

System & Software Architecture Scope Document

Magnetics Product Design Software (MPDS)



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1. Purpose

The System and Software Architecture Scope Document for Magnetics Product Design Software (MPDS) provides a foundation for a consulting firm to comprehend the requirements of Standex Electronics, enabling them to provide a proposal for the deliverables outlined in this document.

2. Project Overview

The objective of this project is to simplify and optimize the current design and quoting process at Standex Electronics, which presently depends on a mix of custom Excel sheets, both free and paid software, and manual data extraction from multiple sources. The project seeks to develop a unified, standardized toolset and workflow that will streamline and enhance the product design and quoting process.

By adopting a more integrated solution, Standex Electronics will minimize dependence on fragmented and complex systems, improve the efficiency of new hires, and boost overall productivity in the design and quoting stages.

- **Project Purpose:** To develop a unified system that allows for easier and faster product design creation, analysis, documentation generation, and customer quoting. The system should reduce the number of tools and manual processes required to complete tasks, thereby simplifying workflows and improving overall efficiency.
- **Project Goals:** The goals of the project include the following:
 - **Reduce the Required Technical Experience and Knowledge:** Minimize the need for deep technical expertise to create optimized product designs and customer quotes by creating a user-friendly and intuitive system.
 - **Increase Time to Effectivity:** Shorten the onboarding process for new hires by reducing the time required for them to become proficient in generating optimal product designs and quotes.
 - **Increase Productivity:** Speed up the design and quoting process, enabling more designs and quotes to be completed by a single resource in less time.
 - **Intelligence:** Introduce a learning mechanism that improves the system's ability to generate optimal designs and quotes over time, based on historical data and performance feedback.
- **Project Scope:** The scope of the project includes the following:
 - **Consolidation of Tools:** Integration and unification of the current range of tools used (Excel sheets, third-party software, and manual data extraction processes) into a single, standardized platform.
 - **Standardized Workflow:** Development of a standardized process for creating, analyzing, and quoting designs. This will be built into the new system, allowing for consistent outputs regardless of user experience.
 - **User Interface & Experience:** The system will have an intuitive user interface that allows employees of varying technical expertise to interact with the design and quoting tool without needing extensive training.

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- **Automation and Learning:** The system will incorporate automated design suggestions and improvements, learning from historical data to recommend the most optimal designs and quotes. Machine learning capabilities will enable the system to adapt and improve over time.
- **Integration with Existing Data Sources:** Seamless integration with current data sources (e.g., internal databases, external networks, and the internet) to ensure all necessary information is readily available for the design and quoting process.
- **Documentation Generation:** The tool will automatically generate supporting design documentation, including technical specifications, quotes, and reports, minimizing manual effort.
- **Customer Quoting Automation:** The new tool will have an intelligent quoting feature that generates customer quotes based on design inputs, helping teams work faster and more accurately.
- **System Training:** As part of the system and software architecture scope, the development and delivery of comprehensive work instructions and training materials are essential. These resources will ensure that all stakeholders, including end users and technical staff, have a clear understanding of the system's functionality, workflows, and best practices. The work instructions will outline step-by-step procedures for using, maintaining, and troubleshooting the system, while the training program will provide both theoretical and practical knowledge to ensure a smooth transition and effective system adoption. This documentation and training are critical to empowering users and supporting ongoing system operations.

3. Business Requirements

- **Functional Requirements:** A list of key functionalities that the system must support.
 - **Design Creation:** The system should allow users to easily input design parameters and generate optimized product designs with full outputs.
 - **Quote Generation:** The tool should automatically generate quotes based on design specifications and company pricing models.
 - **Historical Data Integration:** The system must be able to pull in historical data for analysis to inform future designs and quotes, with a focus on continuous improvement.
 - **User Permissions & Roles:** The system will support different user roles (e.g., designers, engineers, sales reps) with varying access levels to ensure security and proper data governance.
 - **Reporting:** The system should generate reports on design and quoting activity, identifying bottlenecks and providing insights on the efficiency of the design process.
- **Non-Functional Requirements:** System characteristics such as scalability, performance, security, reliability, and maintainability.
 - **Scalability:** The system should be able to handle increasing volumes of designs and quotes as the company grows.
 - **Reliability:** The system must be highly reliable, ensuring minimal downtime during design and quoting activities.

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- **Usability:** The system should be intuitive and easy to use, even for employees with minimal technical background.
- **Security:** The system must adhere to appropriate security standards, protecting sensitive design data and customer information.
- **Compliance Requirements:** The control, storage, and access to data must fully comply with the International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR) as required. Therefore, each associate should have a unique login to ensure that non-eligible individuals are prevented from accessing restricted data.
- **Competitive Advantage:** The system and software must be developed so that it will maintain its competitive advantage against a broadly used industry software in providing innovative design solutions.

4. Technical Requirements

- **Platform Requirements:** Provide a recommendation on a hosting platform based upon having 100+ users spread throughout North America. We have a data center in Andover but have previously faced data latency problems with some applications, especially those with large amounts of data.
 - Operating System: Microsoft Windows 11 Enterprise and newer
 - Preferred Hardware: x64-based PC
 - Mobile Interface: Not Required
- **Integration Needs:** Systems, applications, or APIs the solution must integrate with (e.g., CRM, ERP, payment gateways). Considerations regarding 3rd party software updates and the possible impacts to this system and software functionality shall be provided as part of the deliverables.
 - Currently Used: SolidWorks, AutoCAD
 - Targeting Broader Implementation: SolidWorks PDM, Ansys Maxwell
 - Being Implemented: Oracle ERP
 - Recommendation To Implement: SolidWorks FEA, Altium, Salesforce
- **Data Management:** Requirements for data storage, retrieval, backup, and archiving.
 - Data Storage
 - Microsoft SQL Server 2019 + is the standard for our databases. If other technologies are more efficient, scalable, or support future AI; please recommend.
 - Data Retrieval
 - Data Retrieval should take less than 3 seconds and should support up to 100 users pulling data concurrently without degradation
 - Only authorized users and APIs should be able to retrieve data

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- Data retrieval actions should be logged and monitored for compliance
- Data Backup
 - Full Backups should at least be completed weekly.
 - Incremental backups should at least be completed daily.
 - Backups should be stored in multiple geographic locations.
 - Please provide any recommendations based on the scope of this document regarding data backup.
- **Security:** Requirements for data encryption, access control, authentication, and auditing.
 - **Encryption Standards:** Standex Electronics does not have an official policy on encryption, but all encryption measures must comply with NIST standards. Please provide additional recommendations to enhance security.
 - **Authentication Methods:** Authentication should be implemented through Microsoft Azure Active Directory to ensure secure access control.
 - **Compliance Standards:** The system must adhere to NIST and CMMC standards to maintain compliance with industry regulations.
 - **Data Protection:** Recommendations for data handling and storage should include policies on data retention, anonymization, and backup strategies. Contracts, such as quotes, are typically retained for the current year plus 3 years. Additionally, in the context of AI/ML, any data used for training or processing must be handled with care. If proprietary data is involved in AI/ML processes, it must be kept closed within the system to prevent unauthorized exposure. Should it be necessary to use this data in broader AI/ML environments, robust processes and guardrails must ensure that the data is anonymized or, if anonymization is not possible, securely protected to prevent any leakage of sensitive or proprietary information.

5. Architecture Design Constraints

- **Scalability**
 - **Users:** The maximum number of users will start at 30. At a 10% growth rate and factoring in potential acquisitions the system shall be able to support up to 60 users in its fourth-year post launch. The system shall be easily scalable to double its users every four years.
 - **Volume:** The number of designs and quotes generated will start at 150 per week or 7,800 per year. This allows for a run rate of 1,500 per year with roughly 5 iterations per design before it is finalized. The system shall be easily scalable to double its volume every four years.
 - **Geography:** The tool will be utilized in multiple locations in the United States to start. Fairfield Ohio, Rockledge Florida, Watertown South Dakota, and Concord New Hampshire. The system will be easily scalable to other locations globally while maintaining ITAR/EAR compliance.

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- **Performance:** Expected system response times (Acceptable: 500ms-1s), throughput (Moderate Throughput: Dozens to Hundreds of RPS), and latency (Low Latency: 10-50ms).
- **Reliability:** Expected system uptime is 99% (3.65 days of downtime per year) and redundant fault tolerance.

6. Deliverables

The deliverables for this scope involve the consulting firm providing a high-level business plan for the system's implementation, allowing Standex Electronics to make an informed decision about the next steps. Additional scoping rounds will be necessary to further refine and accurately define the project scope.

- **Milestones:** Key stages or deliverables in the project.
- **Timeframe:** Estimated duration for the completion of each milestone and overall project.
- **Resource Requirements:** Skillsets and number of resources required for each milestone and overall project.
- **Budget:** Expected cost of each milestone and overall project broken down by External Development Costs, Software Costs, and Hardware Costs, etc. It shall also be broken down by the segmentation defined in this document (Data, MPD, Outputs, Search).
- **Maintenance Resource Requirements & Budget:** Skillsets and number of resources required for annual maintenance of the system along with associated costs. Understanding if Standex Electronics will be able to maintain this system or if we will need ongoing external support.
- **Architectural Models:** Diagrams, such as high-level system architecture, component diagrams, and data flow diagrams.
- **Hardware/Software:** Recommended hardware, software, programming languages, and coding standards to complete the project.
- **Risks:** Documentation of any risks that were identified when creating the deliverables.
- **Assumptions:** Assumptions made due to lack of concrete information when creating the deliverables.
- **Constraints:** Any limitations or restrictions that if removed would have a significant impact on cost, timeframe or reduce risks. Constraints that are noted shall be quantified in a way that allows for a cost/benefit decision.
- **Reasons To Believe:** What are the reasons to believe that this software developed for the sole use of Standex Electronics will stay ahead of a broadly used industry software? What about the proposed learning model, allowing it to maintain its competitive advantage in the innovative design solutions provided against broadly used industry software?
- **Confidence:** Percent confidence in the accuracy of the timeframe, resources, and budget estimates provided.

7. Project Phases and Timeline

- Included as part of Deliverables.

8. Risk Management

- **Potential Risks:** Included as part of Deliverables.
- **Risk Mitigation Plans:** Included as part of Deliverables.

9. Quality Assurance and Validation

- **Testing:** To be included as part of the milestone section within deliverables.
- **Validation Criteria:** To be included as part of the milestone section within deliverables.
- **Performance Metrics:** Not required.

10. Change Management

- **Version Control:** Not required.
- **Change Request Process:** Not required.
- **Maintenance and Support:** Not required.

11. Communication Plan

- **Project Team:** Not required.
- **Status Reporting:** Not required.
- **Meetings & Reviews:** Not required.

12. Assumptions and Constraints

- **Assumptions:** Included as part of Deliverables.
- **Constraints:** Included as part of Deliverables.

13. Approval Process

- **Approval Signatures:** Ramy Shatoot, Travis Lane, Doug Haworth, Katie Trickey
- **Approval Criteria:** Approval signatures are required for each revision of this document and before transitioning in and out of a project milestone.

14. System Operation & Workflow

14.1 Level 1 - Operation & Workflow

Figure 14.1 provides a conceptual diagram that illustrates the potential operation and workflow of the system and software architecture.

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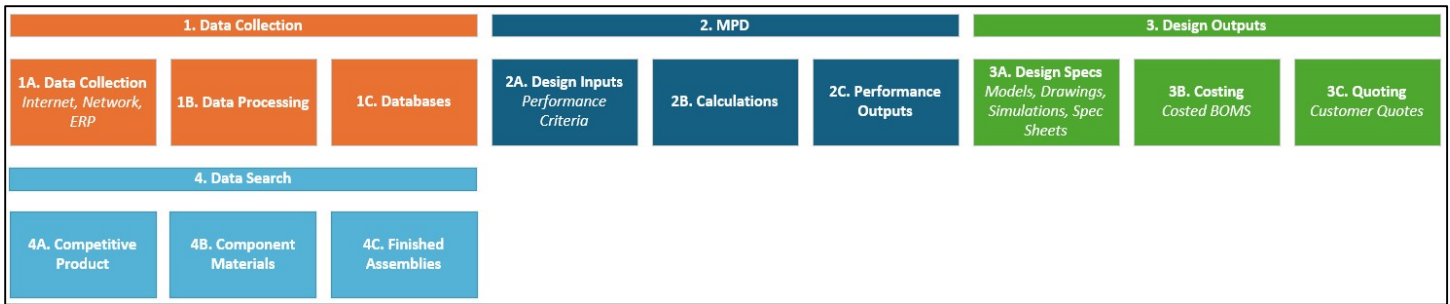


Figure 14.1: Level 1 Operation & Workflow

- **1. Data Collection:** The system's ability to collect and process data to place in databases for quick recall. This includes internet data, network data, ERP data, drawing data, etc.
- **2. MPD:** Inputs of the design parameters into the software, calculations are performed, and performance outputs are provided.
- **3. Design Outputs:** The selected output has design specifications created, costing and quoting completed.
- **4. Data Search:** The ability to search and retrieve information from collected internal and external data sources—stored within the system's databases—related to competitive products, component materials, finished assemblies, and completed quotes.

14.2 Level 2 - Operation & Workflow

Figure 14.2 provides a conceptual diagram that illustrates the potential operation and workflow of the system and software architecture at the next level down.

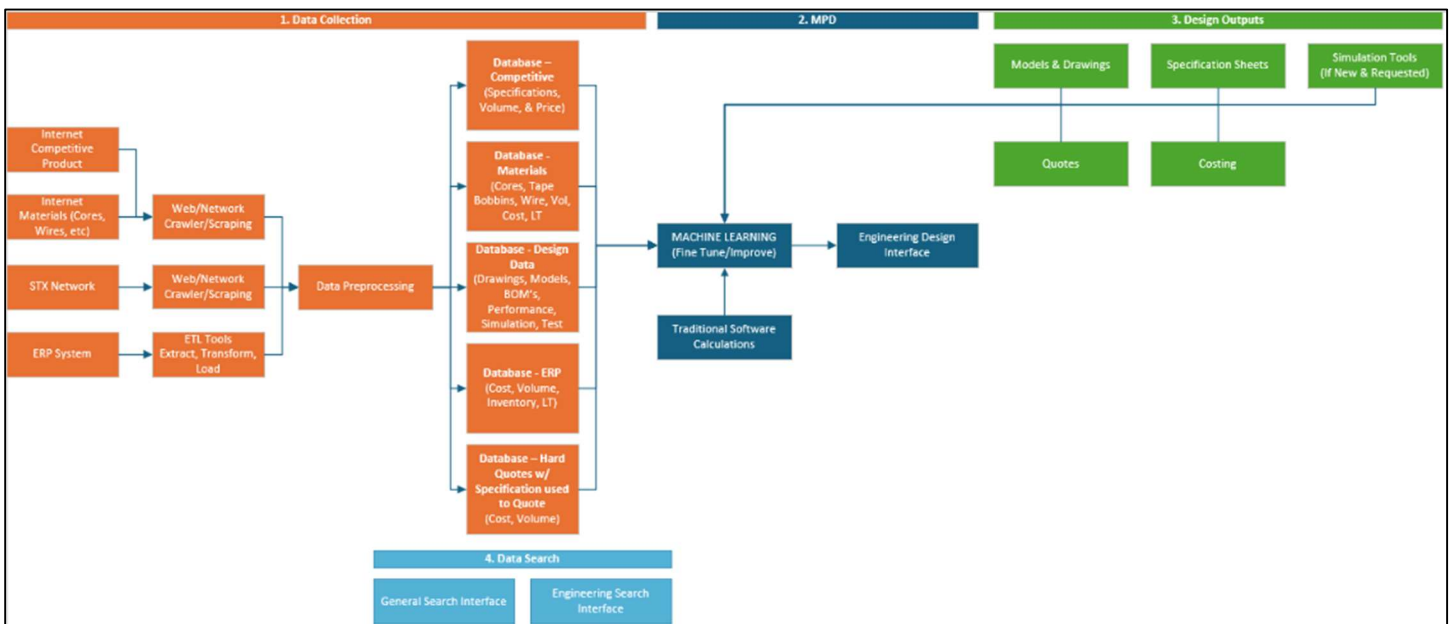


Figure 14.2: Level 2 Operation & Workflow

14.3 Level 2 - Data Collection

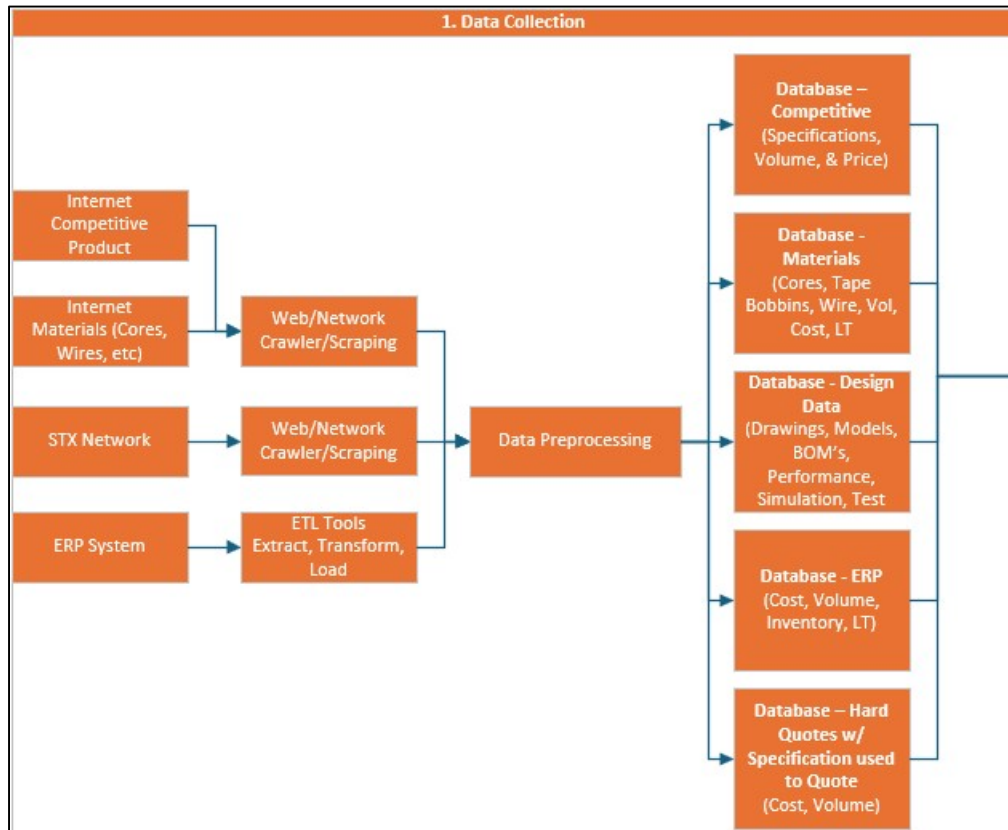


Figure 14.3: Data Collection

- **Sources:** Data is collected from both external and internal sources. External data includes publicly available information from the internet, such as competitive product details and supplier material data (e.g., pricing, volumes, and performance metrics). Internal data is gathered from the Standex network, including historical drawings, specifications, test reports, and other engineering documentation. Additionally, data is retrieved from the ERP system to capture current pricing and inventory levels. This data is pulled on a regular basis to ensure accuracy and relevance.

All data collection follows appropriate use guidelines, ensuring that only publicly accessible or authorized internal data is used. Quality checks are applied where possible to maintain data integrity, and any limitations or restrictions on data usage—such as proprietary, outdated, or incomplete information—are considered during the mining and analysis process.

- **Processing:** The data that is collected from the internet, network, and ERP is processed for input into a database(s) for recall by the other parts of the system.
- **Databases:** Information is stored in a database(s) for recall.

14.4 Level 2 - Magnetics Product Design (MPD)

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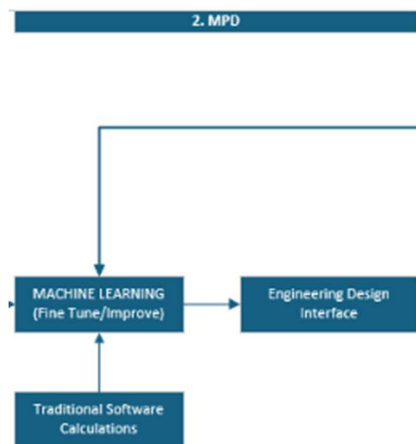


Figure 14.4: MPD

- **Machine Learning/AI:** The system shall incorporate machine learning and artificial intelligence to enhance decision-making and improve design outputs over time as the dataset grows. The AI/ML models may either be developed in-house or built upon existing open-source frameworks. If open-source solutions are used, appropriate legal and licensing restrictions will be followed to ensure that proprietary information is not unintentionally exposed or made public.
- **Design Inputs:** Inputs are entered into an interface by the engineer defining the performance and other requirements of the design. This can include topology, inductance, power, etc. It can also include identifying project/quote details such as the customer, shipping location, manufacturer (Standex or 3rd party), Manufacturing location, ITAR/EAR requirements, Volumes, etc. At times customers request tiered quotes. Therefore, volume should be allowed to be entered as more than a single number. Example: 1 Ea., 10 Ea., 100 Ea., 500 Ea. It is recommended that up to 5 volumes are allowed to be entered in this stage.
 - **Standards:** The system shall have a repository of all standards relevant to our industry. This includes UL, Military Standards, Automotive, REACH, ROHS, etc. The relevant standards that apply to the design can be selected during the design input stage. The system ensures that the outputs which are generated conform to the standards selected.
- **Calculations:** The system takes these inputs and makes calculations to define the design parameters.
- **Performance Outputs:** The system takes the design inputs and the calculations and generates multiple design solutions to the problem.
 - **Highest performance solution:** The design solution that provides the highest performance irrespective of cost.
 - **Lowest cost solution:** The solution that still meets performance requirements but provides the lowest cost solution.
 - **Balanced solution:** The solution that provides the best balance between performance and the lowest cost solution.
 - **Existing material solution:** This solution focuses on utilizing as many existing components as possible to achieve the optimal balance between performance and cost-efficiency, or alternatively, recommends an existing assembly.

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- **Modular Product Design Solution:** As the data set grows and the model evolves, the software will transition from providing an "Existing Material Solution" to offering a "Modular Product Design Solution." The software will feature capabilities to analyze a set of design inputs and propose modular product design recommendations. By incorporating predefined design parameters, industry best practices, and product configuration rules, the system will pinpoint opportunities to modularize components. This will steer the product portfolio towards greater modularity, enabling efficient reuse of designs, reducing time-to-market, and optimizing costs, all while ensuring flexibility and scalability across product lines. The system will also support continuous refinement of modular designs based on changing inputs, driving ongoing improvements and aligning with strategic product development objectives.
- **Competitive Solution:** The system shall also provide a competitive overview of the highest performance, lowest cost, and balanced solution. Information includes cost at various volumes, lead time, and links to any available performance data.
- **Output Details:** At this stage in the process, full and final design outputs noted in Design Outputs are not required. However, some initial outputs of information are required for the designer to assess the outputs provided.
 - **Costed Bill of Material w/LT:** Vendor Information, Estimated or Actual Material Cost, Labor Time & Cost, Overhead Cost, Freight Cost, and Lead time of all components, with the system clearly identifying what is estimated and what is actual. This shall include price breaks at each identified volume.
 - **Calculations:** Sheet showing the step-by-step calculations that were made to arrive at these outputs.
 - **Performance Information:** Performance sheet and graphs.

14.5 Level 2 - Iteration

- The designer will need to iterate and refine the design outputs through multiple adjustments. This iterative process helps avoid unnecessary consumption of system resources by delaying the generation of the complete output package until it is required. Effective workflow management by the software is crucial at this stage, allowing the designer to move forward or backward through various steps in the workflow, as needed, to modify, review, or finalize the design. The designer shall be able to temporarily save (or pin) up to 4 design outputs. This provides the ability to retain an output while manual changes are made to fine tune the design.
 - The designer shall be able to make updates to the Highest Performance, Lowest Cost, Balanced, and Existing Material Solutions. There will be a need to overwrite the output based on the experience and knowledge of the designer. As the model learns this will occur less and less.
 - Updating Design Inputs.
 - Searching the databases for different materials to manually insert into the Costed Bill of Material.
 - Ability to add/remove materials from a Costed Bill of Material (Epoxy, Potting Material), adjusting quantities used, and adjusting labor estimates.
 - The designer will have the ability to create a new component that is not yet part of the database and add it to the generated Bill of Materials. This includes the creation of a solid model, generating associated drawings, defining material specifications, and attaching these elements to the newly created component.

- After adjustments are made the designer can rerun the outputs to get an updated Costed Bill of Material w/LT, Calculations, and Performance Information.
- The above cycle can repeat multiple times until the designer has 1-4 finalized design solutions.

14.6 Level 2 - Design Outputs

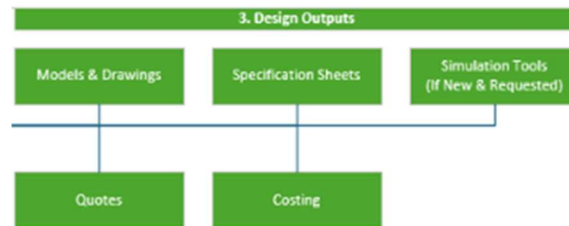


Figure 14.6: Design Outputs

- Once 1 to 4 designs are finalized the designer can generate more detailed design outputs. While this is shown in the diagrams as a separate segment of the system, iteration back and forth will be required.
- **Solid Model Creation:** The designer can choose to generate assembly and component solid models for the final solutions they selected.
 - If upon viewing the solid model it is not what the designer requires, they can go back to iteration.
 - The designer must select between 1 and 4 designs to proceed with generating design outputs. Selecting at least one design is required to continue, and no more than four designs can be chosen at this stage.
 - At this point the system shall provide the weight of each component and the entire assembly and include it in the Bill of Materials.
- **Drawing Creation:** The designer can choose to generate assembly and component drawings for the final solutions they selected.
 - If upon viewing the drawings they are not what the designer requires, they can go back to iteration.
 - The designer can modify the drawing(s) by adding or removing details.
 - The designer must choose 1 to 4 designs to move forward in the process of creating design outputs.
- **Simulation:** The designer can choose to run simulations on the selected design to evaluate the transformer's performance characteristics—such as efficiency, thermal behavior, electrical parameters, and other key metrics. This step is optional and can be skipped if the designer determines that simulation data is not necessary for the current evaluation.
 - If upon viewing the simulation results, they are not what the designer requires, they can go back to iteration.
 - The fidelity needs to be predefined, allow the flexibility to adjust fidelity, or allow for a high-fidelity simulation to be completed. However, there needs to be controls on this.
 - The designer must choose 1 to 4 designs to move forward in the process of creating design outputs.
- **Routing:** The design engineer reviews the costed bill of material with focus on the routing and labor estimates. They can build more detailed routing steps and add/modify times in the routing based on their understanding of the design.
- **Design Review:** At this stage the design engineer can send the package to another person in the organization to complete a design review. Once it is reviewed, it is sent back to the design engineer for review.

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- **Part Number Assignment:** New items that are generated shall be assigned a unique identifying number after the design review and prior to the quote stage. This shall be in line with the standard as defined for our ERP system.
- **Quotes:** The designer can choose to send designs to Supply Chain & Manufacturing for quoting of the final solutions. Some components may have estimated or no pricing. Therefore, a step to formally quote & cost the components (or FG Assembly) at the required volume is necessary.
- **Temporarily Saved/Pinned:** At this stage, any designs that have been temporarily saved or pinned are purged from the system and are not retained. Only the designs that are explicitly selected will be saved. No AI or machine learning will be applied to temporarily saved or unselected designs, as they are considered incomplete or non-final and are excluded from any form of system learning or analysis.

14.7 Level 3 - Budgetary Quotes & Commodity Index Recording

- **Budgetary Quotes:** The software will have the capability to bypass the “Supply Chain & Manufacturing” step in the workflow to facilitate the generation of a budgetary quote based on the most current available data. The generated quote will be clearly marked with a disclaimer, such as: “Budgetary and Non-Binding.”
- **Commodity Index Recording:** The software will include functionality to automatically capture and record commodity indices on the day it moves to “Supply Chain & Manufacturing” or the day it is moved forward with a Budgetary Quote. This ensures that all relevant market data, such as prices for raw materials and commodities, is accurately logged and tied to the specific quotation. By recording these indices at the time of the quote, the software will provide a historical record that can be referenced for future analysis, ensuring consistency in pricing and enabling accurate cost tracking. Additionally, this feature will support better decision-making by providing clear insights into how fluctuations in commodity prices impact product pricing and cost structures over time.

14.8 Level 3 – Supply Chain & Manufacturing

- It is recommended to implement a dedicated interface and queue specifically for Supply Chain and Manufacturing teams. This interface would support efficient management, tracking, and assignment of quoting activities. It should provide a clear list of all projects—and the associated parts within those projects—that require Supply Chain quotes and/or Manufacturing estimates.
- The system shall determine the appropriate quoting path based on the sourcing strategy. If accurate and up-to-date costing is available for all components, the request does not need to be routed to Supply Chain for additional component-level quotes. Likewise, if the product is being fully outsourced, only a finished good quote is required, and the request should not be routed to Manufacturing for review or estimation. However, if the product is being fully insourced, the request must be routed to Manufacturing for detailed review and estimation.
- Supply Chain and Manufacturing shall have access to all the information that was output during the design process, subject to access controls in compliance with EAR and ITAR.
- Supply Chain shall work with suppliers to get the quotes and upload these quotes to the corresponding items in the BOMs that were generated.
- Freight cost is reviewed and is updated as necessary.
- Manufacturing reviews the routing and labor estimates. They can add detailed routing steps and add/modify times in the routing. Manufacturing also adds input on estimated scrap rates.
- Manufacturing provides CAPEX estimates broken out as individual line items providing a description of what needs to be purchased, why it needs to be purchased, cost of the item, and lead time. They upload any quotes that were obtained to the project or note if it was an estimate.

- Once all the required inputs are completed by Supply Chain and Manufacturing, they can each indicate that their work is complete.
- Once it is completed the project is sent back to the design engineering queue. The design engineer is then notified that the project is ready for review and to be finalized.

14.9 Level 2 - Quote Package

- The design engineer completes a final review and updates the quote package that has been created up to this point. This includes Costed Bill of Materials, Competitive Product Insights, Calculation Sheets, Performance Sheets/Graphs, Models & Drawings, Simulation Details, and CAPEX Estimates
- Additional notes and costs associated with NRE, PPAP, Testing, Certification requirements (UL, CSA, etc.), and other activities can be added to the overall project deliverables and costs at this stage.

14.10 Level 3 - Engineering Leader Review

- Once the quote package is complete, the design engineer will send a link to the quote package for review by the engineering leader.
- The software has a function for “Engineering Leader Review”. Once selected, an email is generated.
- The engineering leader reviews the quote package for completeness and accuracy.
- They can make comments and request updates to the quote package and return it to the design engineer.
- If it is complete, they can finalize the quote package.

14.11 Level 2 - Finalize Quote Package

- Once the quote package is reviewed and accurate, the engineering leader finalizes the quote package.
- The software has a function to “Finalize Quote Package”. Once selected, an email is generated.
- Multiple designs can make up the quote package, providing more than one solution to the customer.
- When the package is finalized, it goes into a database and becomes part of the model and is used to train the model.
- The engineering leader finalizes the quote package and emails a link to the quote package to the Field Application Engineering Org.
- It is common to have additional iterations of the design to fine tune it to the customer’s requirements after it is finalized and after it is submitted to the customer. Therefore, the original package can be recalled and mirrored. The original package is kept as a valid final design and isn’t modifiable. The mirrored package is modifiable to make iterations to the design and is kept in the database if it proceeds through to finalization of the quote package. The mirror history is retained for a record of the evolution of design development throughout the project.

14.12 Level 2 - Data Search

There shall be a capability for search interfaces to find relevant information that is stored in the database(s), including all internal and competitive products, materials, cost, volume, lead time information, etc. This interface shall be available outside of the design interface.

The search function shall also provide the capability to view the modular product design solutions that the software is building upon. This will allow the business to directly observe where the software is steering the product portfolio. Also, this will provide an opportunity to assess the opportunity to commercialize the modular product design solutions.



Figure 14.12: Data Search

15. Brownfield Design

While earlier sections focused on greenfield design, the system must also support build-to-print requests, which are common from customers. This means the system must be capable of handling brownfield design scenarios, where customers provide varying levels of existing design information—ranging from complete to incomplete sets of assembly drawings, component specifications, or material details. In such cases, the system shall identify gaps in the provided data and allow Standex Electronics to generate the necessary specifications or design elements to complete the solution, while still meeting the customer's defined inputs.

The software architecture must therefore include a method for integrating brownfield designs into its workflow. Additionally, the system should generate the same types of design recommendations as with greenfield designs—such as highest performance, lowest cost, balanced, and existing-material solutions—so that we can offer optimized alternatives to the customer's original request.

16. Miscellaneous Items

- Once a test report for a finished assembly, materials, or components is complete, it shall be able to be uploaded to the project. Real world test data is extremely important to improve the model.
- An accurate material database is extremely important to an accurate model. Real world test data is extremely important to validate the supplier's material data sheets.
- Standex Electronics does not have a consolidated and clean data set. There are multiple systems, databases, networks, software, and formats used at every step in the process. Considerations of what is necessary to have a clean data set for use by this system and software architecture shall be considered.
- Considerations around textbooks on transformer and power magnetics design can provide a foundational knowledge base for AI models to generate design recommendations. When combined with advanced simulation tools, optimization algorithms, and ongoing learning from real-world data, AI models can become effective assistants in transformer and power magnetics design. However, practical design decisions often also rely on a balance of theoretical knowledge, empirical data, and real-world constraints, making human expertise indispensable in some scenarios.
- There are some internal (Excel) and commercial MPDS packages which exist today. These packages are not a complete solution as described in this scope document. There are pros and cons to each. Common challenges with each are accuracy due to material data, do not have full capabilities across a wide range of topologies or designs, do not consider items such as tapes & epoxies which are added to the design and their impact on performance, and do not provide a manufacturable solution.

17. Ownership

- Standex shall retain exclusive ownership of all rights, title, and interest in the custom-developed system and software created by the firm under this project. This includes, but is not limited to, the source code,

System & Software Architecture Scope Document

Magnetics Product Design Software (MPDS)



documentation, and any related materials, whether developed specifically for Standex or as part of a broader development effort. The firm acknowledges that, upon completion of the project, all intellectual property resulting from the development process shall be considered work for hire and fully transferred to Standex, including any modifications, enhancements, or improvements made during the course of the work. A formal agreement regarding ownership of any intellectual property in the software, including use of Standex intellectual property and restrictions on the use of Free/Libre and Open-Source Software, shall be entered into as part of the project.

18. Supporting Files

- The following additional documents are provided alongside this scope document to offer further detail and insight into the system and software requirements, enabling more accurate and thorough deliverables.
 - **Complete Design Packages:** Real world design packages are provided to assist with understanding what information is being generated by the business to provide a quote to the customer.
 - **Topology & Design Methodology Grouping:** Excel file listing the top 80% of topologies, grouped by design methodology. Information provided to assist with the understanding of utilization and differentiation if a phased implementation approach is recommended.
 - **New Business Opportunity (NBO) Process:** PDF document outlining the NBO process. This is how new opportunities are moved through the business today. This software covers activities that begin at “Design” within “Propose Solution/Costing” through “Quote & Review” within “Quote & Negotiate”. The exception is “Customer Design Review & Approval” within “Propose Solution/Costing”.
 - **CRM:** A CRM will be used by the commercial organization to manage the sales funnel portion of this process. The commercial portion occurs before “Design” and after “Quote & Review”. While this CRM does not currently exist today, it is expected to be Sales Force. No direct transfer of information between the MPD software and the customer is currently in scope. The front-end and back-end commercial aspects of this process are out of scope and expected to be handled by another means. However, the system and software architecture shall be built in a way to allow for integration of CRM inputs/outputs in a future system upgrade.
 - **Commercial MPDS Packages:** Some commercial MPDS packages are provided below for reference.
 - [Frenetic Electronics](#)
 - [OpenMagnetics](#)
 - [Magnetics Designer: Transformer and Inductor Design and Analysis Made Easy](#)
 - [Ridley Engineering | - Intro](#)
 - [POWERSTAGE-DESIGNER Design tool | TI.com](#)
 - [Magnetics - Curve Fit Equation Tool](#)
 - **APEC2025:** “AI in Power Electronics Design: Present and Future” Relevant presentation of opportunities for AI in Power Electronics during APEC2025.

19. VOX

VOX was conducted on the “System & Software Architecture Scope Document for Magnetics Product Design Software (MPDS)”. This includes the Voice of End Users and the Voice of Business Stakeholders. These VOX inputs were incorporated into the latest revision of this document.

- Voice of End Users
 - Paul Oppelt, Engineering Director
 - Mohamed Elemery, Engineering Director
 - Chris Riccardella, Director Field Application Engineering
 - John Reppe, Senior Field Application Engineer
 - Chris Mulryan, Senior Director Supply Chain
 - Chris Brafford, Manufacturing Engineering Manager
- Voice of Business Stakeholders
 - Doug Haworth, President Magnetics
 - Travis Lane, VP Innovation
 - Katie Trickey, Director IT
 - Ramy Shatoot, Group President Electronics
 - Esther Zolotova, Corporate Attorney

20. Terms and Conditions

1. General

This Request for Proposal (RFP) is issued solely for the purpose of soliciting proposals for the development of custom software. All information provided by Standex Electronics (hereafter referred to as the “Client”) is confidential and must not be disclosed without written permission.

2. Proposal Submission Deadline

Upon receipt of this Scope of Work (SOW), the Vendor shall provide written confirmation of receipt and intent to proceed within two (2) business days.

The Vendor shall submit a detailed proposal in response to this SOW no later than twenty (20) business days after providing written confirmation.

For the purpose of this clause, “Day 1” shall be the first full business day following written confirmation from the Vendor.

3. Proposal Submission

- All proposals must be received by the submission deadline specified in the RFP. However, the Client reserves the right to extend the submission deadline at its sole discretion. Any such extension will be communicated in writing to all known prospective respondents.
- Late submissions may be rejected at the sole discretion of the Client.
- Proposals must be complete and include all requested documentation and pricing.

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- All costs incurred in the preparation and presentation of the proposal shall be borne solely by the respondent.

4. Proposal Validity

Proposals shall remain valid for a minimum period of 90 days from the proposal due date unless otherwise specified. The Client may request an extension of this period.

5. Right to Accept or Reject

- The Client reserves the right to accept or reject any or all proposals without incurring any liability or obligation to any respondent.
- The Client reserves the right to negotiate with one or more respondents or to award the contract without negotiation.

6. Ownership of Deliverables

All software code, documentation, and other deliverables created as part of this project shall become the exclusive property of the Client upon full payment, unless otherwise agreed in writing.

7. Confidentiality

Respondents must not disclose any information provided in the RFP or related documents without the prior written consent of the Client. All proposal contents will be treated as confidential by the Client and will not be shared with third parties, except as required for evaluation purposes.

8. Compliance with Laws

The selected vendor must comply with all applicable local, state, national, and international laws and regulations related to the development and delivery of the software.

9. Subcontracting

No part of the work may be subcontracted without prior written consent of the Client. If subcontracting is permitted, the respondent remains fully responsible for all services provided.

10. Termination

The Client reserves the right to terminate the agreement with the selected vendor for convenience, or for cause including non-performance or breach of terms. Termination terms will be defined in the final contract.

11. Liability and Indemnification

The selected vendor shall indemnify and hold the Client harmless against any and all claims, damages, losses, and expenses arising out of the performance of the services, including but not limited to third-party claims of intellectual property infringement.

12. Evaluation Criteria

The evaluation of proposals will be based on the criteria outlined in the RFP, which may include technical merit, project approach, experience, price, and other factors deemed relevant by the Client.

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13. No Obligation

Issuance of this RFP does not obligate the Client to award a contract, and the Client shall not be liable for any costs incurred by respondents in preparing or submitting proposals.