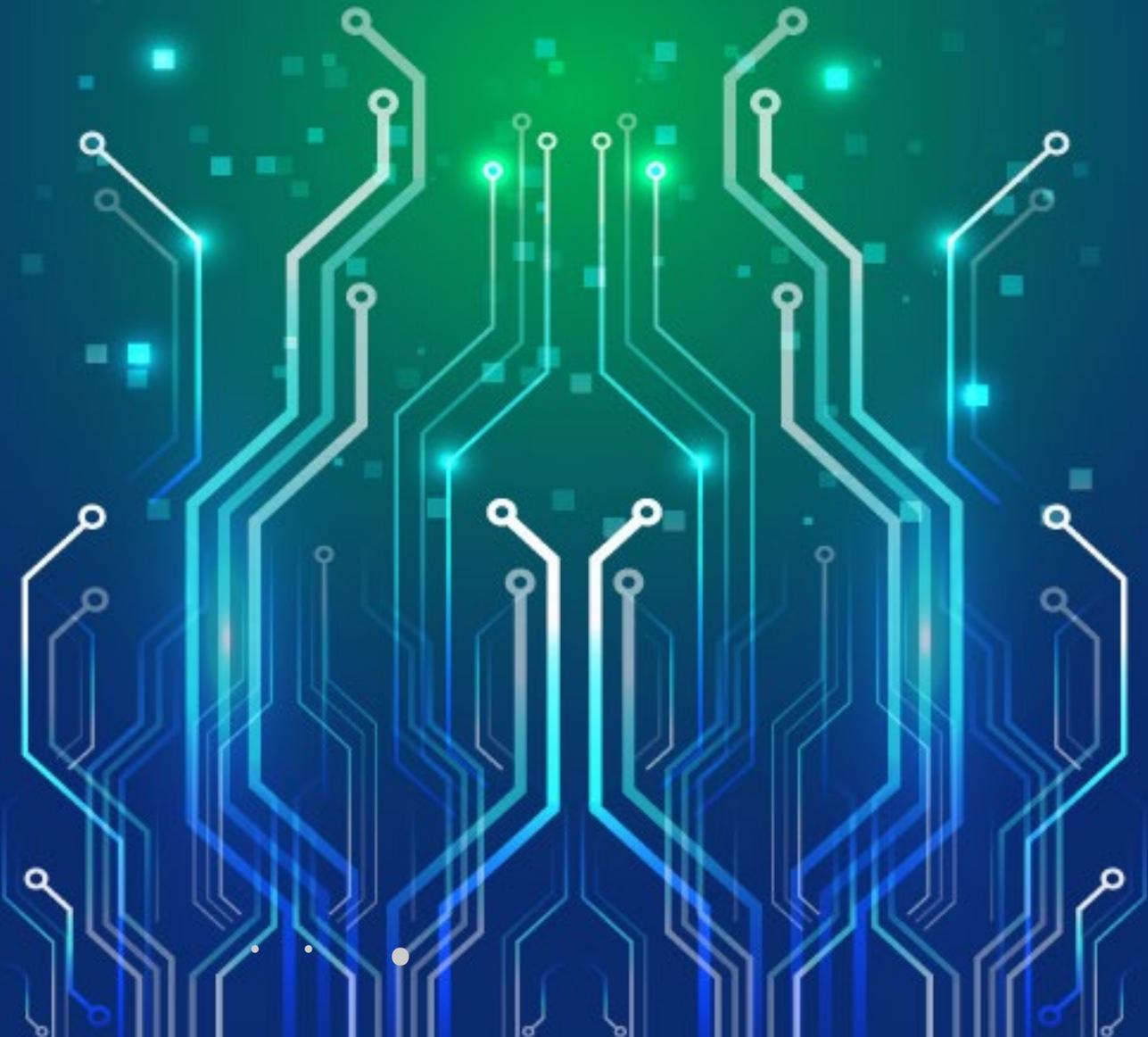


eBook

HOW MANUFACTURERS HELP SHAPE THE PCB DESIGN ENGINEER'S JOURNEY



HOW MANUFACTURERS HELP SHAPE THE PCB DESIGN ENGINEER'S JOURNEY

The path to a working electronic circuit board for a PCB designer is a multi-stage process that involves many essential stakeholders. These include the customer—the focus of product development—the contract manufacturer(s)—which may include separate fabrication and assembly houses—and the suppliers—who provide the electronic components and board materials. The IC or component manufacturer is missing from this list of essentials. Yet, the manufacturers that produce the components on which all electronics rely can influence the PCB design engineer's journey.

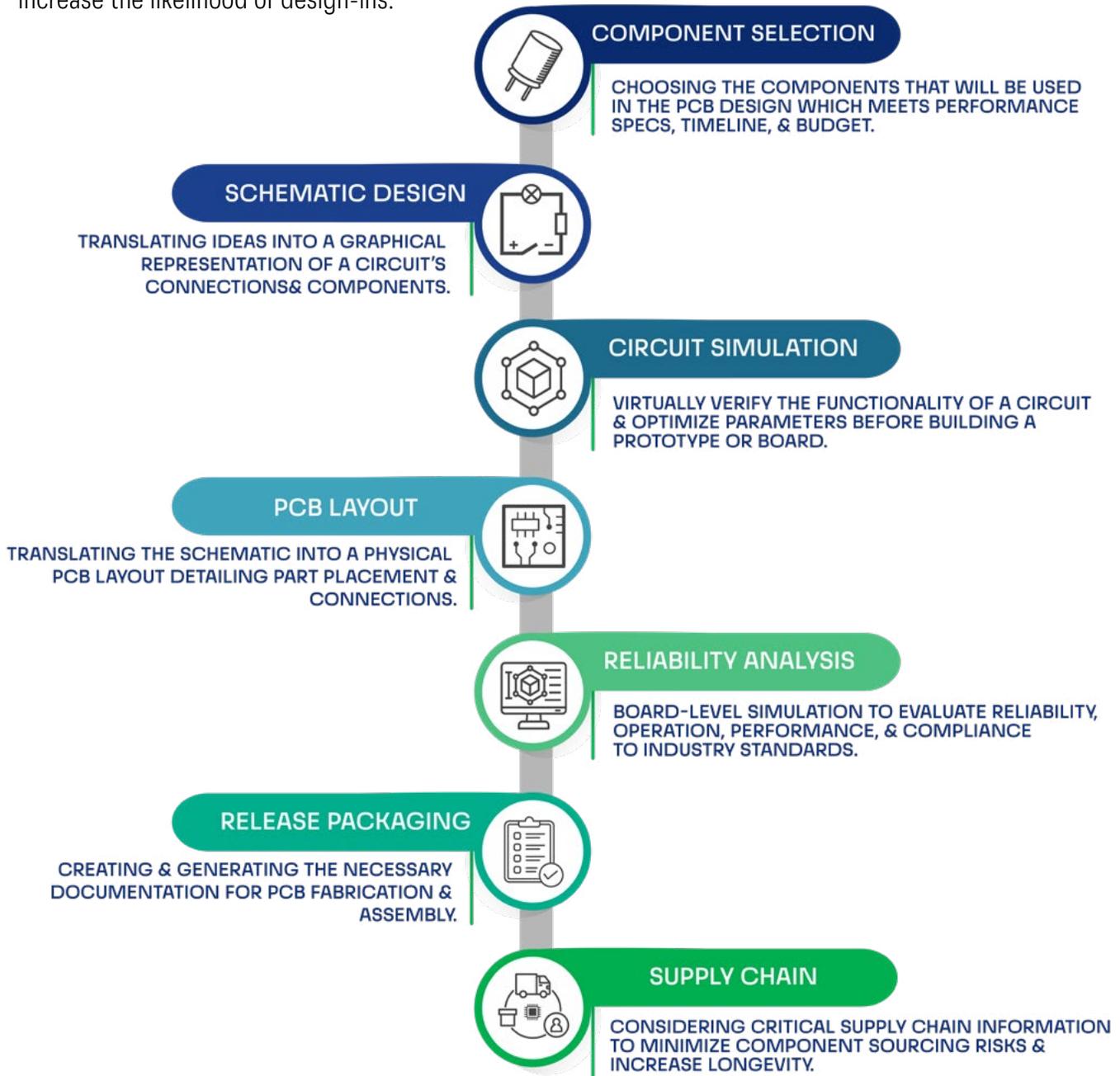
Becoming an influencer comes with no risk to manufacturers; however, increased IC/component manufacturer visibility and specific impactful actions are required. These include offering accessible component CAD models and providing a streamlined download process. These and other [marketing efforts](#) will enhance engineers' UX with your brand.

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INTRODUCTION TO THE PCB DESIGN ENGINEER'S JOURNEY

There are multiple stages along the PCB design engineer's journey where manufacturers can exert significant influence and impact PCB development process quality, efficiency, and effectiveness. This e-book will dive into each stage of the PCB design process as seen below, and the areas in which IC manufacturers can increase the likelihood of design-ins.



By understanding how to affect these stages, you can favorably influence outcomes for PCB designers and create greater industry awareness and market success for your offerings.

CHAPTER 1: COMPONENT SELECTION

FROM SPECS TO SELECTION: MAKING INFORMED CHOICES

The most important decisions that PCB designers make are what components to use. Making a bad choice here can result in PCBs that will/can not meet operational and performance requirements, board failures, excessive costs, and even loss of clients and customers. As a result, engineers tend to be highly discerning when selecting components.

PRINCIPLES OF COMPONENT SELECTION

When selecting a component, engineers consider a variety of criteria, including:

- ✓ Part performance specifications
- ✓ Product class (IPC Class 1, 2, or 3)
- ✓ Cost
- ✓ Availability
- ✓ Component lifecycle
- ✓ Part status
- ✓ Ease of implementation
- ✓ Regulatory compliance

	KYOCERA AVX 08055C104JAT2A	0805 100nF 50 V \pm 5 % Tolerance X7R Surface Mount Multilayer Ceramic Capacitor	Availability ✓	Price \$0.035	Compliance Pb FREE	Models Available 
Visit Site: Rutronik (\$) Avnet (\$) RS (Formerly Allied Electronics) (\$) Mouser (\$0.044)			More Pricing Details			
	KYOCERA AVX 0805YC104KAT2A	0805 100 nF 16 V \pm 10% Tolerance X7R Surface Mount Multilayer Ceramic Capacitor	Availability ✓	Price \$0.04	Compliance Pb FREE	Models Available 
Visit Site: Avnet (\$) Onlinecomponents.com (\$) Verical (\$) Mouser (\$0.049)			More Pricing Details			
	Kemet C0805C104K1RECAUTO	ESD SMD Auto X7R, Ceramic, 0.1 uF, 10%, 100 VDC, X7R, SMD, MLCC, Temperature Stable, Electro Static Discharge,	Availability ✓	Price \$0.069	Compliance Pb FREE	Models Available 
Visit Site: Avnet (\$) Onlinecomponents.com (\$) Verical (\$) Master Electronics (\$)			More Pricing Details			

By understanding how engineers approach component selection and taking proactive steps to support them, IC and component manufacturers can position themselves as trusted partners during this critical stage of the design process.

“53% of engineers said CAD model availability plays an important factor in their component selection process.”

- Ultra Librarian User Survey

CHAPTER 1: COMPONENT SELECTION IC AND COMPONENT MANUFACTURER'S ROLE

Component selection is not only the first and arguably the most critical stage of the engineer's journey, but offers unique opportunities for IC and component manufacturers to influence journey success. IC and component manufacturers can influence the PCB design engineer's journey by implementing key strategies such as developing clear component selection criteria and maximizing sourcing options.

1 PROVIDE ACCURATE, UP-TO-DATE INFORMATION

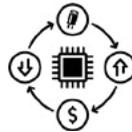
Information about your components enhances visibility and creates brand awareness for the manufacturer. This approach increases exposure and offers users various ways to browse and discover your components. Make sure you are providing potential customers with up-to-date information on:



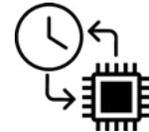
COST



AVAILABILITY



PART LIFECYCLE
STATUS



LEAD TIME

2 CENTRALIZE AND ENHANCE DISTRIBUTION

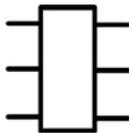
An online repository that distributes component data across multiple channels is vital for IC manufacturers. Centralizing this information with an online library allows users to access various PCB design resources from a single platform. The content is then pushed to multiple platforms, including distributors, marketing outlets, CAD tools, and manufacturer websites, ensuring that engineers and designers can find and utilize the latest component data seamlessly. This multi-channel distribution increases visibility and accessibility, helping users streamline their design processes, make informed decisions, and increase BOM share for an IC manufacturer.

CHAPTER 1: COMPONENT SELECTION IC AND COMPONENT MANUFACTURER'S ROLE

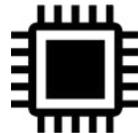
3

ENSURE COMPATIBILITY WITH POPULAR DESIGN TOOLS

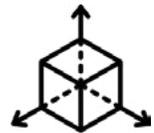
IC manufacturers that ensure their components are compatible with popular design tools and existing platforms can streamline the integration process, making it easier for engineers to select their products. According to our industry study of engineers (UL User Survey 2020), over 43% of engineers feel IC manufacturers should be responsible for providing CAD models and 53% stated CAD model availability plays an important role in their component selection process. IC manufacturers can increase IC compatibility and streamline component adoption by providing the following in multiple CAD formats:



SCHEMATIC
SYMBOLS



PCB
FOOTPRINTS



3D
MODELS



REFERENCE
DESIGNS



SIMULATION
MODELS



VALIDATION
DATA

Staying top of mind early in the design process, such as during schematic creation, is essential for choosing a component for the final design.

“Over 43% of engineers feel IC Manufacturers should be responsible for providing CAD models.”

- Ultra Librarian User Survey

CHAPTER 2: SCHEMATIC DESIGN

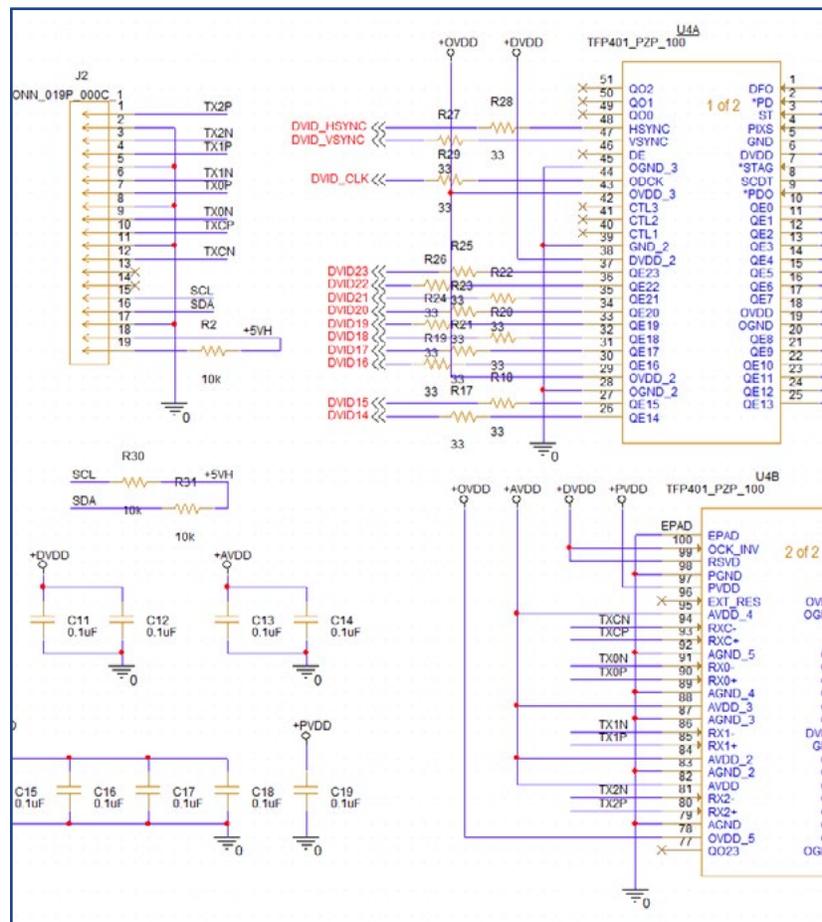
TRANSLATING IDEAS INTO CIRCUITRY

The first major step along the PCB design engineer's journey is developing the schematic design. A schematic design is a graphical representation of the circuit's electrical connections and components. It serves as a blueprint for how the circuit functions and is the first step before laying out the physical PCB. Contrary to popular belief, the schematic is not simply an initial drawing used only by the designer. In many cases—certainly for highly complex circuits—the schematic or some version of it is passed to the contract manufacturer (CM) to help convey design intent.

PRINCIPLES OF SCHEMATIC DESIGN

- ✓ Use [common schematic symbols](#) and link to verified CAD models
- ✓ Include accurate and detailed component data
- ✓ Link components to manufacturer datasheets
- ✓ Ensure all connections are complete
- ✓ Use multiple pages and embedded design while necessary
- ✓ Run Design Rule Checks (DRCs) often and correct all errors

Manufacturers can best assist PCB design engineers by understanding the principles of schematic design and highlighting tools and software that can readily utilize CAD models of their components.



CHAPTER 2: SCHEMATIC DESIGN

IC AND COMPONENT MANUFACTURER'S ROLE

IC manufacturers can significantly influence the schematic design process by ensuring accurate component symbols in formats that integrate with commonly used EDA tools and educational resources are readily available.

1 PROVIDE VERIFIED SCHEMATIC SYMBOLS

Schematic symbol creation can be time-consuming for designers. 47% of engineers report savings of 5-10 hours per month when they are able to leverage CAD model downloads instead of having to build their own. To improve readability, schematic symbols should be created based on [industry standards](#), such as often referenced IEEE/ANSI 315-2015. These provide universal metrics, such as specific reference designators based on the type of component and more. Not only does the actual model creation subtract from precious design time, but schematic symbols must be validated against the PCB footprint to ensure proper pin assignments and connectivity. IC manufacturers can save designers time by providing pre-built and verified models, providing the path of least resistance, and increasing the likelihood that your component will be selected for the design.

2 PROMOTE COMPONENT MODE INTEGRATION

IC manufacturers should actively promote how their models integrate with various PCB design tools and software for several reasons. Showcasing compatibility makes it easier for engineers to adopt their components, streamlining the design process and reducing time and effort. Providing accurate models within design software enhances design accuracy and informs better decision-making. Additionally, emphasizing tool compatibility can differentiate a manufacturer from competitors, positioning access to them as user-friendly and versatile.

CHAPTER 2: SCHEMATIC DESIGN IC AND COMPONENT MANUFACTURER'S ROLE

3

PROVIDE EDUCATIONAL RESOURCES AND SUPPORT

Offering educational resources and support encourages innovation and helps engineers understand the full potential of the products. Ultimately, this approach can build long-term relationships with design engineers, leading to increased sales and stronger partnerships in the industry. Educational resources and design support can be provided in the form of:



REFERENCE DESIGNS

[Reference designs](#) provide guidance on optimal circuit configuration and additional support circuitry.



SIMULATION DATA

Simulation data provides vital information on component performance metrics and operation.

Once the schematic is complete, engineers can continue onto the next phase of the design process, simulation, to verify performance requirements.

“47% of engineers report savings of 5-10 hours per month when they are able to leverage CAD model downloads.”

- Ultra Librarian User Survey

CHAPTER 3: CIRCUIT SIMULATION

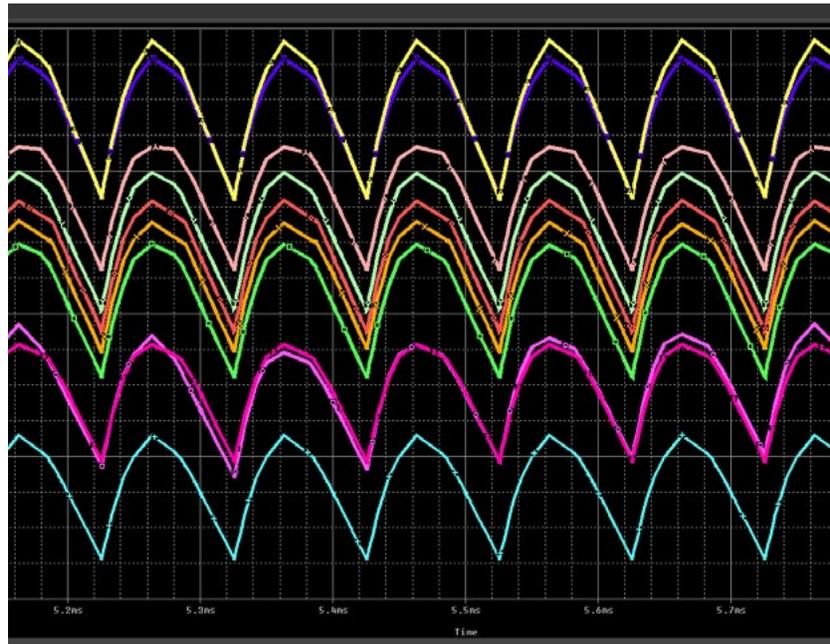
VALIDATING FUNCTIONALITY IN A DIGITAL ENVIRONMENT

Circuit simulation is a technique used in the PCB design process to analyze and verify circuit behavior before building a physical prototype. The importance of simulation to PCB design cannot be overstated. In fact, the modeling, simulation, and analyses of circuit behavior during the schematic design phase are the most effective means of verifying functionality and performance without a board build and physical testing.

PRINCIPLES OF CIRCUIT SIMULATION

Designers perform simulation, specifically SPICE simulation, to:

- ✓ Verify circuit behavior
- ✓ Optimize component values
- ✓ Enhance circuit performance
- ✓ Analyze the effects of environmental conditions
- ✓ Improve reliability
- ✓ Reduce errors
- ✓ Reduce costs



Simulation plays a crucial role in PCB design, serving multiple purposes that enhance the overall quality, performance, and reliability of electronic products. One of its primary benefits is the ability to verify circuit functionality before physical prototyping. This early testing helps identify errors, ultimately reducing development time and costs.

CHAPTER 3: CIRCUIT SIMULATION

IC AND COMPONENT MANUFACTURER'S ROLE

By creating and making available component models for simulation tools like SPICE that are easily uploadable and compatible with EDA tools, IC manufacturers help facilitate more efficient and cost-effective PCB design and development workflows.

1

PROVIDE SPICE MODELS

High-quality [SPICE and behavioral models](#) enable precise simulations, allowing designers to make informed decisions. Additionally, manufacturers can collaborate with EDA tool developers to ensure their components are effectively represented in simulation software, enhancing usability for designers.

2

INCREASE MODEL COMPATIBILITY

By collaborating with EDA tool manufacturers, IC manufacturers can provide component models that are compatible with leading simulation software tools, like SPICE. This will enable engineers to evaluate their designs regardless of their desired CAD tool -ultimately minimizing manufacturing costs and bringing up time.

3

INCREASE ACCESS AND AVAILABILITY

For SPICE simulation, designers typically use generic models found in CAD software, create custom SPICE models, or spend time scouring the internet for trustworthy and accurate sources. The first solution produces unrealistic circuit functionality results while the latter two methods are time-consuming and can yield unpredictable results. IC manufacturers can increase the likelihood of component selection by providing verified simulation models for designers to use in their circuit simulations, helping guarantee proper circuit performance up front when selecting components for the PCB.

Engineers prioritize accuracy and efficiency. By supporting the schematic design process, IC manufacturers position themselves as helpful facilitators of both. The opportunity to influence PCB design extends to the next stage along the PCB design engineer's journey: PCB layout and CAD integration.

CHAPTER 4: PCB LAYOUT AND CAD INTEGRATION

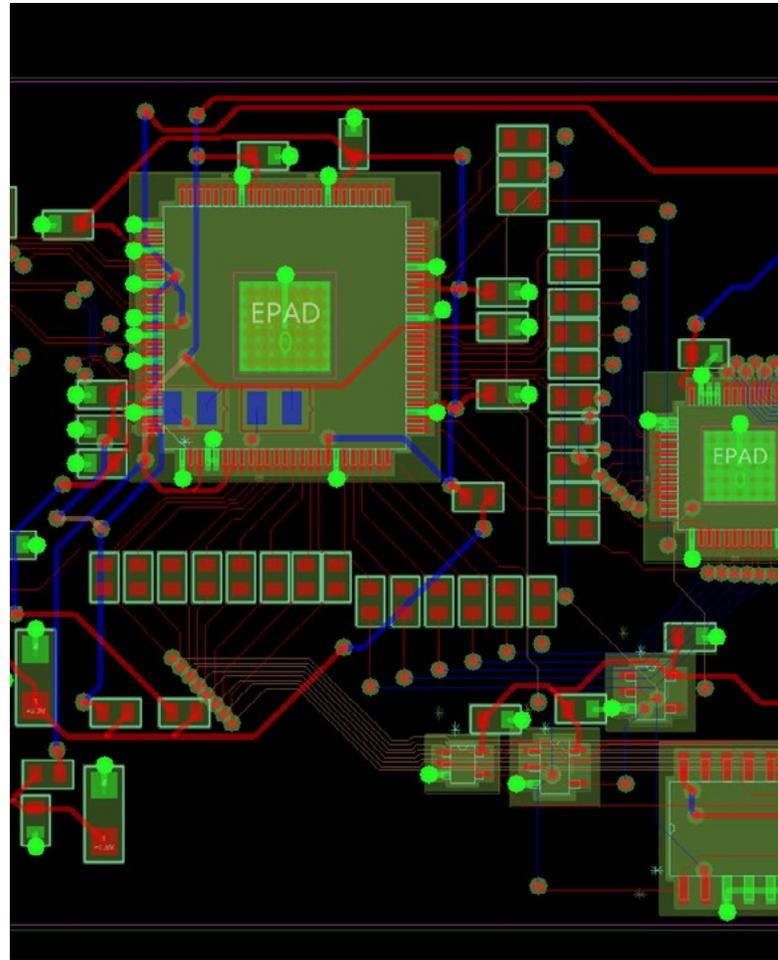
TRANSLATING SCHEMATICS INTO PHYSICAL FORM

Once the schematic design has been satisfactorily completed, the design moves to the PCB layout phase. Undoubtedly, this stage is the most complex and the source of most design errors. Many of these can result from the need for creative and innovative approaches, such as how to best place components that may challenge typical [best practices](#).

PRINCIPLES OF PCB LAYOUT DESIGN

When designing a PCB layout, engineers must follow a certain set of principles to create a functional and manufacturable design:

- ✓ Use PCB footprints which conform to industry-standard guidelines
- ✓ Follow your CM's DFM and DFA rules and guidelines
- ✓ Place components according to signal type(s)
- ✓ Prioritize signal integrity (SI) and power integrity (PI) when routing traces
- ✓ Leave adequate spacing between components and the board edge
- ✓ Leave adequate spacing between traces
- ✓ Use the correct aspect ratio for drill holes
- ✓ Run design rule checks (DRCs) often and correct any constraint violations
- ✓ Verify the final assembly with 3D modeling



To adhere to these principles most PCB design tools include specific functionality to aid engineers with layout, such as autorouters, which automatically complete connections between components on the PCB. However, most of these aids are EDA tool-dependent or proprietary, which leads to the question-

WHERE DO IC MANUFACTURERS COME INTO PLAY?

CHAPTER 4: PCB LAYOUT AND CAD INTEGRATION

IC AND COMPONENT MANUFACTURER'S ROLE

CAD tools are vital for efficient and accurate PCB design, enabling designers to create high-quality products. Manufacturers can be influential by collaborating with CAD tool vendors to ensure their components are easily utilized by these programs and providing the necessary information to streamline the PCB layout for designers:

1

PROVIDE STANDARD MODELS FOR ICs

Utilize standard component models for ICs to promote streamlined conversion to CAD tools. PCB footprints should comply with industry standards such as [IPC 7351](#). These ensure that structurally sound and reliable circuit boards can be fabricated and assembled.

2

CREATE COMPLIANT MODELS IN VARIOUS CAD FORMATS

Collaborate with PCB design software developers to create compliant CAD models in various formats that are compatible with industry-leading CAD tools. By working together, manufacturers can ensure that the CAD tools incorporate the latest design rules and best practices for components. This method will also broaden the customer base that can easily implement your component into their design.

3

OFFER LAYOUT SUGGESTIONS

Achieving the optimal PCB layout for circuit functionality can be time-consuming. By providing known-good layout suggestions through [reference designs](#), IC manufacturers can jump start the PCB design, save time for the engineer, and increase the likelihood of proper component operation.

4

PROVIDE 3D MODELS

Did you know 3D models are the #1 download format on Ultra Librarian?

Visualizing the end product in 3D is essential to ensure components do not interfere with each other or the mechanical housing. In order to verify the final assembly, realistic 3D models should be used for components in the design. IC manufacturers can provide STEP models, which are compatible with most industry-leading CAD tools, to accelerate the modeling process for designers.

The layout is the digital visualization of the PCB. All dimensions and details must be accurate to enable your CM to create the physical board that satisfies your design intent and satisfies the performance objectives. The next stage of the engineer's journey is meant to validate that these expectations can be realized.

CHAPTER 5: RELIABILITY ANALYSIS AND VALIDATION

TESTING PERFORMANCE UNDER REAL-WORLD CONDITIONS

PCB quality is measured by the board's ability to consistently perform as intended over its expected lifetime. The most determinant factor for a board to meet this mandate is the reliability of its components. Therefore, reliability analysis and validation of components and circuit board operation are essential for good PCB design. For certain industry applications, such as some IPC class 2 and all class 3 PCBs, reliable operation over extended periods of time is critical. To analyze reliability and validate the PCB design, the following analyses can be performed:



SIGNAL INTEGRITY (SI)

Evaluates how electrical signals travel through a PCB to prevent performance issues such as reflection, crosstalk, and noise—improving the quality of signal transmission.



POWER INTEGRITY (PI)

Analyzes the power delivery network (PDN) to ensure clean, stable voltage is delivered to all components without excessive noise, voltage drops, or fluctuations.



THERMAL ANALYSIS

Evaluates heat generation, dissipation, and distribution in high-power electronics, RF circuits, power supplies, and densely populated PCBs to prevent overheating, improve reliability, and ensure safe operation.



RF ANALYSIS

Ensures high-frequency signals (typically above 100 MHz), seen in systems with wireless communication and antennas, are transmitted without excessive loss, distortion, interference, or unwanted radiation.



CFD ANALYSIS

Computational Fluid Dynamics (CFD) analysis evaluates thermal and airflow behavior to optimize cooling strategies, prevent overheating, and ensure reliable performance of high-power and high-density PCBs.



COMPLIANCE

Ensures that a board meets industry standards, regulations, and design rules for electrical performance, safety, and electromagnetic compatibility (EMC) to guarantee it's suitable for the intended application.

CHAPTER 5: RELIABILITY ANALYSIS AND VALIDATION IC AND COMPONENT MANUFACTURER'S ROLE

Reliability analysis and validation are critical components of PCB design as they ensure that electronic products function as intended throughout their expected lifespan and under varying conditions. IC manufacturers can significantly influence the reliability analysis and validation stages in several ways:

1

ENSURE COMPONENTS ADHERE TO INDUSTRY STANDARDS

Provide reliable component data, including comprehensive reliability data and testing results. This information enables designers to make informed decisions about component selection and application in specific environments. It will also help engineers ensure components adhere to industry standards for typical usage (for example, USB-IF compliance to ensure interconnectivity of USB components).

2

PROVIDE TESTING MODELS AND ACCURATE RESULTS

Provide testing models and accurate results for performance comparison and verification. This will give engineers the confidence that your component will perform as intended for their desired circuit operation.

3

PROVIDE SUGGESTED CIRCUITS AND SUBCIRCUITS

Provide suggested circuits and subcircuits to simplify design and ensure component functionality. Suggested circuits and subcircuits should outline options for support circuitry and component placement to achieve optimal circuit and component performance.

CHAPTER 5: RELIABILITY ANALYSIS AND VALIDATION

IC AND COMPONENT MANUFACTURER'S ROLE

4

PROVIDE EXTENSIVE SIMULATION MODELS

In today's high-speed, cutting-edge PCB designs, engineers must simulate the PCB layout to identify potential failure modes, assess product performance, and confirm that designs meet industry standards and customer expectations. IC manufacturers can streamline this process by providing accurate component models for simulation and analysis. The following table outlines the type of analysis, industry-leading CAD tools, and the type of model required for simulation:

TYPES OF PCB DESIGN SIMULATION AND ANALYSIS		
ANALYSIS TYPE	TOOLS	MODEL REQUIREMENT*
Signal Integrity (SI)	Sigrity, Simulia, HyperLynx SI, Ansys SIwave	Detailed signal specifications
Power Integrity (PI)	Sigrity, HyperLynx PI, eCADSTAR	Material specifications
Compliance	OrCAD X, Altium Designer, PADS, SOLIDWORKS	Input Buffer Interface Specifications (IBIS)
RF	PSpice, AWR, CST, Ansys HFSS, Sonnet	Parasitic parameter specifications
Thermal	Celsius Studio, Altair Pollex, SOLIDWORKS, Ansys Icepak	Detailed geometric specifications
CFD	Fidelity CFD, Fidelity Pointwise, Celsius EC Solver, SIMULIA	Fluid region definitions and specifications

** Model requirements here are essential for the given analysis type. However, many of these model attributes are useful and utilized for multiple analysis types.*

IC and component manufacturers play an essential role in helping designers ensure their PCBs meet and exceed reliability standards by ensuring components adhere to industry standards and providing data and information that streamline simulation, analysis, and compliance testing. Once the design functionality has been verified, PCB data can be packaged for manufacturing.

CHAPTER 6: RELEASE PACKAGES

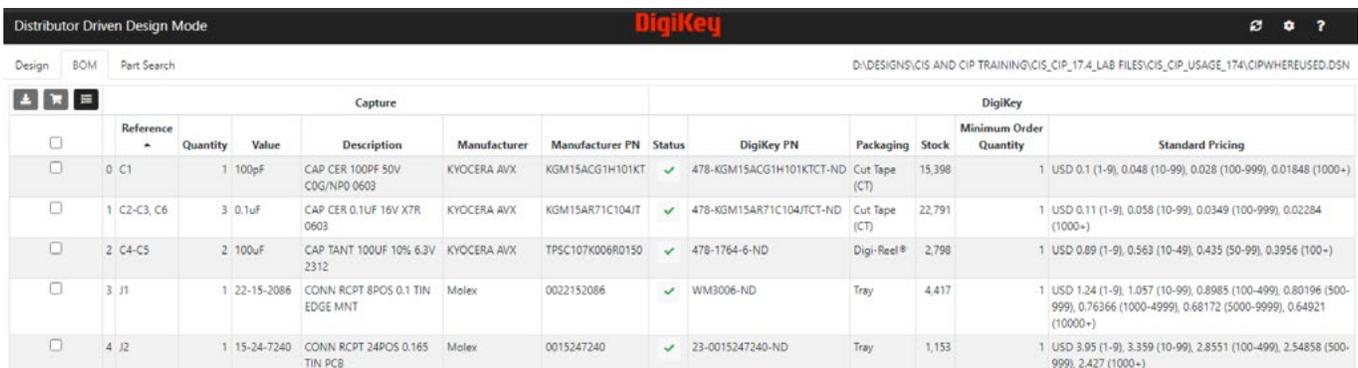
PREPARING DESIGNS FOR PRODUCTION

Satisfying the schematic and PCB layout objectives for your design does not necessarily mean it can be built to the defined specifications. In fact, taking a black-box approach to PCB development where the designer and CM work isolated from each other will likely lead to inefficient board builds and extended prototyping periods. Today, most designers and developers realize the importance of DFM and DFA rules and guidelines during design, which necessitates collaboration with the CM to generate comprehensive release documentation that streamlines board production. The release package typically includes all necessary documentation, design files, and specifications needed for manufacturing, such as:

BILL OF MATERIAL (BOM)

The bill of material, or BOM, is an essential document that is provided to both the procurement team for component purchasing and the manufacturer to aid in the assembly process. The BOM should contain critical component information including:

- ✓ A detailed listing of components in the PCB design
- ✓ Manufacturing data such as manufacturer and Manufacturer Part Number (MPN)
- ✓ Reference indicators
- ✓ Part quantities
- ✓ Purchasing information



DigiKey												
Distributor Driven Design Mode												
D:\DESIGNS\CIS AND CIP-TRAINING\CIS_CIP_17_4_LAB FILES\CIS_CIP_USAGE_174\CIPWHEREUSED.DSN												
Design BOM Part Search												
Capture												
Reference	Quantity	Value	Description	Manufacturer	Manufacturer PN	Status	DigiKey PN	Packaging	Stock	Minimum Order Quantity	Standard Pricing	
0 C1	1	100pF	CAP CER 100PF 50V COG/NPO 0603	KYOCERA AVX	KGM15ACG1H101KT	✓	478-KGM15ACG1H101KTCT-ND	Cut Tape (CT)	15,398	1	USD 0.1 (1-9), 0.048 (10-99), 0.028 (100-999), 0.01848 (1000+)	
1 C2-C3, C6	3	0.1uF	CAP CER 0.1UF 16V X7R 0603	KYOCERA AVX	KGM15AR71C104JT	✓	478-KGM15AR71C104JTCT-ND	Cut Tape (CT)	22,791	1	USD 0.11 (1-9), 0.058 (10-99), 0.0349 (100-999), 0.02284 (1000+)	
2 C4-C5	2	100uF	CAP TANT 100UF 10% 6.3V 2312	KYOCERA AVX	TPSC107K006RD150	✓	478-1764-6-ND	Digi-Reel®	2,798	1	USD 0.89 (1-9), 0.563 (10-49), 0.435 (50-99), 0.3956 (100+)	
3 J1	1	22-15-2086	CONN RCPT 8POS 0.1 TIN EDGE MNT	Molex	0022152086	✓	WM3006-ND	Tray	4,417	1	USD 1.24 (1-9), 1.057 (10-99), 0.8985 (100-499), 0.80196 (500-999), 0.76366 (1000-4999), 0.68172 (5000-9999), 0.64921 (10000+)	
4 J2	1	15-24-7240	CONN RCPT 24POS 0.165 TIN PCB	Molex	0015247240	✓	23-0015247240-ND	Tray	1,153	1	USD 3.95 (1-9), 3.359 (10-99), 2.8551 (100-499), 2.54858 (500-999), 2.427 (1000+)	

BOMs are the primary source for developing efficient procurement strategies, like [component kitting](#).

CHAPTER 6: RELEASE PACKAGES

IC AND COMPONENT MANUFACTURER'S ROLE

IC and component manufacturers can help facilitate efficient board fabrication and manufacturing by creating and making available documentation that helps engineers create comprehensive design files based on an understanding of prototyping techniques and considerations.

1 PROVIDE COMPREHENSIVE COMPONENT DATA

Providing comprehensive component data can aid PCB designers in achieving successful manufacturing. IC manufacturers should provide comprehensive datasheets with component details as well as additional information for manufacturing. To facilitate efficient fabrication and assembly, produce component models which include:

- ✓ Pad dimensions
- ✓ Silkscreen information
- ✓ Graphical elements like pinouts
- ✓ Special considerations for manufacturing, such as keepouts

By providing detailed and accurate component specifications and models, manufacturers can help ensure that the release package includes the necessary information for proper assembly and testing.

2 KEEP COMPONENT DATA CURRENT

Base available documentation on real-time or most current component data, including revisions. To aid designers in generating an accurate, ready-to-purchase BOM, IC manufacturers should provide accurate and up-to-date information about their components, including:

- ✓ Detailed specifications
- ✓ Availability
- ✓ Lead time
- ✓ Pricing

During part selection, this will help engineers determine if the lead time and cost of your component will adhere to their project timeline and budget. Once the BOM is generated, providing this real-time information will streamline part procurement, minimize the risk of errors and delays during manufacturing, and keep their PCB design on schedule.

CHAPTER 6: RELEASE PACKAGES IC AND COMPONENT MANUFACTURER'S ROLE

3

INTEGRATE COMPONENT DATA DIRECTLY INTO CAD TOOLS

All PCB design software programs include BOM creation functionality, as this document is essential to acquiring the components necessary for the design. As such, the range of capabilities of these tools can vary greatly. Often, CMs require specific formats to accept BOMs, which only adds to inefficiency and may introduce errors. A better alternative is to opt for a specialized tool, like [UltraBOM](#), which integrates one of the top distributors, DigiKey, with the industry leader for engineer engagement with engineers seeking component CAD models and essential design information, Ultra Librarian.

The screenshot displays the OrCAD X Professional interface. The top portion shows a PCB schematic with various components like capacitors (C1-C4), resistors (R1-R5), and integrated circuits (U1, U2). The bottom portion shows the DigiKey 'Distributor Driven Design Mode' window, which includes a BOM table for the design.

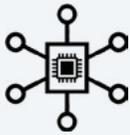
Reference	Value	Description	Manufacturer	Manufacturer PN	Status	Store	DigiKey PN	Packaging	Stock	Minimum Order	Standard Pricing	Manufacturer
C1	100µF	CAP CER 100PF 50V COG/NPO 0603	KYOCERA AUX	KGM15ACG1H101KT	✓	Store	478-KGM15ACG1H101KT-ND	Cut Tape (CT)	15,398	1	USD 0.1 (1-9), 0.048 (10-99), 0.028 (100-999), 0.01848 (1000-)	
C2	0.1µF	CAP CER 0.1UF 16V X7R 0603	KYOCERA AUX	KGM15AR71C104IT	✓	Store	478-KGM15AR71C104IT-ND	Cut Tape (CT)	22,791	1	USD 0.11 (1-9), 0.058 (10-99), 0.0349 (100-999), 0.02284 (1000-)	
C3	0.1µF	CAP CER 0.1UF 16V X7R 0603	KYOCERA AUX	KGM15AR71C104IT	✓	Store	478-KGM15AR71C104IT-ND	Cut Tape (CT)	22,791	1	USD 0.11 (1-9), 0.058 (10-99), 0.0349 (100-999), 0.02284 (1000-)	
C4	100µF	CAP TANT 100UF 10% 6.3V 2312	KYOCERA AUX	TPSC107K006R0150	✓	Store	478-1764-6-ND	Digi-Reel®	2,798	1	USD 0.89 (1-9), 0.563 (10-49), 0.435 (50-99), 0.3956	

With release packages created for the fabrication and assembly of the PCB, components must be purchased efficiently to keep production on track. This often requires additional attention to the component supply chain to ensure minimal component costs and timely sourcing.

CHAPTER 7: SUPPLY CHAIN CONSIDERATION

ALIGNING DESIGN CHOICES WITH REAL-WORLD LOGISTICS

For PCB design engineers, creating effective release documentation goes hand-in-hand with incorporating supply chain resilience into the PCB development process. Understanding the importance engineers place on supply chain issues is necessary for IC and component manufacturers to effectively engage and market to this constituency. When selecting components, engineers often analyze the risk of the following:



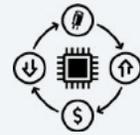
MULTI-SOURCING

Procuring components from multiple vendors, as opposed to a single source.



INVENTORY

The number of components currently available from distributors.



LIFECYCLE

The amount of time a component is projected to reliably operate.



RoHS

A list of hazardous substances restricted from use in electronics manufacturing.



CONFLICT MINERALS

Earth minerals extracted within conflict or designated high-risk areas.



YEARS TO END OF LIFE

Estimated number of years until the component is no longer in production or available for purchase.

PCB designers must work closely with suppliers to ensure that components are sourced in a timely manner and that they meet quality standards.

CHAPTER 7: SUPPLY CHAIN CONSIDERATION IC AND COMPONENT MANUFACTURER'S ROLE

Engineers typically select components that have a robust presence in the component supply chain. This will minimize risks associated with sourcing the required components for their PCB designs. IC manufacturers can help PCB and electronics designers manage supply chains by:

1

KEEP BUILD RATE IN MIND

Build components at a rate commensurate with current and future component usage. This will ensure that build rates are adequate to meet the current and projected need for components and [minimize lead times](#).

2

WORK WITH TOP DISTRIBUTORS

Be aware of and use the [top distributors](#). Working with the top distributors will help optimize lead times and guarantee part procurement is sourced from trusted suppliers.

3

UTILIZE DISTRIBUTION CHANNELS EFFECTIVELY

Implement a diverse strategy for [component distribution channels](#). This will increase confidence in part selection by decreasing the multi-sourcing risk and providing alternate sources for purchasing.

4

PROVIDE PCNS AND STATUS UPDATES

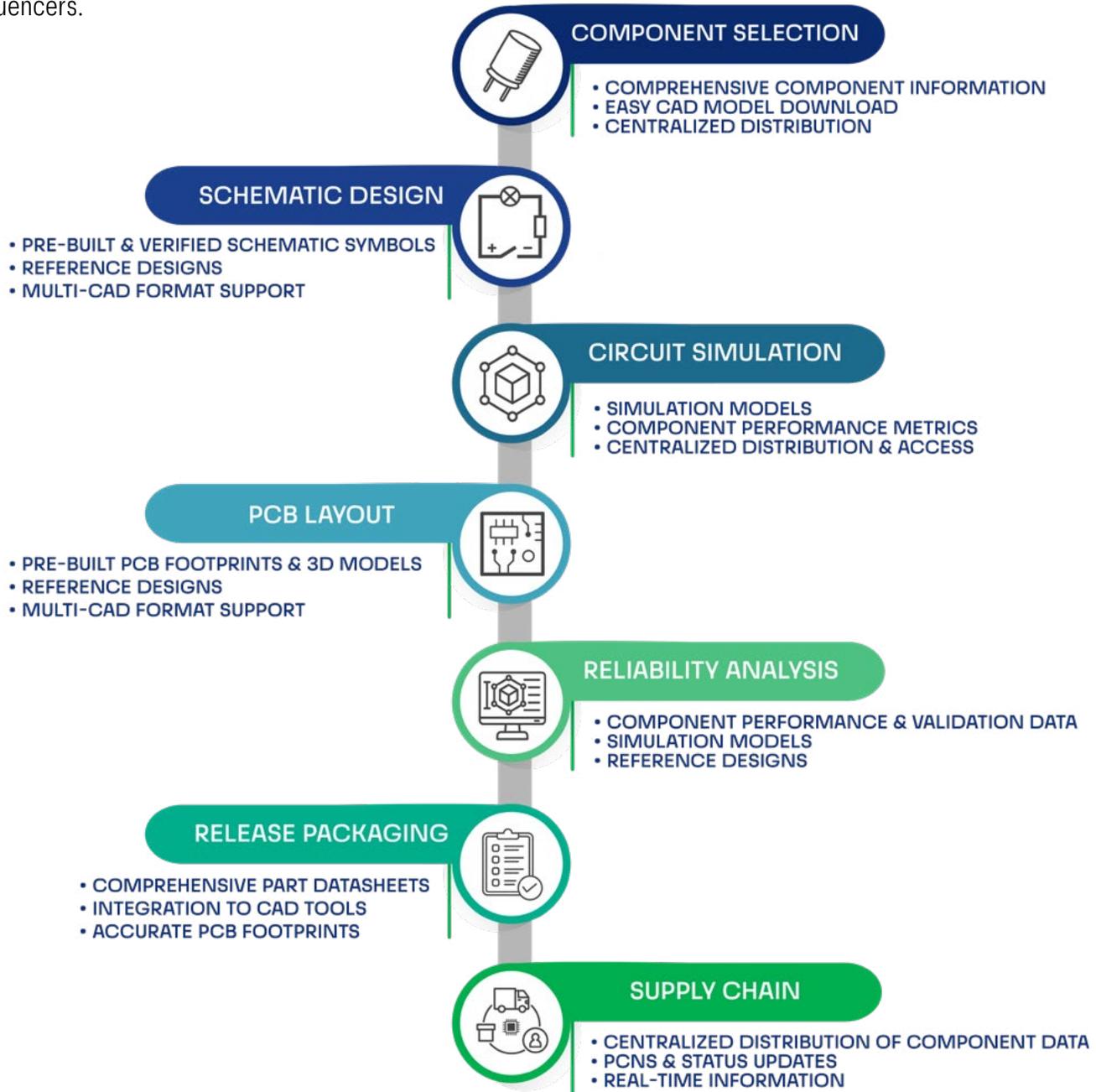
Build components at a rate commensurate with current and future component usage. This will ensure that build rates are adequate to meet the current and projected need for components and [minimize lead times](#).

Understanding key supply chain metrics and improving the availability of your components will minimize the risks associated with multi-sourcing, inventory, and cost - providing PCB design engineers confidence in the ability to reliably source your components.

BECOMING A COMPONENT INFLUENCER

DRIVING INNOVATION BY LEADING COMPONENT ADOPTION

IC and component manufacturers can and should be counted among the essential stakeholders for efficient and effective circuit board design. In addition to building the high-quality components that engineers prefer, there are several key steps along the PCB design engineer's journey where manufacturers can be significant influencers.



Becoming a PCB design influencer is a no-risk proposition for manufacturers. Yet, it does necessitate an awareness of current and [future trends](#) that do and will impact the workflow of circuit board designers and the industry.

INFLUENCING THE PCB DESIGN ENGINEER'S JOURNEY HOW ACCELERATED DESIGNS AND ULTRA LIBRARIAN HELP

Partnering with Accelerated Designs and Ultra Librarian enable IC and component manufacturers to influence the PCB design engineer's journey at every stage of the product development process.

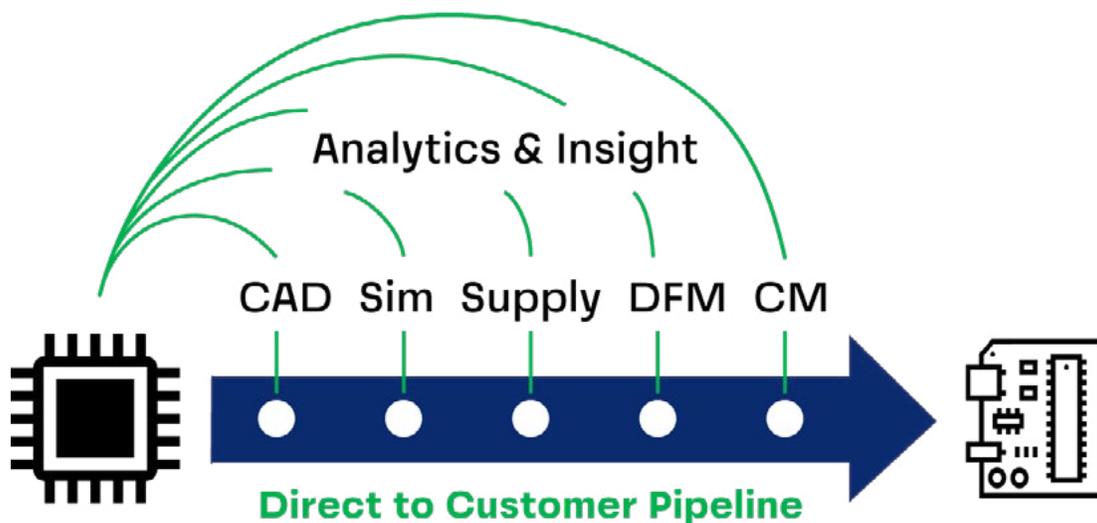
[Accelerated Designs](#) offers a suite of services and tools that can significantly help IC manufacturers influence PCB designers throughout the entire design journey. Accelerated Designs can help digitally transform and optimize the PCB design process by providing the latest EDA software, diverse data and systems integration expertise, and the industry's most comprehensive PCB CAD-content digital library through Ultra Librarian.

The screenshot displays the Ultra Librarian web interface for a component. It is divided into three main sections: **Symbol**, **Footprint**, and **3D Model**. The **Symbol** section shows a list of pins and their connections, with a **RESET** button. The **Footprint** section shows a top-down view of the component's physical layout, also with a **RESET** button. The **3D Model** section shows a 3D perspective view of the component. Below these sections are dropdown menus for **Normal View** (set to 'Normal View'), **Basic View** (set to 'Basic View'), and a component identifier 'STM32F303_334RXT_1'. A **Download Now** button is prominently displayed. Below the main interface, there is a **Reference Designs** section featuring a link to 'STMicroelectronics STEVAL-DPSLLCK1' with a description and a **Download** button. At the bottom, an **Additional Info** section includes icons for **Datasheets**, **Pricing & Availability** (with a '24' icon), and **Tech Specs**.

Partnering with Ultra Librarian allows IC and component manufacturers that provide access to their library of component models, CAD footprints, and schematic symbols to connect with the greatest number of engineers at a single online location who are actively seeking components and design information. UL helps streamline the design process, enabling designers to efficiently incorporate components into their projects. This accessibility helps ensure that designers have the most accurate and up-to-date information about the components they use, reducing the likelihood of errors and enhancing overall design quality.

SHORTEN THE DISTANCE BETWEEN YOUR CHIP AND THE CUSTOMER

Typically, the PCB design engineer's journey is minimally influenced by IC and component manufacturers—resulting in a haphazard approach to component selection. By establishing a partnership with Accelerated Designs and Ultra Librarian, you can shorten the distance between your chip and the customer and increase your likelihood of design-ins by providing the component information designer's need at every stage of the PCB design process:



Accelerated Designs and Ultra Librarian can enable IC and component manufacturers to:

- ✓ Control your destiny
- ✓ Win more customers
- ✓ Increase BOM share
- ✓ Syndicate for unparalleled reach
- ✓ Provide customers value with on-demand simulation and optimization engines

Leveraging the tools and expertise available from Accelerated Designs and Ultra Librarian will help IC manufacturers transform their engagement with the engineers who need and use their products from static and unpredictable into a dynamic quality enhancement and cost-optimization symbiotic relationship.

APPENDIX

Below is a list of references and useful links.

[Electronic Components Management Solutions](#)

[Electronics Components: Guide for Circuit Design and PCB Layout](#)

[Electronic Component Sourcing: Meeting Engineer's Needs](#)

[Electronic Component Industry Trends: 2024](#)

[Product Marketing Strategy for IC Manufacturers](#)

[Engineering Marketing Strategies: Content That Works](#)

[How to Market a Manufacturing Company](#)

[Understanding How Engineers Think](#)



DESIGN PROCESS

- EDA SOFTWARE
- DIVERSE DATA EXPERTISE
- UL INTEGRATION

Unlock faster innovation and optimal outcomes with Accelerated Designs. With access to the latest EDA software, diverse data, and the industry's most comprehensive PCB CAD-content digital library, we provide the tools, technologies, and expertise to reduce development costs, speed time to market, and overcome common design challenges.



LIBRARY

- COMPONENT MODELS
- CAD FOOTPRINTS
- SCHEMATIC SYMBOLS

Discover how [Ultra Librarian](#) can further optimize your design process. By streamlining CAD creation and amplifying part downloads, Ultra Librarian empowers manufacturers to boost productivity and drive success in today's competitive market.

[Contact Accelerated Designs](#) to start optimizing your design process today.