Etron Technology, Inc. *Since 1991*

2024 Third Quarter Investor Conference

Nov.8 , 2024

Disclaimer

- The forward-looking statements contained in the presentation are subject to risks and uncertainties and actual results may differ materially from those expressed or implied in these forward-looking statements.
- Etron makes no representation or warranty as to the accuracy or completeness of these forward-looking statements and nor does Etron undertake any obligation to update any forward-looking statements, whether as a result of new information or future events.

Business Overview

Etron Technology, Inc.

- Fabless IC Design House since 1991
- IPO in Taipei Exchange, 1998 (TPEx: 5351.TW)
- Patents：USA 315；Total 871 (As of October 2024)
- Number of Employees：425 (As of October 2024)
- Headquarters：Taiwan Hsinchu Science Park
- Global Location：
  - USA：California Bay Area, Boston
  - Europe：UK, Poland
  - China：Shanghai, Shenzhen, HK
  - Asia：Japan Tokyo, Korea Suwon, Singapore
- World-Class Fabless IC design Company with Creativity and Innovative Products
- Leader in Long-term Dedication to Application-Driven Buffer Memory
- Pioneer of Known-Good-Die Memory Combined with Heterogeneous Integration
- USB4.0 Type-C Switch Chip (20Gbps), Thunderbolt 3 (40Gbps) and Power Delivery (PD3.0 up to 100W) Controller
- Sensing, Recognizing, Comprehending: Multi-Dimensional Sensing Fusion Chips and Subsystem Design Solutions
- Global leading provider of differential privacy computing software and hardware solutions

Etron Group Companies Working with Customers in Multiple Applications

IntelligenceN

Brain: Memories/DRAM+AI Etron 鈺創科技 Etron Technology, Inc.

Smart Memory

3D Eyes/XR/Object Capture

eYS3D Microelectronics 晶立微電子股份有限公司 MultipleVisions Computing

Connectivity

Privacy

Nerves: USB4.0; SERDES eEver 鈺群科技 eEver Technology, Inc.

D&Cloak 高隱智慧科技 Differential Privacy Computing

MemorAiLink

One-stop Development Platform

Revolutionizing the Way SoC Companies Approach Memory Solutions

Comprehensive Memory Solutions	Streamlined Memory /Package System	Seamless Integration

33 Years of Innovation: Etron's Value-Driven Specialized DRAM Designs for Emerging AI Systems

1991 · 1993 — Taiwan's First 16Mb DRAM

Developed Taiwan's first 16Mb DRAM on 8" wafers.

1995-'97 — Fastest Graphics DRAMs

Delivered the world's fastest graphics DRAMs to leading 3D graphics systems, including nVIDIA and Toshiba.

2000 — Known-Good-Die Memory (KGDM)

Pioneered the world's Known-Good-Die Memory (KGDM) with TSMC for Intel's 3D heterogeneous integration products, earning Intel's Quality Supplier Award.

2004-'10 — DRAM for Apple's First iPod

Supplied KGD DRAM dice to Seagate, used in Apple's first iPod.

2015 — Wide-IO DRAM Collaboration

Collaborated with Intel on Wide-IO DRAM KGD for 3D microsystems.

2020 — Smallest Form-Factor DRAM

Introduced the world's smallest form-factor chip-scale packaged RPC (Reduced Pin Count DRAM) for AIOT cameras in automobiles.

2023 — Launch of MemorAiLink

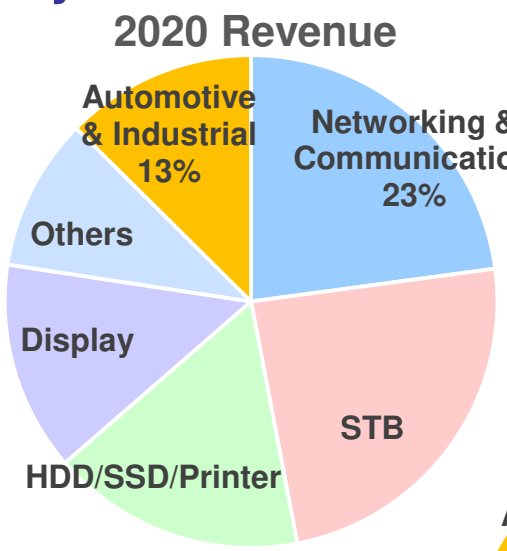
Launched MemorAiLink, an AI platform architecture and custom DRAM chip design, establishing a leading-edge AI design foundry.

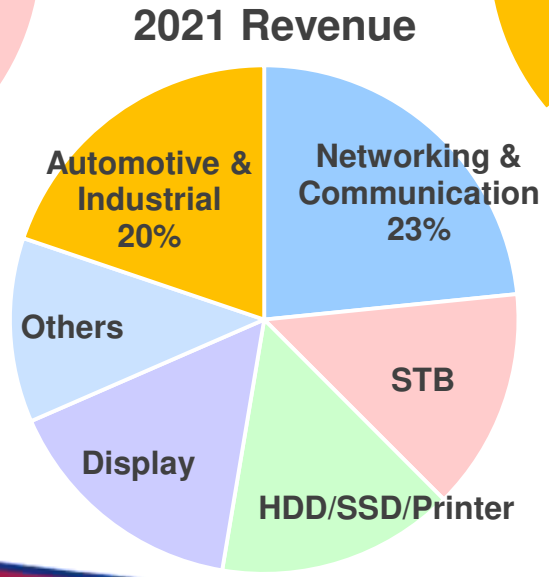
2024 to-date — Discuss Your DRAM Needs

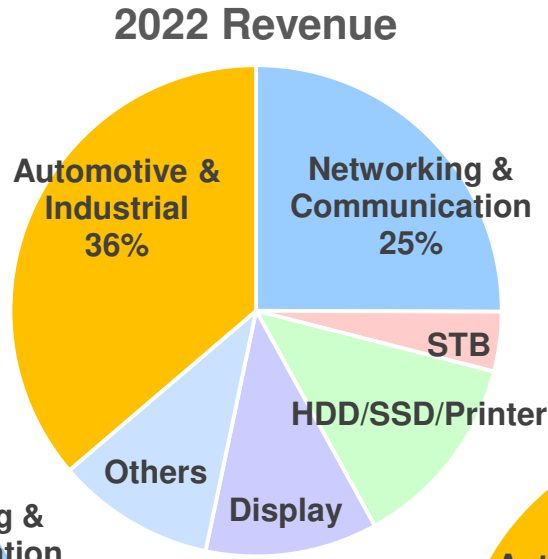
Engage with us today to discuss your DRAM solutions.

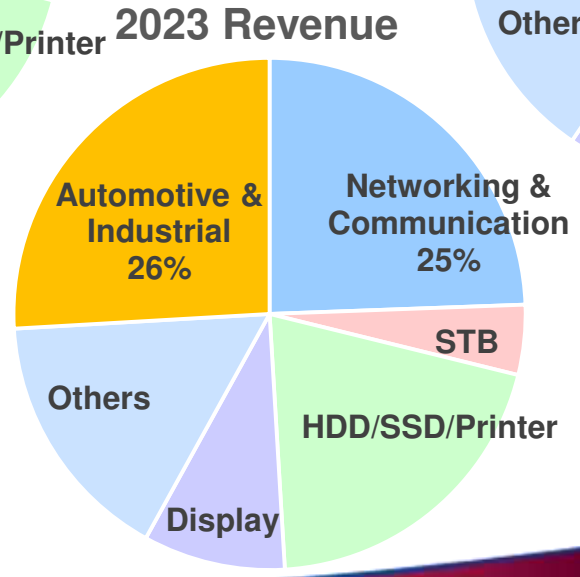
DRAM Revenue (By Applications)：2020 ~ 2024Q3

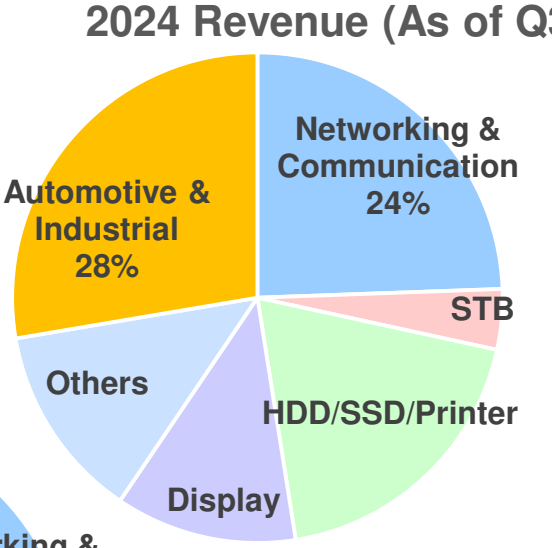
- Continuously focusing on networking and automotive/industrial applications, these two major applications contributed over 50% of total company revenue over the past three years as of Q3 2024







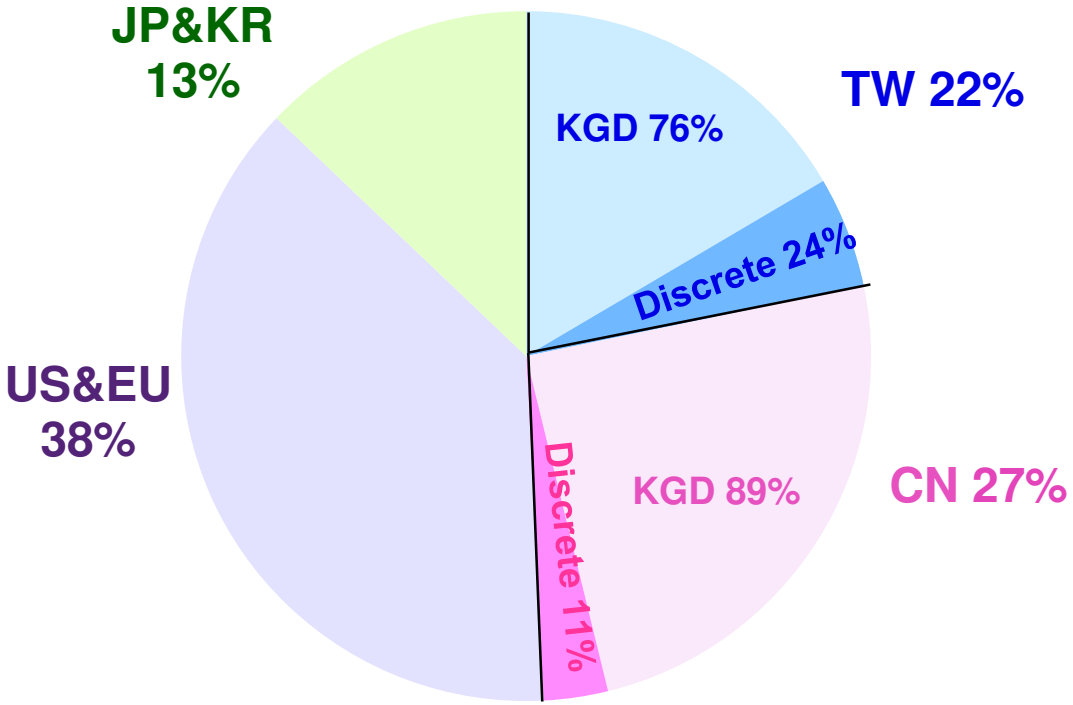




DRAM Revenue (By Regions)：As of Q3 2024

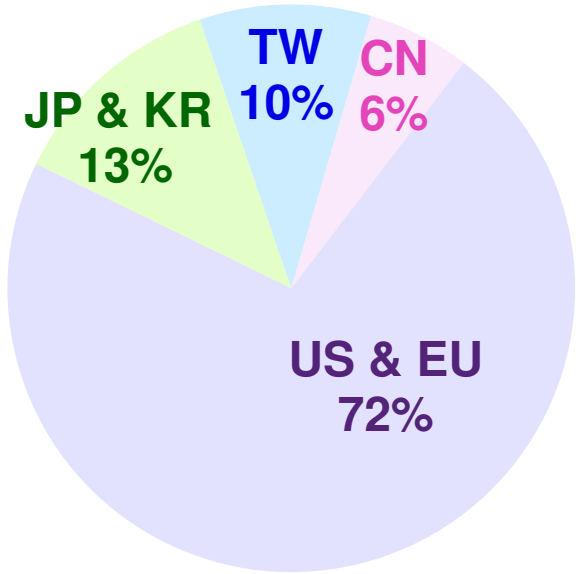
- 73% of overall business comes from US/EU/JP/KR/TW, slightly higher than in 2023
- For discrete business, 94% of revenue comes from US/EU/JP/KR/TW

2024 Revenue (As of Q3)



> 73 % from
US/EU + TW+ JP/KR

2024 Revenue in Discrete (As of Q3)



> 94% from
US/EU + TW+ JP/KR

Etron：Key Memory Supplier in Telecom Broadband Networking

- Networking accounts for nearly a quarter of Etron's total revenue
- Providing a comprehensive range of DRAM and SPI NAND Flash solutions to meet customer needs from Wi-Fi 5 and Wi-Fi 6/6E to Wi-Fi 7

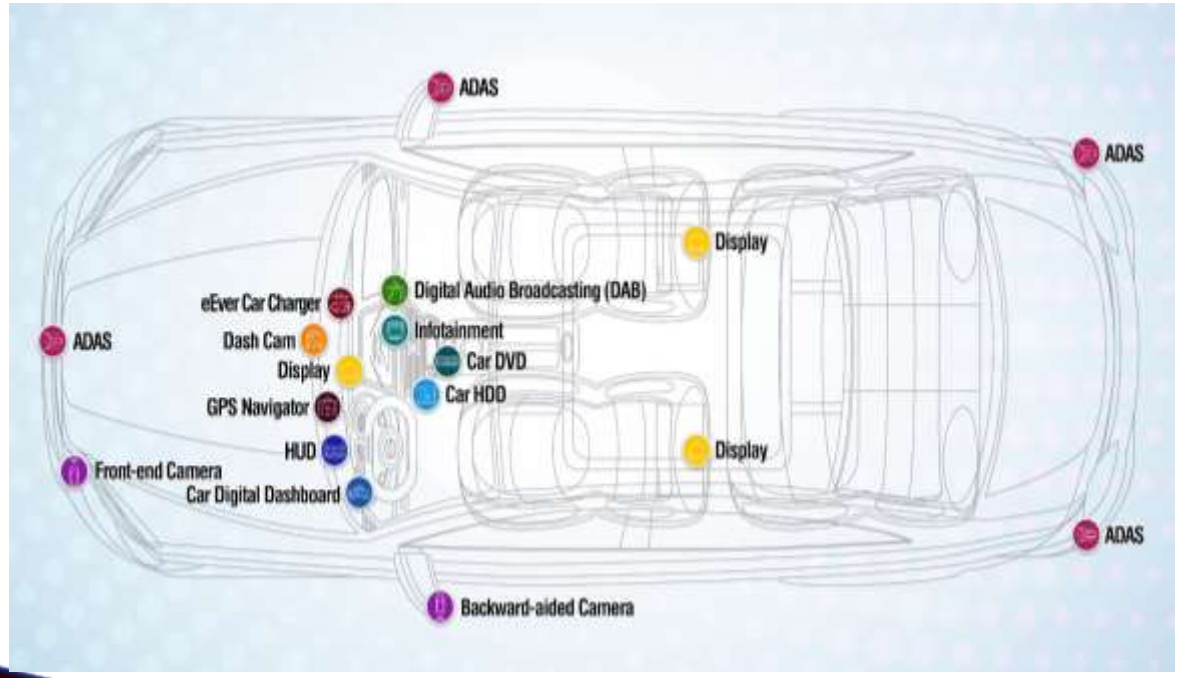
WiFi 5	WiFi 6/6E	WiFi 7
1Gb DDR2 1Gb/2Gb/4Gb DDR3	2Gb/4Gb DDR3 4Gb/8Gb DDR4	4Gb/8Gb DDR4

Etron's 8Gb DDR4 SDRAM For WiFi-7 Router

  - WiFi 6E：DDR4 8Gb/4Gb & DDR3 4Gb design-in & MP in Indo-Pacific & EU customers
  - WiFi 7: DDR4 8Gb/4Gb approved in WiFi chipset vendor list & sampling in end-customers
- AVL for major Wi-Fi chipset vendors Qualcomm/ Broadcom/ Mediatek/ Realtek..
- Available for both discrete and KGD DRAM solutions

A Focus on Electric Vehicles and Autonomous Driving

- Etron's automotive DRAM products have been widely adopted in various automotive applications, including Infotainment, Navigator, CD/DVD, HDD, DAB, HUD, Dash Cam, Display, Surrounding Camera, ADAS, etc.
- Starting from supporting Japan customers, and expanding to Europe, US, Taiwan, Korea and China customers



Etron's products are widely used in automotive applications

Application	SDR	DDR	DDR2	DDR3/3L	LPDDR2	RPC
HUD		v		v		
Car DVD	v					
Car HDD		v	v			
Digital Audio Broadcasting (DAB)	v					
Car Digital Dashboard	v	v	v	v		
Backward-aided Camera		v	v	v		v
Front-end Camera		v		v		v
ADAS		v		v		v
Infotainment				v		
Dash Cam	v	v	v	v	v	
GPS Navigator	v	v	v	v		
Display		v	v	v	v	

Continuously Expanding Product Portfolio to Provide Customers with a Diverse and Enriched Selection

- Since launching its first SDR product in 1998, Etron has continuously expanded its memory product line to encompass SDR, DDR, DDR2, DDR3, DDR4, LPDDR2, LPDDR4/4X, RPC, SPI NAND, and e.MMC, along with KGD and Discrete solutions. The company is committed to delivering high-quality products, exceptional service, and long-term customer support

DRAM	SDR		DDR			DDR2			DDR3				DDR4			LPDDR2	LPDDR4/4X			RPC	
	63nm	38nm	63nm	45nm	38nm	45nm	38nm	25nm	38nm	25nm	20nm	1xnm	25nm	20nm	1xnm	38nm	25nm	20nm	1xnm	38nm	20nm
16M																					
32M																					
64M																					
128M																					
256M																					
512M																					
1G																					
2G																					
4G																					
8G																					
16G																					
32G																					

Flash	SPI NAND		e.MMC
	1.8V	3.3V	3.3V
1Gb			
2Gb			
4Gb			
8Gb			
32Gb			4GB
64Gb			8GB
128Gb			16GB
256Gb			32GB
512Gb			64GB
1024Gb			128GB

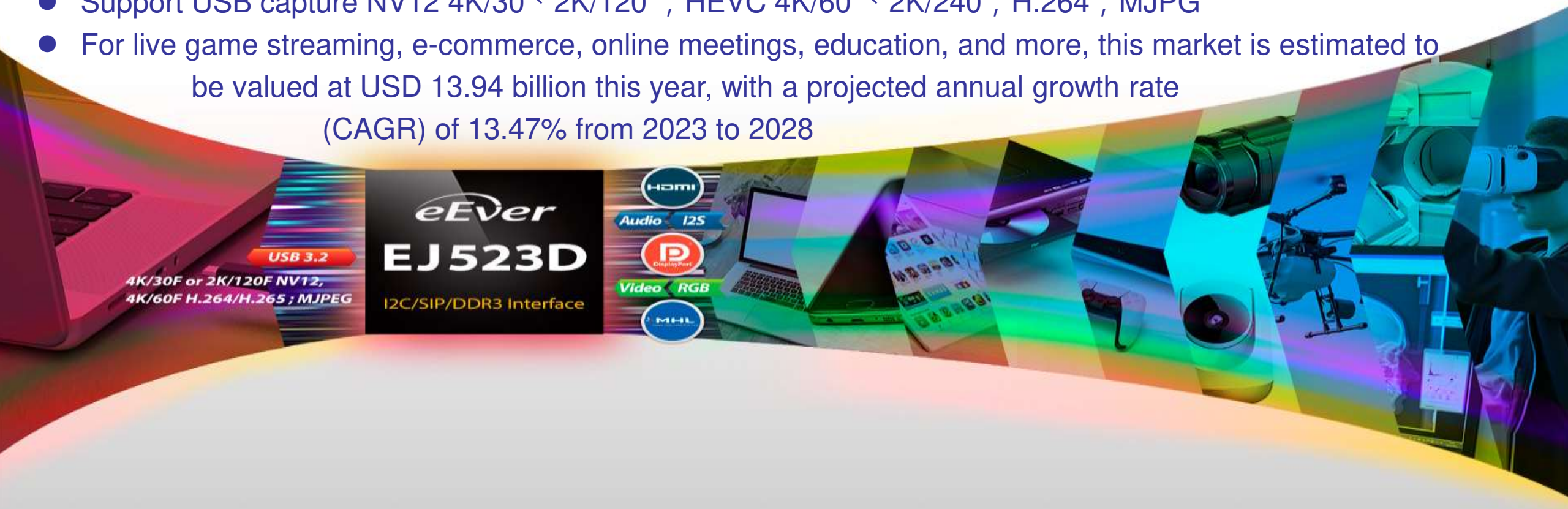
Mass Production | Pilot Production | Designing | Design Planning

- In response to GenAI era, Etron is developing DWB (Direct-Wide-Bus) DRAM to provide high bandwidth, low power consumption, and low-cost AI memory for LLMs in edge computing
  - Providing the total solution of DWB DRAM+PHY+Controller
  - Effectively reducing power consumption for both DRAM & Memory Controller by unique DWB design
  - Scalable design: The min. capacity is 4Gb, expandable to 32Gb and achieving102.4GB/s bandwidth

Multi-Streaming Processor- EJ523D

eEver 鈺群科技 eEver Technology, Inc.

- Integrated Full-Function SCALER：Up-Scaling/Down-Scaling； PIP ； POP；OSD；MIRROR
- Support Audio re-sampling, Mixer, and 5.1 channel support
- Support HEVC 10bit HDR Encoding
- Support USB capture NV12 4K/30、2K/120 ；HEVC 4K/60 、2K/240；H.264；MJPG
- For live game streaming, e-commerce, online meetings, education, and more, this market is estimated to be valued at USD 13.94 billion this year, with a projected annual growth rate (CAGR) of 13.47% from 2023 to 2028



USB E-MARKER IC- EJ903

eEver 鈺群科技 eEver Technology, Inc.

- According to an analysis report from market research firm - Omdia, the annual shipment volume of devices featuring USB-C port designs continues to grow, with handheld devices having particularly high numbers. Overall, the estimated shipment volume is expected to exceed 6 billion units by 2027.
- The only manufacturer in the world certified for both USB4™ and Thunderbolt™ 4.

- Customers using the EJ903 E-Marker have all successfully passed Intel certification to obtain the lightning bolt logo on Thunderbolt cables, including several world-class cable manufacturers.

eYS3D Microelectronics

From
“Eye” to “Brain”

Work our way up from Vision to compute with AI through Silicon centric technology and Application specific Designs

Under the wave of AI, combining special memory, generative AI, multi-dimensional sensing, and fusion technology to meet "Sense & React!"

Stereo Vision Sub-System

Camera Use Case

Obstacle Detection
CUSTOMER EXAMPLE

G53

Application Requirements

High Frame Rate + Accuracy

Depth of VGA IR cameras at 30 FPS & Active IR projection performance from 10CM up to 1.5 Meters.

Detecting

- Obstacles in the path of Robots at short range.
- Robust surface resistance.

GOALS

1. Near Floor Obstacle Detections.
2. Motional Obstacle Detection at Short Range.
3. Detect Obstacles such as Reflective and Black/White Cables.

Stereo Vision Sub-System

Camera Use Case

Obstacle Detection
CUSTOMER EXAMPLE

G100

Application Requirements

Large FoV/Color + Depth Output

D FoV 120 + Color Stream

Monitoring

- Human Presence
- Car Presence
- Sensor Fusion for Slam
- Distance Information
- Dynamic Range & Object in Motion

GOALS

1. Large FoV Depth Capture with High Accuracy
2. Working Range up to 2 M with good Accuracy / 5 M+ for Depth and Color Stream

Stereo Vision Sub-System

Camera Use Case

OBSTACLE AVOIDANCE
CUSTOMER EXAMPLE

G62

Application Requirements

High Frame-rate + Accuracy

Depth of VGA IR cameras at 30 FPS & Active IR projection performances from 10CM up to 1.5 Meters.

Detecting

- Obstacles in the path of Robots at short range.
- Robust surface resistance.

GOALS

1. Near Floor Obstacle Detections.
2. Motional Obstacle Detection at Short Range.
3. Detect Obstacles such as Reflective and Black/White Cables.

Stereo Vision Sub-System

Camera Use Case

OBSTACLE AVOIDANCE
CUSTOMER EXAMPLE

R77

Application Requirements

High Frame-rate + Accuracy

Depth of VGA IR cameras at 30 FPS & Active IR projection performances from 30CM up to 1.5 Meters.

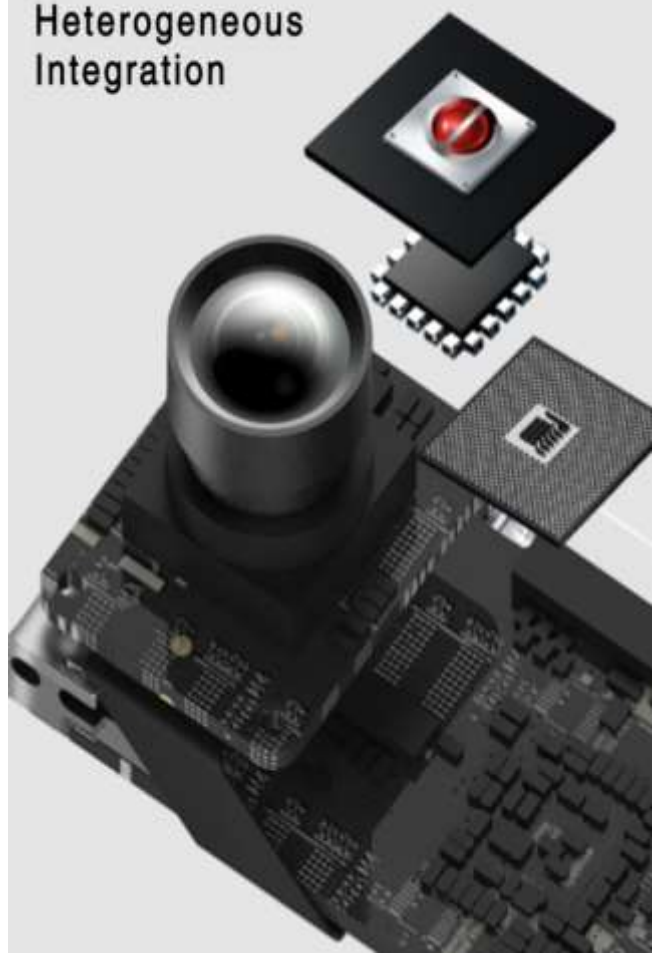
Detecting

- Obstacles in the path of Robots at short range.
- Robust surface resistance.

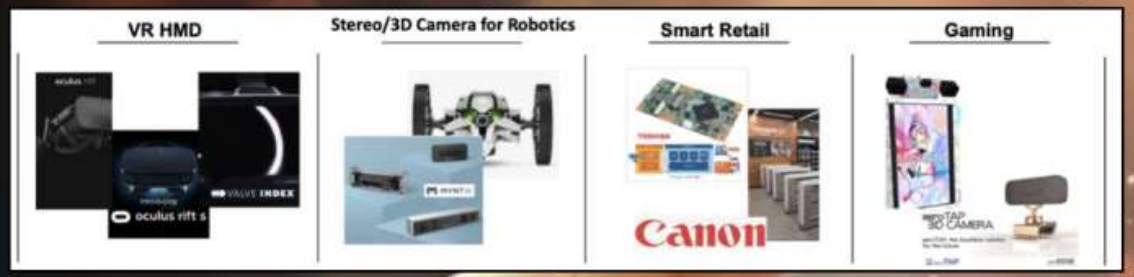
GOALS

1. Motional Obstacle Detection at Short Mid-Range.
2. Detect Obstacles such as Reflective and Black/White Cables.

Silicon 4.0 Heterogeneous Integration



Sensing Sub-Systems



Sensing & From Perception to Understanding

Past

eYs3D Signal Processor(eSP)

USB 2.0 / 3.0 Bridge with MIPI out

VGA up to 3M Pixel Hardware ISP

Dewarp/Rectify

Stereo Depth Engine

MJPEG Compression

Now

eYs3D Computer Vision(eCV)

Cortex-M / Cortex-A CPU

NPU or TINYML from 0.2~4TOPS

Up to 12M Pixel Hardware ISP with HDR/ WDR/ Dewarp and Rectification

Optical Flow Processing

H.264 Encoder

2025 Onward

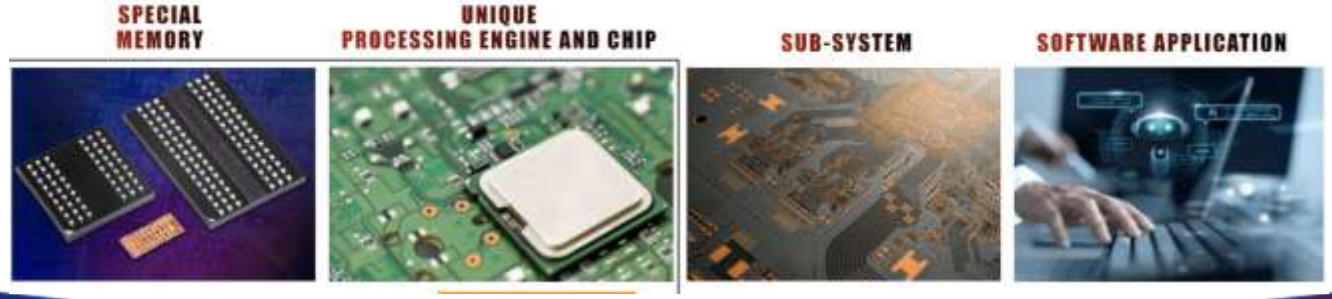
eYs3D Neural Processor(eNP)

Cortex-M / Cortex-A CPU

CNN & Transformer Support NPU

04 TOPs to 40 TOPs

USB 3.0 TX/RX & MIPI OUT



AT-MEMORY COMPUTE

EFFICIENT COMPUTE WITH "ON-NPU" DRAM

Lower Power. High Throughput

Efficient Architecture Domain Computing

Cortex-M

TRANSFORMER Model Enabled

LLM Models

UP to 8B At 35 Tokens/S

Llama, Phi-3, Gemma2, Mistral and more

UNIVERSAL & EMBEDDED

USB & MIPI

Scalable for Wide Applications

Single to Multi-core for Multi-Tasks

Next-Gen Human Machine Interface

SENSE REACT

Future intelligent human machine interactions

Combining 3D sensing, computer vision, large language models (LLM), and convolutional neural network (CNN), we utilize sensing technology to recognize the environment. CNN is employed to assess the scene and environmental conditions, while LLM grants action commands and prompts to operate machinery and interact with users, thereby enhancing the user experience.

Combining visual language models with robotic control

By AI chip with LLM, integrated CNN, verbal commands can be used to control robots to execute tasks, creating a new human-machine interface application. This technology can be applied in various fields, including smart homes, industry, and healthcare.

DCloak | Privacy-Enhencing Products Received CES Innovation Awards

DeCloakFace

Easy to Add-on
Free consultation and assessment for application requirement. DeCloakFace is not subject to device condition settings and supports multiple platforms. Making it easy to add-on to existing devices and platforms.

Safe and Compliant
Through DeCloak's de-identified technology, identity verification can be done without personal data. No facial images will be stored on cloud or premise to avoid data theft.

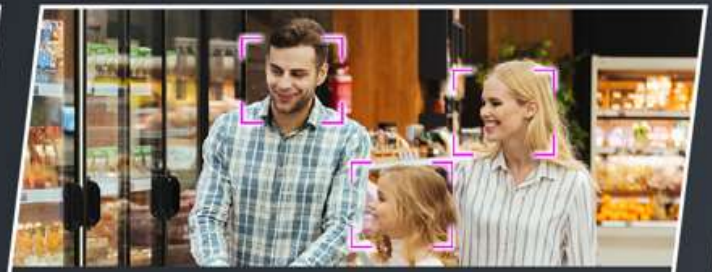
Cloud/Edge Computing
Through cloud and edge computing, efficiency is greatly improved compared with the general traditional method. Any image data processed will be obfuscated while maintaining over 99% of identification accuracy.

DeCloakFace Solution Application Scenarios

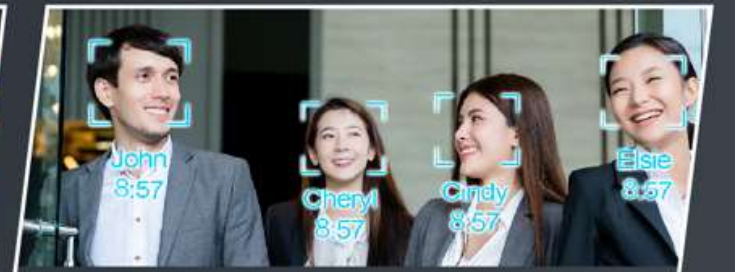
Digital Finance & Insurance
Through privacy protection of facial images, identity can still be accurately verified; making online banking transactions and online insurance signing smarter and safer.

Smart Medical and Health Care
Prevent personal information leakage through obfuscated facial image recognition and combining SOE cloud file searchable encryption engine for secure data retrieval to enable intelligent and privacy-protected medical and health care.

Smart Digital Access Control
Integrating access control system of the enterprise to accurately identify employees and non-employees through cameras under complete protection of facial image privacy.



Smart Digital Retail
By tagging and labelling target audiences with consumption behavior to activate marketing campaign efficiency through facial recognition.



Smart Attendance System
Accurately record working time through facial recognition system to eliminate identity-replaced card swiping. Extinguish loopholes in personnel management and further evolve overall attendance system.

DeCloak | Fields Entered

Smart Access Control 、 Smart Digital Retail、Smart Vehicle System

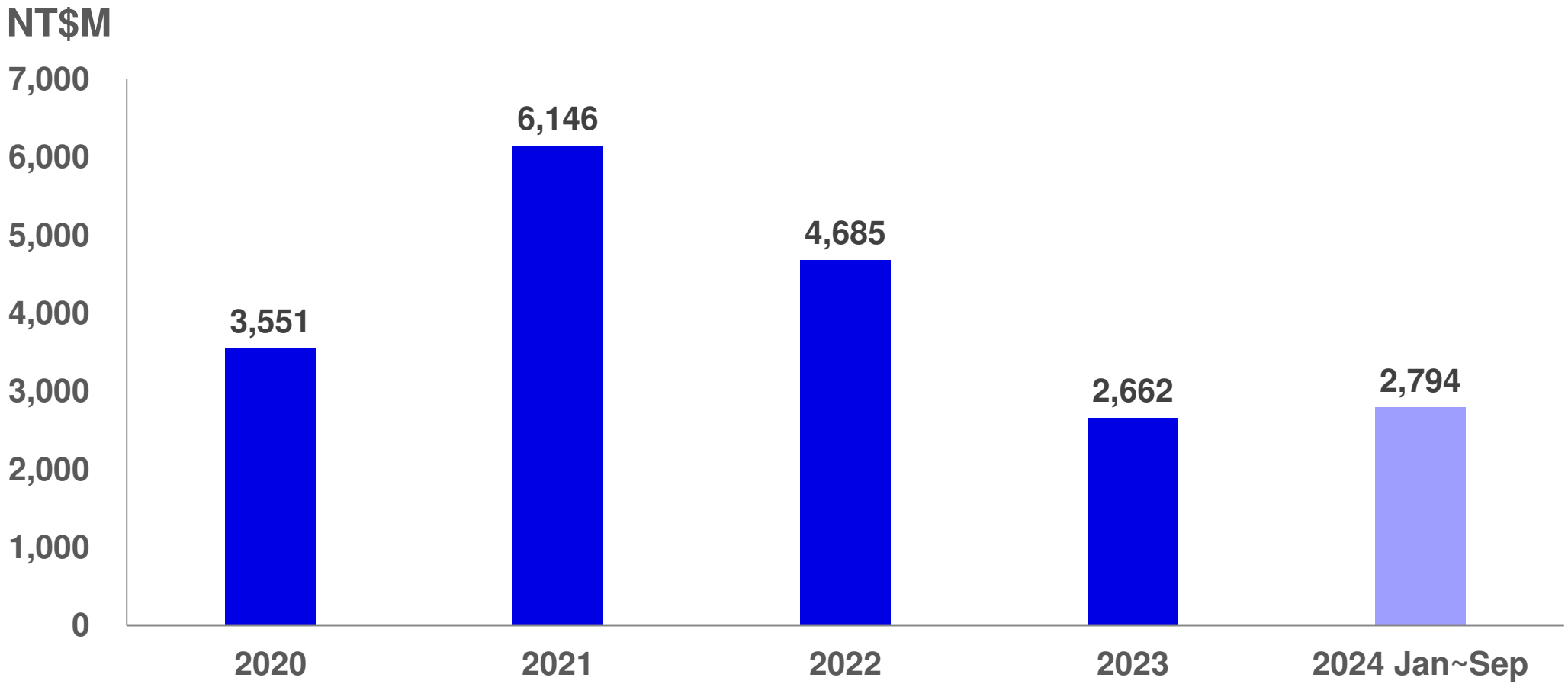
- DeCloak has successfully integrated surveillance systems for enterprises and retail shops, ensuring facial data privacy is fully protected while the targeted person can still be accurately identified through the lens.
- DeCloak is currently cooperating with a Japanese company to co-develop next generation surveillance system bundled with trustable multi-modal AI enhancing human for chain drug stores in Japan.
- DeCloak has successfully integrated DeCloakFace with Driver Monitoring System, to introduce biometric de-identification into existing DMS products to strengthen driver privacy protection.

Smart Medical and Health Care

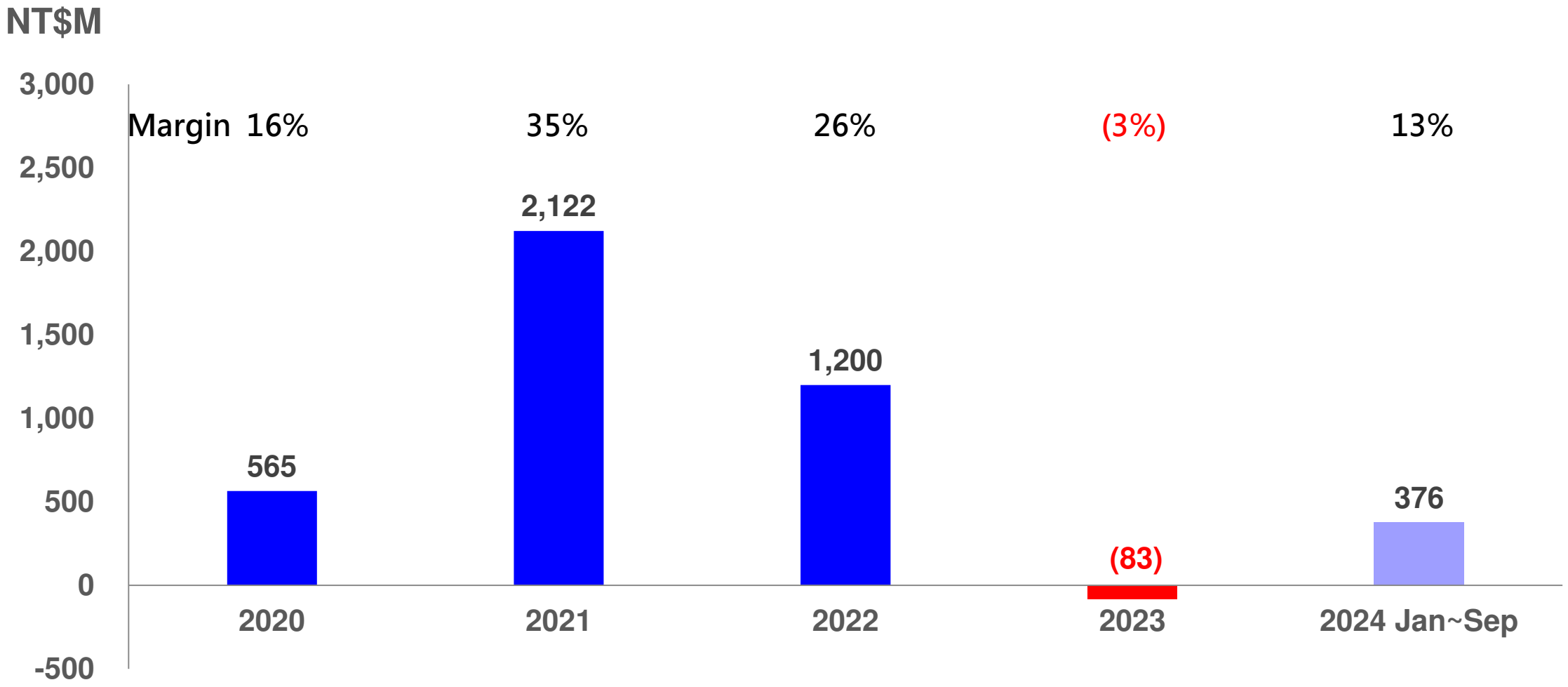
- To prevent personal information leakage through obfuscated facial image recognition, and paired with SOE cloud-based secure file retrieval system to ensure medical care is smarter and safer.
- DeCloak has signed MOU with a mid-sized hospital in Taoyuan and integration completed in 1Q2024.
- DeCloak has deployed its DeCloakFace and DeCloakVision in a sizable hospital in Hsinchu, aim to complete all integration by 2024Q4.

Financial Summary

Consolidated Operating Revenue



Consolidated Gross profit



Consolidated Statements of Comprehensive Income

Expressed in millions of New Taiwan dollars	3Q24	2Q24	3Q23
Operating revenue	929	1,018	661
Gross profit (loss) from operations	166	162	(56)
Gross margin from operations	18%	16%	(9%)
Operating expenses	(304)	(297)	(286)
Operating loss	(121)	(118)	(326)
Non-operating income and expenses	1	(15)	25
Profit (loss) attributable to Owners of the parent company	(105)	(112)	(276)
Basic (losses) earnings per share (in dollar of NTD)	(0.34)	(0.39)	(0.96)
EBITDA	(53)	(62)	(231)

Consolidated Balance Sheet

Expressed in millions of New Taiwan dollars	Sep.30, 24		Dec.31, 23		Sep.30, 23	
	Amount	%	Amount	%	Amount	%
Cash and cash equivalents	1,253	17	707	10	620	8
Accounts receivable	917	13	646	10	767	11
Inventories	2,320	33	2,782	41	3,048	42
Total current assets	4,579	64	4,246	62	4,574	63
Total non-current assets	2,525	36	2,584	38	2,711	37
Total assets	7,104	100	6,830	100	7,285	100
Current liabilities	2,376	34	1,992	29	2,096	29
Long-term liabilities	291	4	1,356	20	1,438	20
Total liabilities	2,667	38	3,348	49	3,534	49
Total equity	4,437	62	3,482	51	3,751	51
Financial analysis highlights						
Liabilities ratio	38%		49%		49%	
Current ratio(times)	1.93		2.13		2.18	

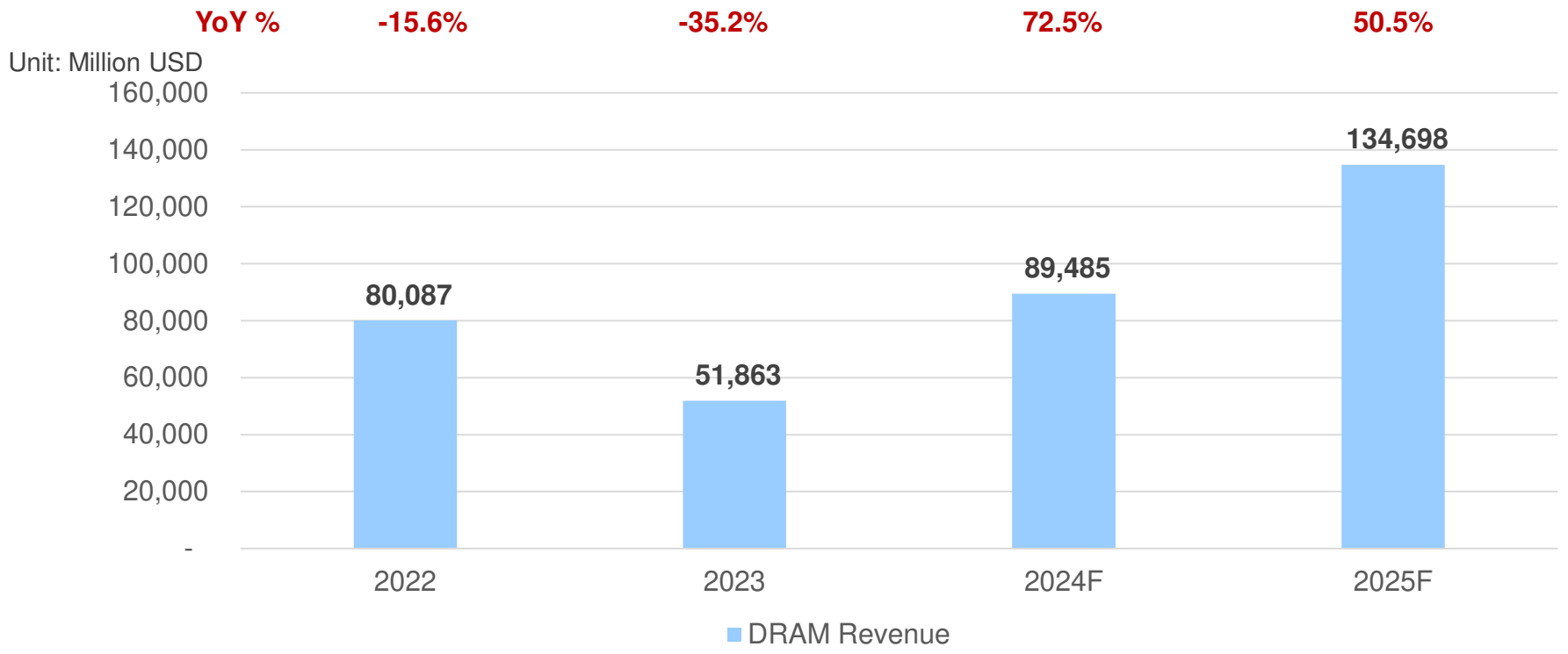
Consolidated Statements of Cash Flows

Expressed in millions of New Taiwan dollars	2024 Jan~Sep	2023	2022
Cash and cash equivalents at beginning of year	707	842	1,277
Cash flows from operating activities	119	(67)	(1,306)
Cash flows from investing activities	(169)	95	(264)
Cash flows from financing activities and others	596	(163)	1,135
Cash and cash equivalents at end of year	1,253	707	842

Prospects

Global DRAM Market Outlook

- Driven by the growth of high-end products such as HBM, DDR5, and LPDDR5, the global DRAM market is expected to reach nearly US$90 billion in revenue in 2024. Moreover, overall revenue is forecast to grow by more than 50% in 2025, reaching US$134.7 billion



Source: DRAMeXchange, Oct. 2024

Business Outlook

Q4 2024 Outlook and Opportunities

- While high-end products like HBM and DDR5 continue to drive DRAM market growth this year, demand for specialty DRAM products remains relatively flat
- In the long run, the three major DRAM manufacturers have been focusing on HBM and DDR5 production, gradually reducing the supply of specialty DRAM products. Once demand for the specialty market recovers, Etron is expected to benefit

Future Growth Drivers

- Networking and automotive/industrial applications remain Etron's key focus areas. With the increasing penetration of WiFi 6/6E and WiFi 7, as well as the expansion of electric vehicles and automation, Etron is poised for continued growth
- Moreover, as generative AI applications shift from cloud to edge, Etron's MemorAiLink platform is well-suited to support this trend. The diverse applications driven by edge AI are expected to fuel the company's future growth

Q&A

www.etron.com