



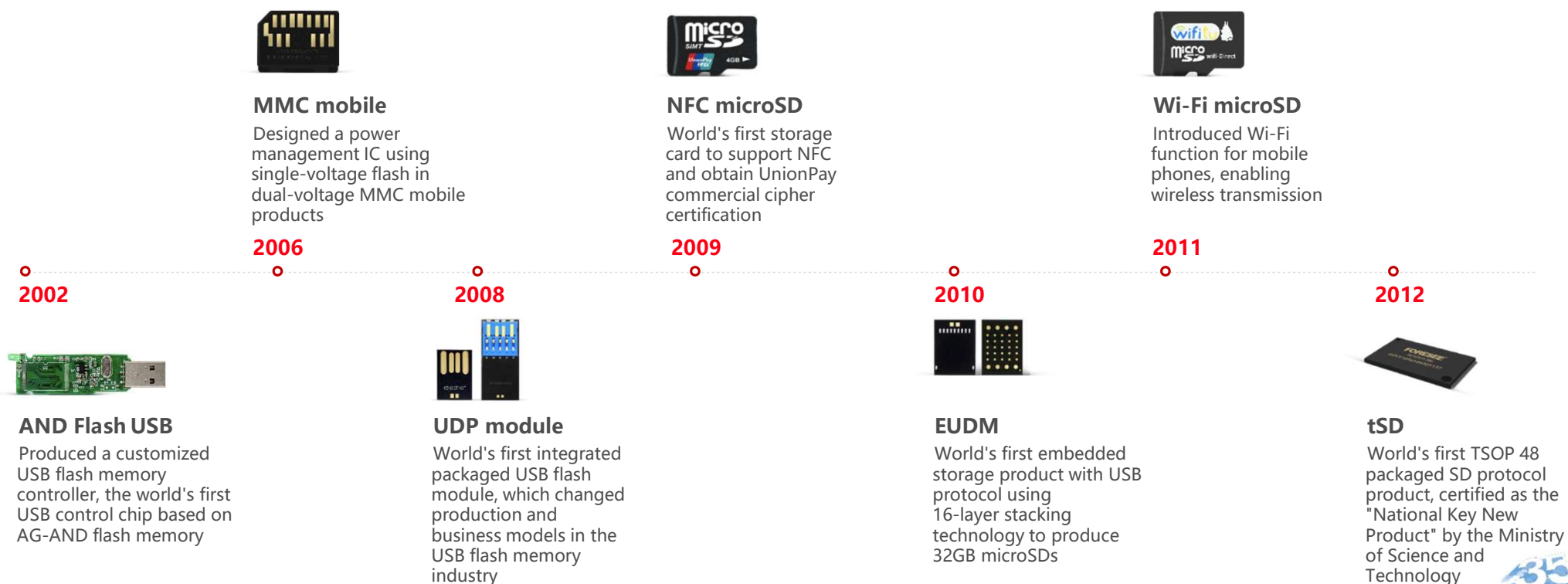
Flash Memory Summit

Evolving Flash Storage for Next-generation User Experience

Mike Chen, Shenzhen Longsys Electronics

Memory and storage have been evolving dramatically in the past decades. SSDs and embedded storage deliver leading-edge user experiences by providing responsive performance in smaller form factors. As an innovative company in storage for decades, Longsys will share a personal cloud design for photo archive, album management, excellent APP access across devices, etc. In addition, Longsys has invested to enter enterprise storage market with high-performing SSD products, as well as DRAM module for a total memory user experience

History of Storage Product Innovation



eMCP

Embedded storage chip with eMMC and LP DDR3 packaged together



Mini SDP

First integrated SSD module, promoting innovation within the industry



NM Card

New standard memory card, the same size as a Nano SIM card, allowing them to share the same slot



Automotive eMMC

AEC-Q100 qualified (reliability validation standard)



2014

2016

2018

2020

2015

2017

2019

2021

Type-C USB3.1 IOS USB

High-speed U3 product-
Type-C USB 3.1
World's first Apple USB
flash drive based on
NAND flash to feature iOS
support



PCIe BGA SSD

World's smallest SSD
(11.5 × 13mm) released
on July 14



Industrial wide- temperature eMMC

Capacity options
ranging from 8 GB to
64 GB, operating
temperature ranging
from -40°C to 85°C,
mass-produced



Cloud storage Personal cloud storage

New storage and
IoT type, realizing
storage connection,
connect storage
Internet of things
properties



Personal Cloud Disk by Longsys

Contents

品牌宣传部9

01 / Feature Introduction

Product Introduction Classification
management Smart Management

02 / Use Management

Device Connection Access Mode Space
Management

03 / APP User Experience

Easy Installation
Cloud Storage User Experience

Slide 4

品牌宣传部9 需要删除M2上的Lexar logo

品牌宣传部 陈玥朵, 7/28/2022

Public & Personal Cloud Disk

Public Cloud Disk

Google Photo, One drive, Facebook,

Advantages: No need to buy SSD

Disadvantages: Data monitoring, Limited file size & download speed, VIP...

Traditional NAS

Hard drive, or SSD standalone through network

Advantages: Powerful and multiple functions, suitable for corporate customers

Disadvantages: APPs with bad user-experience and hard to use, low transfer speed for relay or DDNS...

Personal Cloud Disk

Physical server, virtual machine, router

Advantages: APP can be quickly installed and easy to use, Files and data are controllable and safe, no speed limitation...

Pain points to access your personal photo and files



Not Enough Storage
This iPhone cannot be backed up because there is not enough iCloud storage available. You can manage your storage in Settings.

New photos can not be saved while old photos are not willing to delete

01



Too many videos would slow down phone operation yet compression might damage videos

02



VIP fee is normally charged when saving photos and files in Cloud Disk

03

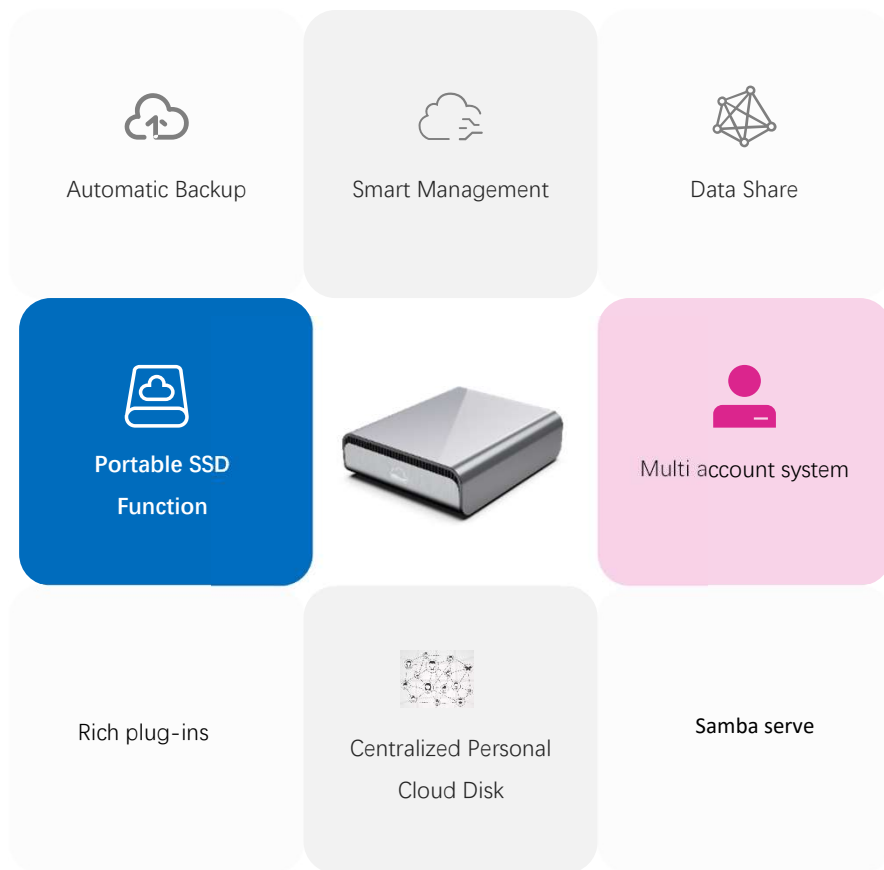


Phone and computer break down without date backup

04



Cloud access experience



Flash Memory Summit

Portable SSD Function

Capacity	500GB,1TB,2TB
----------	---------------

Interface	Type-C
-----------	--------

Speed	Up to 550MB/s
-------	---------------

Support System	Mac OS10.6+, Windows 10/8/7, Andorid4.4+, Compatible with Thunderbolt3
----------------	--

Operating temperature	0-40°C
-----------------------	--------



Automatic Backup

Free
Phone
Storage

Easy to view & manage

Start Backup

- Go to the album backup on the APP homepage, turn on the backup photos and videos, and select the album directory to back up the albums in your phone

Smart Backup

- Next time when you open the APP, it will automatically back up the new photos of the selected album. Album, QQ, WeChat can all be backed up.

Four categories of Personal Storage

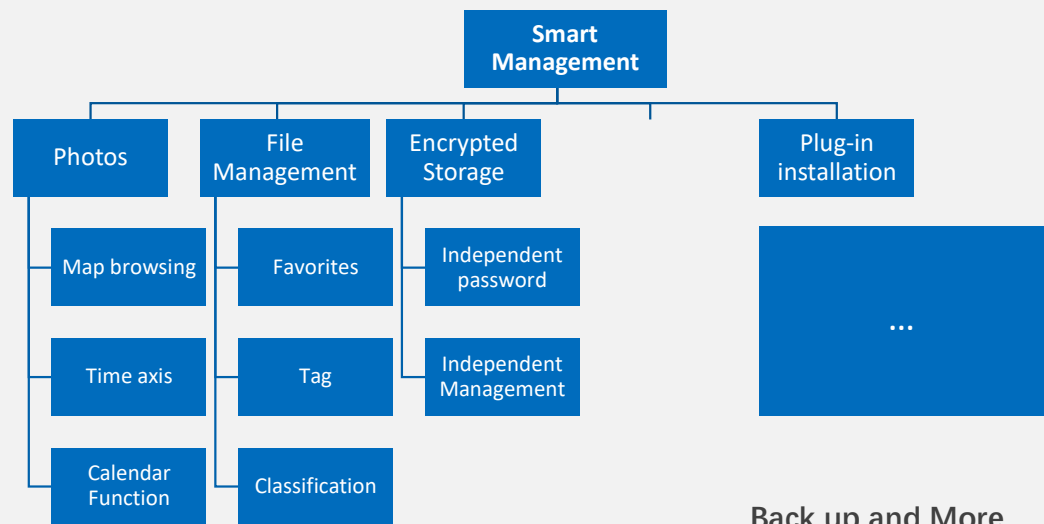
Videos

Photos

Music

Files

- Memory Box divide the personal data into four categories automatically: Videos, Photos, Music, Files
- Supported file format: DOC、XLS、PPT、PDF
- Files support online viewing and preview
- Support file sorting and search function to quickly find file data



Back up and More

Open Memory Box APP to find out more Smart Management functions...

Access Management | Device Connection

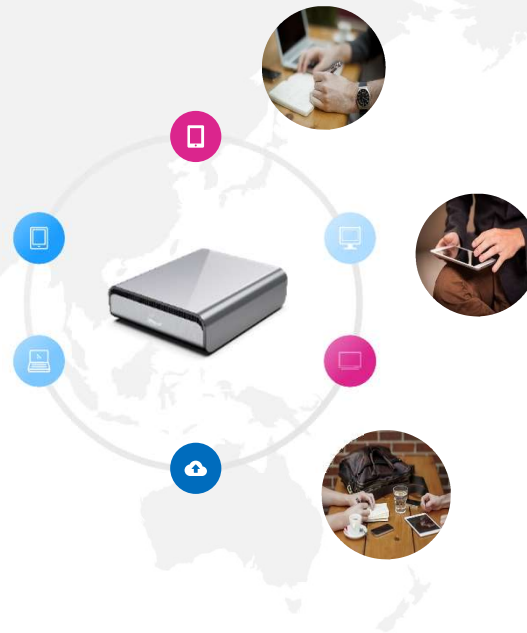
Support multi-platform device interconnection

- Android8.0+ phone
- iOS 9.0+ iPhone
- Windows7&10 Computer
- Mac OS X10.12+ Computer
- Android4.0.3+ Smart TV
- Web login (Browser login)



01. Remote Visit (Non-LAN access)

- Bind the device with the mobile APP or cloud account, no matter where you are, the data is by your side



02. Samba (LAN access)

- When the Memory Box and the access devices are in LAN using the same router. Enable the Samba protocol on the Memory Box, the PC, TV, and mobile phone can be accessed via the **device's** IP and then log in through the account.

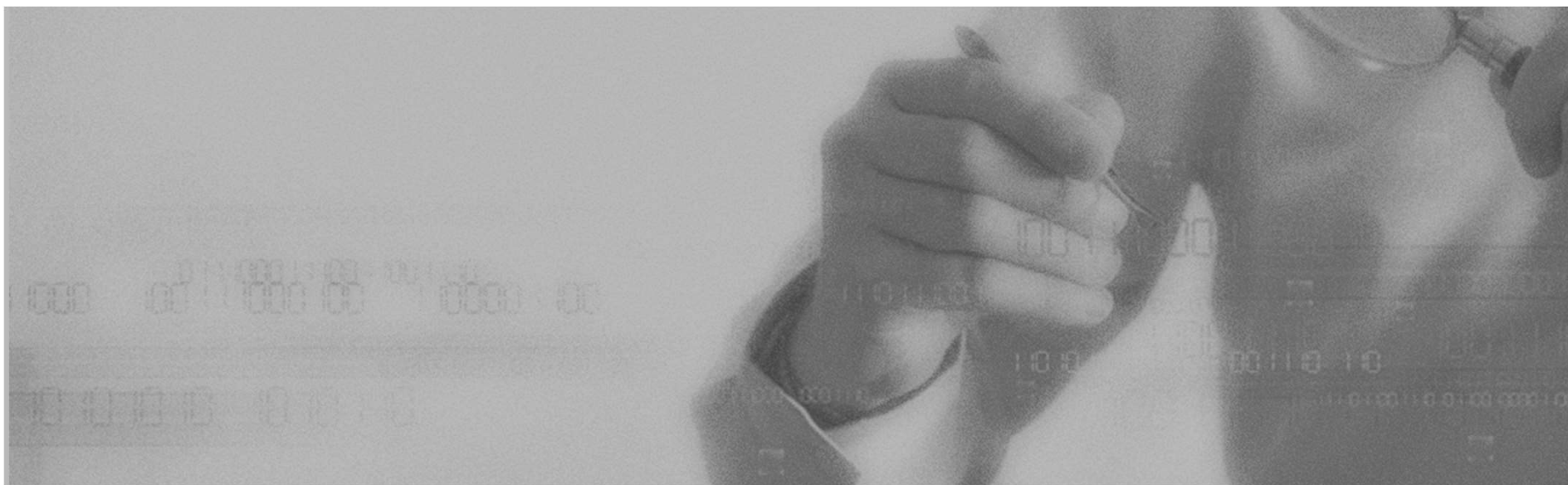
03. Web Access

- All network devices can be accessed through the web (browser) cloud account to login after binding the cloud account in the APP

04. Web Share

- Share data with friends through links, and friends can access directly without installing APP. (Only support personal space data sharing)
- Supports sharing on WeChat, Moments, QQ and other social platforms (the quality of pictures and videos will not be compressed during sharing)





APP gesture/face Recognition

Use gesture/face Recognition to open personal cloud disk, data privacy is more secure.

Data Controllable

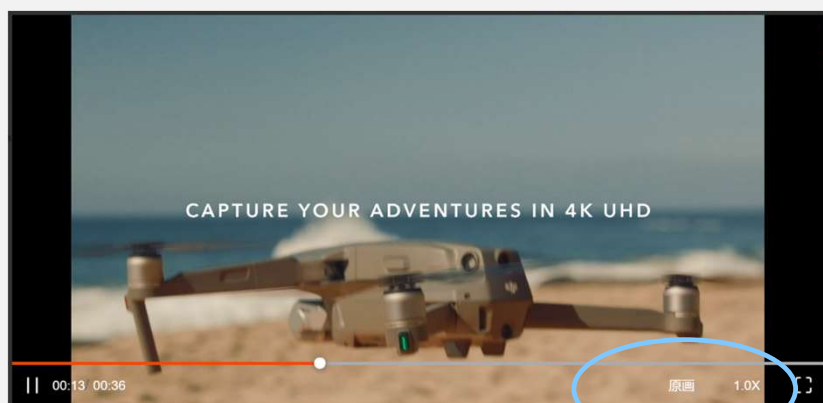
Encrypted network transmission (upload and download data) Data is saved by the local storage disk without being monitored by a third party.

Encrypted Space

Set up encrypted access to private files and protect personal data even more.

Video transcoding plug-in

Generate a smooth format of hd video shared on the web for remote playback



Transcoding before



After the transcoding

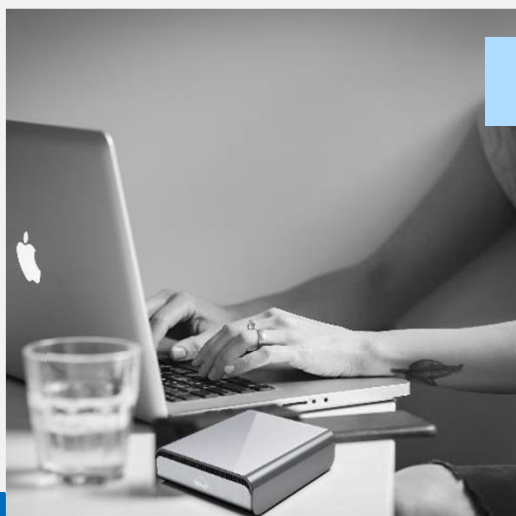
Thunderbolt download plug-in&File deduplication plug-in

Thunderbolt download plug-in

- Thunderbolt download can help users to quickly manage and download the required content without any browser.
- No need to view online real-time download progress, users will add all downloads to the queue, More convenient to save the download task.

File deduplication plug-in

- File deduplication plug-in can clean up duplicate files of users, which is beneficial to save storage space



Delivery

Interconnection, innovation, technology
Entertainment, sharing, happiness

Configuration

Operating System	Linux
Processor	ARM 4 Core Cortex A53 1.5G
RAM	1GB DDR4
Flash memory	8GB eMMC
Storage	SSD *1 500GB - 2TB
PSSD Speed	Up to 550MB/s
Interface	Reset button, Type-C
Network port	100/1000Mbps adaptive network port
Dimension	L95*W75*H25.5mm
Operating temperature	0-40°C;
Input Voltage	5V/1A DC power supply

Product Parameter | Gigabit Ethernet port



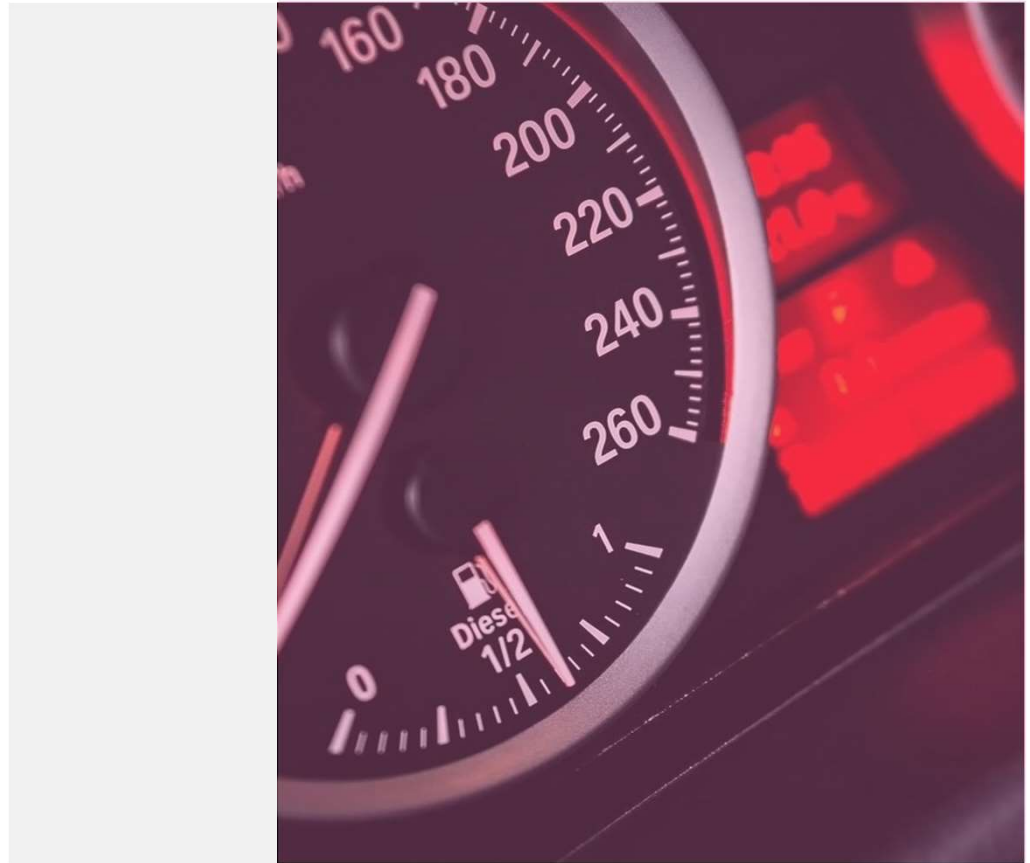
Flash Memory Summit

Gigabit Ethernet port, high-speed transmission

- High-speed output of pictures, videos, Blu-ray movies, upload and download speeds are guaranteed, the more powerful the broadband, the more stable the speed, and the 4K video without delay.

(Reference) The download speed of telecommunications 100M width (100Mbps) is about 10MB, the actual upload speed is only 3~5M seconds, and the remote access speed depends on the actual transmission speed of the bandwidth.

LAN transmission: 100MB/s



Plug&Scan installation



Packaging list:



Packaging & Product x1



Data & Power cable x1



Cable (CAT.6) x1



Adapter x1



Manual x1

Install Steps

Step One

Connect power

About 30s after the system starts, the white light is on and operates normally

Step Two

Connect network cable

The network port light is steady green and flashing orange which shows that network connection is normal

Step Three

Link APP

Scan the QR code to install the APP
Open APP device to bind

Software open for 3rd-party applications, storage for multiple APPs

Support major APPs



【Xunlei】【Shared Photo】【Baidu】



【Transcoding】 【P2P】 【File deduplication】

Open API

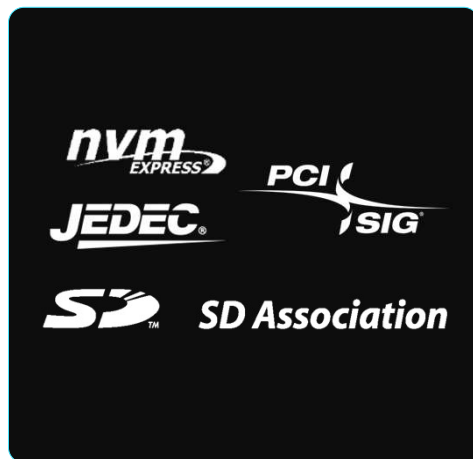
Support industry
customers/technology
geek secondary
development/application
customization



E-tailer option

Innovations is the storage industry's next standard

Industry standards »



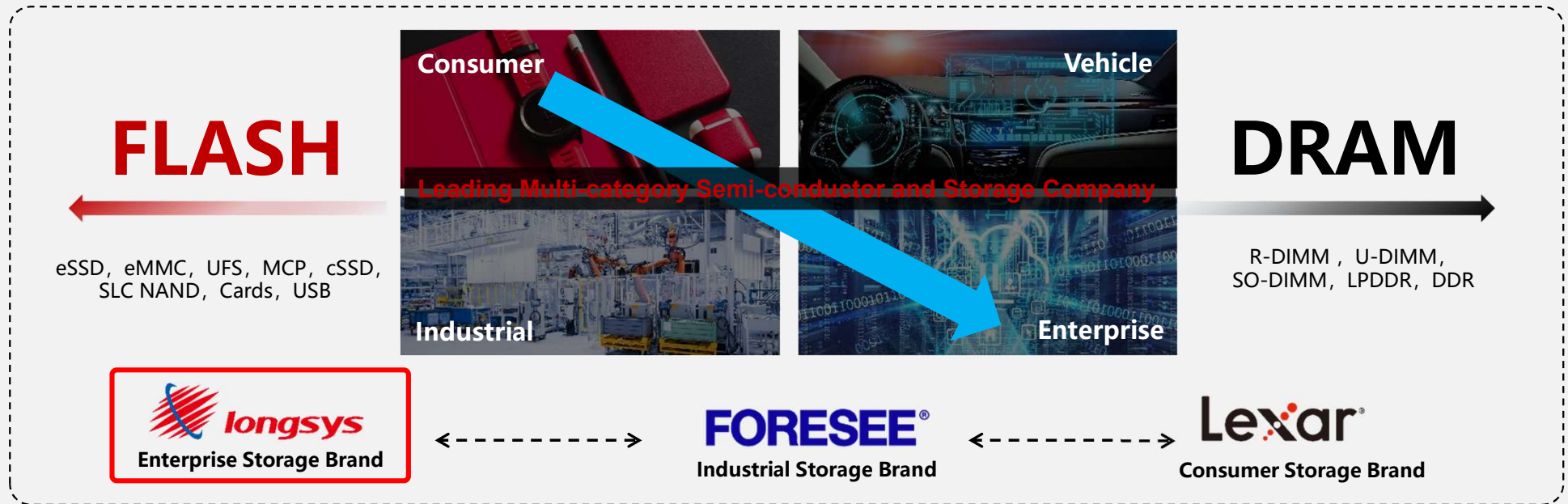
P C I e S S D



SD Memory card



Introducing DRAM and Enterprise for total memory user experience

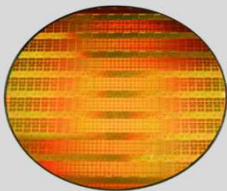

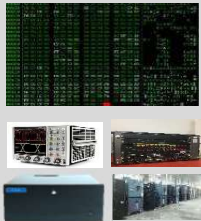







**Full Coverage of Storage
Products and Market
Applications**

Global Branding Strategy

**Focus on Technology
Investment and Service**

Chip level storage product development and production

	Wafer	Testing& Encapsulation	Development	Production & Testing	Services
Strategy	<ul style="list-style-type: none"> Purchase NAND & DRAM from the original storage factory. Self-developed small capacity storage IC. 	<ul style="list-style-type: none"> Longsys collaborate with partners for encapsulation and testing; Sorting NAND and DRAM dies for different product lines 	<ul style="list-style-type: none"> Adhere to development and innovation in software and hardware. Strict verification to improve product quality. 	<ul style="list-style-type: none"> Develop machines and tools to improve product testing quality and efficiency. Work with industry advantage partners. 	<ul style="list-style-type: none"> Adhere to strict quality standards Instant response customer service
Competitiveness	<ul style="list-style-type: none"> With original storage factory for many years stable, large-scale supply relationship to ensure the security of storage medium supply 	<ul style="list-style-type: none"> Longsys have solutions and tools for sorting and testing NAND&DRAM. Make full use of different grade dies in different product lines 	<ul style="list-style-type: none"> Fully develop test mode, processes and tools for different product lines. 	<ul style="list-style-type: none"> Independent development of production testing machine and quality control process and methods. 	<ul style="list-style-type: none"> Product customization ability.
Equipment					
Partners and Products					

Longsys digital intelligent production lines



SMT production line equipment introduction
Longsys has spent most advanced machines to build SMT product line



FUJI advanced multi-function high-speed SMT P&P machine

Ersa Vacuum reflow furnace solder void rate only 5%-8%, produce RDIMM with higher stability and reliability



Automatic solder paste printing machine

SPI

SMT P&P Machine

AOI

Vacuum reflow furnace

AOI

Online 3D X-Ray

Online dividing machine

Vitrox 3D X-Ray highly reliable defect detection

Compatibility Validation

Hardware Information

VIAVI Solutions XgigSP16 Exerciser
Vendor ID: 0x1D97
Device ID: 0x6640
Class Code: 0x010802 NVMe
Header Type: 0x00 End point (single fct)
Link Speed And Width: Gen4x1

Overall Test Result

Diagnostics Summary:
32 **29** **0** **3**
TOTAL PASS FAIL ABORT

Name	Description	Result
41-20 ReservedFieldsDLLPreceiv	4	Pass
52-10 RetrainOnNak		Pass
52-11 ReplayTimerTest		Pass
52-12 ReplayNumTest		Pass
52-20 LinkRetrainOnRetryFail		Pass
52-100 ReplayTLPonder		Pass
52-150 CorruptedDLLP		Pass
52-160 UndefinedDLLPEncoding		Pass

**PCIe 4.0 Compliance, Pass All(29)
(Skip LTR and ASPM)**

**PCIe 3.0 Compliance, Pass All(113)
(Skip LTR and ASPM)**

**PCIe CV, Pass All(64)
(Skip LTR and ASPM)**

Test Summary	
Test Suite Name	SSD TEST SUIT
Model Number	PCIe SSD
Halt on Fail	False
Total Case	84
Case Run	84
Passed	79
Failed	5
Skipped	0
Run to Plan (executed/total)	100.00%
Passed to Plan (passed/total)	94.05%
Passed to Run (passed/executed)	94.05%
Duration	3523.747s
Tested Modules	NVMe MI

NVMe MI, Pass 84, Fail 5

The screenshot shows the IOL test interface. A red box highlights the test result: "Test 9.3 - MAXCNA Namespace Attachment Limit Exceeded - Case 6 (FYI)". The test failed, and the error message states: "Irvine command: iocb_submit: ah - invalid 9.3.6 - device not attached to". The test was performed on Jan-17-2022, 15:32:38.

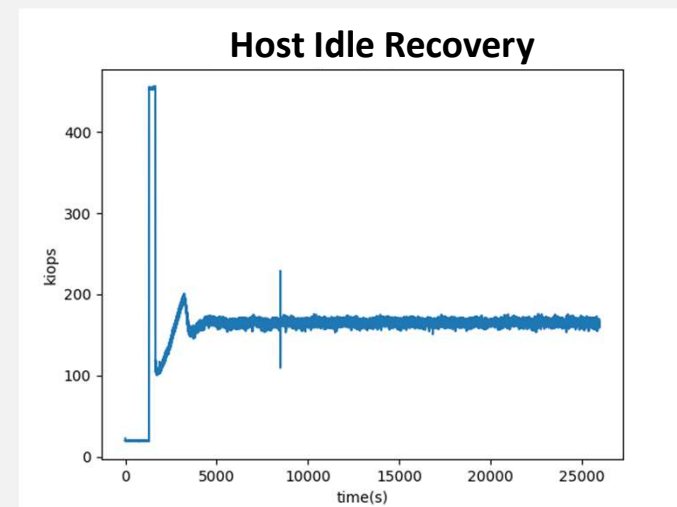
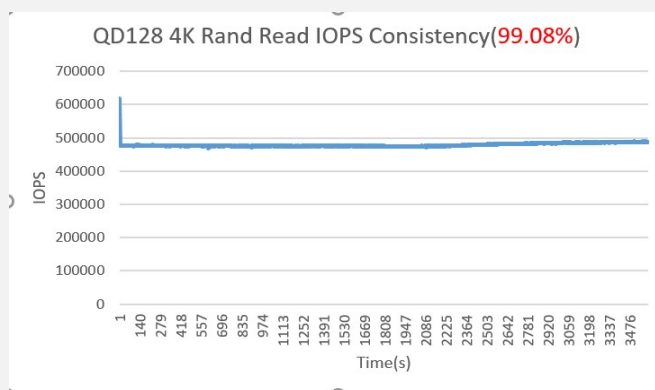
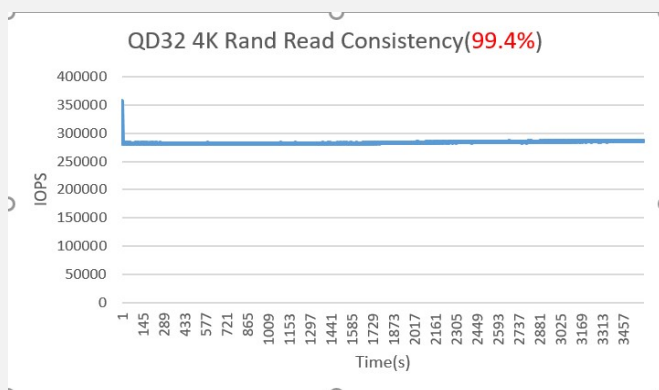
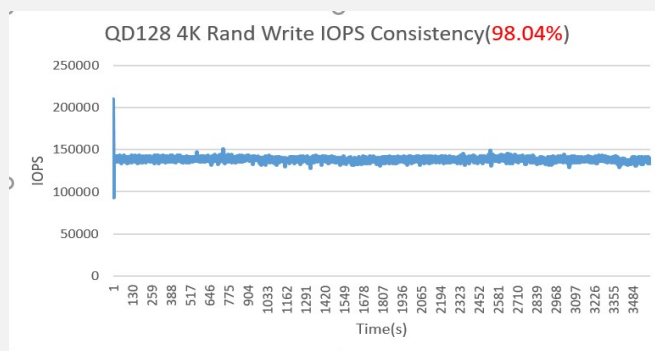
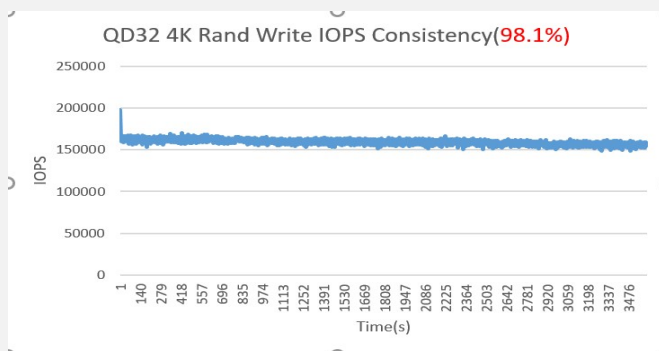
IOL, Pass 164, Fail 2

Test ID	Test Name	Test ID	Test Name	Test ID	Test Name	Test ID	Test Name	Test ID	Test Name
1	Test 1.1 - Basic NVMe	17	Test 1.17 - Basic NVMe	33	Test 1.33 - Basic NVMe	49	Test 1.49 - Basic NVMe	65	Test 1.65 - Basic NVMe
2	Test 1.2 - Basic NVMe	18	Test 1.18 - Basic NVMe	34	Test 1.34 - Basic NVMe	50	Test 1.50 - Basic NVMe	66	Test 1.66 - Basic NVMe
3	Test 1.3 - Basic NVMe	19	Test 1.19 - Basic NVMe	35	Test 1.35 - Basic NVMe	51	Test 1.51 - Basic NVMe	67	Test 1.67 - Basic NVMe
4	Test 1.4 - Basic NVMe	20	Test 1.20 - Basic NVMe	36	Test 1.36 - Basic NVMe	52	Test 1.52 - Basic NVMe	68	Test 1.68 - Basic NVMe
5	Test 1.5 - Basic NVMe	21	Test 1.21 - Basic NVMe	37	Test 1.37 - Basic NVMe	53	Test 1.53 - Basic NVMe	69	Test 1.69 - Basic NVMe
6	Test 1.6 - Basic NVMe	22	Test 1.22 - Basic NVMe	38	Test 1.38 - Basic NVMe	54	Test 1.54 - Basic NVMe	70	Test 1.70 - Basic NVMe
7	Test 1.7 - Basic NVMe	23	Test 1.23 - Basic NVMe	39	Test 1.39 - Basic NVMe	55	Test 1.55 - Basic NVMe	71	Test 1.71 - Basic NVMe
8	Test 1.8 - Basic NVMe	24	Test 1.24 - Basic NVMe	40	Test 1.40 - Basic NVMe	56	Test 1.56 - Basic NVMe	72	Test 1.72 - Basic NVMe
9	Test 1.9 - Basic NVMe	25	Test 1.25 - Basic NVMe	41	Test 1.41 - Basic NVMe	57	Test 1.57 - Basic NVMe	73	Test 1.73 - Basic NVMe
10	Test 1.10 - Basic NVMe	26	Test 1.26 - Basic NVMe	42	Test 1.42 - Basic NVMe	58	Test 1.58 - Basic NVMe	74	Test 1.74 - Basic NVMe
11	Test 1.11 - Basic NVMe	27	Test 1.27 - Basic NVMe	43	Test 1.43 - Basic NVMe	59	Test 1.59 - Basic NVMe	75	Test 1.75 - Basic NVMe
12	Test 1.12 - Basic NVMe	28	Test 1.28 - Basic NVMe	44	Test 1.44 - Basic NVMe	60	Test 1.60 - Basic NVMe	76	Test 1.76 - Basic NVMe
13	Test 1.13 - Basic NVMe	29	Test 1.29 - Basic NVMe	45	Test 1.45 - Basic NVMe	61	Test 1.61 - Basic NVMe	77	Test 1.77 - Basic NVMe
14	Test 1.14 - Basic NVMe	30	Test 1.30 - Basic NVMe	46	Test 1.46 - Basic NVMe	62	Test 1.62 - Basic NVMe	78	Test 1.78 - Basic NVMe
15	Test 1.15 - Basic NVMe	31	Test 1.31 - Basic NVMe	47	Test 1.47 - Basic NVMe	63	Test 1.63 - Basic NVMe	79	Test 1.79 - Basic NVMe
16	Test 1.16 - Basic NVMe	32	Test 1.32 - Basic NVMe	48	Test 1.48 - Basic NVMe	64	Test 1.64 - Basic NVMe	80	Test 1.80 - Basic NVMe

Sanblaze - 459 Pass / 2 Fail

Performance Tuning

Consistency



ZNS & QLC

Eco-system

Both cloud vendors and SSD vendors are working on software adaptation based on ZNS features

SPEC

2021 ZNS command set released and actively updated
Latest Version 1.1b

TCO

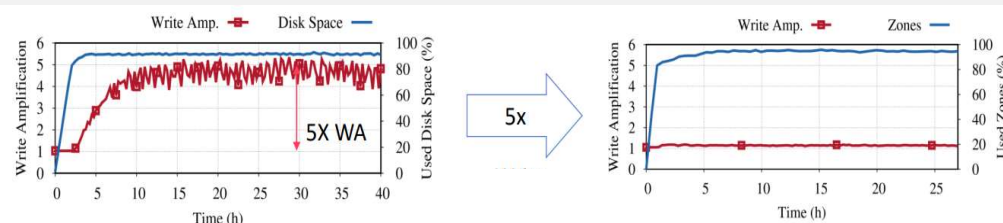
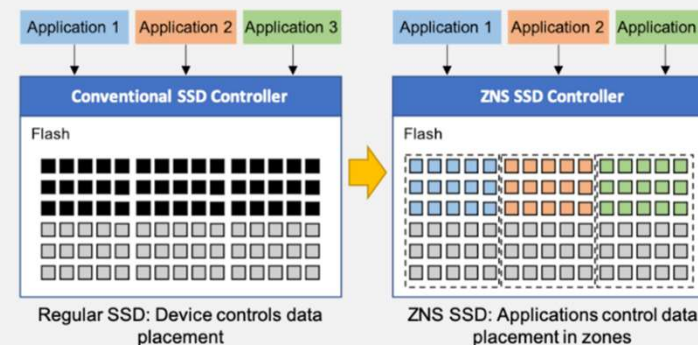
ZNS SSD achieves cost-down by reducing OP and DRAM, and combining QLC is the key path for SSD cost reduction

Performance

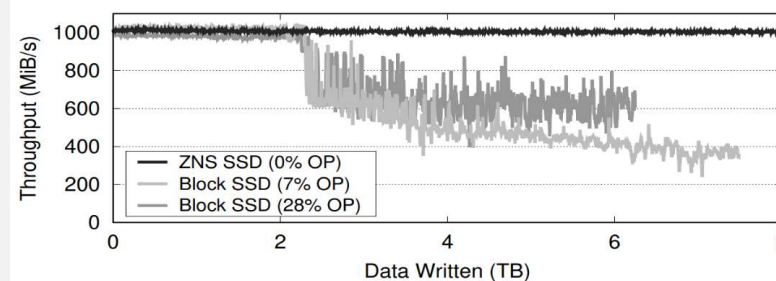
ZNS SSD eliminates GC, provides higher bandwidth and better QoS, and reduces write amplification



Flash Memory Summit

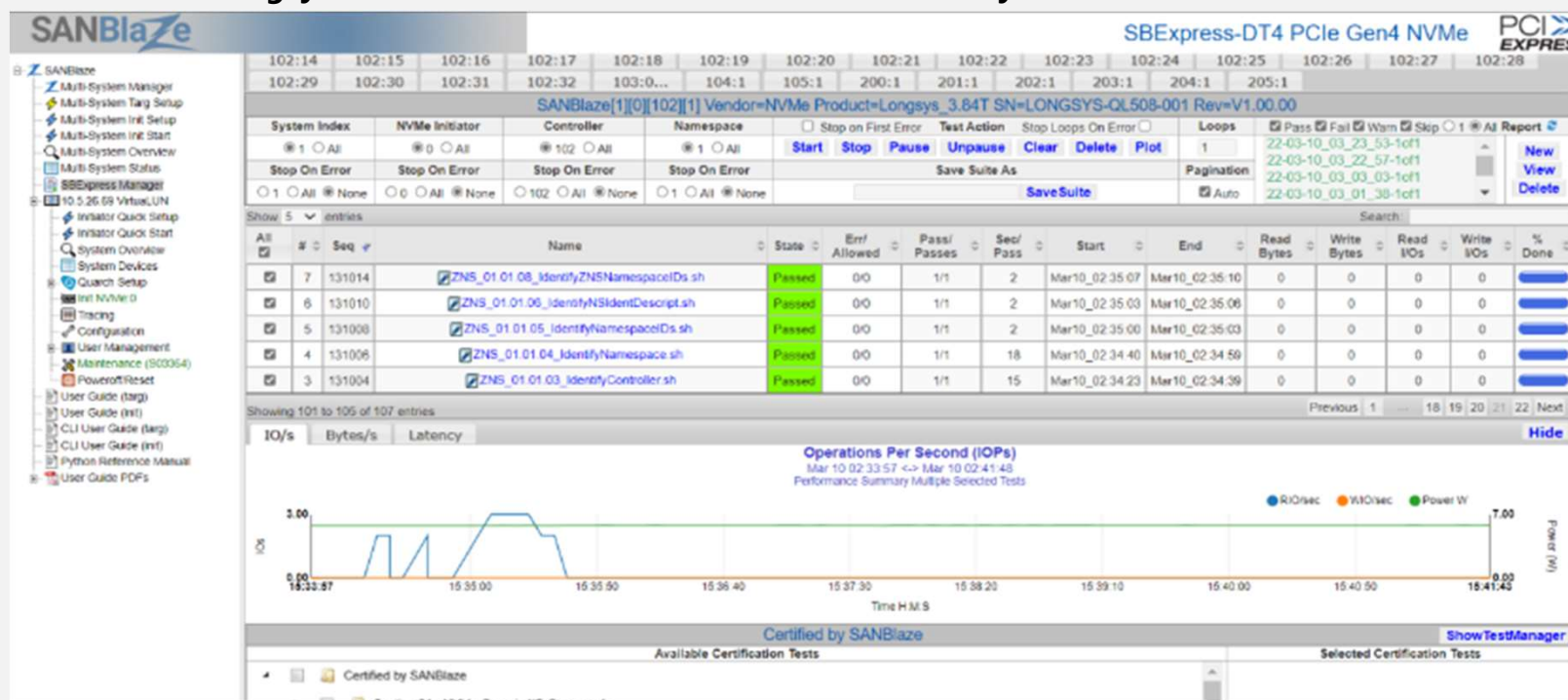


Multi-threaded write overwrites the available capacity of the SSD 4 times



ZNS advanced technology development

Longsys ZNS SSD demo verified with Sanblaze test system

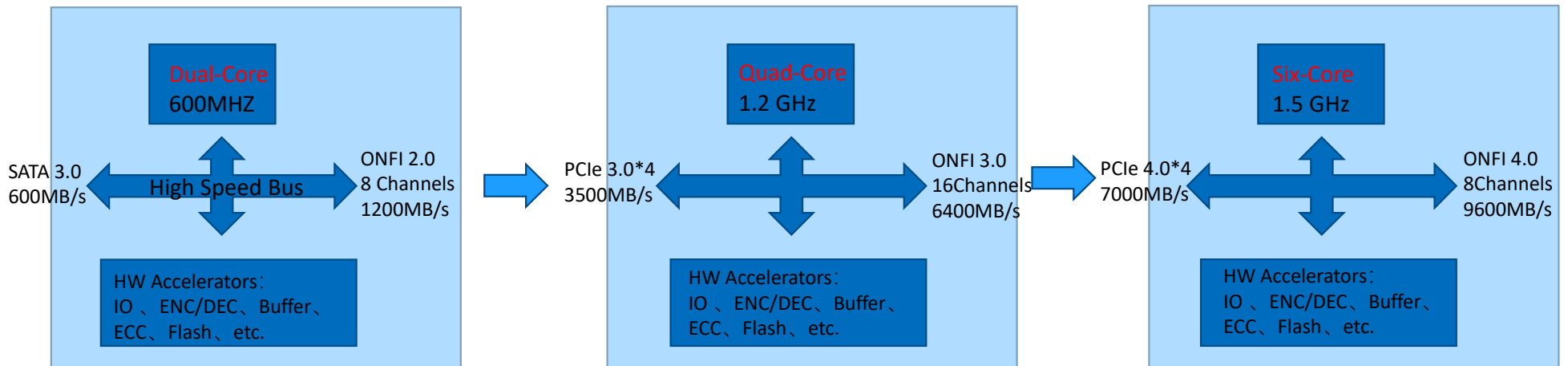


#	Seq	Name	State	Err/Allowed	Pass/Passes	Sec/Pass	Start	End	RBytes	WBytes
70	131306	ZNS_07.01.01_ZoneAppend.sh	Passed	0/0	1/1	3	Mar11_10:27:19	Mar11_10:27:24	0	0

Solutions: Unified architecture and acceleration for application

✓ **One FW Arch Design**

- Firmware defined arch: flexibility for the challenges
- SMP: could scale up/down easily
- Coherency & atomicity
- Low latency
- High reliability and shared resource pool



Enterprise SSD



ORCA 4836 NVMe SSD

Form Factor: U.2

Capacity: 1.92TB/3.84/7.68TB

NAND Flash:	DRAM:	Random read/write(IOPS):	Sequential read/write(MB/s):	Operating Temperature:
3D eTLC	DRAM-base	Up to 1000K / 170K	Up to 6800/4800	0°C~70°C

Warranty Period:	DWPD:	MTBF(Hour):	UBER:
5 years	1	2,000,000	1 sector per 10 ¹⁷ bits read

S.M.A.R.T. support:	TRIM:	Power-loss protection:
Y	Y	Y

Application: Server

Shown @Microchip booth

Enterprise SSD



UNCIA 3836 SATA SSD

Form Factor: 2.5inch SATA

Capacity: 480GB/960GB/1.92TB/3.84TB

NAND Flash:	DRAM:	Random read/write(IOPS):	Sequential read/write(MB/s):	Operating Temperature:
3D eTLC	DRAM-base	Up to 100K / 50K	Up to 550/520	0°C~70°C

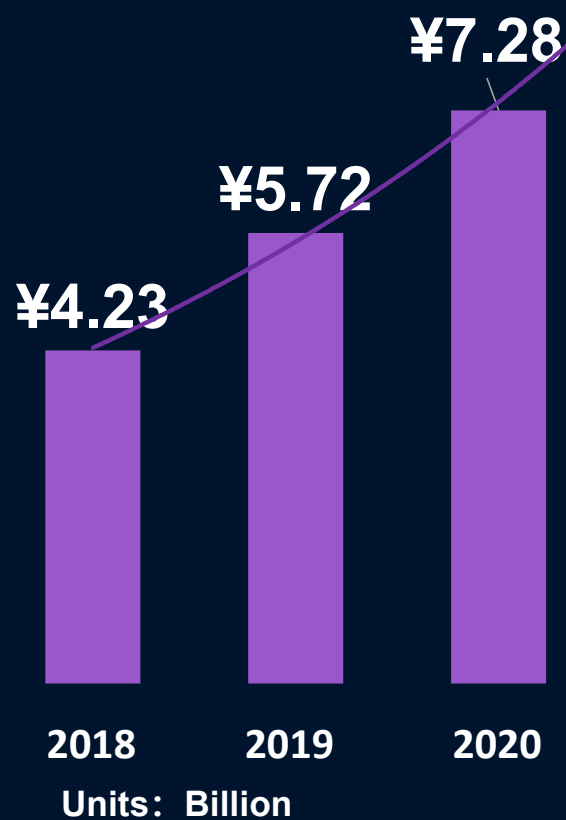
R-DIMM



AQUILA R-DIMM DDR4

Design reference	JEDEC DDR4 module
Interface	288PIN R-DIMM
Capacity	16GB / 32GB
PCB	10L
Rank	2Rank 72bit
Speed	2933Mbps / 3200Mbps
CL	21 (Default) / 22 (Default)

Shown @Techmart Suite#320



¥9.75(1.5B USD)

**IPO this week
to invest future!!**





Thank you

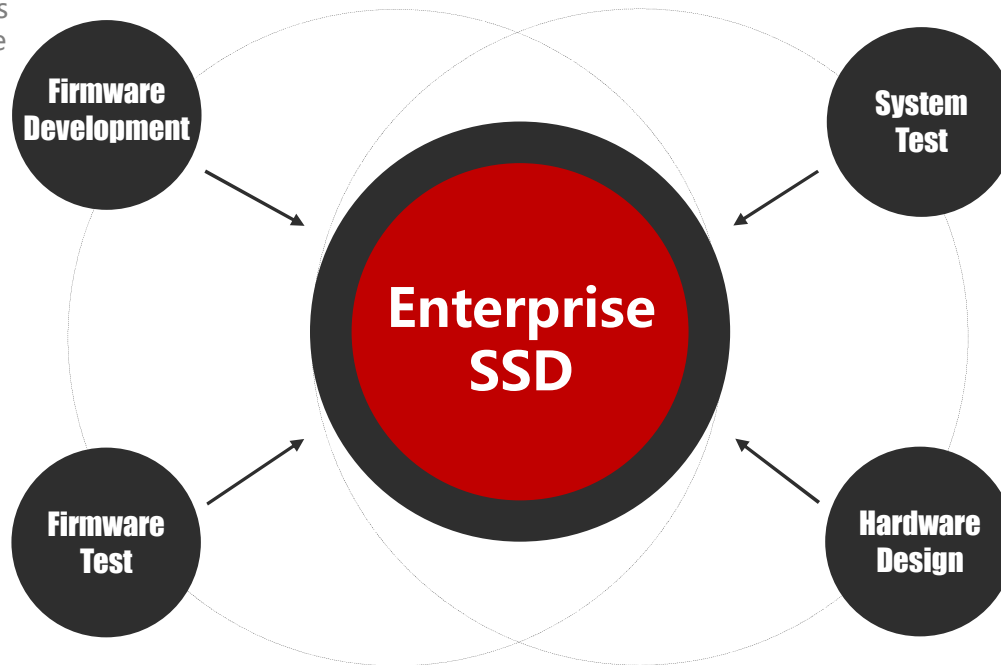


The information is for reference only and does not constitute any form of commitment
Products (including but not limited to color, size, screen display, etc.) please refer to the actual product.

Enterprise SSD R&D Team

- Multiple core members
 - from world TOP3 R&D centers
 - over 10 years R&D experience
 - managed to release multiple SSD products, including consumer and enterprise SATA/PCIE SSD

- Over 1500 test cases covering all the enterprise SSD features, including protocol, performance, compatibility, algorithm, NAND, high-low temperature, power consumption and etc



- Complete product validation process
- Validation environment and capability for reliability on various platform, compatibility, long-term stability, performance, power consumption and etc
- Various test and validation equipment, including various servers, RDT devices and etc

- SSD circuit board level design
- Analysis capability for signal integrity, power consumption, high-low temperature validation, failure analysis and etc

Shanghai R&D Center

Shanghai R&D Building

Opened in March 2021, it is one of Longsys 's own properties. The Shanghai R&D Center focuses on the R&D of high-end storage products. Approximately 180 engineers will be working in this building by the end of 2021. The office area, which covers around 2,000 m², will be equipped with a 600 m² verification laboratory.

The Lingang Dishui Lake R&D Center Park is located in Dishui Lake core area, Lingang Special Area, Shanghai. Purchased by Longsys for construction its the Shanghai headquarters and R&D center, the park occupies an area of around 9,333 m², with a total building area of 43,000 m². This project is planned to be completed by the end of 2024.

Integrating R&D offices, professional storage testing, storage product demonstrations, and other functions, the center will be able to hold more than 800 R&D personnel. It will play a key role in Longsys's long-term development strategy.





eSSD R&D and production building

- Longsys eSSD products started pre-research in 2020, and the project approval in 2021. It is expected that the first generation of eSSD products will be mass produced in early 2023. At present, there are more than 100 people in the development team, in Shanghai, Shenzhen, Chengdu built R& D centers. The core architecture designers and FW developers have more than 10 years of industry experience.
- Shanghai Lingang Dishui Lake R&D Center, plans to build a new enterprise SSD product design center and laboratory, which will be put into use in 2024.
- Longsys has invested nearly 100 million to purchase and development equipment, including the most advanced SANBlaze test system and Advantest test equipment.



Explore next storage innovations

通过产品基础、技术积累及市场摸索，
Platform partnership for Storage Innovations
Internet of Things - IoT
(Memory To IoT)



Flash Memory Summit

reddot winner 2021

