

# AI in PCB System Design: A glimpse into the Future?

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Applications Engineer Consultant - ECC





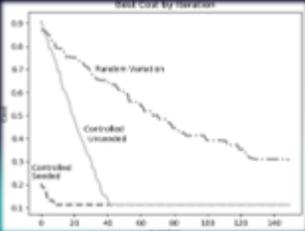
**Aerospace | Transportation | Energy | Industrial | Medical | Mobility | Semiconductor**

**Siemens has been **deploying AI, at-scale,**  
delivering significant **quality of life**  
**improvements** to people all over the globe with  
**over 1400 AI developers & 3700 patents****

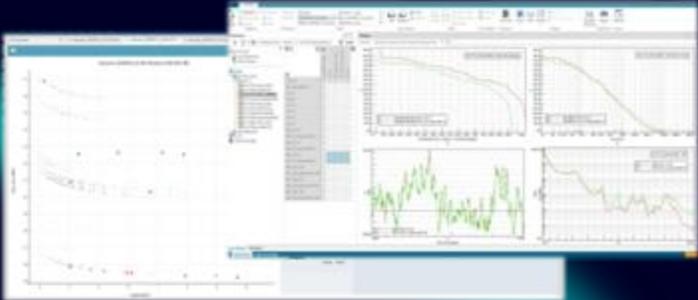
# Siemens AI expertise delivered for design....



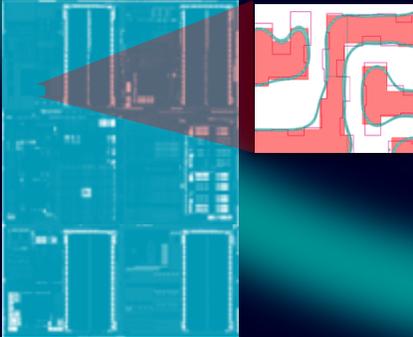
NX adaptive user interface



HyperLynx  
Design space exploration &  
PDN optimization



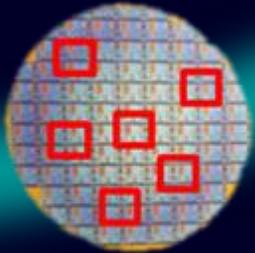
Simcenter design decision support, model-based system testing & smart controls



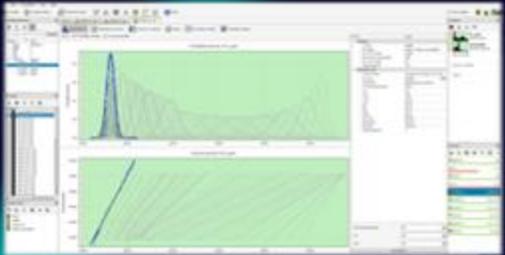
Calibre OPC & LFD  
IC verification



Supplyframe supply  
chain analysis



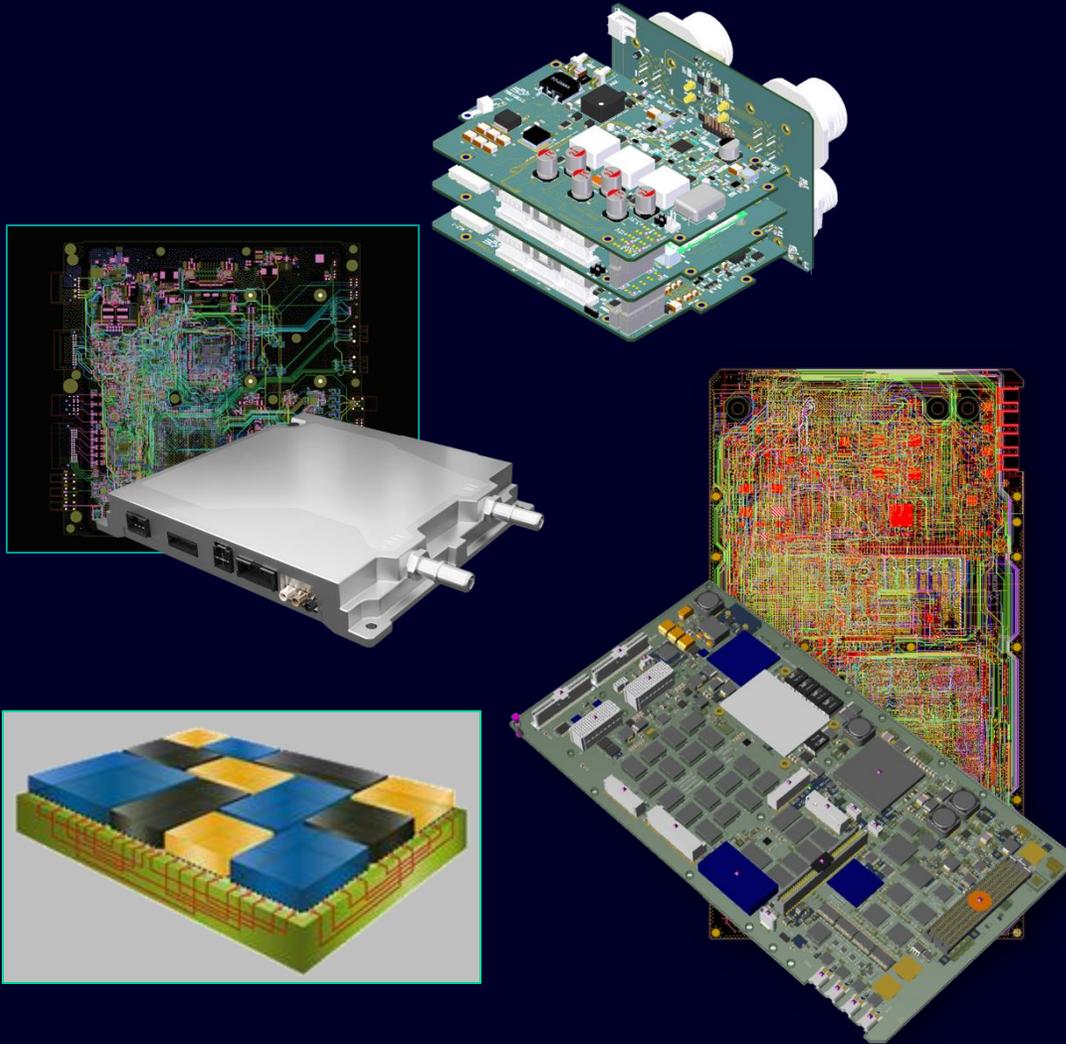
Tessent yield analysis



Solido variation designer

Why does  
electronic system  
design need AI  
solutions?

## The scaling dilemma



Systems design activity is **rising**

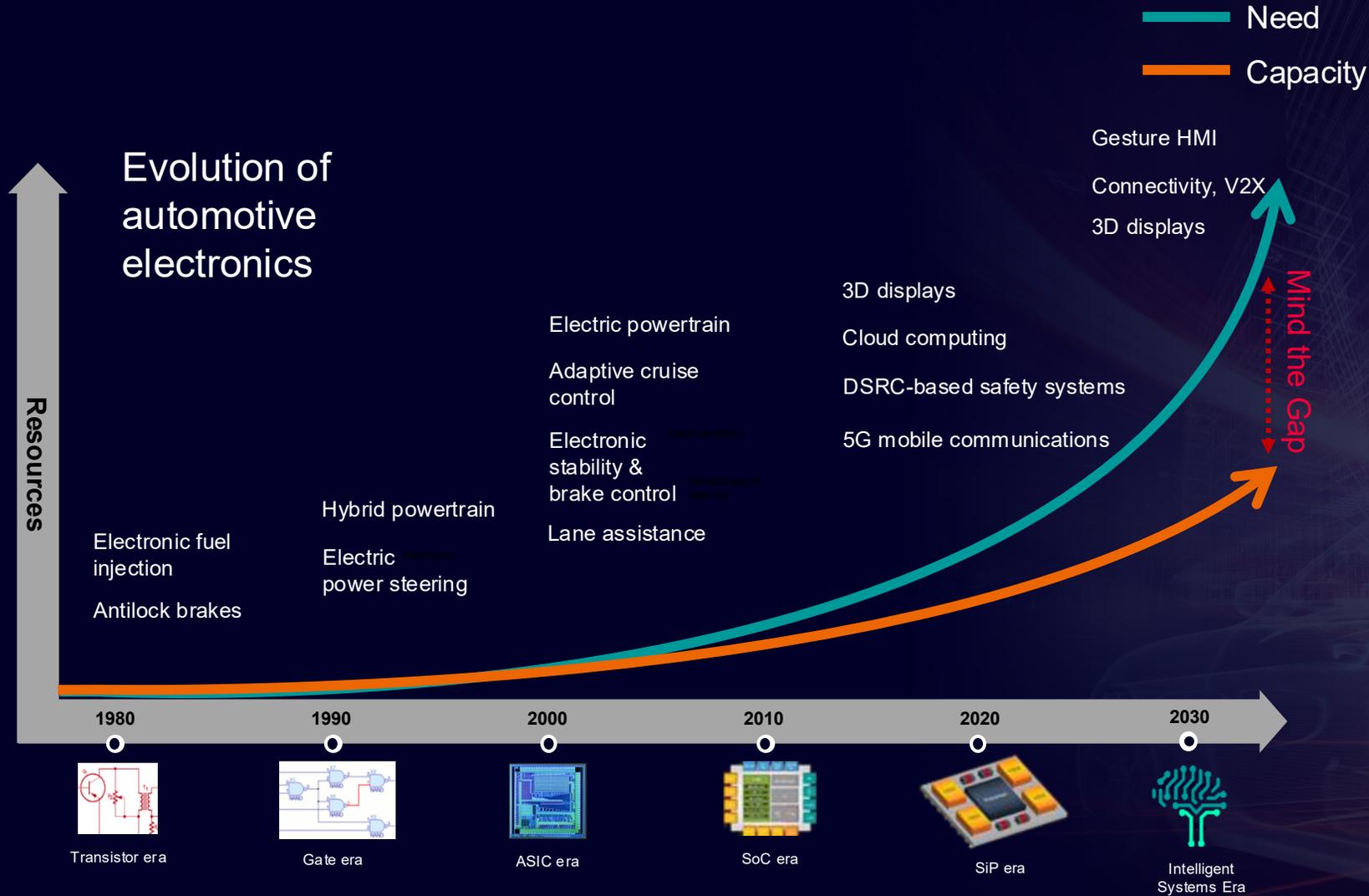
Systems complexity is **exploding**

Costs and schedules are **skyrocketing**

Universities are not graduating **enough EEs and hardware engineers**

Existing talent is slowly **exiting the workforce**

# The resource gap is accelerating



A gap is growing between **what is needed** and **what is possible**

Solutions need to deliver **orders of magnitude** improvement **not percentages**

AI is closing this gap **reducing the needed resources** and **increasing available capacity**

# AI-infused electronic systems design

## Success requires verifiable AI targeted to EDA applications

**Verifiable AI** empowered tools delivering trusted, repeatable value and **you own your data**

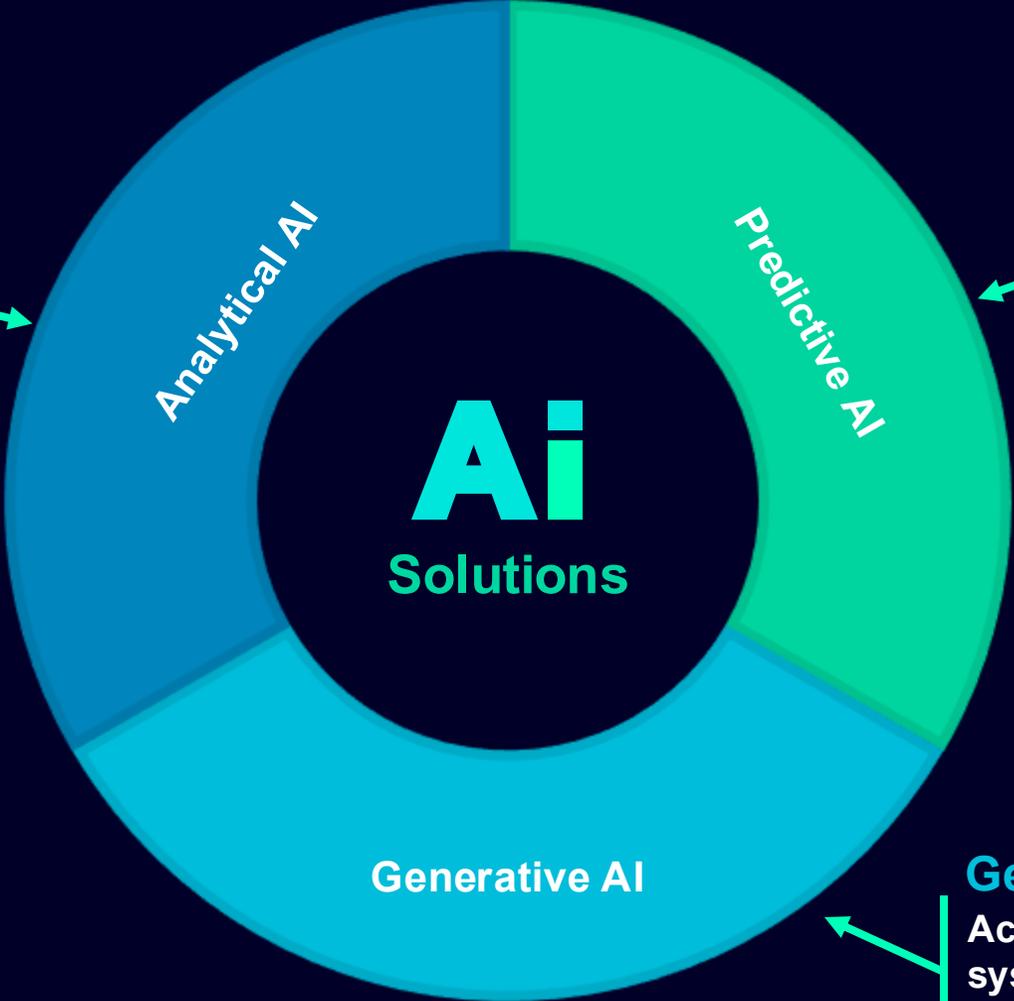
- Delivering orders of magnitude productivity improvements
- Providing new design insights
- Accelerating workforce knowledge

A large, stylized logo for 'Ai' in red and orange. The 'A' is a solid red block letter. The 'i' is composed of a red vertical bar with a white dot, and a red horizontal bar above it, all set against a white background.

# AI spans modeling technologies to deliver productivity

## Analyze

Identification of key data insights not practical with traditional methods



## Optimize

Domain-specific predictive models to reduce computational requirements and accelerate decision making



## Generate

Accelerate design creation, system optimization, and model abstraction



# AI-infused electronic systems design

*Addresses key business challenges*

## Quality

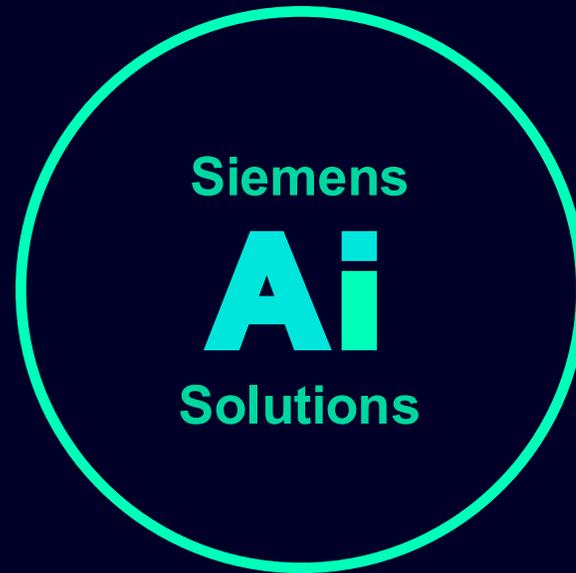
Enable high quality design  
with AI tools

## Schedule

Manage schedules as  
complexity increases

## Resources

Non-linear increase across  
the toolchain and processes



Faster design closure

Fewer re-spins

Reduced design errors

Accelerated debug

Prioritized resources

Increased proficiency

Improved quality

Optimized logistics

# Enabling technologies for electronic systems design

*Anticipated delivery*

Analytical AI

Via, fanout optimization  
Channel optimization

Net unravelling

Advanced simulation

Predictive AI

Decoupling optimization  
Supply chain prediction  
Process prediction

Constraint prediction

Component placement

Component prediction

Generative AI

Product support

Interactive data sheets

Automation generation

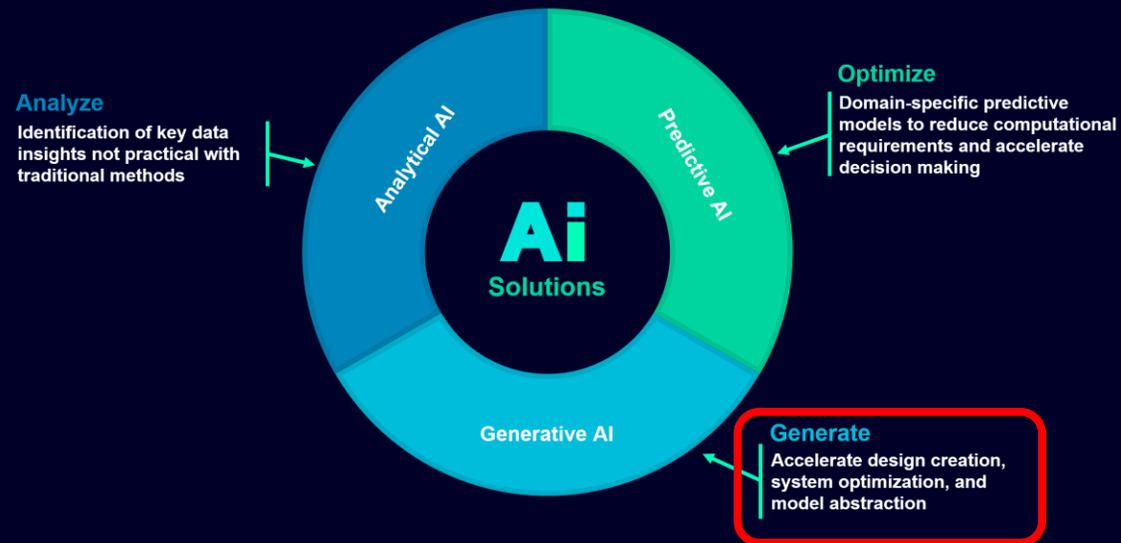
Library model creation

Schematic connectivity

Process execution

Auto route

Design synthesis



**CELUS integration**

# About CELUS



Founded in **2018**



Headquarters in **Munich, Germany**

Commercial Headquarters **Austin, Texas**

Design Center **Porto, Portugal**



**100** employees and growing



**30 million €** in funding from renowned **VCs**



# Data & Insights : CELUS Platform Summary

Projects Created

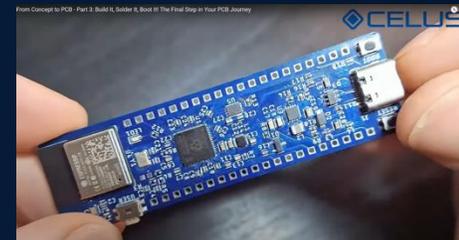
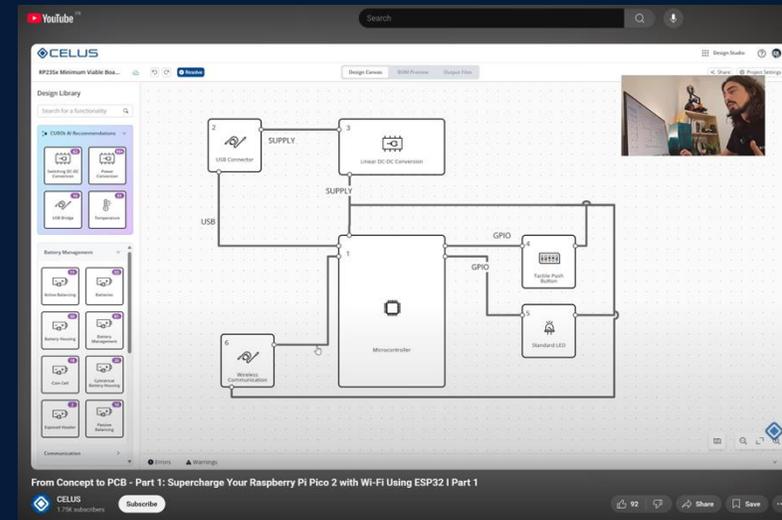
22K

Platform Users

20K

Components In Use

225K



User Type	Projects Completed	User Type	% Users	% Projects	% Component
Professional Eng.	1.71k	Professional Eng.	21.79%	28.61%	27.58%
Innovators & Inventors	1.40k	Innovators & Inventors	31.14%	32.02%	39.89%
Academics	800	Academics	20.43%	22.43%	19.72%
Unknown	752	Unknown	26.64%	16.94%	12.81%

# CELUS Design Platform: Digital Transformation



Ideas & Requirements



Template or Clone Selection

Capture - Evaluate - Validate - Handover

BOM



Fully-Connected Schematics



# CUBO™ : The Smart Digital Datasheet & Sub-Circuits



CUBO™
Essential Information at Your Fingertips
An AI-Powered Digital Datasheet
Streamlined Design & Component Selection
Accelerate Innovation & Reduce Errors
Faster Time-to-Market for Your Products

# Co-Brand: A Comprehensive, Personalized Platform

The screenshot displays the Siemens Design Studio - CELUS web interface. At the top, the browser address bar shows the URL `siemens.celus.io/design-studio`. The page features a Siemens logo on the left and a CELUS logo on the right, with the text "Powered by CELUS" and "Design Studio" next to it.

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This project aims to create a portable retro gaming console. It...  
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Created 11/20/2024, 4:16 AM  
[Go to project](#)
- ertyjuio**  
This project aims to detect a cooking temperature. It will do...  
Last updated 11/15/2024, 2:52 AM  
Created 11/15/2024, 2:41 AM  
[Go to project](#)
- Retro Game Console\_COPY**  
This project aims to create a portable retro gaming console. It...  
Last updated 11/13/2024, 9:44 AM  
Created 11/13/2024, 9:43 AM  
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- LPC5569jBD100K Minimu...**  
This project aims to achieve a versatile minimum viable board...  
Last updated 11/13/2024, 7:51 AM  
Created 11/13/2024, 7:51 AM  
[Go to project](#)
- demo1**  
This project aims to cooking sensor app. It will do these thing...  
Last updated 11/12/2024, 5:21 AM  
Created 11/12/2024, 2:50 AM  
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This project aims to be a smart cooking utility device. It will emit sounds depending on...  
**CELUS Onboarding**  
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This project aims to achieve a versatile minimum viable board (MVB) based on the...  
**CELUS**  
Last updated 11/05/2024, 7:21 AM  
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- LPC5569jBD100K Minimum Viable ...**  
This project aims to achieve a versatile minimum viable board (MVB) based on the...  
**NXP**  
Last updated 11/06/2024, 7:49 AM  
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- Retro Game Console**  
This project aims to create a portable retro gaming console. It will simulate classic gam...  
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<p>Version 2 PADS Pro</p> <p>pcie-comm-module</p> <p>5/9/2025, 10:26 AM   Olivier Arnaud</p>	<p>Version 1 Celus</p> <p>My_guitar_effect1</p> <p>2/28/2025, 4:48 PM   Olivier Arnaud</p>	<p>Version 2 PADS Pro</p> <p>Embedded Passives</p> <p>1/28/2025, 3:16 PM   Olivier Arnaud</p>	<p>Version 2 PADS Pro</p> <p>SCM-TXRX-PF ver 03</p> <p>10/3/2024, 4:45 PM   Charl Peters</p>	<p>Version 2 Xpedition 2.14</p> <p>Current gen</p> <p>9/12/2024, 5:39 PM   Olivier Arnaud</p>	<p>Version 5 PADS Pro</p> <p>BeagleBoneBlackV1</p> <p>2/26/2025, 2:58 PM   Olivier Arnaud</p>	<p>Version 2 PADS Pro</p> <p>MS401</p> <p>7/9/2024, 4:45 PM   Olivier Arnaud</p>
<p>Version 2 PADS Pro</p> <p>MS401_CG</p> <p>7/9/2024, 4:55 PM   Olivier Arnaud</p>	<p>Version 1 PADS Pro</p> <p>Network</p> <p>6/19/2024, 4:53 PM   info and support PCBFlow</p>	<p>Version 2 PADS Pro</p> <p>BeagleBoneBlack</p> <p>3/14/2024, 1:35 PM   Olivier Arnaud</p>	<p>Version 2 PADS Pro</p> <p>EBSD_LP220</p> <p>2/28/2024, 1:55 PM   Olivier Arnaud</p>	<p>Version 2 PADS Pro</p> <p>Preview_Split</p> <p>2/19/2024, 12:35 PM   Olivier Arnaud</p>	<p>Version 6 PADS Pro</p> <p>System Controller</p> <p>1/28/2025, 10:40 AM   Olivier Arnaud</p>	<p>Version 4 PADS Pro</p> <p>BeagleBone Black</p> <p>8/8/2024, 11:46 AM   Olivier Arnaud</p>
<p>Version 1 PADS Pro</p> <p>AMS</p> <p>2/1/2024, 6:15 PM   Olivier Arnaud</p>	<p>Version 3 PADS Pro</p> <p>Turbot</p> <p>10/20/2023, 3:42 PM   Olivier Arnaud</p>	<p>Version 1 PADS Pro</p> <p>Nanobox</p> <p>10/20/2023, 3:42 PM   Olivier Arnaud</p>	<p>Version 1 PADS Pro</p> <p>Aspen</p> <p>10/20/2023, 3:41 PM   Olivier Arnaud</p>	<p>Version 1 PADS Pro</p> <p>Hand Drill</p> <p>10/20/2023, 3:41 PM   Olivier Arnaud</p>	<p>Version 6 PADS Pro</p> <p>LED Flasher</p> <p>8/6/2024, 4:36 PM   Olivier Arnaud</p>	<p>Version 5 PADS Pro</p> <p>Parallela</p> <p>12/21/2023, 10:54 AM   Olivier Arnaud</p>
<p>Version 3 PADS Pro</p> <p>Corporate</p> <p>9/27/2023, 11:37 AM   Olivier Arnaud</p>	<p>Version 1 PADS Pro</p> <p>Aspen</p> <p>7/10/2023, 3:48 PM   Bas Hassink</p>					



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**My\_guitar\_effect1**

This project aims to create a special effect for a guitar. It will d...

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Design Library

Search for a functionality

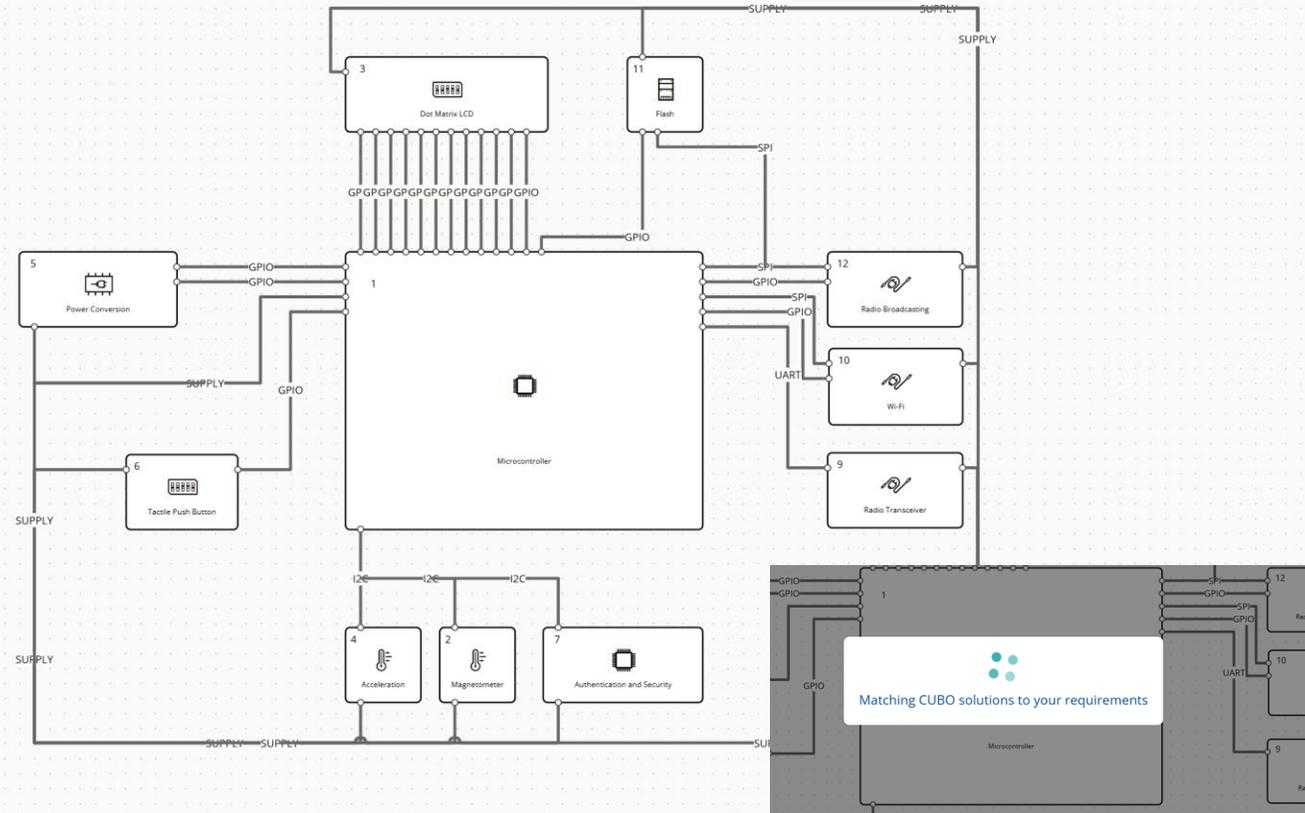
Recommendations

- Switching DC-DC Conversion (65)
- Power Monitor (14)
- Wireless Communication (99+)
- Signal Conditioning (39)

Battery Management

- Active Balancing (25)
- Batteries (55)
- Battery Housing (51)
- Battery Management (99+)
- Coin Cell (18)
- Cylindrical Battery Housing (26)
- Exposed Header (3)
- Passive Balancing (23)

Communication



Matching CUBO solutions to your requirements

Selected CUBO ▼

**JN5169/001Z WIFI MCU w/ Antenna and Program...**

**CELUS recommended**

Ultra low power, high performance wireless microcontroller suitable for ZigBee applications. MCU with a 50 Ohm single-ended Antenna and...

[See more](#)

Lock [See more CUBO options](#)

**Wi-Fi block settings**  
Communication / .../ Wi-Fi

Block Name:  Icon Color:

Wi-Fi Frequency

Select specification types

- 2.4 GHz
- 5 GHz

11 | CELUS Design Platform Schematics - 10 - JN5169/001Z WIFI MCU w/ Antenna and Programming connectors V1 Sheet 7/11

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Download your project

- PDF**  
Project document containing project description, schematics and BOM.
- BOM**  
CSV file containing the project Bill of Materials.
- Project Package**  
EDA files containing the schematics and component footprints.

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My\_guitar\_effect1

BOM Last updated: 24 Apr 2025 | Unique Components: 33 | Est. Price: 49.41 USD | Lead time: 24 weeks

Manufacturer	MPN	Package	Value	Quantity	Functional Block(s)	Lifecycle	Est. Unit Price	Est. Stock	Lead time	Description	Datasheet
KYOCERA AVX COMPONENTS CORP	12061C105K6Z4A	1206	1 µF	3	3_Batteries LTC2959 Ultra-Low Power Batt...	Active	0.2825 USD	550548	15 week(s)	Ceramic Capacitor, Multilayer, Ceramic, 100V, 10% +Tol, -10% -Tol, X7R, 15% TC, Tuf, Surf...	View PDF
KYOCERA AVX COMPONENTS CORP	08051C104KAT2A	0805	100 nF	1	3_Batteries LTC2959 Ultra-Low Power Batt...	Active	0.0434 USD	6441805	13 week(s)	Ceramic Capacitor, Multilayer, Ceramic, 100V, 10% +Tol, -10% -Tol, X7R, 15% TC, 0.7uF, Surf...	View PDF
KYOCERA AVX COMPONENTS CORP	08051C474K6Z2A	0805	0.47 µF	1	3_Batteries LTC2959 Ultra-Low Power Batt...	Active	0.2645 USD	2636079	10 week(s)	Ceramic Capacitor, Multilayer, Ceramic, 100V, 10% +Tol, -10% -Tol, X7R, 15% TC, 0.47uF, Surf...	View PDF
PANASONIC CORP	ERJ2BF10X	0402	100 mOhm	1	3_Batteries LTC2959 Ultra-Low Power Batt...	Active	0.1372 USD	285672	16 week(s)	Fixed Resistor, Metal Glaze/thick Film, 0.166W, 0.1ohm, 0.1288V, 1% +/-Tol, 0.300ppm/Cel...	View PDF
PANASONIC CORP	ERJ2RF2001X	0402	2 kOhm	1	3_Batteries LTC2959 Ultra-Low Power Batt...	Active	0.0311 USD	4774351	20 week(s)	Fixed Resistor, Metal Glaze/thick Film, 0.1W, 2000ohm, 50V, 1% +/-Tol, 100ppm/Cel, Surface...	View PDF
ANALOG DEVICES INC	LTC2959IDDB#TRMFBF	-	-	1	3_Batteries LTC2959 Ultra-Low Power Batt...	Active	7.92 USD	56	10 week(s)	Power Supply Management Circuit, Adjustable, 1 Channel, +1.45V, CMOS	View PDF
Same Sky	CEM-1201(42)	-	-	1	2_Audio Output CEM-1201(42) Buzzer V1	Unknown	-	-	-	Same Sky - CEM-1201(42)	-
SAMSUNG ELECTRO-MECHANICS	CL05A105K05NNNC	0402	1 µF	5	2_Digital to Analog Converter...	Active	0.0181 USD	11370320	19 week(s)	Ceramic Capacitor, Multilayer, Ceramic, 18V, View PDF	View PDF

Supply and price information indicative and correct as at 19 May 2025

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Celus

My\_guitar\_effect1

2 minutes ago | Olivier Arnaud



Version 2

PADS Pro

pcie-co

5/9/20



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Projects

## Connect

Projects > My\_guitar\_effect1

This project aims to create a special effect for a guitar. It will do various things. It should work this way. This comprises of these functions and requirements. It should operate under these power conditions. It should meet . It must work this operating environment and under these constraints and limits. The project cost is

Design BOM Files Users History

Project Version

Version 1 | Created 5 minutes ago by Olivier Arnaud

Download Project

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Name	Open as	Type	Modification Date	Last modified by
My_guitar_effect1		SCHEMATIC_E...	5 minutes ago	Olivier Arnaud

# Your reaction ?



# Thank You !

[olivier.arnaud@siemens.com](mailto:olivier.arnaud@siemens.com)

