New to 8.4, for engininzed SEER
CAIDATA.DAT	
CAIDEFS.DAT	
CAIMATH.dll	
CAIMATH_SA.dll	New to 8.4, math for engininzed SEER
CAITOOL.DAT	
ChartFX.WinForms.8.dll	
ChartFX.WinForms.Adornments.8.dll	
ChartFX.WinForms.Annotation.8.dll	
FileEditor.INI	New tor 8.5, Data File Editor
FLDDEFS.DAT	
FLDDEFSEXT.DAT	
Galorath.ttf	Font File
GMU.DLL	
GMU_MFG_SA.DLL	New to 8.4, for engininzed SEER
GMUDEFS.DAT	
IDToHtmMap.xml	HTML Help ID mapping file
Import Source Data.XLS	New file for 8.4, used for import file option
IMPORT.DLL	
IMPORT_SA.DLL	New file for 8.4 SEER engine
LABOR1-0.MLB	Primary Machining Operation Database file
LABOR2-0.MLB	Primary Machining Operation Database file – new to version 6.1
LABOR3-0.MLB	Primary Machining Operation Database file – new to version 6.1.18
LABOR4-0.MLB	Primary Machining Operation Database file – new to version 6.1.30
LABOR5-0.MLB	Primary Machining Operation Database file – new

	to version 7.0.15
Libxl.dll	
Libzstd.dll	
License_SEER-MFG.old	The installer renames the old license file during upgrade
License_SEER-MFG.lic	Product License file
MFG_64 DLL.dll	new to 8.1
MFG_64 DLL_SA.dll	new to 8.4, for engininzed SEER
MFGPARTS.MDB	Parts database for mechanical assembly model, additional items dialogs, Purchased Parts, and PCB Components
MFGParts.XLSM	Parts database for mechanical assembly model, additional items dialogs, Purchased Parts, and PCB Components
MFGTOOL.DAT	
MigraDoc.DocumentObjectModel-gdi.dll	new to 8.1
MigraDoc.Rendering-gdi.dll	new to 8.1
MigraDoc.RtfRendering-gdi.dll	new to 8.1
normprob.db	
out_0000.flx	
out_0001.flx	
out_0002.flx	
out_0003.flx	
out_0004.flx	
out_0005.flx	
out_0006.flx	
out_0007.flx	
out_0008.flx	
out_0009.flx	
out_0010.flx	
out_0011.flx	
out_0012.flx	
out_0013.flx	
out_0014.flx	
out_0015.flx	
out_0016.flx	
out_0017.flx	
out_0018.flx	
out_0019.flx	
out_0025.flx	New to 8.4
out_0026.flx	New to 8.4

out_0027.flx	New to 8.5
OUTDEFS.DAT	
PdfSharp.Charting-gdi.dll	new to 8.1
PdfSharp-gdi.dll	new to 8.1
PrintLogo.jpg	
SEER.API.MFG.ClrWrappers.dll	New to 8.4
SEER.API.MFG.Loader.dll	New to 8.4
SEER.Common.dll	
SEER.Common.dll.config	
SEER.DAC.ClrWrappers.SeerDb.dll	
SEER.DAC.CppEmulators.DataAccessors.dll	
SEER.DAC.CppEmulators.Entities.dll	
SEER.DAC.CppWrappers.Entities.dll	
SEER.DAC.DataAccessors.dll	
SEER.DAC.DataAccessors.dll.config	
SEER.DAC.Entities.dll	
SEER.DAC.Entities.dll.config	
SEER.DAC.Errors.dll	
SEER.DAC.Errors.dll.config	
SEER.DAC.Security.dll	
SEER.DAC.Tools.DbApplicationRoleSetup.exe	
SEER.DAC.Tools.DbApplicationRoleSetup.exe.config	
SEER.DAC.Tools.EnterpriseManager.exe	
SEER.DAC.Tools.EnterpriseManager.exe.config	
SEER.DAC.UI.dll	
SEER.DAC.UI.dll.config	
SEER.PrintEngine.dll	new to 8.1
SeerCustCalcControl.xla	Controls custom calculation templates within excel
SeerCustCalcRibbon.xlam	Controls custom calculation ribbon within excel
SeerDataObjects.dll	
SeerDb.dll	
SeerDbDll.dll	
SEER-MFG.DAT	
SEERMFG.EXE	Application Executable file
SEER-MFG8-5.DBS	new to 8.5
SoftwareFX.WinForms.Base.8.dll	
SoftwareFX.WinForms.Data.8.dll	
TableEditor.INI	New tor 8.5, Data File Editor
zstdNet.dll	

[Installation Path]\SEER\SEER-MFG 8.5\AppData\

Filename	Notes
CAIDATA2.DAT	
CAITOOL2.DAT	
COMPOSITES.INI	
MATERIAL.INI	
MFGData.INI	
ProData.ini	Previously named AeroData, changed in 8.5
SEER-MFG Settings.INI	
SEER-MFG.LRC	Labor Rate Calculator Database
Tooling.INI	

[Installation Path]\SEER\SEER-MFG 8.5\Documents\Export Templates\

Filename	Notes
Pro3DRE.FLX	Changed Aero to Pro, changed in 8.5
ProCO3D.FLX	Changed Aero to Pro, changed in 8.5
ProCOBR.FLX	Changed Aero to Pro, changed in 8.5
ProCOFW.FLX	Changed Aero to Pro, changed in 8.5
ProCOHL.FLX	Changed Aero to Pro, changed in 8.5
ProCOP4.FLX	Changed Aero to Pro, changed in 8.5
ProCOTW.FLX	Changed Aero to Pro, changed in 8.5
ProCUAU.FLX	Changed Aero to Pro, changed in 8.5
ProCUEB.FLX	Changed Aero to Pro, changed in 8.5
ProCURT.FLX	Changed Aero to Pro, changed in 8.5
ProCUVA.FLX	Changed Aero to Pro, changed in 8.5
ProDRIL.FLX	Changed Aero to Pro, changed in 8.5
ProEBAS.FLX	Changed Aero to Pro, changed in 8.5
ProFAST.FLX	Changed Aero to Pro, changed in 8.5
ProFITU.FLX	Changed Aero to Pro, changed in 8.5
ProPAST.FLX	Changed Aero to Pro, changed in 8.5
ProSM.FLX	Changed Aero to Pro, changed in 8.5
ProSPF.FLX	Changed Aero to Pro, changed in 8.5
ProSUMM.FLX	Changed Aero to Pro, changed in 8.5
ProTRIM.FLX	Changed Aero to Pro, changed in 8.5
AllOutputs.FLX	
Detailed Analysis Cost Per Unit.flx	
ENTERPRI.FLX	
First Standard and Average Hours.flx	
Lot and Lifetime Tooling Costs.flx	

MonteCarloRisk.flx	
MultiCurrencySummary.flx	
OperationDetails.flx	
OUTSUMM.FLX	
ProjectWBS.FLX	
Total Production Lot Costs.flx	

[Installation Path]\SEER\SEER-MFG 8.5\Documents\Sample Projects

Filename	Notes
Prosamp.mfg	Changed Aero to Pro, changed in 8.5
Proteam.mfg	Changed Aero to Pro, changed in 8.5
Blended Winglet Images.pdf	
Blended Winglet.mfg	
Chevy S-10 Bed Liner Fab.mfg	
Core Detail Fab.mfg	
Custom Calc - Examples.mfg	
Custom Calc - LAYERS.xls	
Custom Calc - PANEL.xls	
Custom Calc - RWRKRDT.xls	
Custom Calc - SPEEDS.xls	
Custom Calc - WATER JET CUTTING - Imperial.xls	
Custom Calc - WireHarness.xls	
Danfloss valve 1.mfg	
Detailed-PCB-Fab+Assy.mfg	
Drone Body.mfg	
Example PBF-SLS Printed Plate with Holes.mfg	
Example Tube Assembly.mfg	
F110 Engine Exhaust Shroud.mfg	
Fighter Aircraft Wing.mfg	
GE90 Turbo Fan Engine Fan Blade.mfg	
GFAULT.mfg	
Global and Local User Defined Parameter Examples.mfg	
MOUSE.mfg	
PCBOARD.mfg	
PISTON.mfg	
Plytypex.mfg	
RACECAR.mfg	
Sample.mfg	

seer roofbox.mfg	
Sheet Metal Example.mfg	
SLA Process Image.jpg	
SLS Process Image.jpg	
Small Media Housing [AM].mfg	
SPF-DB.mfg	
Steplern.mfg	
WAGON.mfg	

[Installation Path]\SEER\MFG 8.5\Documents\Tools

Filename	Notes
MFGTools - INI File Manager.xls	
SEER-Pro Detailed Reference .pdf	Changed Aero to Pro, changed in 8.5
SEER-Pro Server Mode Details.xls	Changed Aero to Pro, changed in 8.5
SEER for Manufacturing User Guide.pdf	
SEER-MFG Detailed Reference.pdf	
SEER-MFG Release Notes.pdf	
SEER-MFG Server Mode Details.xls	

[Installation Path]\SEER\MFG 8.5\Documents\Scenarios

Filename	Notes
Machined Bush (Metric_USD).mfg	
PCB (Metric_Euros).mfg	

[Installation Path]\SEER\MFG 8.5\Documents\Import Templates

Filename	Notes
Additional Items.IMT	
Assembly Parts.IMT	
PCB Parts.IMT	
Purchased Parts.IMT	

[Installation Path]\SEER\MFG 8.5\Documents\KBases

Filename	Filename
!GENERAL.CMP	MACHARMS.MCH
!general.cmp	JogColdStl.sht
!general.eas	JoggleCold MilAero.sht
!general.fin	JoggleCold.sht

!general.mas	JoggleHot MilAero.sht
!GENERAL.mch	JoggleHot.sht
!general.pcb	JogHotAl.sht
!general.pls	JogHotTi.sht
!general.sht	laminatn.sht
!none.3dr	largcarb.pls
!none.cma	largeabs.pls
!none.cur	LaserCuttingCO2.add
!none.drl	LaserJetCut Metric.sht
!none.eas	layup.cmp
!none.eba	LazerJetCuttingImperial.sht
!none.fin	lchan.cma
!none.fit	Longeron MilAero.shm
!none.fst	Longeron.shm
!none.mas	lopowder.pls
!none.pbn	lrgpart.prc
!none.pcb	lrgprogd.sht
!none.plc	MACHALUM.mch
!none.shm	MACHARMS.mch
!none.sht	MACHCAST.mch
!none.spf	Major Assy.fit
!none.tfw	Manual Film.pbn
!none.trm	Manual Paste.pbn
3DSystems_SLA700.ama	Manual.pbn
AbBlastLrgPrts.fin	Markforged_X7.ama
AbBlastSmlPrts.fin	MaskPaperTape.fin
AbrasiveWater MilAero.sht	MaskTape.fin
AbrasiveWater.sht	MaterialJetting_General.ama
Access Door P4A.plc	medprogd.sht
Access Panel.shm	Metal Bond.plc
AccessDoor MilAero.plc	migweld.mas
AccessPanel MilAero.shm	Missile Body.cur
AclaveWingSkin MilAero.cur	Missile Body.plc
AclaveWingSkin2 MilAero.cur	Missile Body.trm
Aircraft Tube Alum.tfw	MissileAutoclave MilAero.cur
Aircraft Tube SS.tfw	Nacelle Skin.cur
Aircraft Welded Duct.tfw	Nacelle Skin.plc
Al Core.mch	Nacelle Skin.trm
AllProcesses MilAero.sht	NacelleSkin MilAero.cur
AllProcesses.sht	NC3Axis MilAero.trm

autolay.cmp	NCTrim Missile MilAero.trm
Automated Drill.drl	NDTCMM.add
Automotive.cur	none.add
Automotive.mch	NONE.ama
Automotive.plc	none.cmp
Automotive.shm	NONE.mch
Automotive.trm	none.pls
AutomotiveCNC5Axis.mch	none.prc
AutomotiveFab.sht	Nutplates.fst
AWJetAl.sht	Optomec_LENS_850-R.ama
AWJetStl.sht	ovenbraz.mas
AWJetTi.sht	PartsPerBlankSheet.sht
Band Saw rout.trm	Peck Drill.drl
BandSaw MilAero.trm	PlateRoll MilAero.sht
Bench Assy.fit	PlateRoll.sht
blowmold.pls	Pocket Mill FIN MilAero.mch
BolsterAl.sht	Pocket Mill RGH MilAero.mch
BolsterPress MilAero.sht	PortBeltSandLrgPrts.fin
BolsterPress.sht	powdpant.fin
BolsterStl.sht	Profile Mill FIN MilAero.mch
BolsterTi.sht	Profile Mill RGH MilAero.mch
boltassy.mas	profrout.sht
Bore FIN MilAero.mch	ProgressiveDies MilAero.sht
Bore RGH MilAero.mch	ProgressiveDies.sht
BrakeAl.sht	proharpp.eas
BrakePress MilAero.sht	protharn.eas
BrakePress.sht	protocon.pcb
BrakeStl.sht	protofab.sht
BrakeTi.sht	protoind.pcb
Bucked Rivets Wet.fst	protomil.pcb
C Channel Braid.plc	protospc.pcb
C Channel HLU.plc	pultrusn.cmp
cabharpp.eas	Quackenbush.drl
cchan.cma	Rad Mill FIN MilAero.mch
CChanBraided MilAero.plc	Rad Mill RGH MilAero.mch
CENTRLES.mch	radrout.sht
ChemMill MilAero.mch	Reaming MilAero.mch
ClipBracket MilAero.shm	RECTUBE.cma
ClipsSS MilAero.shm	rivassy.mas
CLOSEDBOX.cma	Robot Film.pbn

cmpspray.cmp	Robot Paste.pbn
CNC5Axis MilAero.mch	Robot.pbn
CncGas MilAero.sht	ROUGHML.mch
CncGas.sht	ROUGHMM.mch
cncgasar.sht	Routing MilAero.sht
CncLaser gen.sht	RoutingFab.sht
CncLaser MilAero.sht	RoutingUserDef Metric.sht
cnclaser.sht	RoutingUserImperial.sht
cncplasm.sht	RTM C Rib.cur
CncPlasma MilAero.sht	RTM I Beam.cur
CncPlasma.sht	RTM Sine Wave.cur
CNCRouting Metric.add	RTM Tee.cur
CncRoutingImperial MilAero.sht	RubberDie MilAero.sht
CNCRoutingImperial.add	RubberDie.sht
CNCRoutingMet MilAero.sht	RubberDieAl.sht
CncTurret MilAero.sht	RubberDieStl.sht
CncTurret.sht	RubberDieTi.sht
cncturrt.sht	sandcast.pls
Commercial.cur	SawingBillet.add
Commercial.mch	SCREWMC.mch
Commercial.plc	Shape FIN MilAero.mch
Commercial.shm	Shape RGH MilAero.mch
Commercial.trm	ShotPeenLrgPrts.fin
CommercialDetailed.pcb	ShotPeenSmlPrts.fin
CommercialFab.sht	SimpleClip.shm
CommFrontDoorVARTM.cur	simpmanl.prc
ConceptLaser_M2Cusing.ama	Sine Wave HLU.plc
con-elec.pcb	SinewaveTRM MilAero.cur
ConventionalFab MilAero.sht	skin.cma
ConventionalFab.sht	Skin.shm
convmach.sht	SLA_ProX950.ama
corefab.mch	SLA-Sterolithography.add
CSecRibCure MilAero.cur	SLEEVE.cma
CSecSparHL.plc	Slot Mill FIN MilAero.mch
Ctrless Grind FIN MilAero.mch	Slot Mill RGH MilAero.mch
Ctrless Grind RGH MilAero.mch	SLS-SelectiveLaserSintering.add
Cyld Grind FIN MilAero.mch	smalacet.pls
Cyld Grind RGH MilAero.mch	smalcarb.pls
Cylgrind.mch	smalnyln.pls
deburr.mch	smalphen.pls

DedicatedTools MilAero.sht	smalprop.pls
DedicatedTools.sht	smlcplx.prc
Delcron Inserts.fst	smlprogd.sht
diecast.pls	SolventWipeSmlPrts.fin
DOME.cma	space.pcb
Drilling MilAero.mch	Spar Large.shm
Drivematic.fst	Spar Med.shm
DropHam RForm MilAero.sht	spar.cma
DropHamAl.sht	Spar.shm
DropHammer MilAero.sht	SparLarge MilAero.shm
DropHammer RubberForm.sht	SparMedium MilAero.shm
DropHammer.sht	SparSmall MilAero.shm
DropHamRubAl.sht	spinform.sht
DropHamRubStl.sht	SpinForming MilAero.sht
DropHamStl.sht	SpinForming.sht
Duct.shm	spoilbtm.cma
DuctHalf MilAero.shm	spoiltop.cma
E-Beam Assy.eba	spotweld.mas
E-Beam Fab.cur	sprpntlg.fin
ecoat.fin	sprpntme.fin
Eddie Bolts.fst	sprpntsm.fin
EDM Mach.add	Squeezed Rivets Dry.fst
EDM MilAero.mch	Stack Drill.drl
EDM.mch	Stiffener MilAero.shm
electwet.fin	Stiffener.shm
END Mill FIN MilAero.mch	Stitching.3dr
END Mill RGH MilAero.mch	Stratasys_F900.ama
EOS_M290_StainlessSteel.ama	StretchFormAl.sht
EOS_M400_StainlessSteel.ama	StretchForming MilAero.sht
ExOne_SMax_Furan.ama	StretchForming.sht
Fab MilAero.sht	StretchFormStl.sht
FenderFlare.pls	StretchFormTi.sht
FenderFlare.sht	stringer.cma
filawind.cmp	Sub Assy Small.fit
finefin.fin	Surf Grind FIN MilAero.mch
FlangedTube.cma	Surf Grind RGH MilAero.mch
forging.pls	Surface Skim FIN MilAero.mch
Former Ti.shm	Surface Skim RGH MilAero.mch
Fuel tank.fit	SURFGRND.mch
FuselageSkin MilAero.shm	T Channel.plc

Gang Channels.fst	Tapping MilAero.mch
GEARHOBB.mch	tchan.cma
GEARMILL.mch	thermfrm.pls
Gen MCH MilAero.mch	Thrust Reverser Small.spf
General MilAero.cur	Thrust Reverser.spf
General MilAero.mch	TiHotForm MilAero.shm
General MilAero.plc	TrueUp.sht
General MilAero.shm	TrueUpHandHammer MilAero.sht
General MilAero.trm	TStiffEBeam MilAero.cur
genplate.fin	TStiffRTM MilAero.cur
glueassy.mas	TstiffVARTM MilAero.cur
Hand Drill Csk.drl	TubeBending MilAero.sht
Hand Drill Ream Csk.drl	TubeBending.sht
HandHamAl.sht	Turbine Blade.mch
HandHamStl.sht	Turn FIN MilAero.mch
HandHamTi.sht	Turn RGH MilAero.mch
handrout.sht	uchan.cma
HandRouter MilAero.trm	vacmetal.fin
HandSandSmlPrts.fin	VpBlastLrgPrts.fin
Hat Stiff.plc	VpBlastSmlPrts.fin
hatstiff.cma	VpDegreaseLrgPrts.fin
HatStiffBraided.plc	VpDegreaseSmlPrts.fin
heattret.fin	VRTM Comm Door.cur
HighSpeedMach MilAero.mch	VRTM Skin.cur
Hilocks Fuel Area.fst	WaterjetTrim MilAero.trm
HIP.pls	weapon.pcb
hipowder.pls	wideassy.mas
HRP Core.mch	wide-con.pcb
hsm.mch	wide-ind.pcb
hsmhfin.mch	wide-mil.pcb
I Beam 3DW.plc	wide-mld.pls
I Beam HLU.plc	wide-spc.pcb
IBeam3DW.plc	Wing Skin 3x.trm
IBeamRTM MilAero.cur	Wing Skin Sand.cur
industrl.pcb	Wing Skin Tow.plc
Intercostal.shm	Wing Skin.cur
IntercostalSS MilAero.shm	Wing Skin.plc
invscast.pls	Wing Skin.trm
J Stiff.plc	Winslow Nutplate Drilling.drl
jchan.cma	WireBrushSmlPrts.fin

Jelly Roll.plc	**Z-pin.3dr**
JogColdAl.sht	