
NX Training – Basic and Electrical Routing



SAPIENCE



NX Training Content – Basic and Electrical Routing

1. Introduction to CAD/CAM and NX:

- Concept Parametric/Un-parametric Modelling
- NX CAD User Interface and setting Preferences
- Pull Down Menus, Resource Bar/Part Navigator
- Cue/Status Bar, Toolbars, Icons, Pop-up Menu
- Visualization Commands Zoom, Rotate, Pan etc.
- Access Methods, Using Snap Options
- Datum Plane, Datum Axis Creation and Associate.

2. Setting Customer Defaults for Diff. Modules

3. Primitive Bodies Creation

4. Sketcher:

- Sketch Creation
- Dimensioning and Constraining
- Show/Remove Constrains
- Sketch Operations



5. Features:

- Extrude, Sweep along Guide, Revolve with Diff. Options
- Boolean Operations : Unite, Subtract, Intersect
- Edit : Blank/Un-blank, Object Display
- Layer Settings
- Draft and Options, Body Taper, Chamfer
- Subdivide Face
- Blend, Variable Blending, Blending with Set Back
- Trim Body, Split Body
- Helix, Tube

6. Customized Design Features:

- Hole, Boss, Pad, Pockets, Slots, Grooves

7. Associative Design Features:

- Instances – Array, Mirror Body, Mirror Features, Patten Face
- Shell/Hollow, Offset Face, Scale

8. Basic Curves and Spline Creation:

- Curves from Curves
- Curves from Bodies



- Edit Curves
- WCS Operations and Orientation

9. Drafting:

- Crating Orthographic, Section, Detail and Broken View
- Setting Preferences for all Entities, Utility Symbols
- Edit Views, View Dependand Edits, Move/Copy Views
- Expand Mode, Update, Out of Date, View Labels
- Annotations and Associability, Dimensioning and Tolerancing,
- Insert Feature Parameters
- User Define Symbols
- GD & T

10. Assembly Modelling:

- Assy. Load Options, Top Down and Bottom Up Assy. Concept
- Mating Components, Reference Sets, Multiple Add, Mirror Assembly
- Exploding Assembly,

11. Assembly Drafting:

- Visible in View, Making Components Non Sectioned, ID Symbols,
- BOM/Part List



12. Inter software Data Exchange

Electrical Routing:

Routing Electrical includes functions for creating and managing electrical power and signal systems. You can use Harness and Cabling specialities within the Routing Electrical application. Use Harness for designing wire and cables that are fabricated together and Cabling for routing cables through cableways.

Siemens PLM Software recommends the following workflow when creating a wiring assembly. The flow of data from the logical design into the physical design, back to the logical design, and on to manufacturing, governs this process. The following is a general procedure. Your needs may require changes to this list.

- 1. Qualify Components:** This is a one-time step that is typically already complete if you have created a library of standardized parts. Qualify Part is used to add routing intelligence by adding ports and assigning their Unique ID's. Optionally, other characteristics may be added through Qualify Part which allows NX to take advantage of additional automated functionality.
- 2. Create the Connection and Component List:** You can:
 - Use a schematics package capable of generating the files.
 - Use the Electrical Connection or Component Wizards.



- Use third party data.
 - Use a text editor.
- 3. Place qualified components (devices) into the assembly:** Typically, devices are fixed electrical components residing in an upper level assembly. The devices then serve as receptacles to which the components in the harness assembly are attached.
 - 4. Create a new part for the wiring harness subassembly**
 - 5. Import an existing connection and component list into the harness subassembly**
 - 6. Manually WAVE link Device Ports into the harness subassembly or let NX automatically link the ports as you select the devices to route to**
 - 7. Using Place Part, attach and lock qualified components to the WAVE linked ports in the harness subassembly**
 - 8. Assign the unique identifiers to the components using the component list functionality**
 - 9. Create wire paths using Routing Electrical path creation tools. As you generate paths, some automatic WAVE linking may occur**
 - 10. Route the wires using the connection list functionality**



11. **Create terminal wires if required**
12. **Add overstock, such as insulating sleeving**
13. **Analyse wiring connectivity**
14. **Perform clearance analysis using assemblies software**
15. **Run batch design rule checks (if available)**
16. **Correct the design as needed**
17. **Export the connection list:** This step is necessary if you need to pass the connection list back to a schematics package in order to back annotate the schematic drawing with wire lengths, or to pass the information to an electrical analysis package.
18. **Qualifying parts**
The Qualify Part command allows you to add Routing specific intelligence to a part. This intelligence dictates how that part is placed into a routing assembly, how it relates to other parts in the routing assembly, and how it behaves during routing operations. It also manages the part's electrical and mechanical connectivity information.



19. **Placing parts**

Typically, qualified parts are placed into an assembly, and then routing paths are run between them. Parts placed in a harness assembly may either be devices or connectors. Devices are fixed items that cables connect to, such as motors, volt meters, receptacles, and so on. Connectors are the objects that attach the harness to the device. For the most part, an electrical package assembly contains devices and supporting objects (trays, panels), while the wiring harness itself consists of connectors, wiring, overstock, and any attaching devices such as clamps that are built into the harness assembly.

20. **Routing segments**

Routing segments define the paths on which wires are run from one component to another. When defining the segments of a path, you typically create a segment that begins at a fitting port or multi port. At this point of the design you do not need to be concerned with the connection of individual terminal paths if a multi port is used.

a. **Create a linear path**

- create a simple linear path using
- Specify Points
- Axis Parallel

**b. Spline Path**

The Spline Path command is designed to interactively create non-linear routing paths and, if desired, assign stock to the new spline segments.

c. Heal Path

The Heal Path command creates a path connecting two objects using one of eight standard directional methods.

d. Delete Routing Objects

The Delete Routing Objects command lets you delete any or all objects within a routing path.

e. Subdividing segments

Subdivide Segment creates an RCP at a position in a segment from which you can route another path or place a part.

f. Overstock

Overstock is used to create features which represent material that holds the wire bundle together and protects it from wear and abrasion.

g. Stock

Stock is the material that connects standard parts along a path in the routing. The Routing application and discipline determines what stock is; in the Piping discipline stock is pipe; in



the Tubing discipline stock is tubing, and so forth. Wiring is a special case where the stock represents bundles of wires and/or cables. Stock is modeled by sweeping profile curves along one or more segments. Stock may carry characteristics and be displayed with different levels of display detail.

h. Edit stock

If the selected stock is not overstock, you may change the type of stock using the Stock group and the segments to which the stock is assigned by using the Segments group. If the selected stock is overstock, you may make changes in any or all of the groups on the Edit dialog box.

i. Transform Path

Use the Transform Path command to move or copy a routing path to a different position.

j. Place Part

Use the Place Part command to add a standard part to a routing assembly.

You first select a standard part, such as a butterfly valve, from a part library. You then define the location and placement for your standard part in the routing assembly.

k. Remove Part

Use Remove Part to delete standard parts from the routing assembly.



l. Interactive check

You can perform an analysis and display the results in the Clearance Browser using the interactive analysis mode. Use this mode to:

- Have an overall look at the interferences in your assembly.
- Isolate an individual interference for a closer look.
- Modify how the interferences are displayed.
- Define how to perform further analyses.

m. Formboard

- Formboard allows Routing Electrical users to create a manufacturing drawing for Routing Electrical harnesses.
- A formboard model is a flattened representation of a 3D electrical model of a cable or wiring harness. An electrical model appears in a formboard as if you took it out of 3D space and placed onto a 2D plane and pulled until it becomes straight.