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ANNUAL
REPORT

Contents

03 About Espressif

07 Facts About Espressif

10 Business Highlights

12 Management Report

27 Consolidated Financial Statements

33 Further Information

04 Message from the CEO

08 Key Announcements

11 Financial Analysis

13 Key Products - IoT Chips

14 Software Solutions

16 Value-Added Services

21 Business Model

22 Research and
Development

23 R&D Employees

27 Consolidated
Balance Sheet

29 Consolidated Income
Statement

30 Consolidated Cash
Flow Statement

33 Terms and Conditions
of the Report

34 Independent Auditor's
Report

09 Espressif DevCon22

17 Market

18 Core Competitiveness

20 Developer Community
Content

24 Ownership of Securities

25 Stock-Based
Compensation

26 Risks and Uncertainties

31 Consolidated Cash Flow
Statement - Indirect Method

32 Consolidated Statement
of Changes in Equity

38 List of abbreviations

About Espressif

Espressif Systems is a public, multinational, fabless, semiconductor company focused on developing cutting-edge, wireless-communication, low-power chipsets. By leveraging wireless computing, we provide green, versatile and cost-effective AIoT solutions. We have accomplished a hardware-and-software, closed-loop development cycle for a series of core technologies, including RF, Wi-Fi & Bluetooth LE network protocol stacks, RISC-V MCUs, AI instruction sets and algorithms, operating systems, toolchains, compilers, IoT software application frameworks, Cloud, etc.

We have a diverse team of engineers from around the world. All company branches employ about 580 members of staff from almost 30 countries and regions, +76% of whom are based in our Research & Development Department. We have eight R&D centers in five countries, including China, India, the Czech Republic, Brazil and Singapore. The company's increasing reputation in recent years has been instrumental in attracting talented engineers from across the world. Being united by our passion for technology, our diversity is our strength, as it allows the creative blending of different kinds of knowledge, perspectives and ways of thinking.



global Wi-Fi MCU
market share*



products distributed
all over the world



millions of users



Our R&D Centers

China

- Shanghai
- Suzhou
- Hefei
- Wuxi

Brazil

- Campinas

India

- Pune

Czech Republic

- Brno

Singapore

* Market share data from TSR

Message from the CEO

“Espressif has consistently demonstrated its ability to thrive in the face of challenges, and we are confident that this will continue in 2023 and beyond. We remain committed to seizing every opportunity to develop even better solutions to address our customers' future needs.”

Teo Swee Ann
Espressif's Founder & CEO



We are delighted to present the Annual Report for Espressif, covering our performance in 2022, a year that witnessed extraordinary global challenges. The COVID pandemic, lockdowns in China, supply chain disruptions, a significant war in Europe, rising energy prices, and inflationary pressures culminated in a cost-of-living crisis in numerous countries. These events contributed to a highly volatile socio-economic environment.

Throughout these turbulent times, Espressif has demonstrated steadfast commitment to our customers' success, showcasing our ability to navigate complex situations while maintaining price stability, supply chain reliability, and competitive positioning in an ever-evolving market. We are proud to have deepened our relationships with our valued customers, whose support has been instrumental to our achievements.

We would also like to extend our sincere gratitude to our suppliers for their unwavering dedication during the past year. Our collaborations have been crucial in preserving supply chain stability and ensuring the exceptional quality of our products.

In 2022, Espressif made significant progress in advancing our core intellectual properties (IPs), including Wi-Fi 6, Wi-Fi 6E, Bluetooth Low Energy, ESP RainMaker (Cloud), ESP Insights (device observability), ESP-Hosted (connectivity), ESP-CSI (wireless environment sensing), video encoders, RISC-V, new RF transceivers, and more. Our in-house developed RF transceivers, power management systems, RISC-V CPU, Wi-Fi 6, Bluetooth Low Energy IPs have successfully entered production with the release of our ESP32-C6 chip, which has also achieved certification in all these areas.

The ESP32-C6 chip, a low-power, cost-effective 2.4 GHz Wi-Fi 6 + Bluetooth 5 (LE) + Thread/ZigBee SoC, featuring a 32-bit RISC-V core, is designed for securely connected devices. By improving sleep and deep sleep power consumption, and with the support of the TWT protocol of Wi-Fi 6, the chip can be deployed in new battery-operated or novel power supply applications. The inclusion of ZigBee and Thread in ESP32-C6 enables the chip to support the Matter standard.

The Matter standard, a new open-source standard for smart home devices, was developed by a consortium of leading tech companies, including Apple, Amazon, Google, and the CSA Alliance. Matter aims to simplify the development and enhance the compatibility of smart home devices across different ecosystems and platforms, providing a seamless experience for users. It is designed to work with a wide range of devices, such as lighting, HVAC, safety and security, and more.

Our latest product portfolio is designed to meet the evolving needs of our customers and empower them to create innovative IoT solutions based on the Matter standard. ESP RainMaker and ESP Insights have gained considerable traction among our customers. These tools, combined with Espressif hardware, facilitate the creation of highly advanced IoT systems. By utilizing ESP Insights, customers can gather feedback from end-users and monitor the status of their deployments, enabling them to continuously refine their products and achieve optimal performance promptly. This powerful tool has resulted in enhanced reliability and reduced costs for our customers.

In 2022, we also unveiled a new iteration of the ESP32-S3-BOX development kit, incorporating our most advanced AI voice-development platform. This platform offers a comprehensive hardware-software framework for controlling intelligent devices through both online and offline voice assistants. The ESP32-S3-BOX is particularly well-suited for smart speakers and IoT devices that require offline human-computer voice interaction capabilities. The market response has been overwhelmingly positive, and we anticipate continued growth in this segment.

Furthermore, we are excited to announce the introduction of the ESP32-P4, which was showcased at the 2023 CES in Las Vegas. This state-of-the-art SoC is powered by a dual-core RISC-V CPU, featuring AI instructions extension, an integrated H264 encoder, an advanced high throughput memory subsystem, and high-speed peripherals. The ESP32-P4 has been specifically designed for high-performance HMI applications demanding robust security.

Our unwavering commitment to in-house technological development has enabled us to consistently outperform competitors and cater to the dynamic needs of our customers. This dedication has also attracted exceptional talent to our organization. In 2022, our workforce grew from 517 to 578 employees, with the majority of new hires joining our R&D departments. At Espressif, our team members are engaged in groundbreaking R&D activities, acquiring new skills while contributing to the company's growth.

We are immensely proud of our accomplishments in 2022 and eagerly anticipate pushing the boundaries of innovation in the years to come. We attribute our sustained success to the unwavering dedication and tireless efforts of our entire team. Espressif has consistently demonstrated its ability to thrive in the face of challenges, and we are confident that this will continue in 2023 and beyond. We remain committed to seizing every opportunity to develop even better solutions to address our customers' future needs.

Facts About Espressif



Key Announcements



New SoCs

ESP32-C2

is a small, simple and cheap combo Wi-Fi 4 + Bluetooth 5 (LE) SoC in a 4mm x 4mm package, with 272 kB of memory and robust connectivity.

ESP32-C5

is our first RISC-V SoC solution that supports 2.4 and 5 GHz dual-band Wi-Fi 6, along with Bluetooth 5 (LE).



Security

Features, such as Secure Boot, Flash Encryption, cryptographic accelerators, TRNG, etc., provide all the necessary components for keeping connected devices secured and trusted. With the help of the Digital Signature Peripheral and a dedicated Key Management Unit, our chips ensure that private keys are generated on the SoC itself and are not compromised by any software in plain text or by any physical attacks. The SoC also supports hardware access protection that facilitates Access Permission Management as well as Privilege Separation.



AI

Espressif's 3A Audio Algorithms

include Acoustic Echo Cancellation (AEC), Audio Noise Suppression (ANS) and Automatic Gain Control (AGC). They significantly reduce noise and echo in calls, keeping high-quality voice intercoms stable at all times.



Thread

Thread-Certified (1.3.0) Components

The ESP32-H2 SoC, along with Espressif's Thread SDK, have been officially given the status of "Thread-Certified (1.3.0) Components". The 1.3.0 Thread certificate is a prerequisite for Matter-over-Thread device certification.



OS

ESP-IDF

Espressif's own IoT Development Framework, including RTOS, has been upgraded to v5.0 and has won 9.9K stars on GitHub.

Zephyr

We keep updating our support for Zephyr, with Low-Power Modes, Wi-Fi Manager, Asymmetric Multiprocessing (AMP) and peripheral support.



Matter

Matter 1.0 Certification

Espressif has successfully completed the Matter 1.0 certification program. Customers can benefit from an accelerated certification process for their Matter devices and reduced time-to-market.



Espressif DevCon22

Espressif has had a truly fruitful collaboration with the developer community at least since 2014 when ESP8266 was launched. Ever since, the impact of our work has increased considerably across different domains of the high-tech industry, but so has the importance of the developer community. Innovation has been the common goal for everyone involved in this business. Likewise, innovation at Espressif remains at the heart of everything we do. Equally central, however, is our belief in the significance of the developer community's contribution to new technologies. Our products and services reflect this philosophy, as their evolution is shaped by community feedback to a certain extent. Through the widespread availability of our development boards, open-source documentation, software and tools, the communication between Espressif and the developer community is always free-flowing, candid and, therefore, effective.

This is how Espressif's Developer Conference came to life in October 2022. After a six-month period of intense preparations we were able to offer more than thirty presentations on such topics as Matter, RainMaker, ESP-IDF, Privilege Separation, Embedded Rust, Components Manager, Board Support Packages, third-party frameworks, and more. It was not just Espressif engineers who presented their most recent work, though. We were delighted to also host guest speakers from Microsoft, Arduino, Adafruit, Goliath, WOKWI and Toit.

The above-mentioned content covered nearly twenty hours of live broadcasting on three different platforms simultaneously, that is, Espressif's official channels on YouTube, WeChat, and Bilibili. Our graphics, documentation and marketing teams, as well as our engineers in Brno, Pune and Shanghai worked tirelessly, in order to ensure that the finalised content would be of the highest quality, while reaching as far and wide an audience as possible. Thus, on YouTube alone, our conference, or Espressif DevCon22 as we officially named it, garnered a total 70,000 views by spectators from all four corners of the world.

The aim of this online conference was to increase Espressif's engagement with the wider community of developers, thus solidifying the connection between Espressif and developers. Our main objectives were to share knowledge, promote Espressif's latest projects, products and services, as well as collect feedback on everything we do.

Espressif DevCon23 will be the next edition for 2023. We hope to establish a tradition by organizing this conference once a year, so that we provide our community of developers, partners and supporters not just with updated information on our portfolio of products and services, but also with a chance to voice their thoughts on our work and common goals.



Business Highlights

Key Financial Data

CNY	Fiscal Year		
	2022	2021	2020
Consolidated Statement of Income Data			
Revenue	1,271,127,201	1,386,371,541	831,286,490
Gross profit	508,251,068	549,025,732	343,235,573
Selling expenses	49,323,100	41,815,693	31,485,447
General and administrative expenses	59,639,944	55,485,146	46,595,295
Research and development expenses	337,121,814	271,689,981	192,792,044
Net income	97,323,103	198,427,708	104,051,961
Earnings per share:			
Basic	1.2129	2.4775	1.3006
Diluted	1.2127	2.4566	1.3006
Consolidated Balance Sheet Data			
Cash, cash equivalents and financial investments	1,200,219,436	1,114,558,363	1,357,770,452
Working capital	1,518,383,808	1,749,605,271	1,634,809,451
Total assets	2,082,796,825	2,129,056,143	1,829,631,150
Long-term obligations	65,591,788	68,244,392	50,822,540
Total shareholders' equity	1,826,677,535	1,823,017,913	1,641,130,356
Consolidated Cash Flow Data			
Net cash flow from operating activities	71,321,658	31,460,857	36,055,511
Non-GAAP Adjustment			
Stock-based compensation	14,726,019	21,787,964	18,757,990
Non-GAAP net income	112,049,122	220,215,672	122,809,951

Key Financial Indicators

	Fiscal Year		
	2022	2021	2020
Gross margin	39.98%	39.60%	41.29%
R&D-to-sales ratio	26.52%	19.60%	23.19%
EBITDA margin	9.29%	16.78%	14.90%
Weighted ROE	5.36%	11.52%	6.47%
Number of Espressif employees as of December 31	578	517	449

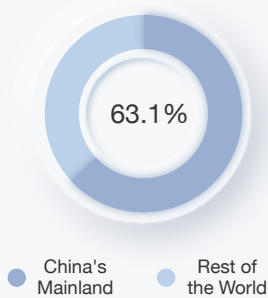
Financial Analysis

Espressif's total revenue in 2022 was CNY 1,271 million, marking a decrease of 8.31% from CNY 1,386 million in 2021, due to the current inflation-driven recession and the consequent decline in consumer confidence. Therefore, the net income was CNY 97 million, which marked a decrease of 50.95% year-on-year, mainly due to our increased R&D expenditure.

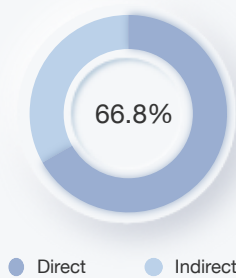
The overall gross margin was 39.98%, in which the gross margin for IoT chips was 47.28%. The overall gross margin is basically flat in comparison with the previous year.

Customers in mainland China prefer purchasing chips, while the customers from the rest of the world prefer modules. We keep the chip margin at a reasonable level, in order to support our future R&D expenditure.

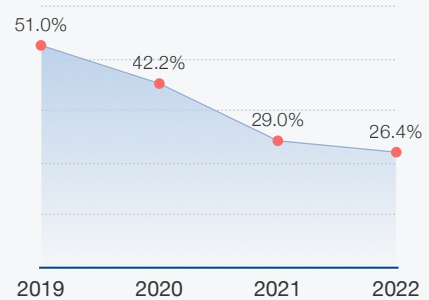
Revenue by Area



Revenue by Sales Mode



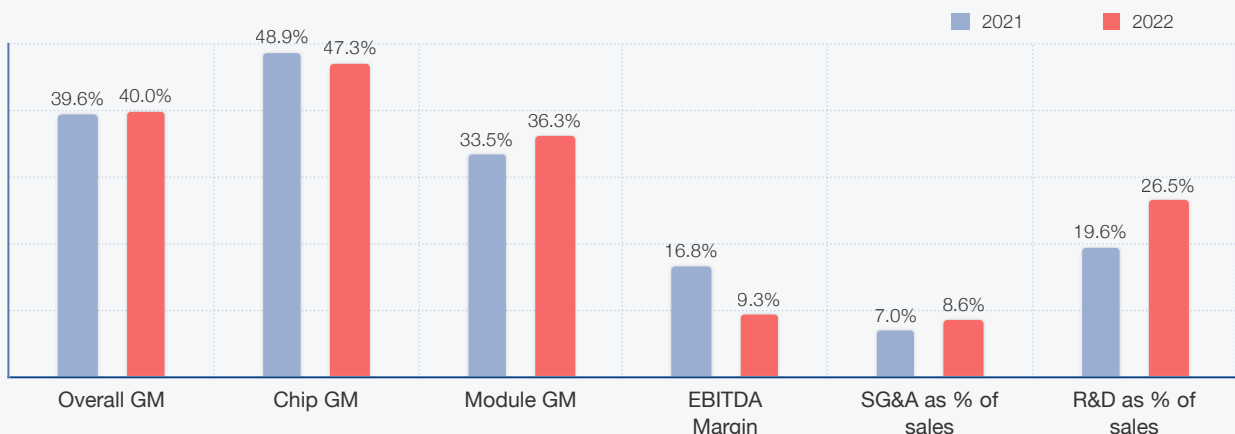
Top-5 Customer Concentration Rate



Revenue by Product Category



Key Financial Indicators

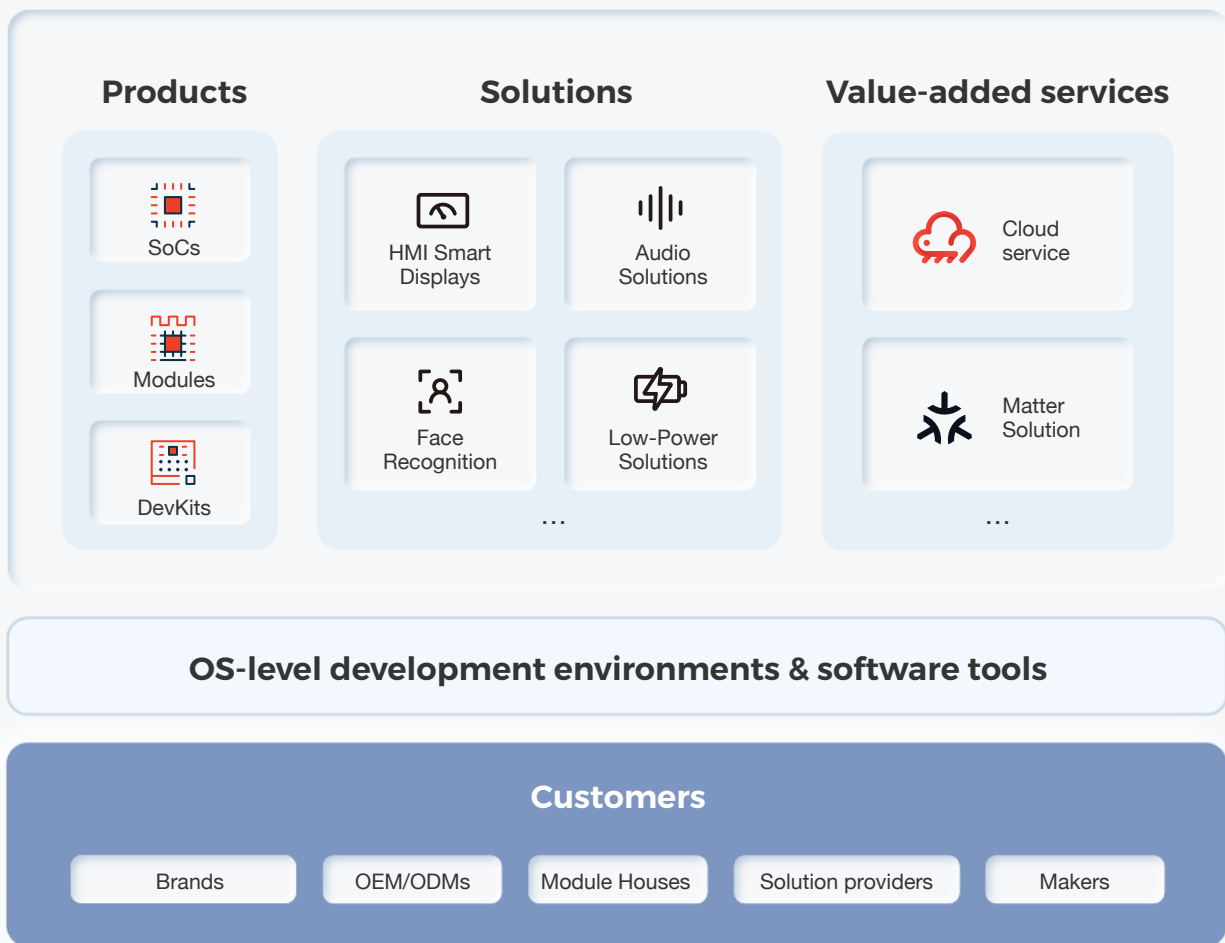


Management Report

Business Strategy

Espressif Systems' business strategy emanates from our service/product areas and our engagement with the developer ecosystem.

Our product and service areas include IoT chips, OS-level development environments, software tools, application solutions, and value-added services, such as Cloud and Matter. The above-mentioned products ensure that we are in the heart of numerous commercial AIoT applications in different markets, including smart home, consumer electronics, industrial automation, healthcare, etc.



Key Products - IoT Chips

Espressif is recognized as a market leader in the field of Wi-Fi MCUs. We released our first Wi-Fi MCU in 2014, and our first Wi-Fi/Bluetooth LE combo chip in 2016. In 2020, we successfully developed our own RISC-V MCU core, adding it to our product portfolio, while in 2021 we released our first Thread/Zigbee/Bluetooth LE 5 combo chip and a 2.4GHz Wi-Fi 6 chip. In 2022, we released our first 2.4 & 5GHz Wi-Fi 6 chip and our product range has expanded to Wireless SoCs.

In fact, we have been constantly diversifying our product portfolio, introducing new solutions through our numerous investments. Thus, we now have various product lines in the main short- and medium-range connectivity technologies. Our core technologies are self-developed, including connectivity IPs, RF components, RISC-V IPs, software frameworks, tools, AI functions etc.

We also provide IoT modules based on our chips. The benefit for customers is that they can get direct support from us, shortening and optimizing their supply chain, even in case of chip shortages.



Software Solutions

HMI Smart Displays

The solution has an innovative user-interface that enables data visualization, touch or knob control, voice wake-up and recognition, multi-mode gateway, etc.

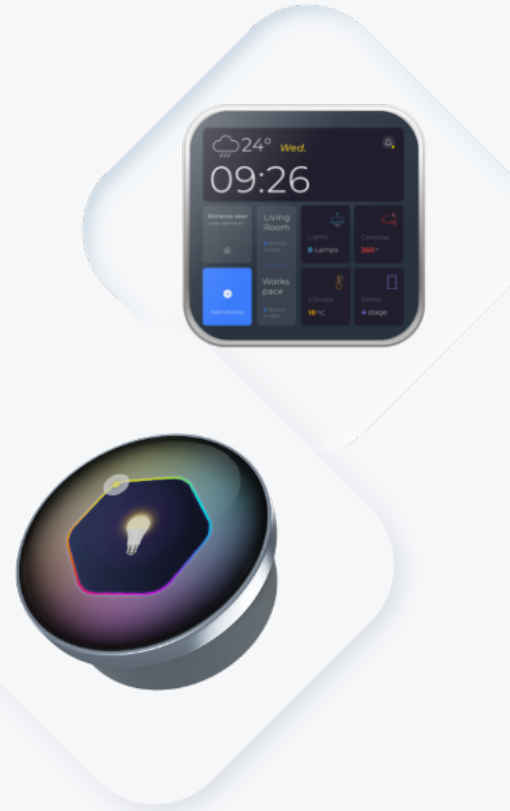
It is widely used in smart-home control, home appliance screens, healthcare, industrial control, and educational devices for children.

Espressif's HMI smart displays, based on ESP32-S3 and ESP32-C3 SoCs, are designed to support RGB and SPI interfaces, respectively.

The RGB display is a common interface for smart-home control. ESP32-S3 is an excellent choice for RGB interface LCDs. ESP32-S3 has a dual-core CPU with powerful AI features.

SPI is a common interface for small displays. The state-of-the-art technology of ESP32-C3 allows it to dynamically adjust the operating frequency and switch over to low-power modes.

The solution is supported by ESP-IDF, Espressif's mature IoT development framework, with which users can easily build new applications.



Low-Power Solution



Smart Switch

Based on ESP32-C2/ESP32-C3, the ESP Smart Switch Solution allows customers to easily build Wi-Fi switches with low power-consumption, excellent Wi-Fi performance, security, and reliability.

Ultra-Low Power, No Anti-Flicker Required

ESP-NOW protocol

ESP-NOW is a connectionless communication protocol defined by Espressif, which enables a direct, quick and low-power control of smart devices without the need of a router.

ESP-NOW can work with Wi-Fi and Bluetooth LE, and supports ESP8266, ESP32, ESP32-S and ESP32-C series of SoCs. It's widely used in smart appliances, remote controls, sensors, etc.



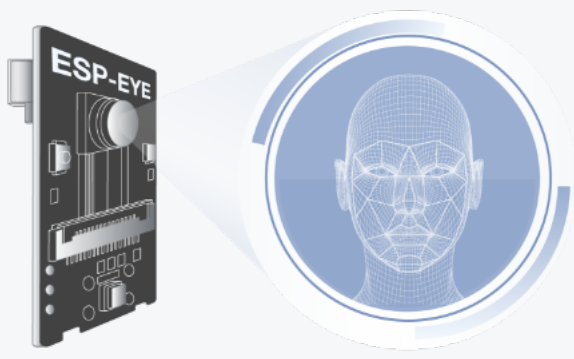
Audio Solutions

AFE (Audio Front-End) Algorithms

have a solid voice-controlled performance even in noisy environments. Customers can use these algorithms with Espressif's powerful ESP32 and ESP32-S3 SoCs, in order to build high-performance, yet low-cost, products with a voice user interface. Espressif's AFE algorithms have been qualified by Amazon as an "Audio Front End" solution for Alexa built-in devices.

Offline smart-voice assistant

supports a configurable wake-word engine (WakeNet), and an offline speech-recognition engine (MultiNet) with up to 200+ offline commands and acoustic algorithms.



Face Recognition

ESP-WHO

is a face detection and recognition development framework based on ESP32 and ESP32-S3.

You can use it with the ESP-EYE or the ESP-WROVER-KIT development board. Then, by adding only a few peripherals, such as cameras and screens, you can easily create complete AIoT applications.



Security

Local memory



High Performance

10 frames per second



Cost-Effectiveness



Expandability

- Object detection
- Object tracking
- Hand-gesture recognition

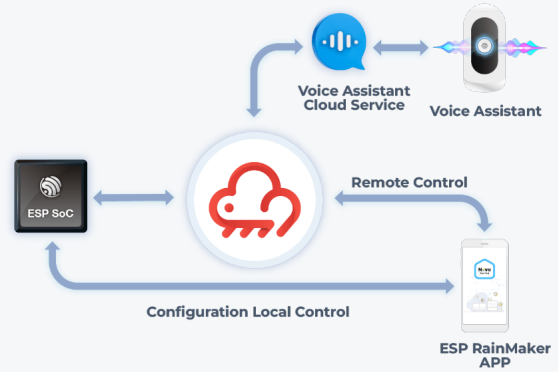
Value-Added Services



Cloud ESP RainMaker

This is a complete, yet light-weight, AIoT solution that enables private Cloud deployment for our customers' business in a simple, cost-effective and efficient manner.

Espressif offers a turnkey solution that includes product firmware, private Cloud and a dashboard, as well as a voice assistant and mobile apps. This allows customers to build their very own brand of an IoT business in an efficient, affordable and speedy way.



Comprehensive Matter Solutions

<p>Wi-Fi End Device</p>	<p>Thread Border Router</p>
<p>Thread End Device</p>	<p>Matter Bridge</p>



Matter One-stop Matter Solution

Espressif is an active contributor to the development of the Matter protocol. Espressif, with its unique combination of connectivity SoCs, software, and complete solutions makes it easy for our customers to build Matter-enabled smart-home devices of various types. Espressif provides the most comprehensive solutions for Matter, including support for Wi-Fi or Thread end-point devices, Thread Border Routers, and Matter gateway reference designs.



Market

The market for wireless SoCs is truly diverse, including applications for smart homes (e.g., smart lights, air conditioners, ovens, coffee machines, etc.), consumer electronics (e.g., smart speakers, drones, etc.), industrial automation (e.g., mechanical arms), smart agriculture (e.g., soil PH detector, CO₂ detector, etc.), healthcare (e.g., monitoring devices for diabetes, blood pressure, etc.), energy control (solar energy devices, EV chargers, etc.), the internet of vehicles (OBD devices, dashboards, etc.), and education (talking pens, interactive whiteboards, etc.).

Although the consumer market shrunk in 2022 due to various macroeconomic factors, digitalization in the non-consumer sectors has brought us many new customers.

<p>Smart Home</p>  <p>Smart Ovens</p>	<p>Consumer Electronics</p>  <p>Smart Speakers</p>	<p>Industrial Automation</p>  <p>Mechanical Arms</p>	<p>Smart Agriculture</p>  <p>Soil PH Detector</p>
<p>Healthcare</p>  <p>Medical Detectors</p>	<p>Energy Management</p>  <p>Smart Solar Panels</p>	<p>Internet of Vehicles</p>  <p>OBD Devices</p>	<p>Education</p>  <p>Talking Pens</p>

Core Competitiveness



Chip Competitiveness

Espressif takes pride in the invaluable experience that our R&D team leaders have in the field of wireless-communication chips. For example, Espressif’s founder and CEO, Mr Teo Swee-Ann, has over 20 years of experience in the semiconductor industry, having also registered over 40 IC and IoT-related patents under his name.

After the huge success of our initial series of Wi-Fi MCUs, our company expanded to other wireless-connectivity technologies, including Bluetooth LE and Thread/Zigbee. This development has further enhanced our Company's high-tech offerings, thus increasing our market opportunities, while also keeping our customers spoiled for choice.

Our products are renowned for their high level of integration, small size, low power consumption, great computing power, large memory space and strong security mechanisms. They are being used by independent developers and big companies alike, while Espressif is recognized as a leading force in the AIoT chip industry.

System Competitiveness

ESP-IDF is Espressif’s official IoT Development Framework for the ESP32, ESP32-S, ESP32-C and ESP32-H series of SoCs. It provides a self-sufficient SDK for any generic application development with the above-mentioned SoCs, using programming languages such as C and C++. ESP-IDF currently powers millions of devices in the field, and enables building a variety of network-connected products ranging from simple light bulbs and toys to big appliances and industrial devices.

ESP-IDF has established a fastidious release process, and a support policy which ensures that customers can choose a stable release, while also getting important updates. Each stable release undergoes a rigorous QA process that ensures production readiness at all times. Also, ESP-IDF comes with an extensive documentation for its software components not only at the usage level but also at the design level. This helps developers to fully understand what ESP-IDF offers, and select whatever suits their applications best.

Furthermore, ESP-IDF supports a large number of software components, including RTOS, peripheral drivers, network stacks, protocol implementations, and examples of common use cases. These components help developers focus on their business logic, while the SDK provides most of the building blocks required for typical applications. Open-source and freely-available developer tools, as well as officially supported Eclipse and VSCode IDEs, ensure ease-of-use for developers.

Software Competitiveness

The company provides numerous software solutions, including AI-related ones (e.g., offline/online voice recognition and smart control, AI image recognition, etc.), Wi-Fi Mesh, BLE Mesh, HMI functions, various peripheral drivers and other functions covering all the development needs of our customers. These solutions greatly reduce the cost of application development for our customers.

Espressif's AI Lab has developed Audio Front-End (AFE) algorithms that have been qualified as a "Software Audio Front-End Solution" to Amazon-Alexa Built-in devices. This is the result of Espressif's incessant focus not just on the connectivity of its own AIoT solutions, but also on high-performance Machine Learning on the edge. Furthermore, in 2022 our AI Lab launched the so-called 3A Audio Algorithms, i.e., Acoustic Echo Cancellation (AEC), Audio Noise Suppression (ANS), and Automatic Gain Control (AGC). Based on Espressif's 3A audio algorithms, Espressif-powered Real-Time Communication applications benefit from significantly reduced noise and echo in calls, and sustained stability in high-quality voice intercoms.

Our newly-launched, one-stop Matter solution, including the fully-customized ESP-Matter SDK and Cloud services, can simplify and accelerate the development process of Matter-compatible products significantly. This is the culmination of our ongoing contribution to the Matter platform in various areas, including protocol formulation, core stack implementation and certification test events.

Furthermore, ESP RainMaker® is a one-stop, development-free and maintenance-free AIoT solution for private Cloud deployment, which reduces R&D costs and accelerates time-to-market. More specifically, this is a complete system for building AIoT products with a minimal amount of code, which enables our customers to deploy and develop secure, customized AIoT solutions. It covers all of Espressif's chips and modules, device firmware, voice-assistant integrations, phone apps and Cloud backend. This helps our customers avoid expensive investments in Cloud capabilities, gain independence and focus on innovating their core-value offerings.

Ecosystem Competitiveness

Our company has brought together professionals and companies from across the AIoT industry, e.g., hardware and software developers, business applications, and Cloud platforms, as well as maker communities. Espressif's own software development platforms and the accompanying documentation are entirely open-source, thus making our innovative products available to people from all walks of life.

As a result, thousands of third-party projects have been based on Espressif's technologies. For example, on GitHub, which is the largest provider of Internet hosting for software development, there are more than 80,000 open-source projects based on Espressif's IoT chips. Furthermore, the popularity of our products has stimulated an increasing number of authors who have produced teaching resources based on Espressif chipsets in several languages including English, Chinese, German, Portuguese, Japanese, and Serbo-Croatian. At present, there are more than 100 digital and physical books about Espressif's SoCs in more than ten languages.

Developer Community Content

ITEM	Dec 31, 2022	Dec 31, 2021	change%
GitHub (Worldwide open-source development platform)			
ESP32 Projects	41,891	29,007	44%
ESP8266 Projects	39,294	35,055	12%
Gitee (Chinese open-source development platform)			
ESP32 Projects	2,629	2,592	1%
ESP8266 Projects	1,868	1,867	0%
CSDN (Chinese Tech-blog platform)			
Search results for ESP32	93,242	79,188	18%
Search results for ESP8266	36,286	30,033	21%
Hackaday (open-source hardware platform)			
ESP32 projects	4,702	3,816	23%
ESP8266 projects	6,101	5,789	5%
Reddit			
ESP32 group members	59,619	46,540	28%
ESP8266 group members	59,004	53,523	10%
bilibili (Chinese video-sharing platform)			
Official account followers	24,064	17,502	37%
Official account views	658,235	390,000	69%
YouTube			
Official account subscribers	14,800	11,600	28%
Official account views	810,523	556,846	46%
ESP32 community videos	641,926	466,459	38%
ESP8266 community videos	778,090	687,155	13%
Views of the most watched ESP32 community video	around 3.4m	around 1.5m	
Views of the most watched ESP8266 community video	around 1.6m	around 1.5m	

N.B.:

Statistical data derived from different platforms may be based on different collecting methods. It is possible for certain platforms to modify their algorithms from time to time and, therefore, impact the resulting statistical data. The above-mentioned data resulted from the Company's research at the end of each quarter reported here, unless otherwise stated.

The search results of the keyword "ESP32" include the ESP32 series, ESP32-C series, ESP32-S series, and ESP32-H series.

Business Model

Business-to-Developer-to-Business (B2D2B)

Espressif has deployed the Business-to-Developer type of marketing, not only because it has gained prominence in recent years, but also because it has proven to be more effective since the influence of developers on organizations of all sizes has gained traction. In other words, most developers are R&D employees in various companies and bring forth business opportunities from the companies they work for.

This way, the developer ecosystem we have created at Espressif demonstrates how the value of networks can grow exponentially:

- The more developers we attract as customers, the more hardware and software solutions we generate.
- The more successful hardware and software solutions we create, the more our reputation spreads with positive feedback from happy customers/developers.
- The above-mentioned interaction between people in our network prompts the creation of more content, which -in turn- attracts more users/developers searching for new content.
- Likewise, other third-party development platforms join our ecosystem and bring in new developers, as our influence continues to grow.

Having successfully applied the B2D2B model, Espressif can now focus on R&D investments, while maintaining a small business team that supports a large number of customers directly. In fact, most of our revenue is gained through direct sales.



Research and Development

R&D Investment

R&D investment is at the heart of Espressif Systems’ development. During the reporting period, R&D cost CNY 337 million, which marked a 24.08% increase compared with that of 2021. At the same time, the R&D-to-sales ratio was 26.52% in 2022.

Espressif’s escalating R&D investment cost can be attributed to the increase in the number of R&D staff and their subsequent compensation level, which increased significantly year-over-year.

CNY	Fiscal Year		change (%)
	2022	2021	
R&D Expenses	337,121,814	271,689,981	24.08
R&D-to-sales ratio	26.52%	19.60%	

Intellectual Property

We seek to protect our technologies through a combination of patents, software copyright and trade secrets. By the end of 2022, the Company had been granted 141 patents. We continue to submit new patent applications relating to our recent R&D innovations.



List of Intellectual Property Rights Applied and Granted

	2022		Cumulative number	
	Applied for	Granted	Applied for	Granted
Invention patents	14	10	124	72
Utility model patents	0	0	26	26
Design patents	0	0	1	1
Software copyright	4	2	23	21
Others	9	10	55	21
Total	27	22	229	141

N.B.: The number of patents that have been “applied for” does not include the rejected applications in China, or the PCT patent applications not submitted to any particular country, or any patent applications beyond the reporting period. The number of “granted” patents includes those with expired IP rights. The category of “others” includes overseas (non-Chinese) patent applications, i.e. the PCT patent applications, U.S. patent applications through the PCT route or the Paris Convention route, as well as patent applications in India.

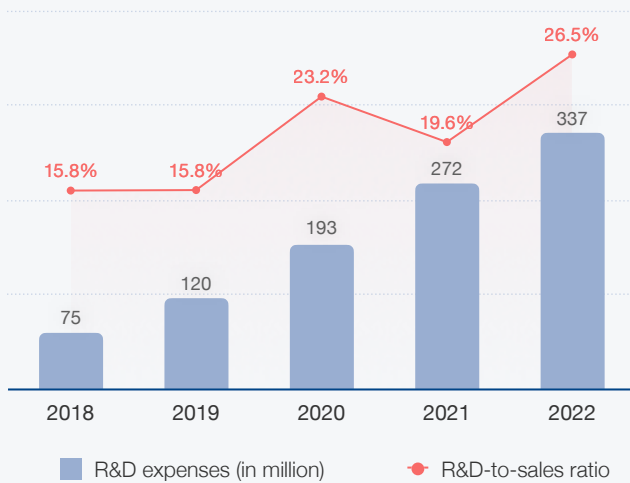
R&D Employees

We are proud of our talented, diverse and multicultural workforce. By December 31, 2022, across our eight branches worldwide, we had employed 578 people, more than 76% of whom are in engineering roles. Meanwhile, we have expanded our business beyond Wi-Fi MCUs, thus offering innovative solutions to wireless connectivity and processing, including AI, RISC-V MCU, Wi-Fi 6, Bluetooth LE, Thread, Zigbee and other IoT-related technologies.

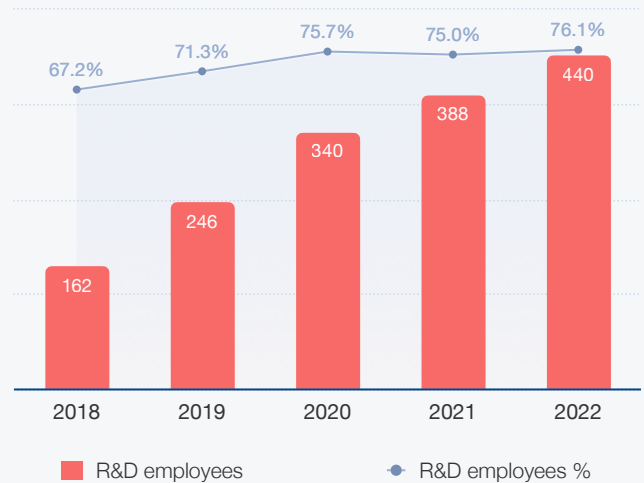
Since the research and development of software and hardware are inextricably intertwined, we constantly invest in software technology, too. Hence, we are currently focused on AIoT technologies, including toolchains, compilers, operating systems, application frameworks, AI algorithms, Cloud products, apps, etc. Our aim is to make Espressif a one-stop solution-provider offering anything relating to hardware, software and the Cloud.

	Fiscal Year	
	December 31, 2022	December 31, 2021
R&D employees	440	388
R&D employees as a percentage of total employees	76.12%	75.05%
Total compensation of R&D employees (CNY in thousands)	270,083	200,254
Average compensation of R&D employees (CNY in thousands)	652	550

R&D Expenses



R&D Employees



Ownership of Securities

Basic information of securities

Share types	Ordinary share
Share capital	80,469,285 (as of December 31, 2022)
Listing	Shanghai Stock Exchange (SSE)
Ticker	688018.SH
Listing Date	2019-07-22

Shareholder Structure as of December 31, 2022

Shareholder	Share Numbers	Percentage (%)
Espressif (Hong Kong) Investment Ltd.	34,760,000	43.20
Shinvest Holding Ltd.	2,804,446	3.49
Dajia Life Insurance Co., Ltd. – Universal Products	2,321,738	2.89
BOC - Franklin Templeton Sealand Fund	2,184,324	2.71
CITIC Securities Co., Ltd.	1,047,353	1.30
Ningbo Meishan Free Trade Port Le Tun Investment Management Partnership (Limited Partnership)	1,046,030	1.30
ABC - Franklin Templeton Sealand Fund	1,020,467	1.27
Yadong Beichen Investment Management Co., Ltd.	909,374	1.13
BARCLAYS BANK PLC	757,242	0.94
China Resources SZITIC Trust - Broadvision Selection II Fund	725,500	0.90
Top 10 shareholders	47,576,474	59.13
Other public shareholders	32,892,811	40.87
Total of outstanding shares	80,469,285	100.00

Stock-Based Compensation

Espressif has four ongoing restricted stock incentive plans. The fair value of the restricted stock incentive plans is calculated by using the Black-Scholes model. The following table presents details of stock-based compensation costs acknowledged in the Consolidated Statements of Income.

Restricted Stock Incentive Plans

Plan	Award Type	Number of Underlying Shares	Ratio of Underlying Shares (%)	Number of Employees in the Plan	Proportion of Awarded Employees to Total (%)	Grant Price (CNY)
2019 restricted stock incentive plan	Class II restricted	204,400	0.25	18	3.11	62.025
2020 restricted stock incentive plan	Class II restricted	215,186	0.27	120	20.76	92.025
2021 restricted stock incentive plan	Class II restricted	952,116	1.18	206	35.64	92.900
2022 restricted stock incentive plan	Class II restricted	1,099,302	1.37	160	27.68	118.400

N.B.:

The above-mentioned numbers were calculated on December 31, 2022.

The grant price has been adjusted due to dividend distribution.

Stock-Based Compensation

CNY	Fiscal Year	
	December 31, 2022	December 31, 2021
Selling expenses	669,137	897,990
G&A expenses	1,398,357	1,722,458
R&D expenses	12,658,526	19,167,516
Total stock-based compensation	14,726,019	21,787,964

Risks and Uncertainties



Financial Risk

The Company performs periodic credit evaluations of its customers' financial condition and generally requires of its customers no collateral. The Company provides an allowance for expected credit losses, based on the net amount expected to be collected on such receivables. Losses have not been significant for any of the periods presented in this report.



R&D Risk

Espressif's research and development strategy is focused on leveraging new technologies for the creation of innovative AIoT products. Any delays or changes in the development of these technologies by our industry partners, or a failure of our products to achieve market acceptance, could compromise our competitive position.



Competitors

As the market for AIoT products grows, we face an increasing antagonism from relatively large competitors, such as Realtek, MediaTek, Infineon, NXP, Qualcomm and others. Intense competition from current players, as well as new entrants, such as Silicon Labs and Nordic, may reduce our product sales and market share.



Suppliers

A significant portion of the Company's products is fabricated by the Taiwan Semiconductor Manufacturing Company Limited (TSMC). The inability of TSMC to deliver wafers to the Company in a timely manner could impact the production of the Company's products for a certain period of time, which could have an adverse effect on the Company's business, financial condition, results of operations and cash flow.



Customers

The Company sells directly to end customers, distributors, solution providers and contract manufacturers. Our customers are a mix of several big customers and numerous small customers. The concentration ratio for our top-five customers was 26.4% in 2022, and it has been shrinking over the years. None of the customers accounted for yielded more than 10% of our revenue during 2022.

Consolidated Financial Statements

Consolidated Balance Sheet

CNY	December 31, 2022	December 31, 2021
Assets		
Current assets:		
Cash and cash equivalents	350,677,354	367,149,078
Held for trading financial assets	461,223,082	747,409,285
Notes receivable	789,099	11,600,177
Accounts receivable, net	198,406,116	306,823,758
Accounts receivable financing	1,441,520	
Prepayments	9,724,045	8,172,703
Other receivables	9,578,753	9,519,869
Including: Interest receivable	838,168	298,796
Inventories	448,981,896	326,168,928
Other current assets	228,089,444	210,555,311
Total current assets	1,708,911,310	1,987,399,110
Non-current assets:		
Debt investment	212,484,600	
Investment in other equity assets	35,340,648	56,600,700
Other non-current financial assets	19,879,347	
Fixed assets	60,243,507	46,176,368
Construction work in progress		
Right-of-use assets	21,692,767	21,731,123
Intangible assets	2,412,317	3,191,335
Long-term deferred expenses	6,565,887	7,582,637
Deferred income tax assets	15,266,444	6,374,870
Total assets	2,082,796,825	2,129,056,143

Consolidated Balance Sheet

CNY	December 31, 2022	December 31, 2021
Liabilities & Shareholders' Equity		
Current liabilities:		
Accounts payable	77,918,867	138,572,198
Contract liabilities	9,044,287	17,184,196
Payroll payable	85,041,335	66,168,763
Taxes payable	5,211,995	6,472,494
Other payable	2,925,552	754,261
Non-current liabilities due within one year	9,607,030	8,641,928
Other current liabilities	778,437	
Total current liabilities	190,527,502	237,793,839
Non-current liabilities:		
Lease liabilities	12,839,126	12,116,036
Deferred income tax liabilities	52,752,662	56,128,356
Total liabilities	256,119,290	306,038,230
Owners' equity (or shareholders' equity):		
Share capital	80,484,430	80,158,963
Capital reserves	1,309,813,001	1,266,771,034
Less: Treasury stock	40,966,012	
Other comprehensive income	16,946,374	-15,711,579
Surplus reserves	46,570,910	33,462,951
Retained earnings	413,828,832	458,336,543
Total shareholders' equity	1,826,677,535	1,823,017,913
Total liabilities and shareholders' equity	2,082,796,825	2,129,056,143

Consolidated Income Statement

CNY	End of Year	
	December 31, 2022	December 31, 2021
Revenue	1,271,127,201	1,386,371,541
Cost of Revenue	762,876,133	837,345,809
Gross Profit	508,251,068	549,025,732
Taxes and surcharges	5,269,680	3,556,395
Selling expenses	49,323,100	41,815,693
General and administrative expenses	59,639,944	55,485,146
Research and development expenses	337,121,814	271,689,981
Financial expenses	1,370,257	-2,312,067
Including: Interest expenses	768,965	608,767
Interest income	3,903,309	4,379,324
Add: Other income	10,304,212	4,251,502
Investment income (mark"- " for loss)	24,156,207	20,794,725
Income from changes in fair value (mark"- " for loss)	1,223,082	4,509,285
Credit impairment losses (mark"- " for loss)	-105,594	-13,830
Assets impairment losses (mark"- " for loss)	-4,981,614	34,567
Assets disposal income (mark"- " for loss)		-2,124
Operating Income	86,122,566	208,364,710
Add: Non-operating revenue	58,946	66,231
Less: Non-operating expenses	93,817	100,817
Income before income taxes	86,087,694	208,330,124
Provision (benefit) for income taxes	-11,235,408	9,902,416
Net Income	97,323,103	198,427,708
Earnings per share		
Basic	1.2129	2.4775
Diluted	1.2127	2.4566

CNY	End of Year	
	December 31, 2022	December 31, 2021
Net Income	97,323,103	198,427,708
Other comprehensive income (loss), after tax		
Changes to the fair value of investment in other equity instruments	-1,269,304	11,929
Currency translation reserves	33,927,257	-8,322,431
Other comprehensive income (loss)	32,657,953	-8,310,502
Comprehensive income	129,981,056	190,117,205

Consolidated Cash Flow Statement

CNY	End of Year	
	December 31, 2022	December 31, 2021
Operating Activities		
Cash from sales of merchandise and provision of services	1,493,812,070	1,453,744,622
Tax refund	66,050,716	37,691,770
Other received cash related to operational activities	18,771,365	8,720,037
Subtotal of cash inflow from operational activities	1,578,634,151	1,500,156,429
Cash paid for merchandise and services	1,042,903,737	1,105,365,342
Cash paid to and for employees	312,650,430	232,723,048
Cash paid for taxes and surcharges	62,356,050	41,903,120
Other paid cash related to operational activities	89,402,275	88,704,063
Subtotal of cash outflow from operational activities	1,507,312,493	1,468,695,573
Net cash provided by operating activities	71,321,658	31,460,857
Investing activities		
Cash arising from the disposal of investments	2,938,975,287	3,096,596,236
Cash arising from investment income	6,724,461	3,266,350
Net cash arising from the disposal of fixed assets, intangible assets and other long-term assets		12,510
Other received cash relating to investment activities	1,936,000	1,535,102
Subtotal of cash inflow from investment activities	2,947,635,748	3,101,410,198
Cash paid for the purchase and construction of fixed assets, intangible assets and other long-term assets	26,220,587	31,912,546
Cash paid for investments	2,867,100,000	3,187,670,000
Other paid cash relating to investment activities	2,050,000	1,500,000
Subtotal of cash outflow from investment activities	2,895,370,587	3,221,082,546
Net cash provided by investment activities	52,265,160	-119,672,349
Financing activities		
Cash arising from the issuance of common stock	28,641,415	9,997,637
Including: Cash arising from subsidiaries absorbing investments by minority shareholders		
Subtotal of cash inflow from financing activities	28,641,415	9,997,637
Cash paid for the distribution of dividends and profits, or payment of interests	128,722,856	40,015,250
Including: dividends and profits paid to minority shareholders by subsidiaries		
Other paid cash relating to financing activities	51,360,071	8,815,291
Subtotal of cash outflow from financing activities	180,082,927	48,830,541
Net cash used for financing activities	-151,441,512	-38,832,903
Impact of fluctuation in exchange rates on cash and cash equivalents	11,389,321	-9,052,722
Net increase in cash and cash equivalents	-16,465,372	-136,097,117
Add: Cash and cash equivalent at the commencement of the period	367,142,726	503,239,843
Cash and cash equivalents at the end of the period	350,677,354	367,142,726

Consolidated Cash Flow Statement

- Indirect Method

CNY	End of Year	
	December 31, 2022	December 31, 2021
Additional information		
Net income	97,323,103	198,427,708
Adjustments to cash provided by operating activities, for the purpose of reconciling net income:		
Add: provision for the impairment of assets	4,981,614	-34,567
Credit impairment provision	105,594	13,830
Depreciation of fixed assets	16,066,265	11,167,228
Depreciation of right-of-use assets	10,994,590	7,547,081
Amortization of intangible assets	779,019	844,718
Amortization of long-term prepaid expenses	3,351,764	4,129,969
Losses on disposal of fixed assets, intangible assets and other long-term assets (mark "-" for income)		2,124
Losses on scrapping of fixed assets (mark "-" for income)		162
Losses on fair value changes (mark "-" for income)	-1,223,082	-4,509,285
Financial expenses (mark "-" for income)	4,960,685	1,700,139
Losses on investment (mark "-" for income)	-24,156,207	-20,794,725
Decrease on deferred income tax assets (mark "-" for increase)	-8,891,574	3,568,877
Increase on deferred income tax liabilities (mark "-" for decrease)	-3,375,693	5,305,815
Changes in operating assets and liabilities:		
Decrease in inventories (mark "-" for increase)	-118,521,370	-129,902,049
Decrease in operational receivables (mark "-" for increase)	122,514,414	-159,345,382
Increase in operational payables (mark "-" for decrease)	-48,313,483	91,379,998
Others	14,726,019	21,959,215
Net cash flow provided by operating activities	71,321,658	31,460,857

Consolidated Statement of Changes in Equity

CNY	Share capital	Capital reserves	Less: Treasury stock	Other comprehensive income	Surplus reserves	Retained earnings	Total equity
Balance as of December 31, 2020	80,030,500	1,235,113,896		-7,401,076	15,428,165	317,958,872	1,641,130,356
Comprehensive income, net of tax							
Net Income						198,427,708	198,427,708
Other comprehensive income				-8,310,502			-8,310,502
Transactions with owners							
Capital increase	128,463	20,963,006					21,091,469
Stock-based compensation		10,694,132					10,694,132
Surplus reserves					18,034,786	-18,034,786	
Dividends						-40,015,250	-40,015,250
Balance as of December 31, 2021	80,158,963	1,266,771,034		-15,711,579	33,462,951	458,336,543	1,823,017,913
Comprehensive income, net of tax							
Net Income						97,323,103	97,323,103
Other comprehensive income				32,657,953			32,657,953
Transactions with owners							
Capital increase	325,467	40,420,694	40,966,012				-219,850
Stock-based compensation		2,621,273					2,621,273
Surplus reserves					13,107,959	-13,107,959	
Dividends						-128,722,856	-128,722,856
Balance as of December 31, 2022	80,484,430	1,309,813,001	40,966,012	16,946,374	46,570,910	413,828,832	1,826,677,535

Further Information

Terms and Conditions of the Report

Responsibility Statement

The Board of Directors, the Board of Supervisors and the executive management of the Company warrant that the contents of this report are true, accurate and complete, and do not contain any false information, misleading statements or material omissions, severally and jointly accepting any legal responsibility thereof.

Shanghai, 17 March 2023
Espressif Systems

Board of Directors

Teo Swee Ann
Founder and Chairman

Ng Pei Chi
Information Technology Officer

Teo Teck Leong
Shareholder-elected

Xu Xin
Shareholder-elected

Lan Yuzhe
Independent Director

Koh Chuan Koon
Independent Director

Lee Sze Chin
Independent Director

Board of Supervisors

Lv Zhihua
Employee-elected

Fu Hanyu
Shareholder-elected

Wang Yiwen
Shareholder-elected

Executive Management

Teo Swee Ann
Founder and CEO

Wang Jue
Deputy General Manager

Shao Jingbo
Financial Director



Forward-looking Statements

This report contains forward-looking statements and/or assessments about the business, financial condition, performance and strategy of the Espressif Group. These statements and/or assessments are based on assumptions and management expectations resting upon currently available information and current estimates. These are subject to a multitude of uncertainties and risks, many of which are partially or entirely beyond Espressif's control. Espressif's actual business development, financial condition, performance and strategy may, therefore, differ from what is discussed in this report.

Independent Auditor's Report

To the Shareholders of
Espressif Systems (shanghai) Co., Ltd.



Opinion

We have audited the financial statements of Espressif Systems (Shanghai) Co., Ltd. (“the Company”), which comprise the consolidated balance sheet and balance sheet as of December 31, 2022, the consolidated income statement, the income statement, the consolidated cash flow statement, the cash flow statement, the consolidated statement of changes in equity, and the statement of changes in equity for the year then ended, and the notes to the financial statements.

In our opinion, the enclosed financial statements were prepared in accordance with the Accounting Standards for Business Enterprises (the “ASBE”) in all material aspects, and present fairly the consolidated and other financial positions of the company as of December 31, 2022, the consolidated and other results of company operations, and the consolidated and other cash flows of the company for the year then ended.

Basis For the Opinion

We conducted our audit in accordance with China’s Standards on Auditing (the “CSA”). Our responsibilities under those standards are further described in the section of our report detailing the “Auditor’s responsibilities for the audit of the financial statements”. We are independent of the Company, in accordance with the CSA’s Code of Ethics for Professional Accountants (the “Code”), and we have fulfilled our other ethical responsibilities, again, in accordance with the Code. We believe that the audit evidence we have obtained is sufficient and appropriate for providing the basis of our opinion.

Key Audit Matters

Key audit matters are those matters that, in our professional judgement, were of the greatest significance in our auditing of the financial statements for the financial year from January 1, 2022 to December 31, 2022. These matters were addressed in the context of our audit of the financial statements as a whole, and in forming our opinion thereon, we do not provide a separate opinion on these matters.

Key Audit Matter

How our audit addressed the Key Audit Matter

Revenue Recognition

Espressif's main business includes the sales of chips and modules, which created a revenue of CNY 1,271,127,201 in 2022.

Since the operating revenue is a key performance indicator, there is an inherent management risk when adjusting the time point of revenue recognition, in order for it to coincide with certain goals or expectations. Therefore, we identify revenue recognition, too, as a key auditing matter.

Our main auditing procedures for revenue recognition are as follows:

- > Understanding and evaluating the effectiveness of the internal control design relating to the revenue recognition of product sales, and testing the effectiveness of the critical control point.
- > Evaluating the appropriateness of the sales revenue recognition policy by interviewing the management, reviewing the main terms of the sales contracts and the time point of major control transfers relating to the revenue recognition.
- > Checking the origin of revenue by performing analytical procedures for the operating revenue, including monthly sales analysis, as well as gross profit analysis categorized by customers and products.
- > Checking the authenticity of revenue by sampling supporting documents related to revenue recognition, such as sales contracts, shipping records and customer receipts.
- > Performing a confirmation procedure on the current amount of sales by using the sampling method.
- > Checking commercial information and the transaction prices paid by important customers, in order to determine whether any abnormal transactions were made by the company.
- > Performing a cut-off test to check whether the revenue recognition is recorded within the correct accounting period.

Inventory

As of December 31, 2022, the inventory balance amounts to CNY 458,557,944 with provision for inventory impairment CNY 9,576,047, and a net book value amount of CNY 448,981,896.

Since most inventories are stored in warehouses entrusted by external processors and third parties, and the determination of provision for inventory impairment involves significant management judgment and estimation, we identify the existence of inventories and the provision for inventory impairments as key matters.

Our main auditing procedures for the inventory are as follows:

- > Evaluating the effectiveness of the internal control design of the inventory management, and testing the effectiveness of the critical control point.
- > Analyzing the rationality of the inventory balance fluctuation at the end of the reporting period by investigating its production cycle and stock policy.
- > Performing a confirmation procedure on the third-party warehouse.
- > Implementing a supervision on the inventory check at the end of the reporting period.
- > Evaluating whether the provision for inventory impairment at the end of the reporting period is fully accrued by conducting storage age analysis and by reviewing the calculation model and the results of provision for inventory impairment.
- > Calculating the inventory turnover and making a comparison to other similar companies.

Other Information

The management of Espressif Systems (Shanghai) Co., Ltd. (henceforth, “the management”) is responsible for any information on all aspects of the 2022 company report, apart from the financial statements and the auditor’s report on them.

Our opinions on the financial statements and the group management report do not cover the rest of the information provided here, and consequently we do not express an opinion or any other form of assurance conclusion thereof.

In connection with our audit, our responsibility is to read the rest of the information provided and, in so doing, consider whether this information:

- > is materially inconsistent with the consolidated financial statements, with the group management report information audited for content or our knowledge obtained in the audit, or
- > appears to be materially misstated.

If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. However, we have nothing to report in this regard.

Management's Responsibilities for the Financial Statements

The management is responsible for the preparation of financial statements that give a true and fair view, in accordance with the ASBE, and for the design, implementation and maintenance of such internal controls as the management deems necessary, to enable the preparation of financial statements that are free from material misstatements, whether due to fraud or error.

In preparing the financial statements, the management is responsible for assessing the Company’s ability to continue its operation, disclosing, as applicable, any matters related to ongoing concerns and using them as the basis of accounting, unless the management either intends to liquidate the Company or cease its operations, having no realistic alternative but to do so.

Auditor’s Responsibilities for the Auditing of the Financial Statements

Our objectives are to obtain reasonable assurances about whether the financial statements as a whole are free from material misstatements, due to either fraud or errors, and to issue an auditor’s report that includes our true opinion. Reasonable assurances provide a high level of confidence, but are not a guarantee that an audit conducted in accordance with CSAs will always detect a material misstatement when and where it exists.

Misstatements can arise from fraud or errors and are considered substantial if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users, taken on the basis of these financial statements.

As part of an audit in accordance with CSAs, we exercise our professional judgment and maintain professional skepticism throughout the audit. We also:

- > Identify and assess the risks of substantial financial misstatements, due to either fraud or errors; design and perform auditing procedures in response to those risks, and obtain auditing evidence that is sufficient and appropriate for providing a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal controls.

- > Obtain an understanding of internal controls relevant to the audit, in order to design auditing procedures that are appropriate to the circumstances.
- > Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the management.
- > Conclude on the appropriateness of the management's use of a growing concern as the basis of accounting and, according to the auditing evidence obtained, determine whether a substantial uncertainty exists about events or conditions that may cast a significant doubt on the Company's ability to continue its operation. If we conclude that there is substantial uncertainty, we are required to draw users' attention to our auditor's report on the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the auditing evidence obtained up until the date of our auditor's report. However, future events or conditions may force the Company to cease its operation altogether.
- > Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and determine whether the financial statements represent the underlying transactions and events in a manner that achieves a fair presentation.
- > Obtain sufficient and appropriate auditing evidence about the financial information of entities or business activities of the Company, in order to express our auditing opinion on the Company's consolidated financial statements. We are responsible for directing, supervising and executing group audits and assume full responsibility for auditing opinions.

We communicate with those charged with governance, among other matters, on the planned auditing scope, timing and significant audit findings, including any significant deficiencies in internal controls that we may identify during our audit.

We also provide those charged with governance with a statement that we have complied with all relevant ethical requirements regarding our independence, and we also communicate with them all relationships and other matters that may reasonably be thought to bear on our independence and, where applicable, any other related protections.

From the matters communicated to those charged with governance, we determine which matters are of the highest significance in the auditing of the financial statements of the current period and are, therefore, the key auditing findings. We describe these findings in our auditor's report, unless a law or regulation prohibits such public disclosure about those findings, or when -in extremely rare circumstances- we determine that a finding should not be communicated in our report, because the adverse consequences of its disclosure would reasonably be expected to outweigh the benefits of such communication for the public interest.

Beijing, 17 March 2023

Baker Tilly China

Ma Gang

Chinese Certified Public Accountant

Yu Yanli

Chinese Certified Public Accountant

List of abbreviations

AI	Artificial Intelligence
AIoT	Artificial Intelligence and Internet of Things
Bluetooth LE	Bluetooth Low Energy
CEO	Chief Executive Officer
CES	Consumer Electronics Show
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
Espressif	ESPRESSIF SYSTEMS (SHANGHAI) CO., LTD.
G&A	General and Administrative
GM	Gross Margin
IC	Integrated Circuit
IoT	Internet of Things
MCU	Microcontroller Unit
OBD	On-Board Diagnostics
R&D	Research and Development
RF	Radio Frequency
RISC-V	Reduced Instruction Set Computer-V
ROE	Return on Earnings
RTOS	Real-Time Operating System
SG&A	Selling, General and Administrative
SH	Shanghai
SoCs	System on Chips
TSR	Techno Systems Research
YoY	Year-on-Year

Investor Relations

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Official Platforms

www.espressif.com

blog.espressif.com

github.com/espressif

esp32.com

esp8266.com

bbs.espressif.com



Social Media

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All amounts presented in these condensed Consolidated Financial Statements are shown in CNY unless stated otherwise. Slight discrepancies between the amounts presented may occur due to rounding.