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BREAKING TECHNOLOGY BARRIERS AND BREAKING MONOPOLIES —A CHIP LEADER'S STORY

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Globally, the printing consumable chips market is currently valued at around US\$2.8 billion with the ratio of aftermarket chips to OEM chips at about 1:5. In the United States and European markets, the ratio reaches 1:1 so there is quite a big market capacity for aftermarket replacement chips. Replacement chips can work in both laser toner and inkjet cartridges.

Chips undertake different functions in various models and there are almost as many chip designs as there are toner and ink cartridge models.

Chipjet, as a core branch company for the Dinglong Group, focuses on chip design, technology research and development for the group's whole industry chain. As such Chipjet integrates high-quality resources and is an active participant in free and equal industry competition.

Humble Beginnings

Going back to 2007, five young graduates, including Martin Wang, from Beijing and Zhejiang universities started to plan a strategy to work in their field of expertise—integrated electronic circuit designs for printing consumable chips. They founded Chipjet.

At that time, the Chinese printer market was enjoying solid growth with the number of printers reaching 26 million. The continuous expansion of the printer market capacity was driving the boom in the consumables market. The Chinese printer consumables market continued to grow. The sales of laser printer cartridges and inkjet printer cartridges achieved remarkable growth.

In 2006, the European Union announced new environmental protection ROHS standards for printing inks. Aftermarket cartridge remanufacturers were expected to strictly abide by these new standards.



打印耗材，世界格局

目前全球耗材芯片市场空间有 28 亿美元左右，通用耗材芯片和原装耗材芯片的比值在 1:5 左右，按照欧美发达国家的原装耗材和通用耗材 1:1 的关系，通用耗材芯片替代原装耗材芯片还有很大的市场空间。通用耗材芯片主要是硒鼓芯片和墨盒芯片，由于收集的信息的不可恢复性以及其存储信息的功能，使得硒鼓与墨盒芯片在不同的硒鼓及墨盒中，不同的打印机中是不能兼容的，因此耗材芯片的型号几乎与耗材的型号一样多。鼎龙集团旗下掌握芯片技术的旗捷科技，身为鼎龙集团核心科技基石中的一员，与集团一起打造全产业链平台，整合行业优质资源，做自由平等竞争的参与者，维护行业正常发展格局。

创业之初，砥砺前行

时光倒流回 2007 年，五个来自北大、浙大等重点高校的高材生怀揣芯片设计创业的梦想，在机缘安排中闯入了打印耗材芯片这个集成电路设计细分的领域，开始了创业的征程，成立了杭州旗捷科技有限公司，而王志萍正是其中的一个。彼时中国打印机市场保持着稳步增长，打印机的保有量已经达到了 2600 万台。打印机市场容量的不断扩张带动了耗材市场的繁荣，中国打印机耗材市场继续保持增长态势，激光打印机硒鼓





Environmental protection became more important and was being paid more attention in European society, government and business.

The demand for remanufactured cartridge chips grew in the general consumables industry. Yet, there were only a handful of companies engaged in chip development within the general consumables industry and the development of chips had to begin from zero. Martin Wang recalled the struggle in the early stages of chip development and manufacturing. Despite the tough barriers being thrown up by the printer OEMs, Chipjet chose to move forward. Wang and his teammates worked hard day and night, to complete the team's first "100-day plan" by implementing the EPSON 711 series from design through to the sample stage. As a result of the successful Epson chip resetter project, Chipjet earned itself a high industry reputation. This young team had tasted success and was ambitious and ready to make a big difference in the aftermarket printing consumables industry.

However, Wang quickly noticed there were many

和喷墨打印机墨盒的市场销量与销售额均实现了稳定增长。自2006年欧盟针对打印墨水推出了环保标准 ROHS，要求各厂商的产品严格履行后，耗材的环保回收问题越来越被社会重视。再生墨盒芯片的需求在通用耗材行业日益增长。通用耗材行业中从事芯片的公司屈指可数，芯片开发可谓是从零开始突破。王总回忆芯片制造初期的心路历程，面对原装壁垒但旗捷选择昂首前行，王总等四个工程师日夜奋战，成功完成了团队的首个“百日计划”——实现 EPSON 711 系列从设计到样品阶段，爱普生芯片项目的成功研发让旗捷在行业打响了名声。这个年轻的团队雄心勃勃准备在通用耗材行业内大展拳脚。

但旗捷很快发现，缺失了成品工厂的配合，这对旗捷的进一步发展是一个严重阻碍，集成电路设计存在技术和市场两方面的不确定性。一是流片失败的技术风险，即芯片样品无法通过测试或达不到预期性能。对于产品线尚不丰富的初创设计企业，一颗芯片流片失败就可能致企业破产。二是市场风险，芯片虽然生产出来，但没有匹配对市场需求，销量达不到盈亏平衡点。对于独立的集成电路设计企业而言，市场风险比技术风险更大。对于依托整机系统企业的集成电路设计企业而言，芯片设计的需求相对明确，市场风险相对较小。在创业低潮期时，五人团队变成了四人团队，但是旗捷的韧劲却一直没变，



serious obstacles to Chipjet's further development. There were the technical and marketing uncertainties in the design of integrated circuits. One such risk is development failure where the chip sample cannot pass the test, or the expected performance is not achieved. For start-up design companies whose product lines are not yet fully established, one chip failure could lead to bankruptcy. Another risk relates to the market. Despite the successful production of a chip, it may not meet the market demand. As a result sales volumes do not reach the break-even point. For independent integrated circuits (IC), market risk is even greater than technology risk for design companies. When the demand for chip design is clear, the market risk is reduced.

During such a low time in the entrepreneurship, the five-person team became a four-person team, but the tough resolve of Chipjet never changed. Wang believed there would always be a way out, fearlessly found a factory partner and Chipjet began a period of rapid development.

Seeking Investment

Chipjet had achieved strategic cooperation with several important customers in the market which had enabled them to move forward and achieve good results. In 2014, the operating income exceeded

王总相信，总会走出一条路来。不畏困难的旗捷找到了合作工厂，思路打开了，销路也打开了。旗捷开始了快速发展期。

快速发展，格局提升

旗捷在市场上与几个重要客户取得了战略合作，让旗捷的业绩取得了不俗的表现，在 2014 年营业收入过 1 亿元大关，净利润近 3600 余万元，也吸引了当时不少的投资机构。团队深知企业要做大，就要展开格局，拓宽眼界。只有完整的上下游产业链，才能让公司发展地更快。“芯片技术需要投入的人力，物力和资本都很高，我们需要寻找的伙伴，一定要具有非凡实力和魄力。”王总回忆当时接触的不同的资本方，唯一打动他的，就是鼎龙。“朱总在格局方面眼界很高，对耗材行业布局长远，更重要的是，鼎龙集团的务实笃行和工匠精神和旗捷坚持的品质是一样的，我们有共同的目标和企业精神。”在 2015 年，旗捷加入了鼎龙集团，为鼎龙打造的通用耗材整体方案平台增加了核心一环。

加入鼎龙之后，旗捷在芯片研发上把研究方向从喷墨领域拓宽到了激光领域。2015 年惠普 CF400 系列热销，耗材适应中低速打印机，机器价格并不高，海外市场尤其欧美市场办公使用和家庭使用的需求量都很大。为了保证原装耗材的市场占有率，惠普在这套热销型号的芯片上设置相当高的技术壁垒。国内外兼容芯片公司对这套彩色芯片都没办法提供解决方案。当时国内的通用耗材供应商只好暂时向客户提供不带芯片的产品，对于专业厂商而言，这只能是权宜之计。

通用耗材厂商们万事俱备，只欠芯片。旗捷抓住机会，全



US\$14 million, and the net profit was nearly US\$5 million. The figures attracted investors. The team knew all too well that a great company needs to expand and broaden its horizons. In order to grow Chipjet faster, it was necessary to complete the upstream and downstream industry chain.

“Chip technology needs significant and consistent investments in manpower, material resources, and capital,” Wang said after meeting with different financial companies at the time. “We need to find a partner that must have extraordinary strength and courage.”

Wang points out the only investor that stood out was Hubei Dinglong and its leader Mr Shuangquan Zhu. “Mr Zhu is a man of extraordinary vision and has a long-term plan for the aftermarket printing consumables industry.” Wang adds that the Dinglong Group's pragmatic craftsmanship is the same level of quality followed by Chipjet. “We have common goals and entrepreneurial spirit,” he noted. In 2015, Chipjet joined the Dinglong Group as a core solutions provider platform for Dinglong's aftermarket printing consumables.

After joining the Dinglong Group, Chipjet expanded its research direction from inkjet to laser printing technologies. In 2015, the HP CF400 series of toners were popular and suitable for medium and

力投入攻克这套彩色硒鼓的通用芯片。在当年用了最快的速度，仅仅六个月完成了开发任务，完成了四色芯片的开发。鼎龙旗下的名图依托旗捷的这款芯片，以最快的速度响应了市场的需要，赢得了新老客户的口碑，巩固了名图在彩色通用硒鼓领域的领先地位。同时旗捷芯片一经上市，为通用耗材市场提供了全新解决方案，让客户不再受限于供应商的选择。加入鼎龙后的第一年即 2016 年，旗捷科技营业收入和销售毛利较上年同期分别增长 14.48% 和 58.11%，经营业绩持续稳步提升。特别是新品 SOC 激光类芯片收入同比大幅增长 650.32%，显示出在激光芯片新品业务上的研发能力和快速市场响应速度，同时也有效保障了鼎龙集团硒鼓产业上游核心原材料的供应安全。

旗捷以喷墨芯片起家，喷墨芯片可以覆盖主流品牌全系列产品，自 2015 年进军激光芯片市场以来，几款主要激光产品的快速上市向市场展示了旗捷过硬的研发实力，也向客户传递了旗捷可以做好激光芯片的决心。旗捷仍在不断加大研发投入，持续的扩充和补全激光产品线，为更多的客户提供高性价比的可选择产品。

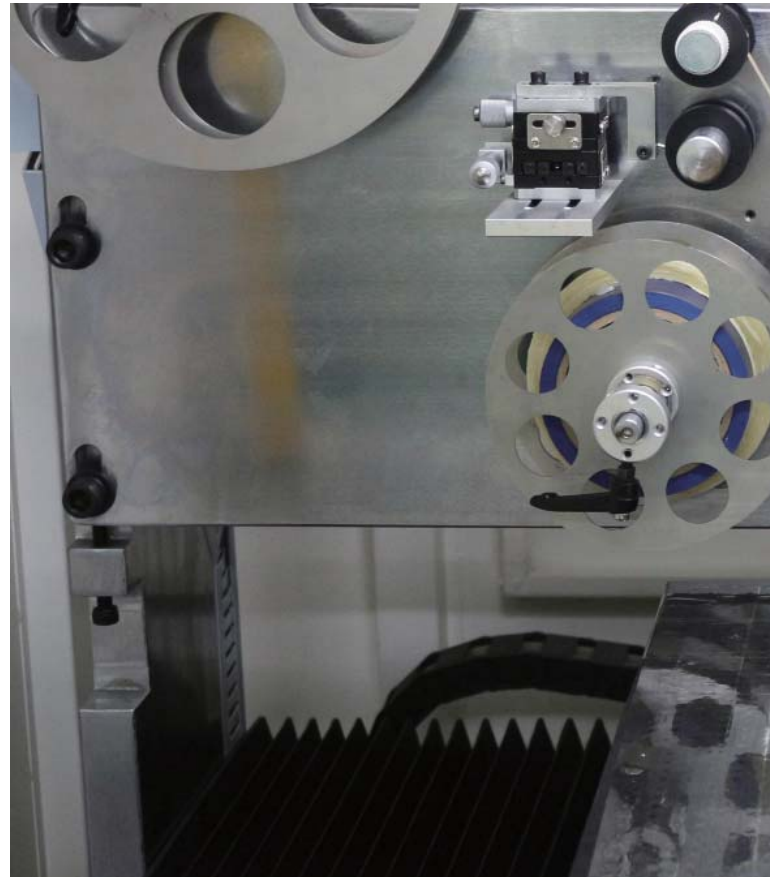
不仅仅是配件，鼎龙集团旨在为通用耗材行业提供完整产业链产品和服务，做关键材料，关键技术的突破者，打破行业垄断。鼎龙作为全球通用打印耗材行业的龙头企业，一直以来都以全产业链运营为发展思路，持续整合行业优势资源。目前，鼎龙在通用耗材板块的主要产品包括：彩色聚合碳粉、耗材芯片、通用硒鼓、显影辊、胶件等，同时在此前顺利投资入股珠海天路后，鼎龙正在实施对北海绩迅的重组收购。北海绩迅是全球最大的再生墨盒细分领域龙头企业，生产规模、自动化专

low-speed printers. The printer price was not high, and the demand was large for office and home use in international markets, especially in Europe and America. To ensure a strong market share of its hot-selling toner brand, HP had set an extremely high technical barrier on the chips it used. Compatible chip companies in China, Europe and the USA struggled to find a non-infringing solution for this set of chips. As a result, aftermarket consumables suppliers had to temporarily provide customers with cartridges without chips. For professional manufacturers, this was not a good strategy.

Chip Challenges

Finding a compatible chip for the HP 400 could wait no longer. A successful developer, manufacturer and supplier needed to master new chip technologies in order to enjoy the benefits of good sales. Chipjet seized the opportunity to fully invest in the compatible chip for HP 400 series color toner cartridges. It took six months, working at top speed to reengineer, design and manufacture the new chips ready for sale. As a result, Mito, Dinglong's well-known color toner subsidiary, won a giant share of the color toner market thanks to the successful development of this chip.

At the same time, Dinglong and Chipjet took their new chips to toner cartridge manufacturers to provide open and equal competition for the global industry. In 2016, Chipjet's business revenue grew 14.48 percent



业化能力等行业领先。两个再生墨盒公司的加盟不仅改变了鼎龙在通用耗材成品领域只有硒鼓没有墨盒一条腿走路的局面，将积极补齐鼎龙在墨盒领域的产业短板，同时助力旗捷芯片业务未来发展，增强持续竞争实力；另一方面，也使鼎龙一举成为全球再生墨盒生产出货量最大的供应商，一定程度上改变和平衡了全球通用墨盒的市场竞争格局，给全球通用耗材用户提供了更多有利的竞争选择！鼎龙集团在行业深耕细作的决心可见一斑。

未来展望 领航前行

“没有竞争就没有活力，我们在行业中谋求健康发展，我们欢迎良性地竞争，这样对行业对企业都是非常有好处的。”王总如是说，“无论是大自然还是商业竞争，垄断是一种不健康的表现。旗捷的使命是做关键技术的突破者，打破垄断，为行业的良性发展做出努力。对于国内外的市场，无论是技术上的不断革新，还是在供应链上多一个选择方案，对于行业进步都是有好处的。我们做的是公平自由竞争的参与者，维护行业正常竞争格局。”

芯片技术迭代时间短、研发难度大，需要强大的科研实力支持。身处杭州的地缘优势，旗捷与江浙各大高校浙江大学、复旦大学等有着紧密的合作，开展产学研项目。公司一直坚持“创新拼搏 卓越共赢”的价值观，不断加大研发投入，扩建研发团队，提升技术实力。公司已建立独立 FIB 实验室和自主知识产权的芯片测试平台，能自主完成芯片物理层分析并实现了



and sales gross profit climbed 58.11 percent compared with the same period in 2015. In particular, the revenue from the new SOC laser chip dramatically increased 650.32 percent year-on-year.

Chipjet's stable R&D capacity and quick response to market demand strengthened Dinglong's upstream core raw material safety ratings. Having started with inkjet chips the range now covers a large range of printer OEM brands and devices.

After entering the laser chip market in 2015, the rapid release of several major laser products improved the R&D reputation and reliability of Chipjet. The company persistently continues to invest in building its laser chips catalog by providing high quality and competitive product solutions for global customers.

Chipjet is not willing to sit back and allow others to take the lead in the very competitive market. The number of aftermarket chip suppliers is less than before and while Dinglong focuses upon being global market "supporter" with its industrial chain platform, it also aims at becoming the chip technology leader and monopoly breaker.

At present, Dinglong's main products in the compatible printing consumables sector include color polymerized carbon powder, chips, compatible toner

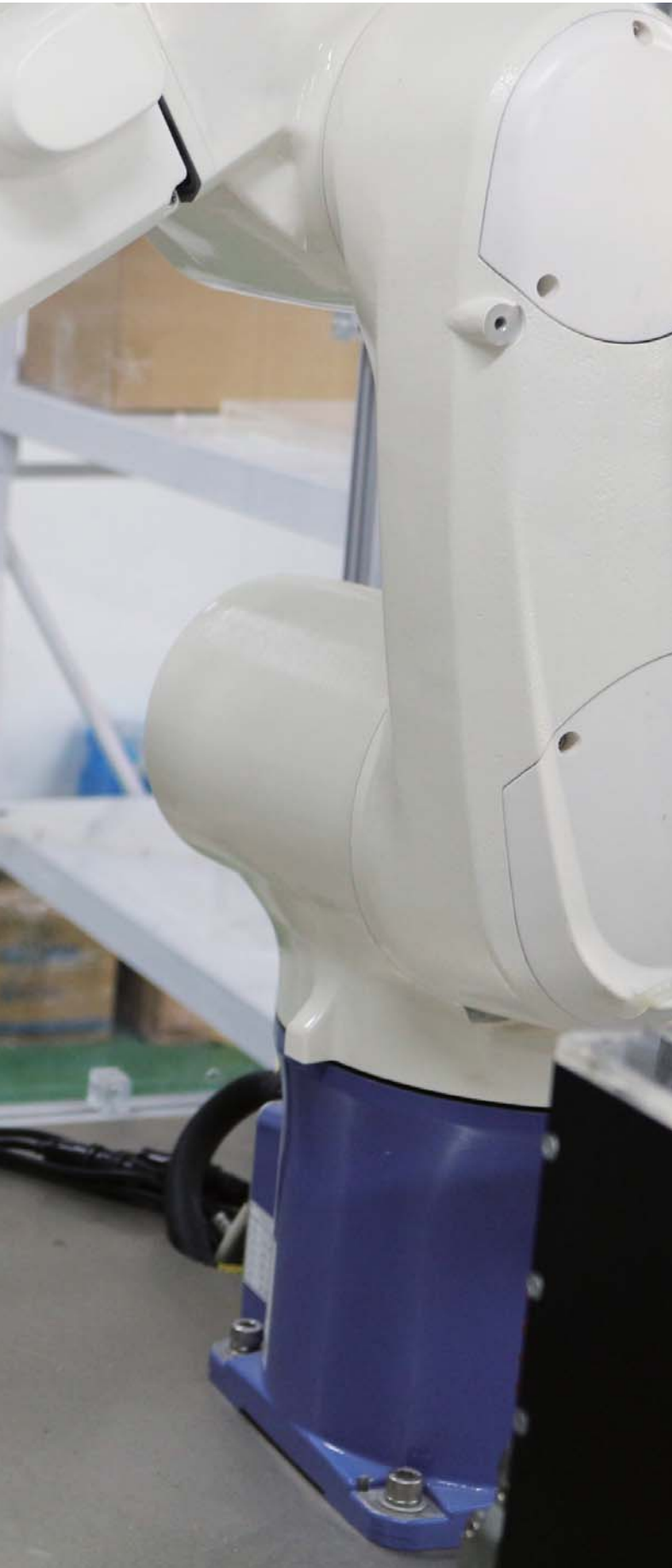
芯片测试自动化，并在一些关键技术领域做提前规划布局。此外，旗捷高度重视知识产权保护，搭建了全球行业专利检索、下载、分析和管理平台，及时掌握行业相关专利情况并及时进行专利规划与布局。经过十多年的磨炼，旗捷在芯片设计、加密技术、流片工艺、芯片可靠性控制、自动化设备设计研发等方面都形成了深厚的技术积淀，在行业内也形成了自己的核心竞争优势。

鼎龙集团非常重视新产品的开发，每年持续加大研发投入。例如，在 2018 年度鼎龙研发投入 1.56 亿元，占当年营业收入的比重为 11.69%。这其中，旗捷的芯片投入就是开发重点之一。除了国内的研发机构和合作中心，旗捷在美国和欧洲都有技术研发合作伙伴，整合优势资源，旗捷未来也会在海外布局更多的技术中心。谈到应对 OEMs 的升级问题，王总表示，固件升级将会是一种常态，原装会频繁使用升级来限制和打压通用耗材的使用。作为鼎龙的核心科技服务商，旗捷会密切关注原装厂商的动态，在第一时间给到客户替代性解决方案。

“成为一流的芯片解决方案商和值得信赖的合作伙伴！”是旗捷的发展愿景，也是旗捷在过去和未来一直坚持的发展理念，我们将通过给客户提供更多更专业的解决方案，来赋能合作伙伴，助推行业发展。

一路十二载风雨走来，旗捷高速成长为全球知名通用耗材芯片设计供应商，在鼎龙集团由点到面的全产业链布局中做一颗定盘星，不断加强企业的产业掌控力，在打印复印耗材行业里不断突破原装壁垒，继续推动整个行业向前。■





cartridges, developing rollers and plastic parts. In order to achieve and maintain its leadership goals it acquired Speed Infotech Holdings Limited (Speed)—which has a monthly capacity to produce remanufactured 750,000 pieces—after having also successfully invested in Zhuhai Topcolor. Both companies are leading remanufactured inkjet factories and help complete Dinglong group's finished product category, allowing it to be more competitive. It has also helped Chipjet to expand its ink development and research range.

Wang firmly believes monopoly leads to unhealthy performance, but competition leads to excellence and vitality. "We welcome healthy competition which benefits the industry," he says. "Chipjet's mission is to be a breakthrough in key technologies and to break the monopoly in both the domestic and international markets. We are a fair and free competition participant."

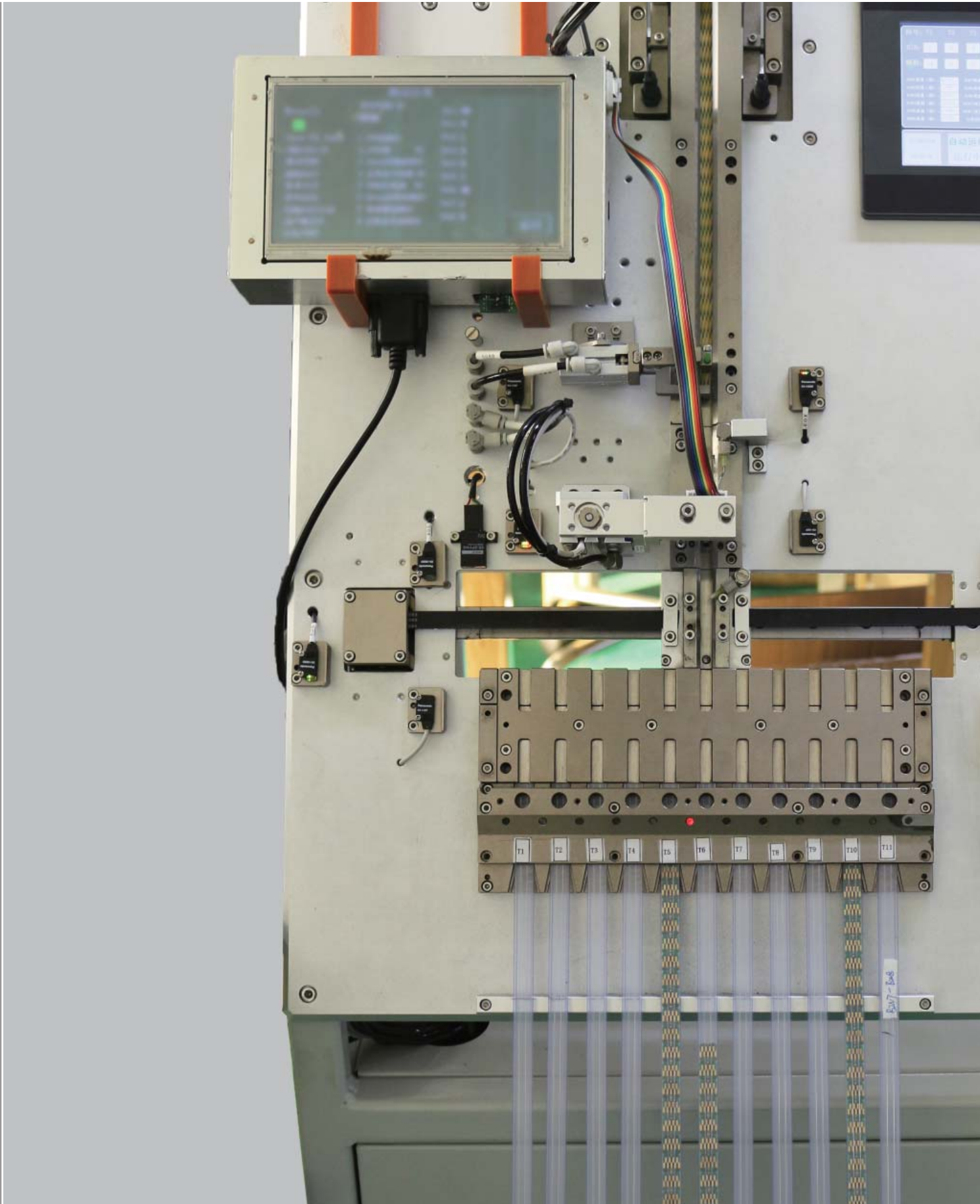
Research

Chip technology has a short life cycle and is difficult to develop. It requires strong scientific research support. Having the geographical advantage of being located in Hangzhou, Chipjet developed a close cooperation with Zhejiang University, Fudan University, and other universities in Jiangsu and Zhejiang provinces to carry out the study and research projects.

The company has always adhered to the values of "innovation and hard work, excellence and win-win," so it continued to increase investment in expanding the research and development team and solidifying its technical strength.

The company established its very own separate, proprietary-owned Focused Ion Beam (FIB) laboratory and chip testing platform to independently complete the chip physical layer analysis, chip test automation and key technical planning.

Chipjet attaches great importance to the protection of intellectual property rights and has built a global





industry patent search, download, analysis and management platform. This allows for speedy searches to locate and identify relevant industry patents. Decades of hard work has helped Chipjet to accumulate a profound technical base of chip designs, encryption technology, thin-film processing, chip reliability control, automation equipment design and development. This gives them a significant core and competitive industry advantage.

Chipjet's continued growth has come from the Dinglong Group's powerful support. In 2018, Dinglong invested US\$21 million in R&D alone, accounting for 11.69 percent of the year's operating revenue. Chipjet's chip budget occupied a major share of the R&D investment.

In addition to domestic R&D institutions and cooperation centers, Chipjet has technology partners in the U.S.A. and Europe. It is intended that more international technology centers for integrating superior resources will be established.

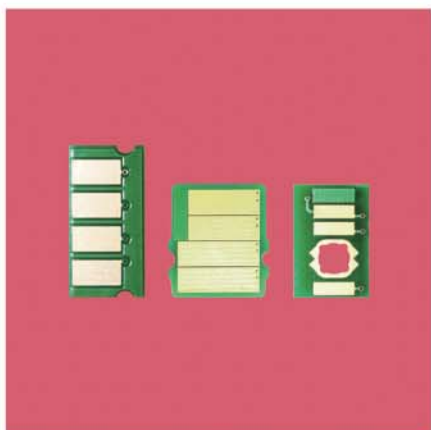
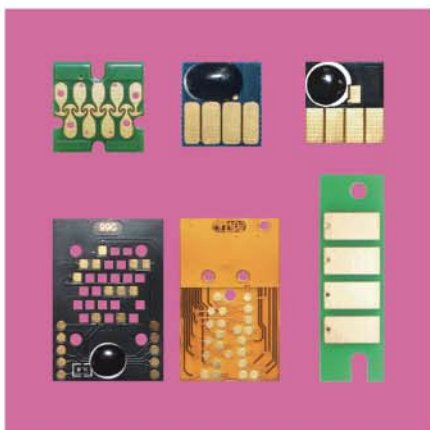
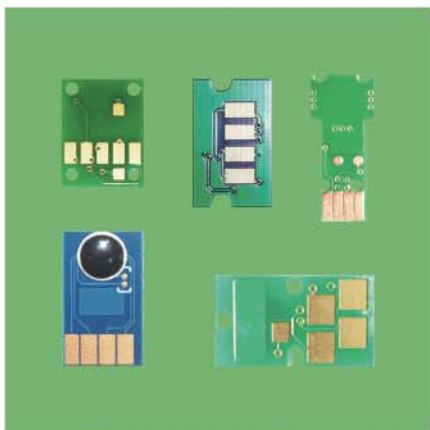
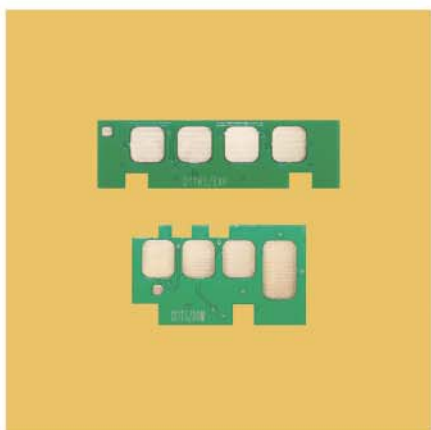
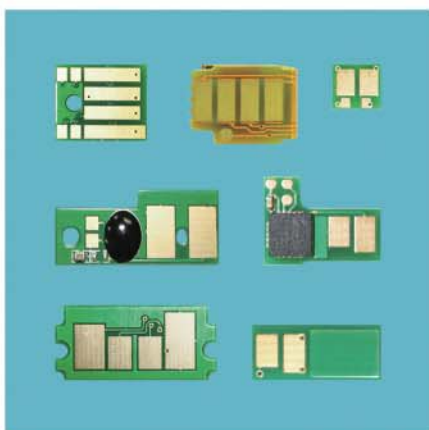
According to Wang, OEM printer firmware upgrades will continue to be frequent. "It is an OEM strategy to control and limit end-users' choices and rights," Wang explains. As the core technology solution provider of Dinglong, Chipjet will pay close attention to the dynamics of each OEM and provide customers with a prompt, alternative solution.

Becoming a first-class chip solution provider and a trusted partner is the philosophy behind Chipjet's journey and it is also the vision Chipjet carries with it into the future. Looking back on the past 12 years, Chipjet has matured into being a world-famous aftermarket consumable chip solution supplier for worldwide customers with Dinglong group in the whole industry solution.

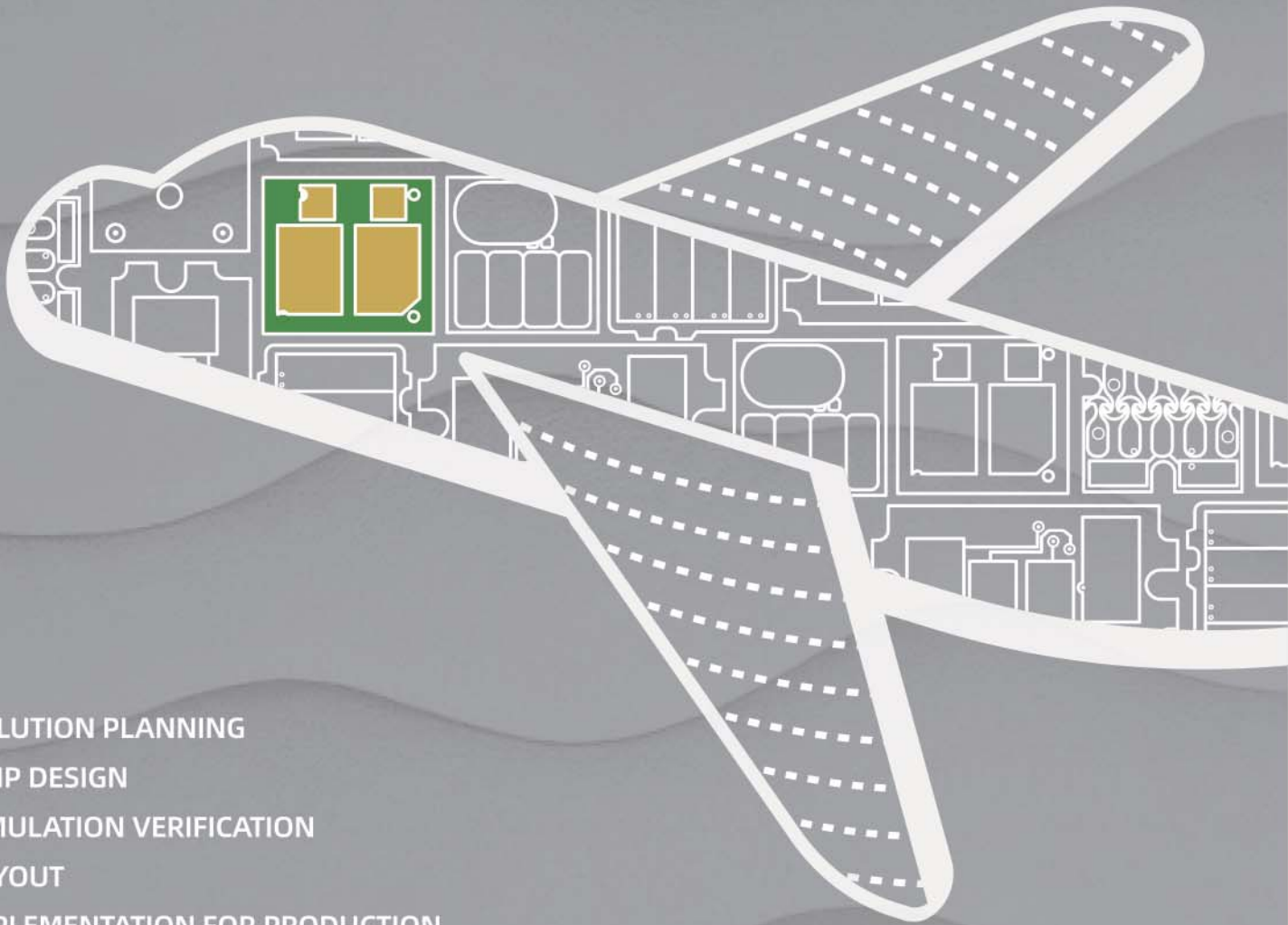
In the printing and imaging industry, Chipjet has become a beacon light. Monopolies thrive in the dark, but they fear the light. Chipjet will continue to break technology barriers and to breaking monopolies and fight for an equal and free competitive industry. ■

A portrait of a man with short dark hair, wearing a black button-down shirt, sitting on a dark leather couch. He is looking off-camera to the right. His hands are clasped in his lap, and a metal watch is visible on his left wrist. The background features blue curtains and a bright window. In the top right corner, the text "Chipjet 旗捷" is displayed in blue and red.

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