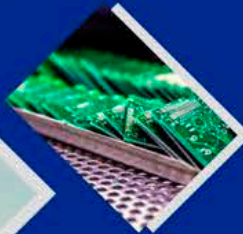


BLUECHIPS

ELECTRONIC PRODUCT DESIGN & MANUFACTURING SERVICES



BLUECHIPS

ELECTRONIC PRODUCT DESIGN & MANUFACTURING SERVICES

COMMITTED TO QUALITY



1 About Bluechips Pg. 4

2 Bluechips Production Pg. 12

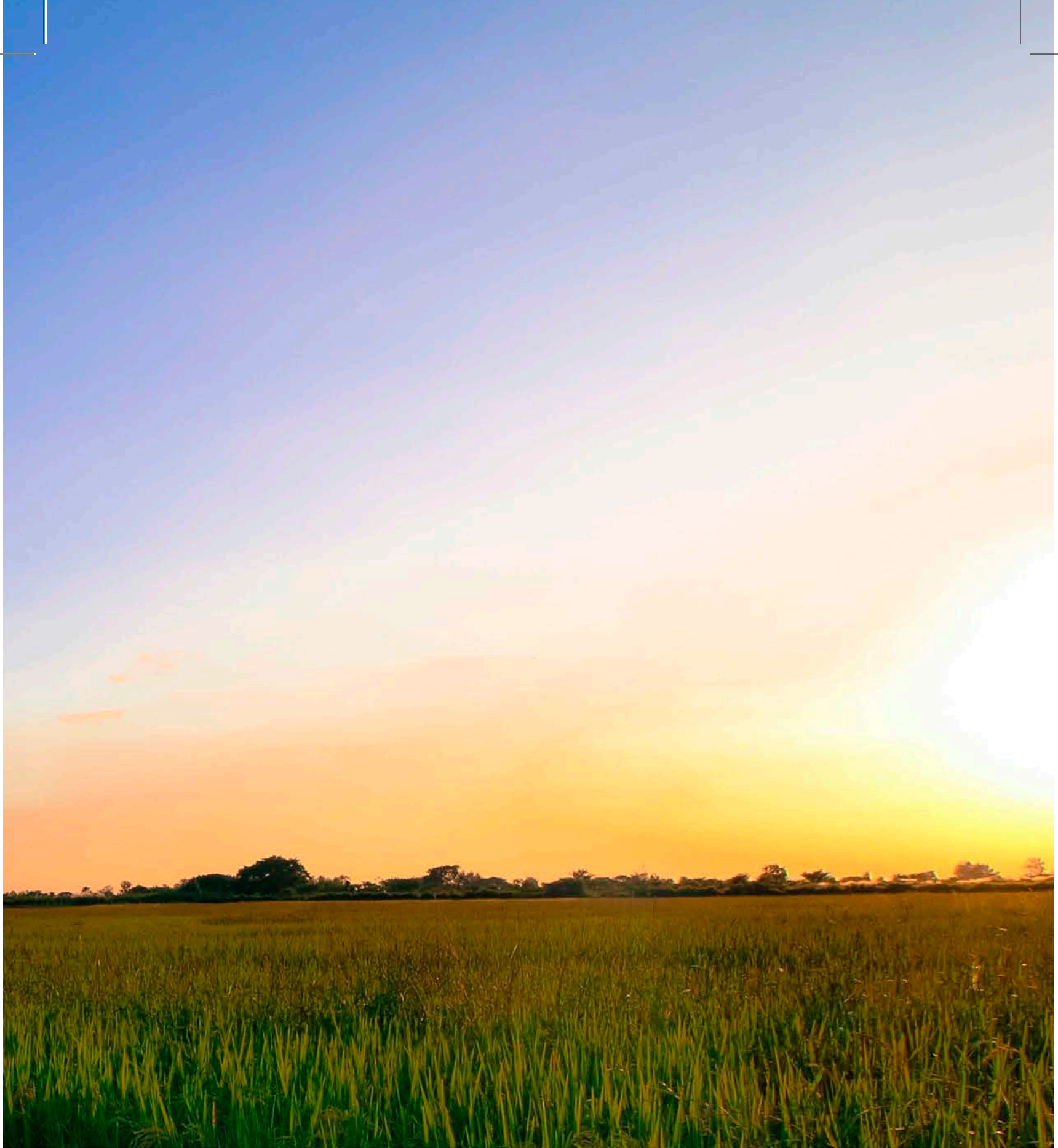
3 Research & Development Pg. 20

4 Why work with Bluechips? Pg. 28





BLUECHIPS MICROHOUSE CO., LTD.



Bluechips Microhouse is an Electronic Manufacturing Service Provider operating out of Chiang Mai, Thailand. With our cost-efficient and uncompromising approach to quality, industry-leading companies from all over the world have turned to Bluechips for a wide range of electronic production. From Printed Circuit Board Assembly to Industrial Control Units, HMIs, custom-made monitors, touch terminals, solar lighting and more; we take the innovative and flexible approach necessary for you to succeed in today's electronic industry.



About Us

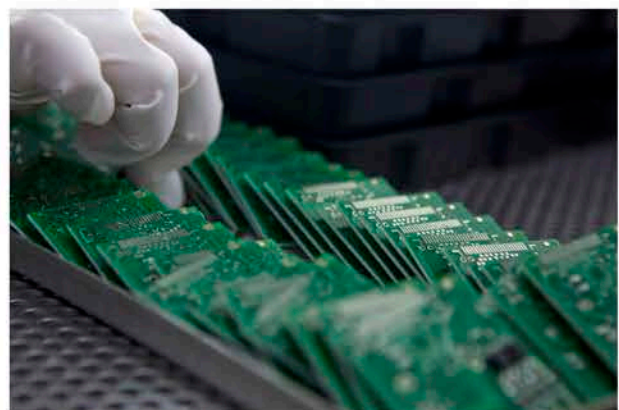
Bluechips Microhouse Co., Ltd.

Bluechips Microhouse is a German-owned Electronics Manufacturing Service provider established in 1999 In Chiang Mai, Thailand. With over 15 years of successful production, Bluechips has a proud track record in producing full electronics solutions for our global customers. Based in our state-of-the-art headquarters in the North of Thailand, Bluechips offers the benefits of international engineering and management, while still operating in the cost-efficient ASEAN region; providing the best of both worlds to our customers.



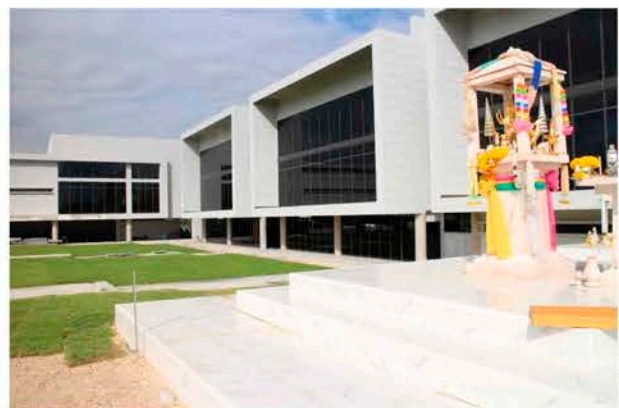
Start-to-Finish Electronic Production

The production service offered by Bluechips is full and comprehensive, allowing our customers to entrust the production of their products to Bluechips from the very beginning of the process right through to the continued mass production. By investing heavily in Research & Development, Bluechips ensures that we can turn the most ambitious concepts into viable and successful products for your company. Our ESD, dust-free production floor guarantees a quality manufacturing process and our separate facility in charge of cabling and housing means that your entire product can be trusted to Bluechips.



Going forward

Bluechips realises that the key to ongoing success is constant improvement and optimisation. We are consistently refining our internal processes with a view to continuing to provide an unbeatable service to our customers. With the move to our brand-new headquarters and factory having been completed, the platform for Bluechips' future growth has been established.



At a Glance

Bluechips Microhouse Co., Ltd.

Established	November 1999
First Production	March 2000
Head Office	155 Moo 5 Tambol Chae Chang. A. San Kamphaeng Chiang Mai 50130 Thailand
Opening of New HQ	October 2015
Services	Electronic Product Design & Manufacturing PCBA Customer-specific Electronics Cabling & Housing HMI's Touch Terminals
Ownership	100% German Owned Promoted by the Thailand Board of Investment
Accreditation	ISO 9001:2015 ISO 14001:2004
Number of Employees	300+

Our Mission

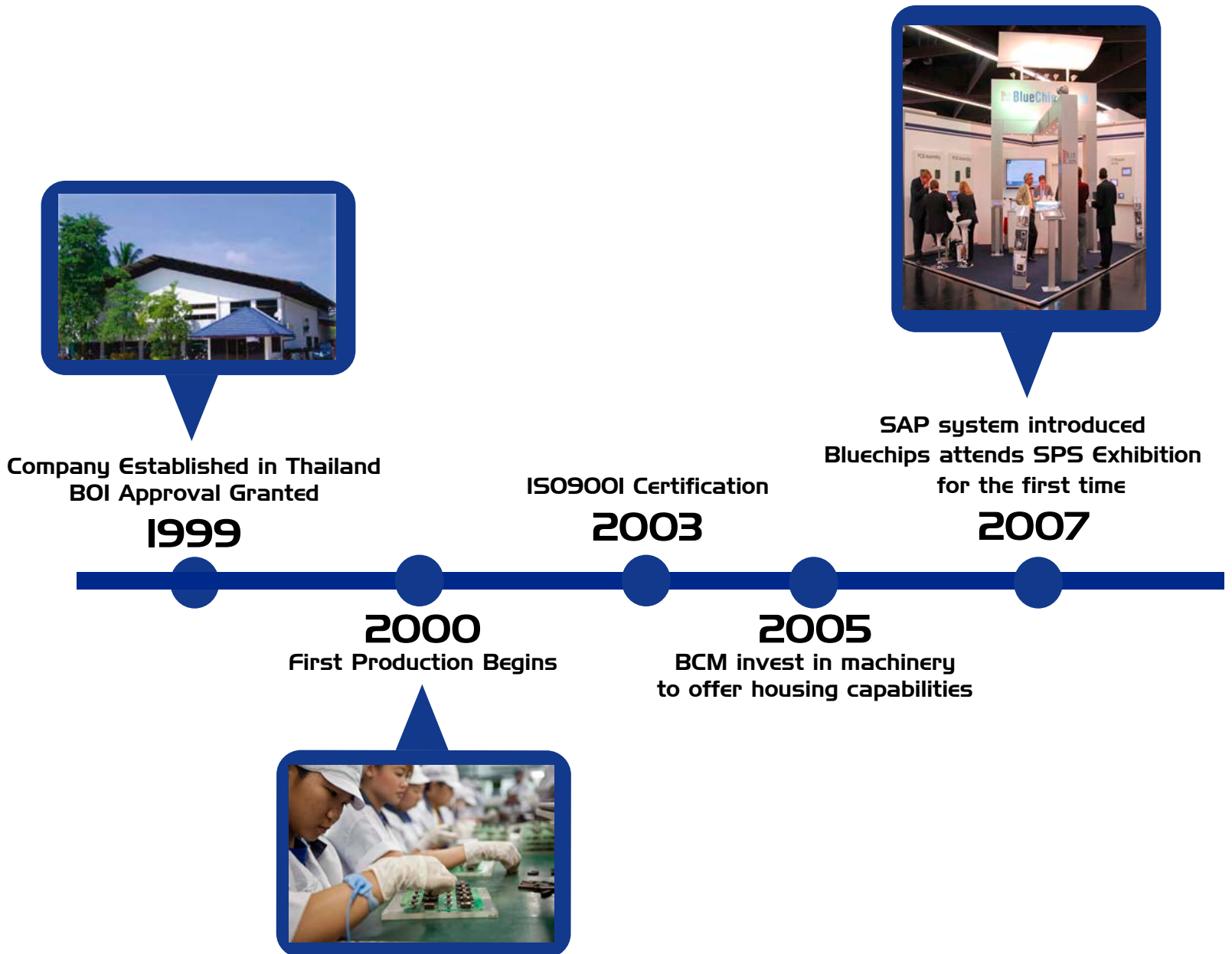
Our mission is to achieve the maximum benefit for our customers with a full, flexible and comprehensive electronic product solution. We aim to continue the competitiveness of Bluechips and our customer base by offering a cost-efficient service based on our innovative technological strengths, our commitment to quality and our focus on long-term, mutually beneficial relationships with our customers and suppliers.



Industries We Serve

Bluechips has a proud history as an EMS supplier for a wide range of industry-leading customers. From automation, to transportation and sensoric to solar, Bluechips has the experience to effectively supply your business. We have the enthusiasm, commitment and versatility to successfully bring your electronic products to market; no matter what your industry. Our large customer base means we are producing products as diverse as energy-efficient display units, solar lighting, pH monitors, user-friendly touch screen monitors and LED lighting. Due to the dynamic nature of the electronics industry, Bluechips approaches all new challenges with the enthusiasm and expertise your products deserve.

Bluechips History





Groundbreaking for
brand new factory

2010

Bluechips given
SSM Supplier Award

2014

2008

ISO 14001 Certification

2012

ISO9001 recertification

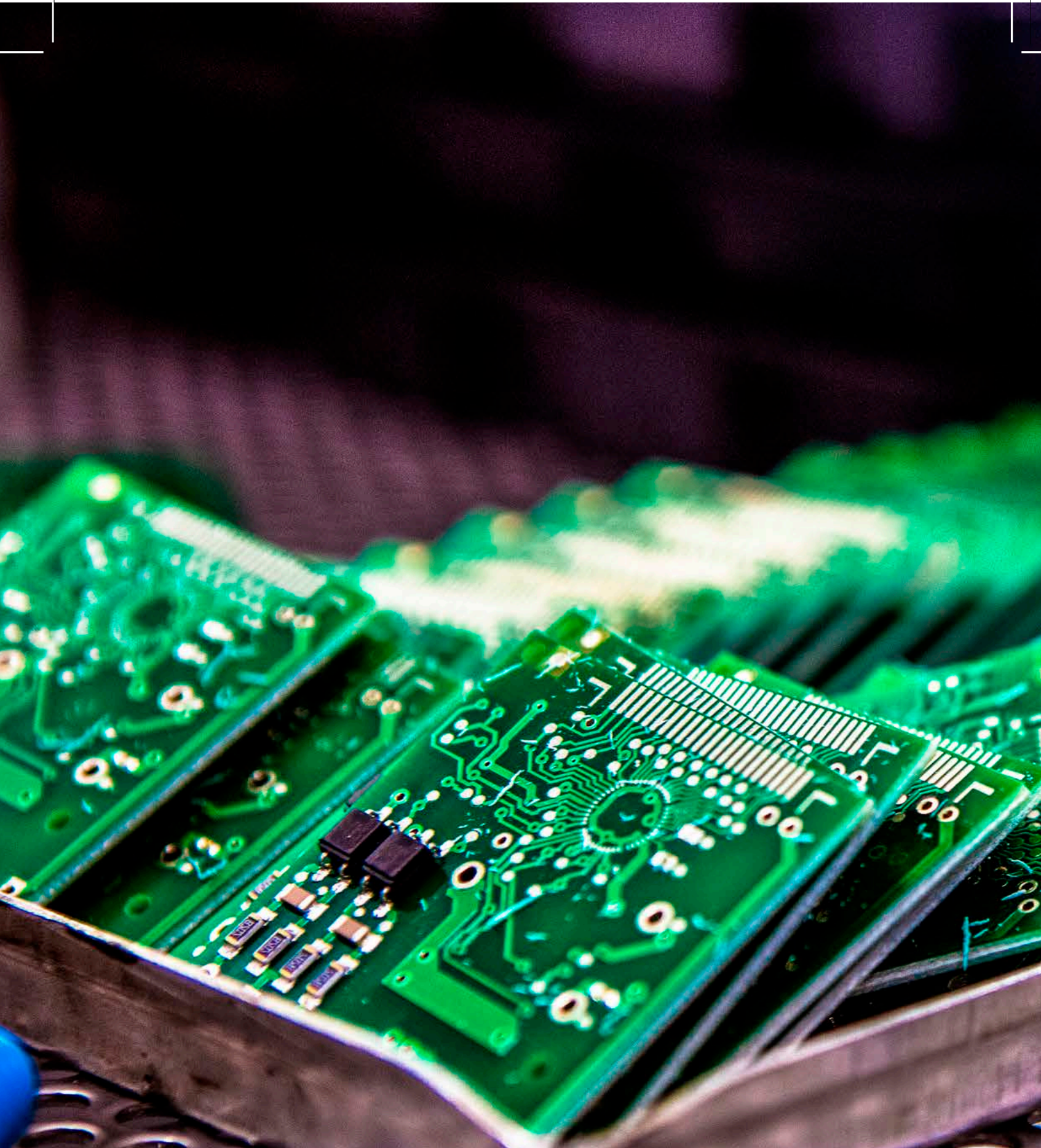
2015

Bluechips complete
move to new HQ
Recertification of ISO9001 &
ISO14001

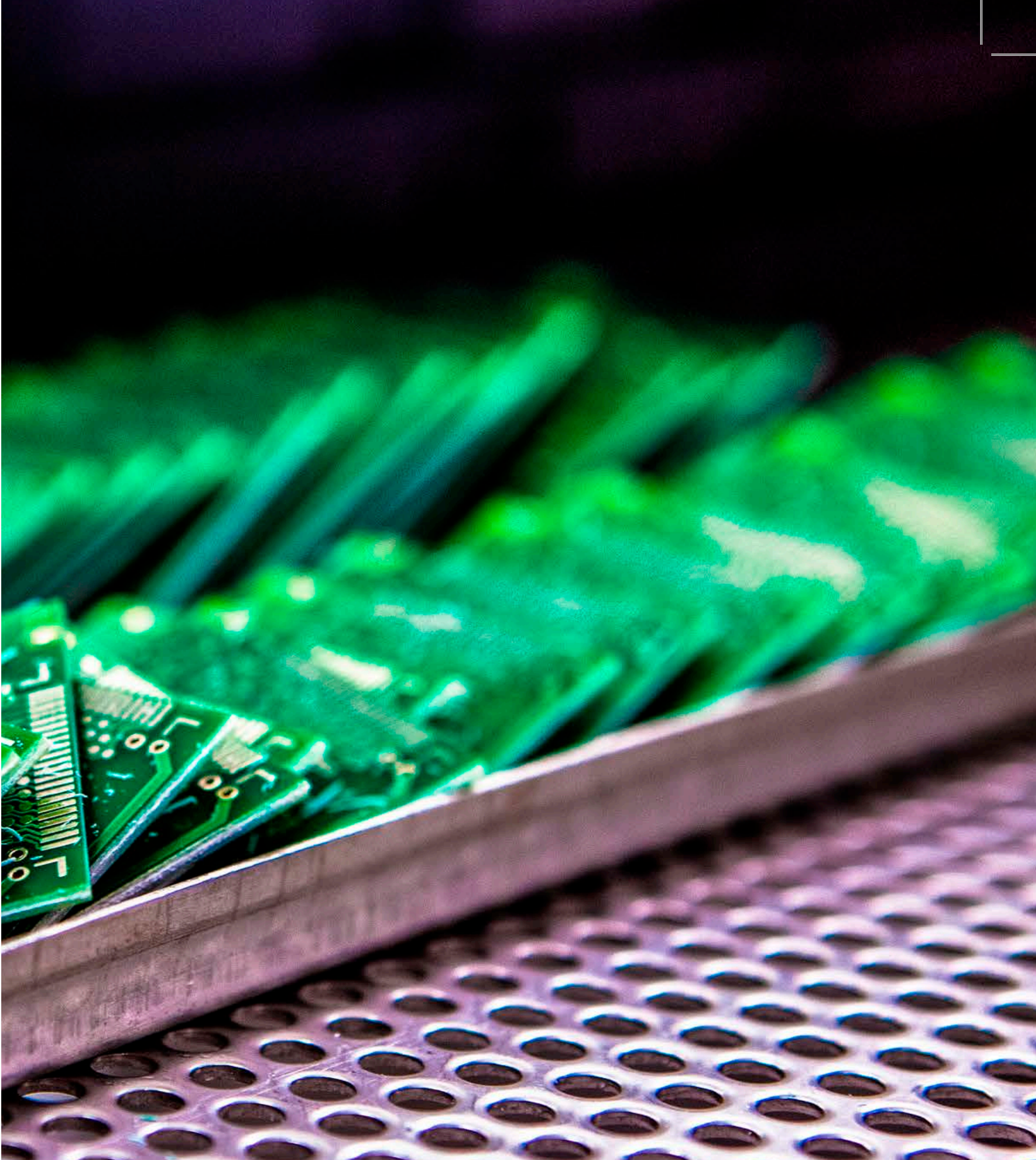


BLUECHIPS

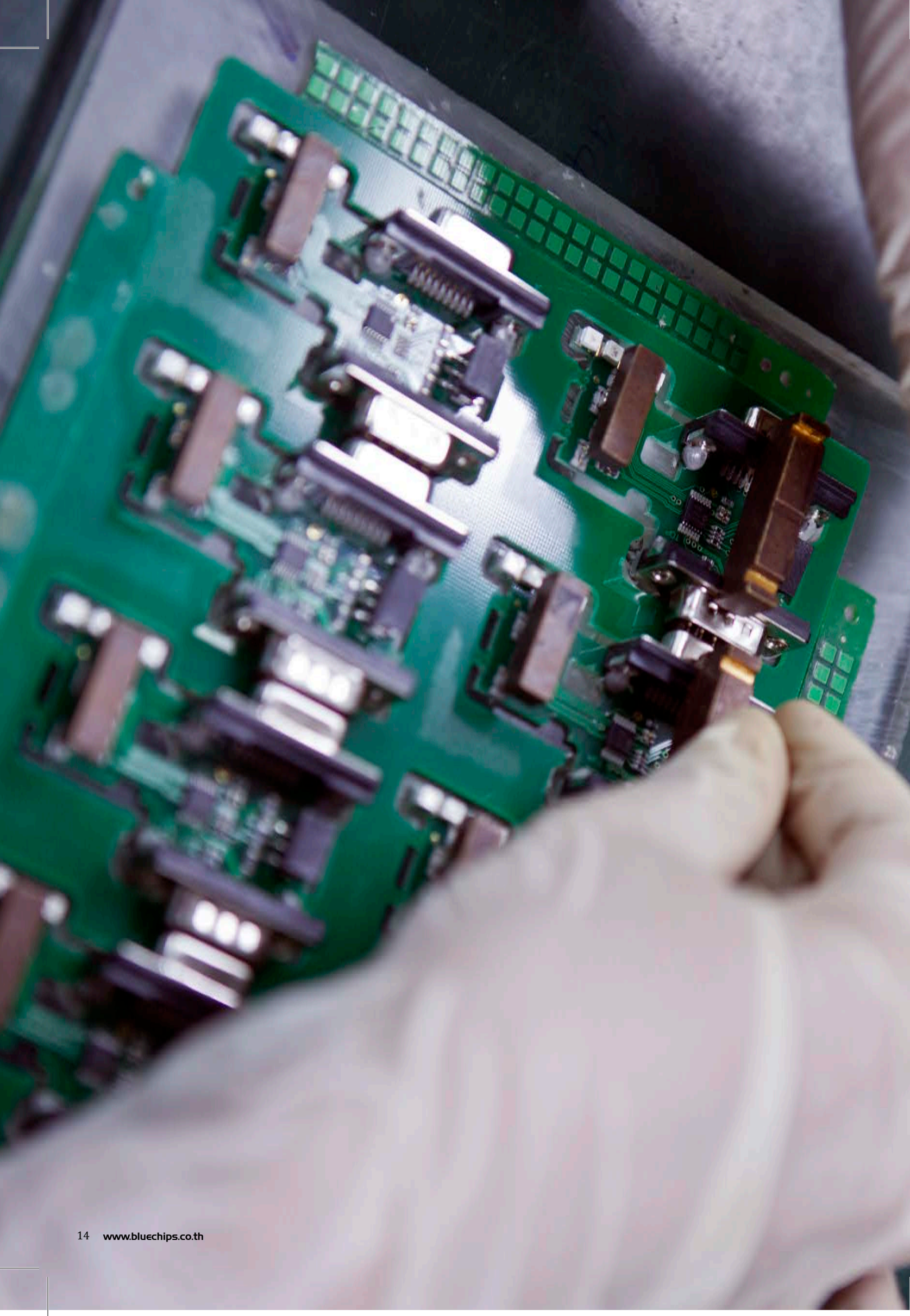
ELECTRONIC PRODUCT DESIGN • MANUFACTURING SERVICES 11



Production at Bluechips Microhouse



Quality production has always been the number one priority for Bluechips. As the company has grown, so has the range of production possibilities for our customers. Using state-of-the-art machinery and processes, Bluechips can proudly offer manufacturing capabilities to satisfy any quantity or complexity of product.



Overview

As an EMS supplier for leading companies around the world, the reputation of our company lies with the quality of our production. Since our establishment in 1999, we have constantly evolved the possibilities of our production. While we began as a PCBA supplier, we now proudly offer full box-building capabilities with circuitry, cabling, housing and mechanics all included as part of the Bluechips service.

Our brand-new, 2400m² production floor has been designed specifically to optimise the material flow of our production to provide the most efficient output possible. With full ESD compliance and dust-free production as well as thorough component traceability throughout our entire production layout, the quality of our production process is assured. With our new production floor fully operational, our previous facility at Lamphun has now become a dedicated second site for our mechanical, cable and backend assembly teams; further improving the start-to-finish product manufacturing on offer at Bluechips.

To continue to give our customers the most efficient and versatile service possible, Bluechips continually invests in new machinery to supplement our excellent production team. With investments made in multiple AOI machines, several SMT lines as well as increased vapour phase, reflow, bonding and soldering capabilities, Bluechips production continues to offer state-of-the-art product solutions to our customers.

Internal Quality

The standard of Bluechips production is epitomised by the rigorous standards that we maintain. For example, many of the products we manufacture rely on an expertly made PCBA. Our standard procedure for all our printed circuit boards ensures the quality of your products from the inside-out. Everything from the solder paste printing and inspection to the production process and testing is done to the strictest quality standards.

By following this procedure, Bluechips has been guaranteeing the quality of our manufactured circuit boards for over 15 years. This is just one example of the steps Bluechips take on a daily basis to make sure we only ship out products that meet, if not exceed, your expectations.

The quality of our production is highlighted further through the company-wide procedures we put in place. With the move to our new factory, for instance, the entire production floor has been made compliant to ESD regulations. Everyone accessing our production floor is required to wear the suitable safety gear to protect both the person and the components involved in the production line. Furthermore, all staff working in the production floor are required to enter through a turnstile that accurately confirms ESD compliance before any work is undertaken.

Our new production floor has also seen the introduction of component traceability. The implementation of this new system means that Bluechips can track all components used in the production process in case of defects. By isolating problem batches and recording the data in our ERP software, time and money is saved in the manufacturing of your products.

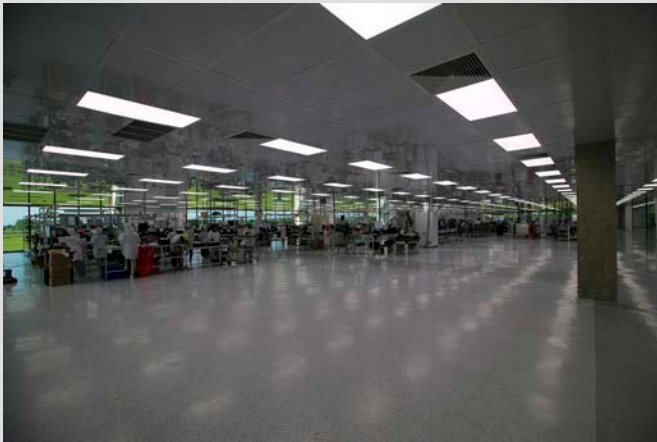


More and more of our customers are looking for a supplier who can take care of the entire production process. As a result, our start-to-finish service has become one of our core philosophies. By offering full consultation, box building and logistical solutions, Bluechips ensures that you only need to work with one supplier for the duration of your EMS product lifecycle.

By working with Bluechips from the initial concept to the delivered product, customers benefit from our streamlined infrastructure. Our teams from R&D, New Product Introduction, Production, QA, Testing and Purchasing all combine to take care of your products in one operation. Even with components supplied outside of Bluechips, such as plastic parts and mould injections, we use our carefully vetted supplier network to guarantee the competitiveness of your company and products; further ensuring that you can rely on Bluechips from the start of the process to the successful and continued delivery of your products.



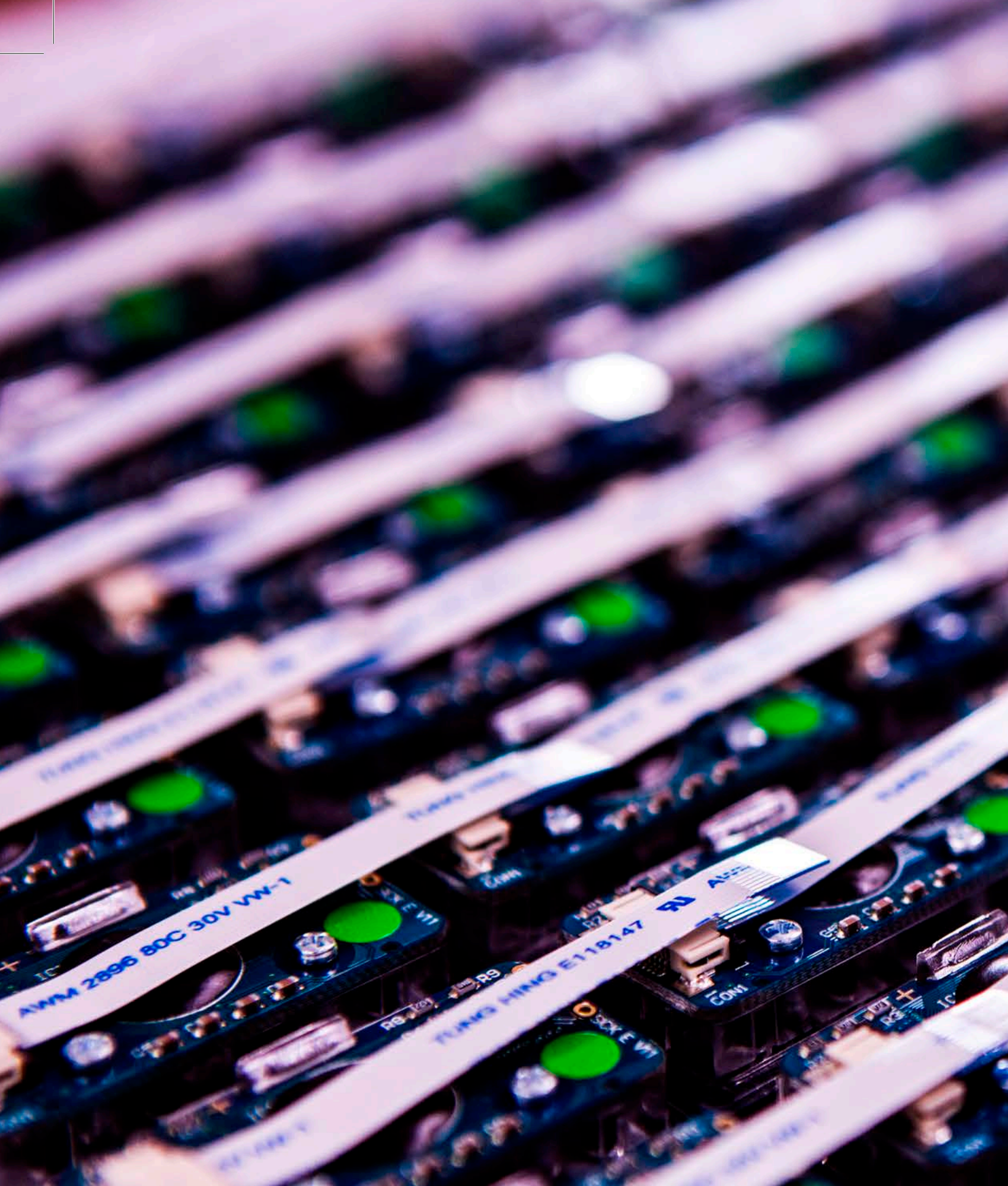
Production Capabilities



- Around 150 trained employees working on our 2400m² production floor
- Screen Printing – highly customisable SERIO 4000 for screen and stencil printing
- PCB and stencil cleaning with rapid cycle time
- Solder Paste Printing and 3D Solder Paste Inspection

- Lead-free vacuum soldering, selective wave soldering and two nitrogen reflow ovens for minimised PCB oxidation
- Surface Mount Technology with an output of 150,000 components per hour
- Aluminium Wire Bonding
- Die Bonding with accuracy of 10 micrometres
- Accurate Laser Marking and Welding
- Testing equipment including three AOI machines with rapid defect detection, x-ray machinery and ICT testing with up to 1000 analogue measurements per second





R&D at Bluechips Microhouse



R&D at Bluechips offers customers the opportunity to outsource all but the very minimum of projects. Products starting at R&D can stay with Bluechips from the initial concept all the way through to mass production and delivery; meaning a simple, efficient and cost-effective life cycle for your products.



Overview

The Bluechips Research & Development department offers a range of capabilities designed to bring your products to fulfilment. Our expert team of engineers possess years of experience in conceptualising ideas, designing circuits and optimising existing products; no matter the product or industry.

Our team offers both the design and production competencies to combine software, firmware, hardware and circuitry to provide you prototypes to a near series standard. With our R&D and production teams working parallel, this also enables a quick and seamless transition into mass production – all under one roof.

All concepts produced by our R&D department are comprehensively tested in-house to make sure they meet your specifications. We also provide lifetime support for the products to ensure their continued successful operation.

With the combination of our production and R&D capabilities, we can streamline the entire process for:

- Design for manufacturing
- Design for testability
- Design to cost
- Design as needed

all to save you time and money while providing a quality service.



R&D Capabilities

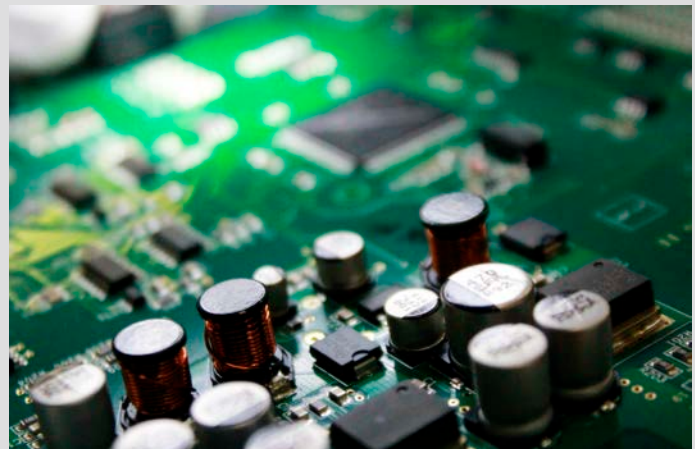
Full Product Design



As with our production, the Bluechips R&D team are capable of combining our areas of expertise to provide full product solutions for our customers. Through significant investment, our research and development team use the latest technology and processes to provide a full and functional product ready for mass production.

Circuit & PCB Design

We use the latest software to simulate circuit concepts and generate 3D models of our circuits to ensure proper function and EMC compliance. This allows us to include all of our circuit concepts directly into our CAD designs and further streamline the development of your products.



Software & Firmware Design

Our R&D department are responsible for developing the software structures based on your specifications. We offer extensive experience in the design and development of embedded software, hardware drivers and industrial controllers. As a result, we offer embedded software from power-efficient 8 bit up to 32 bit ARM Cortex ICs.

Our experience in embedded software has allowed us to specialise in the implementation of custom display units where we can offer solutions ranging from sizes of a few millimetres up to full graphic LED modules – all of which can be produced with touch screen capabilities.

Hardware Design



The hardware design for R&D products is also provided in-house. Using the latest CAD software, Bluechips can provide sleek and functional designs for your product. This design process ensures that Bluechips can provide the cabling and housing for your products in a way that stays true to your specifications.

Testing

We believe that the quality of your products begins with R&D. To that end, we also provide in-house quality control by incorporating EMC pre-compliance testing on our boards; enabling us to improve our electronic designs and circuits during the development phase.

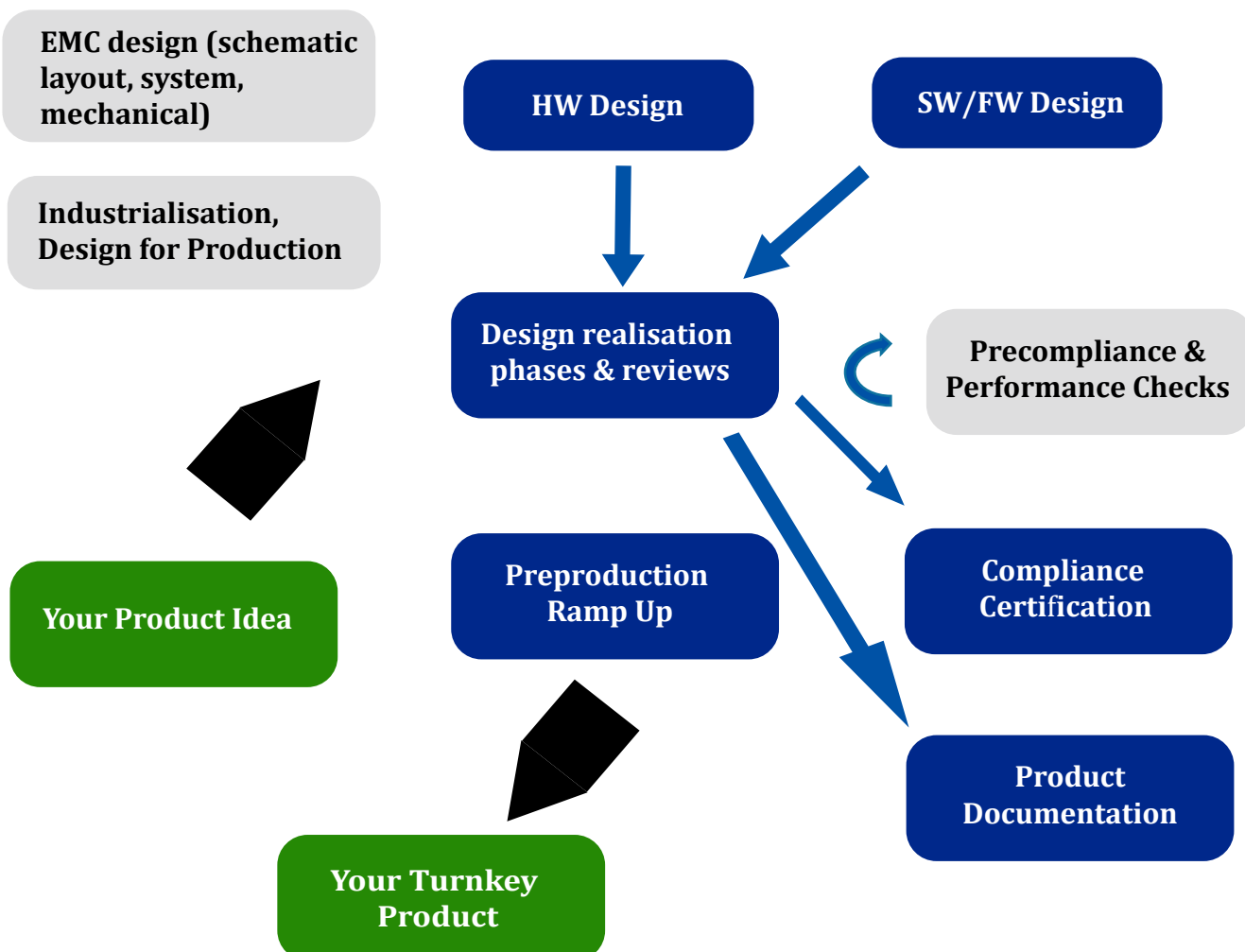


EMC

A particular strength of our R&D team lies in our EMC design. Led by an officially appointed EMC expert, our team can offer schematics, PCB designs and mechanical designs that all comply fully with EMC specifications.

To ensure this, we undertake several steps, including pre-compliance measurements and EMC design optimization. On the rare occasions boards are not initially acceptable; our failure analysis and troubleshooting program enables the team to rectify the problems in an efficient manner.

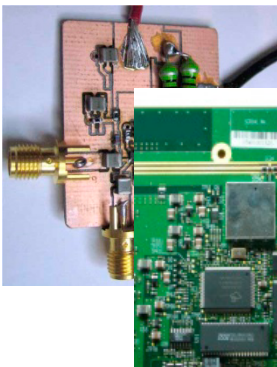
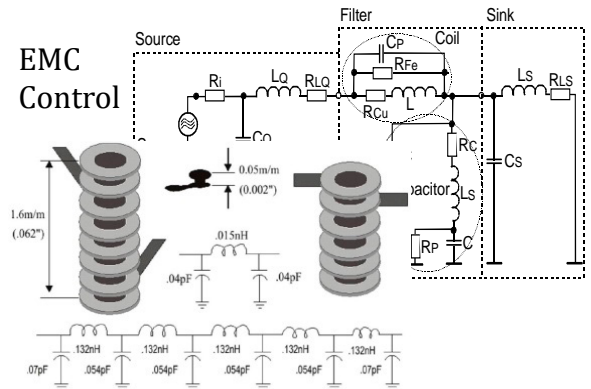
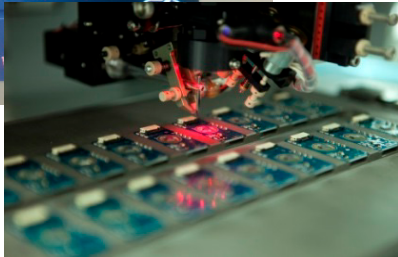
Service Expertise Process



Focus Areas

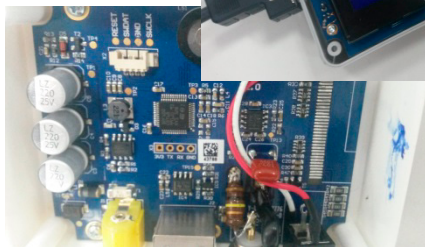


Industrial
Control
Systems

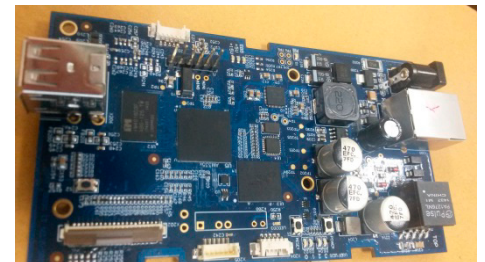


RF &
Wireless

Industrial &
Sensoric



Multimedia
Embedded Platforms



Monitors &
Display Units



Benefits

Working with R&D at Bluechips offers many benefits to our customers:

- Realise your product idea with an international experienced R&D team
- Work with one company for the entire lifecycle of your product
- Benefit from professional engineering in the low-cost Asian market
- Get your design optimized for manufacturing, testability, cost and international market requirements
- Drastically reduced time to market
- Communication in English, German, Thai, Italian, Russian, Romanian, Hindi possible



Why Choose Bluechips



With the EMS industry providing a lot of competition, companies these days have more choice than ever which company to outsource to. That is why Bluechips has to work harder than ever to reassure our customers of the value we provide. By offering quality production, a streamlined process and a transparent communication system we believe that we remain your best option for all your electronic production needs.



In A Nutshell

Working with Bluechips means working with our philosophy of remaining committed to quality in every aspect of what we do. This is something that goes far beyond the products we make and includes the partnerships we create and sustain with customers, suppliers, our community and our employees.

From day one of working with Bluechips, your project will be treated with the enthusiasm and professionalism that it deserves. Beyond the products, we put a significant emphasis on the importance of cultivating long-term, mutually beneficial relationships with all of our business partners.

By providing product solutions from concept through to delivery, we aim to become your EMS provider for the entire lifecycle of your products. From the initial consultation, through the design, R&D, production and delivery process, the satisfaction of our customers remains our top priority.

Working with Bluechips allows companies to feel at ease knowing that every stage of the manufacturing process is being taken care of as efficiently as possible. By operating both the office and production facility in the same location, we provide a streamlined approach to manufacturing your product which encompasses the benefits of Western engineering and the cost-effectiveness of the Asian market. Additionally, our material storage, logistical support, production capabilities and customer support means that the all-around service offered by Bluechips will meet all your expectations.

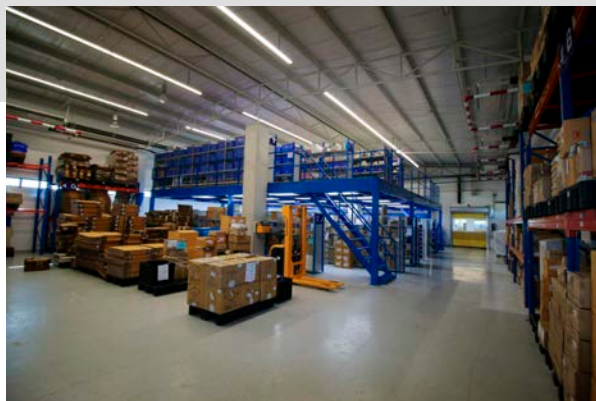
The international culture of the company also allows for communication with our customers to be as simple and hassle-free as possible. Our Key Account Team can regularly communicate in English, German, Spanish and Thai while our engineers offer a range of other languages.

However, the primary benefit of working for Bluechips is the knowledge that the company will continuously strive to improve. With our new factory representing a massive leap forward for the company, we hope to continue to grow alongside our customers.

Warehouse

Since the move to our new factory was completed, the operation of the warehouse has been completely revamped to optimise our material flow and storage. Our new 600m² warehouse comes equipped with a completely digital component storage system; using scanners to keep our material records 100% accurate. This information allows production and logistics planning to be finalised in the knowledge that the information provided is correct. We also offer a faster material picking time, with several Kardex machines allowing for automated, accurate material flow into production.

Furthermore, our new warehouse has implemented a full climate and humidity control system to allow all stored materials to be held in ideal conditions. By controlling the environment of our components, defects and problems can be easily avoided, resulting in a higher quality end product for our customers.



Material Management

Working closely with our warehouse and production teams, our planning and purchasing departments operate a just-in-time material flow strategy, designed to pass on the best supplier pricing strategies to our customers.

Recently, Bluechips has begun to implement an Electronic Data Interchange (EDI) with our top-tier suppliers. This initiates collaboration between Bluechips and our suppliers wherein our SAP system will send purchase orders to the supplier with their ERP system relaying delivery information back to Bluechips. By automating key aspects of the purchasing process, our team can focus more time and effort on providing our customers with competitive quotations by sourcing and acquiring cost-efficient components.



BLUECHIPS

ELECTRONIC PRODUCT DESIGN & MANUFACTURING SERVICES 33



Logistics

The Bluechips service is not considered complete until we guarantee the safe and timely delivery of your products. Through years of experience, our internal logistics team have worked tirelessly to create shipping links across the world. Bluechips happily offer a variety of delivery methods to get your products to you as fast as possible. Whether it is by air, land or sea, Bluechips will support any shipping method approved by our customers to make sure your products arrive via your preferred method of transportation.

Our logistical support also includes our communication. Working with our Key Account Managers, our logistical operation allows our customers to know the status of their shipments as well as showing the certificate of origin.

Customer Service

We only consider our work a success when our customers are satisfied with the value, products and service that we provide. As we prioritise long-term customer relationships, it is important that we strive to provide the best possible customer service. That means that we must give proper communication and transparency wherever possible.

To achieve this, Bluechips designates a specialist Key Account Manager to every customer to assure a consistent and clear point of contact. Your Key Account Manager acts as your gateway to the information surrounding your order status, technical considerations as well as quotations, purchase orders and other negotiations. By removing many convoluted processes of communication, Bluechips can simultaneously remove a lot of the complications with customer-supplier relations while still providing all the information necessary to put your mind at ease regarding your products.



Our New Home

- 2400m² production floor – a 3x increase from the previous facility
- Full ESD Compliance and Dust-free production
- 600m² Climate & humidity controlled warehouse for optimal component storage
- Material flow layout designed specifically for Bluechips processes
- 600+ solar panels providing over 15% of the needed electricity

The opening of our brand new facility represents everything about the Bluechips philosophy, with quality production and employee wellbeing at the centre of the construction process. The building was officially opened with a Grand Opening ceremony on October 12th, 2015 with the Governor of Chiang Mai and the German Ambassador to Thailand among the VIPs present to celebrate the occasion.

Based only 30km away from our previous building, it was important for Bluechips to remain loyal to our base here in Northern Thailand. By locating the new headquarters so close to our first factory, we have ensured that both can remain operational and give us the highest production output possible. It also ensures that we can retain the talents of the excellent Bluechips team in the area and reward the loyalty of our talented staff. The new building provides the environment necessary to allow everyone in our team to reach their full potential.

With our increased production capabilities and optimised processes, the new home of Bluechips embodies everything we aim to achieve as a company; we look forward to passing on these benefits to our customers.



Our Team

Behind each and every one of our products is a talented team of individuals who set Bluechips apart from our competitors. The Bluechips team is the catalyst behind the success and the growth of the company, with every individual offering tangible value towards the collective company goals.

Our base in Northern Thailand means that we are able to employ skilful local people at all levels of the company while simultaneously offering a company and cultural lifestyle that allows us to attract industry experts from around the globe. The result is that our multi-cultural and integrated team combine to offer an exceptional service to our customers.

With our team of over 300 employees coming from over a dozen countries, the experience of the worldwide electronics industry is vital. With our customers consistently needing product solutions for the global marketplace, the commitment, experience and reliability of our international team prove invaluable to Bluechips.



