



FROM DESIGN *to production*

**SUCCESSFULLY
OUTSOURCING
AN ELECTRONIC
PRODUCT**

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Editorial

In a world that is committed to the path of exponential digitalization, the industrial ecosystem is facing various major structural challenges.

Globalized competition

Economic and financial issues are exacerbated by an acceleration in Time to Market. Companies that lead projects need to be able to rely **on accepted partners in order to innovate and produce products and electronic features together.**

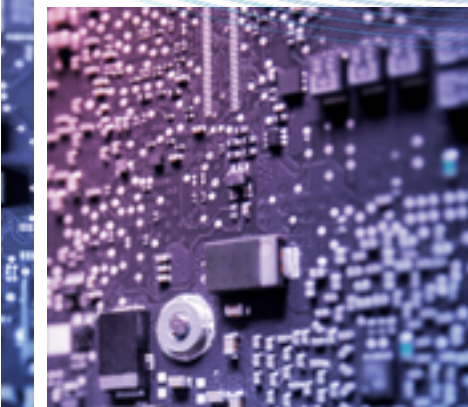


IoT, cybersecurity, connectivity and more

Continuous evolution of expectations and accelerated technological change risk the rapid obsolescence of the products created by project leaders. **When it comes to the industrial production of electronic products, strategic choices need to be made right from the design stage.**

Innovating is a multidisciplinary challenge

Even if companies have their own internal engineering office, they sometimes have difficulty gathering and combining talent. To effectively deal with circumstances that are made even more critical by globalized competition, **the richness of the “innovation” ecosystem is crucial.**



LACROIX's Electronics Activity

The Electronics Activity works alongside project leaders, **mobilising their teams and multi-skilled talent** so that they can keep their **promise to be demanding, ambitious and committed to sustainable innovation.**

From design to production

Successful sub-contracting of an electronic product presupposes a **climate of mutual trust**. The commitment of LACROIX's teams is the first condition for success. However, outsourcing is a choice that can be tricky. With its **end-to-end support option**, LACROIX offers a **dynamic of innovation** that is truly collaborative.

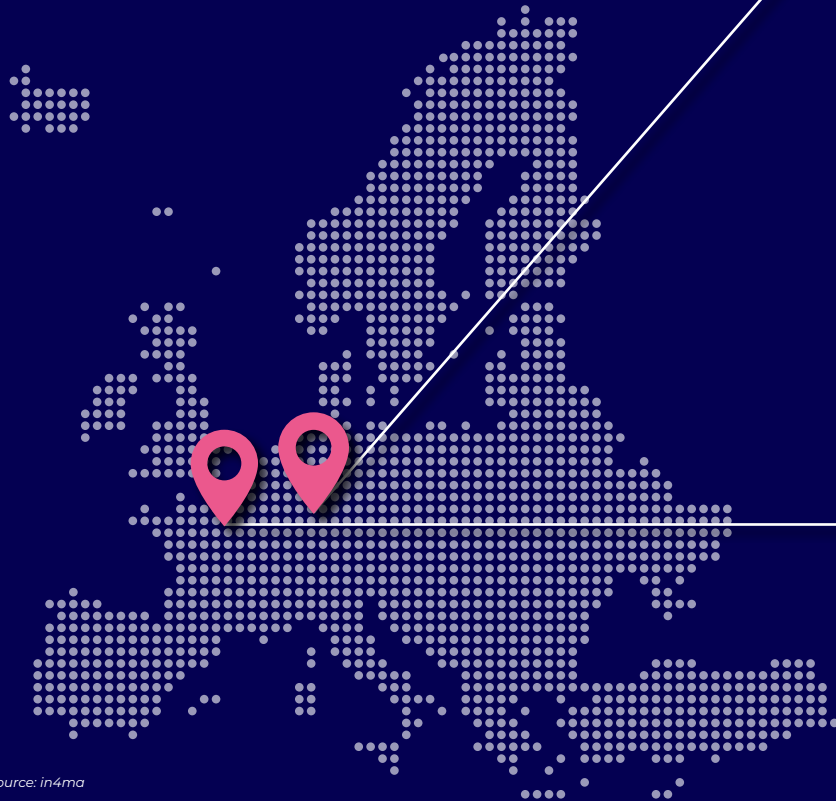
In this white paper,

LACROIX explains, with facts and analyses, **why, how, and to what extent you will be able to innovate more quickly, effectively and in a more sustainable manner** if you have end-to-end support, from the design of your electronic products right through to their production. ●

Key figures

The European Market for EMS
(Electronic Manufacturing Services)

More than
€44 Billion
in turnover for EMS in Europe in 2021



Source: in4ma

The ecosystem of EMS in Germany

Number of companies
550

Workforce
24,000

Turnover
5,000 M

Source: in4ma

The ecosystem of electronic subcontracting in France

Number of companies
500

Workforce
24,000

Turnover
5,000 M

Source: SNESE

The market for connected objects or IoT

35 Billion
IoT devices in 2021

x2
in 4 years



152,200

IoT devices that connect to the internet every minute, according to Dataprot

Connected objects in 2021



7.7%

are used in the field of security



8.3%

in the retail industry



30.3%

in the health sector (SafeAtLast)



We have chosen to present the concerns of Emma Louis: a product manager for a company that specializes in home & building automation. She may be a fictional character, but she is inspired by real life. Here is her journey...

Name

Emma Louis

Age

28

Position

Engineer, Product Manager

Her needs

Emma is conscious of the fact that the project that has just been assigned to her will be a springboard for her career. As such, she would like to be put in touch with professionals with the requisite technical expertise for her project to ensure she has well-defined goals to begin fluent, effective communication with a contract manufacturing partner. This is why **she is seeking to surround herself with reliable service providers**, in order to complete the project successfully. In searching for support in design and production in the context of new technology, she wants to look far and wide. Redesign, obsolescence management, integration of new functions, innovation skills, product marketing, and the technological aspect are some of the challenges that she hopes to overcome. However, **she wonders what type of outsourcing she should consider: board-level or higher level assembly**. She is struggling to decide... ●

Her belief

“Trusting my service providers is the best guarantee that my projects will succeed.”

Subcontracting in order to access design expertise

As a product manager, Emma Louis knows that **the success of an electronic product** is determined by three essential variables: **respecting deadlines, controlling costs, and guaranteeing quality**. In particular, Emma wonders about **her ability to explain her needs clearly** – her immediate needs, but also, in particular, her future needs! In 2022, if the Time to Market

continues to get shorter, it is important to be able to conceive of the product throughout its entire life cycle. This reality means increasing expertise right from the design phase. While considering outsourcing, **she asks herself specifically about the way in which the contract manufacturing that supports her will be able to open as many avenues as possible for her.** ●

Different perspectives Multidisciplinary for the purpose of innovation

How do you seek to support project leaders?

Erwan Villalard: We do all we can to **help them clearly express their needs.** This means that we take on a listening role, and we ask different questions as all the people we speak to don't have the same level of expertise in all fields (cybersecurity, IoT, connectivity, etc.). **Knowing how to listen, decode, support,** and knowing when to say no when a project isn't feasible is how we position ourselves as an **innovation partner.**

Serge Laverdure : We aim to **go beyond simply being a "maker"** as we seek to break into consulting. Our varied expertise on numerous projects allows us to have a real perspective, and it is this value-added support that we wish to provide.



Erwan Villalard
Sales &
Marketing
Manager -
Design Services



Serge Laverdure,
General
Manager -
Design Services

What resources does LACROIX provide for the companies that it supports?

E.V.: Here at LACROIX, we have more than 100 employees, most of whom are engineers, who work on solutions architecture missions, hardware, software, project managers, mechanical design, etc. All this **energy and expertise is mobilised to define the expectations of the project leaders from end to end.**

S.L.: This idea of A-to-Z support is essential. **Our teams have full control over the innovation chain.** This is what allows us to provide the best technical solutions to very specific issues for the market in question. We support our customers in their choice of power supply, communication protocol, security technology, etc. These are all major aspects that need to be taken into consideration at all stages of the project.

What are the assets of your methodology and your company?

E.V.: The **multi-disciplinary structure of our teams** is, without a doubt, our biggest asset. However, in the changing, fluctuating sectors of connectivity, IoT and cybersecurity, it is also essential to be able to rely on an ecosystem of external expertise. **Continually upskilling and enriching our expertise** isn't just our method, it is also our driving force.

S.L.: All the teams are closely involved in each project. Our team of external experts is an extension of our engineers. It is a network that places collective intelligence above all else. Each project is a challenge. We keep an agile mindset, which allows us to **make progress so that we can satisfy our customers and meet their objectives in terms of quality, deadlines and costs.** ●

Outsourcing in order to optimize Time to Market and Total Cost of Ownership



If Emma Louis is considering subcontracting her project, it is because she is conscious that her company's

R&D teams are not structured in a way that will allow them to take on an additional project, and at the same time, she fears a certain degree of resistance in the beginning. Resistance can

translate into delays which may sometimes be harmful to the dynamic of an innovation project and have an impact on development costs. She would like to be certain that subcontracting will allow her to cover all the issues involved in the innovation. Her biggest concerns are getting access to tailored support and having complete transparency with regard to the progress of the project. ●

(...) getting access to tailored support and having complete transparency with regard to the progress of the project



Erwan Joret,
Business Development Engineer

LACROIX's Electronics Activity: a methodology for success

In order to support project leaders, we have **defined a method that is structured around a checklist**

which serves as a roadmap for all the phases of the project. This is an invaluable tool that **ensures both coherency in the work of each individual and absolute transparency** for the project leader.

Our customers expect us to be both proactive and reactive, and the project teams are designed to respond to these two requirements. The support provided from design right through to production also includes **LACROIX's ability to create prototypes on a dedicated line.** This allows our customers to test their concept and carry out functional validation. This step also helps with anticipating production issues and creating analyses in relation to producibility.

The goal? To reduce time frames, as well as risks, and to minimize development costs!



3 questions for William Naret

End-to-end support: between promises and reality...



Successfully outsourcing a project is both a technical and a human issue. The essence of this approach is the need to rely on tailored support. William Naret shares his vision.

1. What are the realities that should cause a project leader to consider subcontracting?

The companies that I meet are seeking a partner who is **reliable, proactive** and **flexible**. For LACROIX, **our contract manufacturing business is based on three pillars**, providing support that allows:

- ☑ **time frames to be reduced** as Time to Market is continuing to accelerate, supported by technological building blocks that are pre-engineered to limit iterations for adjustments;
- ☑ **risks to be reduced** as far

as possible;

- ☑ **and costs to be optimized.**

A project leader that is seeking to bring these three variables together within one single equation needs to think about identifying a partner to support them.

2. What are the key criteria for selecting the right partner?

Several elements need to be taken into consideration.

- ☑ First of all, the **partner needs to be financially stable** so that

they can support you over the long term. The shareholder structure of a market leader such as LACROIX, its **stability**, and its **pre-existing presence on the market** are major assets.

- ☑ Another one of the selection criteria is the ability to support the project leader by **providing a turnkey solution** when they don't have an engineering office or a bespoke solution by working together to develop it.
- ☑ And finally, the ability to **provide end-to-end support** (from design to production) is another strength of an actor such as LACROIX.

Whatever the case, the basis of this collaboration is openness and transparency.

3. How does the end-to-end support offered by LACROIX meet these expectations?

The outsourcing of a project needs to achieve both a reduction in

Time to Market (TTM) and an optimization in the Total Cost of Ownership (TCO). In order to achieve these objectives, **Design for Manufacturing (DfM)** is a part of our overall Design for eXcellence (DfX) approach here at LACROIX, which also includes **testing and purchasing strategies**. In other words, **we control the entire value chain**, from design to production. This allows us to integrate product **testability, producibility** and **repairability** into our support. By being present throughout the product's life cycle, we can provide optimized technical solutions with a view to standardization. Together with our purchasing department and our project teams, which have the benefit of our rich ecosystem to deliver the best skills for the project, **LACROIX's end-to-end support is more than a promise, it's a methodology.** ●

Outsourcing mass production over the long term



Innovating is always both a financial and a human investment. Also, in order to maximise ROI, Emma Louis would like to have a long-term view of the industrial production of her project.

- ▶ What if component shortages occur?
- ▶ And how should she react if faced with changes to the standards or regulations?
- ▶ Who can she rely on to identify and utilize the right tools?
- ▶ And how can she be assured that her internal engineering office will have the necessary bandwidth if urgent redesign is required?
- ▶ Is working with a contract manufacturer that knows how to be part of an approach that is both reactive and proactive really what she needs?



1.



in Expert opinions...

Redesign: anticipating, preventing, controlling, etc.

No one ever really wants to go back to the drawing board. **Redesign is often seen as excess work in the R&D departments of companies.** In order to tackle the obsolescence of a product, or its components, and prolong its saleable life, redesign is

essential, but rarely planned for. Our job is to ensure that this perspective is taken into account. **Our multidisciplinary teams cover all the different aspects of redesign:** identifying components that may soon be obsolete by continuously monitoring the roadmaps of our production partners, working closely with our purchasing department in order to optimize costs, and controlling contingencies relating to the integration or re-design of software, certifications, etc. Whether the re-design aims to prolong a product's life span or to optimise production costs (redesign-to-cost), we can always be involved in a proactive manner.

Therefore, whenever our teams detect an opportunity to integrate more modern technologies, we let the companies that we are supporting know while always considering the constraints in relation to production volume. This 360° perspective on redesign is our best promise **for long-term production to maximize cost control.**



Outsourcing mass production over the long term



Dominique Chanteau,
VP Purchasing -
Electronics
Activity



Expert opinions...

Design for purchasing: optimizing obsolescence management

It is a buyer's mission to reduce risks and optimize costs. With Design for Purchasing, we seek to fulfill this mission right from the design phase of a product and throughout its life cycle. There is always some element of risk. Technology is evolving very quickly, and issues of competitiveness are enormous. This leads to finding the best balance between newness and security: technological security in the sense of reliability and

security of supplies.

This ongoing dialogue that we are engaged in with engineering offices, right from the design phase, contributes to finding the ideal compromise. In order to do so, we rely on a unique database that allows us to identify technological equivalences and deal with levels of risk related to obsolescence, availability, or further risks of future incompatibility in relation to environmental regulations. **The critical nature of our mission has been highlighted, once again, by the shortages that resulted from the health crisis.** Our knowledge of our supplier ecosystem, mastery of technological issues and perfect integration with the LACROIX engineering office allowed us to deal with this situation.

2.

Outsourcing in order to create innovation & value together



Emma Louis likes to plan for the long term. Also, when she is considering subcontracting a

project, **she expects her partner to share her ambition and her desire to change things.**

What she wants is to make the processes flow, limit iterations, and save time, without ever hindering creativity.

What she hopes to find is more than just a maker; it's a shared

creative energy combined with rigorous processes and expertise that is based on continually asking questions in relation to the issue that she considers to be most important: **"How can we work towards operational excellence more and more each day?"**

All the services provided by LACROIX in the fields of **Smart Industry** and **Lean Management** contribute to the **competitiveness and innovation of project leaders.** ●

Her needs:

to make the processes flow, limit iterations, and save time, without ever hindering creativity.

3 questions for Eric Meynet & Dominique Maisonneuve

*In a globally digitalized society, the promise of growth in the field of electronics is very strong. As a result, project leaders are seeking **partners who are fast, flexible, reliable, innovative and competitive** in order to produce their products under the best conditions.*

In order to respond to this demand and create the EMS of tomorrow, **LACROIX, together with its entire ecosystem, is creating the electronics industry of the future.** Eric Meynet and Dominique Maisonneuve share their respective views on the issue.



Eric Meynet,
Corporate
Operational
Excellence
Manager.
Electronics
Activity



Dominique Maisonneuve,
Smart Industry
Project Manager
- Electronics
Activity

Connected technologies for smarter industries

1. In your eyes, what are the essential ingredients for value-generating innovation?

Eric Meynet : In my opinion, innovation in the electronics sector is based on the three pillars of operational excellence: **technical expertise, expertise in processes and quality cooperation.**

Dominique Maisonneuve: In order to generate performance, it is essential that a contract manufacturer have a view of their activity in the long term. Here at LACROIX, we created our *"Smart Industry"* strategy 4 years ago. Then, we set out major milestones which were identified with the support of the company's management. At the heart of this strategy, we have linked real-world needs to new technologies in two fields: **digitalization and automation of processes. These are two areas that generate performance.**

2. How can the challenge of excellence in electronics contract manufacturing be overcome?

E.M.: Each stage of the product's life cycle should be the subject of particular attention. This is the principle of Lean Management. The biggest issue consists of guaranteeing the robustness of the project, from design through to industrialization. The evidence is clear: **investing 10% more in development means you can avoid up to 100% of additional production costs.** Anticipating, preventing and foreseeing are three top priorities!

D.M.: Interoperability is the operative word. In Smart Industry, as we understand it, **continuity of data must be ensured** between different information systems, pieces of production equipment, and employees throughout the development and production cycles for a product. Interoperability will allow exchanges to be faci-

tated between the company's different departments in order to meet our customers' expectations. This is key to successfully dealing with the issues of speed, flexibility, reliability and competitiveness. Specifically, we have implemented the *"Real Time Monitoring"* project which consists of providing the performance of our production equipment in real time, using indicators for *"Overall Equipment Effectiveness"*, quality, and component rejection. In addition, to improve our *"Design for Manufacturability"* approach, we have integrated the Valor solution which consists of automatically obtaining the product's design weaknesses in relation to our rules on producibility.

3. Why is Smart Industry the best response to the quest for excellence in the electronics industry?

E.M.: It is by having an industrial tool that is at the cutting edge of technology, which is digitalized, automated, collaborative and has the most innovative technologies, that we will best support our customers from tomorrow onwards. **By investing in Smart Industry, we are giving ourselves the ability to respond to any future challenges.**

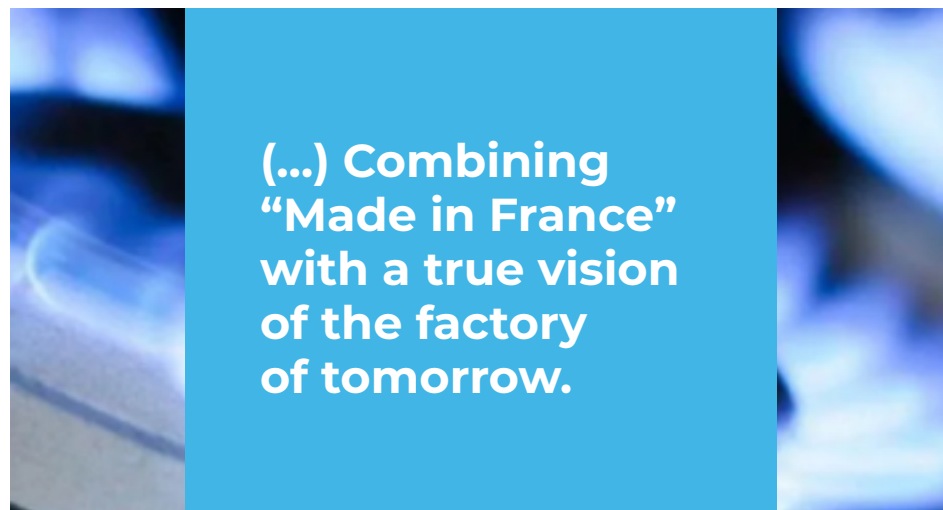
D.M.: Smart Industry allows us to **accelerate exchanges and make them more reliable.** Digitalization and automation allow us to focus on issues related to added value. New technologies provide us with solutions that allow us to change our working methodologies. For example, we have set up a *"Forecast and Order Automation"* project which allows us to automatically enter the customers' needs in our ERP. We have set up an entire automation approach for some of our production processes by integrating AGVs on our lines as well as cobots and robots. ●



Conso Live solution from TotalEnergies: Design and production that is guaranteed to be 100% French in origin

Périne Jaffrennou, Chief Innovation Officer, Power & Gas Europe for TotalEnergies, is responsible for the development of the Conso Live solution used for the Conso Live service that is available in the TotalEnergies Electricity & Gas France app. This hardware device contributes to making the Linky counters smarter in order to offer real-time visibility of electricity consumption, get a detailed understanding of

the users' needs from it, and provide personalized advice. ***"The Conso Live solution constitutes a major tool for reducing the electricity consumption of our customers. It is the basis for a digital service that is provided in their TotalEnergies app which allows them to understand and control their consumption in order to reduce their energy bill as well as their environmental impact,"*** explains Périne Jaffrennou.



An environmental issue

The Conso Live solution is considered to be a concrete solution for helping to control energy consumption.

"It is a device that is designed to respond to a significant environmental issue," observes Périne Jaffrennou. *"We think that it should be designed and produced in France so that it lives up to its ambition."*



Sharing values

In their search for a solid, stable partner that also shared their values with regard to CSR, the TotalEnergies teams decided to entrust their design and production to LACROIX.

"Combining 'Made in France' with a true vision of the factory of tomorrow were decisive criteria in the relationship that will join us to LACROIX from now on. Our shared environmental values, as well as the expertise of the teams at all stages of the project, have allowed us to move forward with confidence."

Conso Live solution from TotalEnergies: Design and production that is guaranteed to be 100% French in origin



Effective organization

The project team put together by LACROIX really is a multidisciplinary one. *"This allows us to **reap the benefits of comprehensive support** and to **be truly agile**. We have weekly check-ins that are coordinated by our dedicated project manager who, based on the agenda, gets the relevant people involved."* Logistics, purchasing, connectivity, security and more – all these aspects are covered in a global, balanced manner *"so that we can concentrate on what is essential and move the project forward with a dynamic of continuous improvement"*.



And in the future?

The Conso Live solution is a project that is important for the mission and values of TotalEnergies. In order to support its sale and the modification of behaviors for the benefit of the environment, an extension of the offer for Belgium is planned as well as an acceleration of production in order to meet the needs of the French market. *"We are currently considering expanding our collaboration with LACROIX in order to increase production volumes."*



About the Conso Live solution

With Conso Live, households can track their electricity consumption in real time. They can understand their consumption behavior and take action to improve it. Their consumption is displayed on the TotalEnergies app. They receive personalized advice on reducing it, such as identifying appliances that are in sleep mode, controlling heating in the winter, or even alerting them to peaks in consumption. TotalEnergies has already observed a **13% reduction in electricity consumption for customers whose homes are heated with electricity**. In addition, the company plans to develop innovative functionalities that will allow the energy efficiency of all its customers to be improved even further. ●

a **13%**
reduction in electricity
consumption

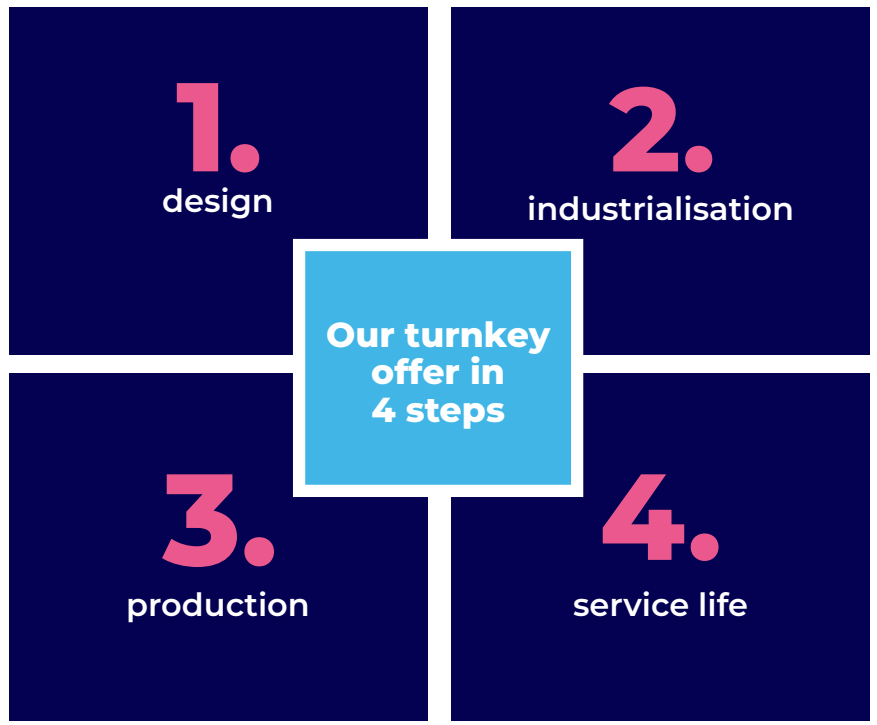
About LACROIX

Specializing in the design and production of electronic assemblies and sub-assemblies, the LACROIX Electronics Activity has been bringing its customers' projects to life for more than 50 years.

With its engineering office and additional production sites, the company is evolving in an innovative ecosystem to develop a smarter, more responsible industry.

Focusing on Time to Market, our complete offer guarantees that you will have control over the entire value chain for your product while also optimizing costs and time

frames. A dedicated team with industrial and R&D skills will handle your project, from the design phase right through to product production. ●



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