



# All-Terrain Automotive Storage Solutions for the Road Ahead

ATP Electronics leverages nearly 30 years of manufacturing experience and a decade of automotive expertise to provide best-in-class automotive-grade memory and storage solutions.

The world's leading OEM/Tier 1 suppliers, system developers and service providers trust ATP to deliver the highest levels of data accuracy, consistency and integrity for the most demanding automotive applications.



# Why the Automotive World Trusts ATP



## Automotive Quality System

Qualified, Certified and Recognized

ATP Automotive Solutions comply with the most stringent international quality standards for the automotive sector.

### IATF 16949

This is one of the automotive industry's most widely used international standards. On October 3rd, 2016 IATF 16949:2016 was published by the IATF (International Automotive Task Force) and supersedes and replaces the current ISO/TS 16949, defining the quality management system requirements for the design and development, production and, when relevant, installation and service of automotive-related products.

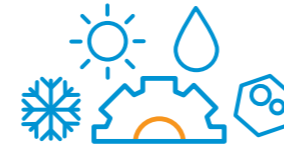
(Certificates to ISO/TS 16949:2009 will no longer be valid after 14th September 2018)

### VDA 6.3

Part of a quality management system standard that is mandatory for German car makers, VDA 6.3 defines a process-based audit standard for production parts and services to evaluate and improve controls in a manufacturing organization. It was developed by the German trade association for the automotive industry (Verband der deutschen Automobilindustrie E.V.).

### International Material Data System (IMDS)

Used by the world's leading OEMs, the IMDS is a global archive of information on all materials found in finished automobile manufacturing.



## Automotive Compliance and Standards

Always Ready for the Rough Road

Vehicles operate under diverse environmental challenges. They should be able to withstand extreme temperatures, power limitations, natural elements and more. ATP Automotive Solutions are designed and built for rigorous, extended use.

### AEC-Q100\*

The AEC-Q100 is a failure mechanism-based stress test qualification for integrated circuits. The Automotive Electronics Council (AEC) was originally formed by leading car makers to establish common part-qualification and quality-system standards.

- **e.MMC:** -40°C to +105°C (Grade 2), -40°C to +85°C (Grade 3) ambient operating temperature range
- **SD/microSD:** Selected AEC-Q100 and AEC-Q104 test items; -40°C to +85°C (Grade 3) ambient operating temperature range

\* Selected AEC-Q100 test items and conditions approved by customers. May vary by product and project support.

### International Protection Marking\*

- Waterproof (IPX7)
- Dustproof (IP6X/IP5X)

\* For SD/microSD cards only.



## Longevity Commitment

Your Partner for the Long Haul

As your partner, ATP is committed to optimizing your investment, ensuring low total cost of ownership (TCO) and stable supply.

### Controlled BOM with PCN/EOL Notice\*

Implemented to guarantee long product cycles with buffer inventory. ATP makes sure that any changes affecting the process or product, as well as product end of life, are communicated to you.

- 5-year roadmap
- PCN/EOL notice typically 6 months in advance

### Global and Local FAE Support

- Over 100 engineers and technical staff worldwide (31% of ATP's total workforce)
- Global presence in five countries with support sales and service offices
- Several global and regional franchised distributors including representatives proudly carrying the ATP brand

\* May vary by product and project support.

# Automotive Storage One-Stop Shop

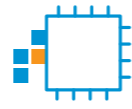
From the IC level to wafer packaging all the way up to module level and mass production, ATP exercises total control of the manufacturing process to meticulously characterize, test and validate every component and finished product. Customers can have total peace of mind that they are not getting ODM or turnkey flash products.



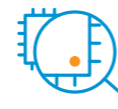
NAND/DRAM IC VALIDATION



NAND WAFER MANAGEMENT



PACKAGE LEVEL VALIDATION



NAND FLASH SCREENING



DESIGN VALIDATION & TESTING



PILOT RUN



MASS PRODUCTION

IC LEVEL

DRIVE LEVEL

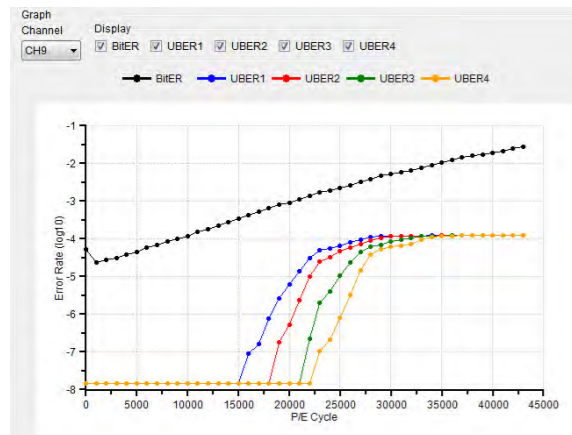
MP LEVEL

## Testing Capabilities

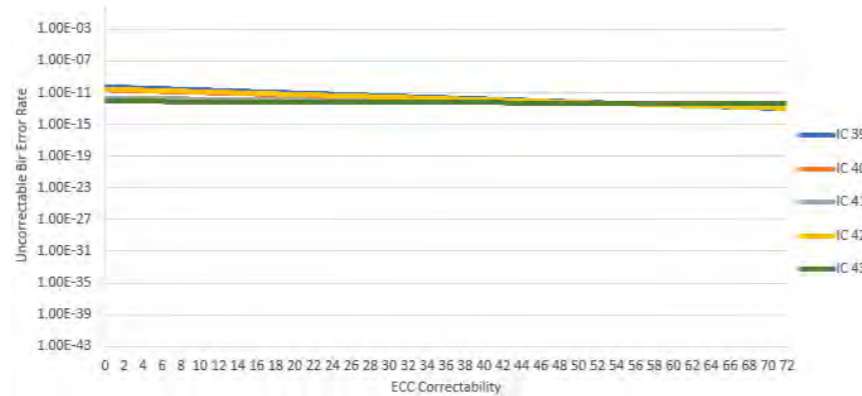
ATP exercises total control of the manufacturing process to meticulously characterize, test and validate every component and finished product. On top of standard tests, ATP offers own-designed unique and customized hardware, software and firmware testing. Below are examples of tests performed from IC, Module/Drive up to Mass Production Level.

### IC Level

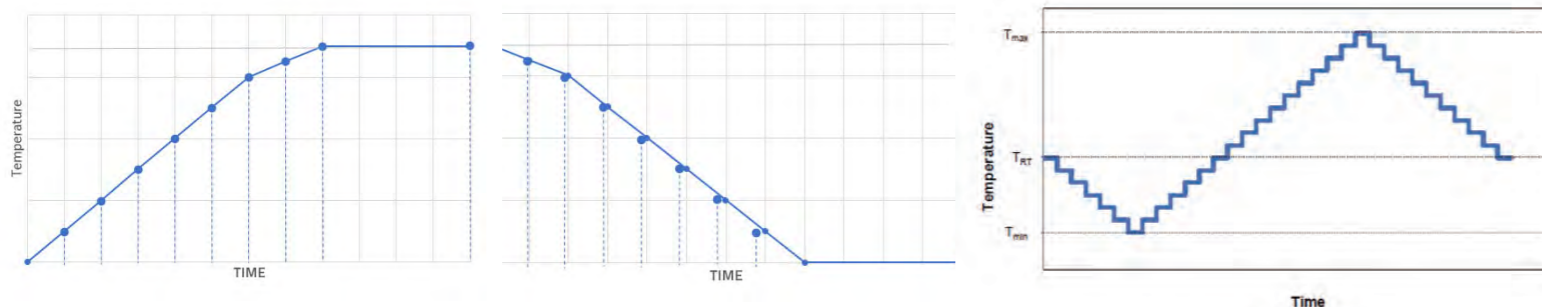
#### Endurance Testing: UBER (Uncorrectable Bit Error Rate) based on different ECC levels



#### High Temperature Data Retention Testing: UBER after P/E cycling



#### Cross-Temperature Testing based on different test profiles



### Drive Level

#### Power Cycling Test

This test uses ATP-developed tester platforms/scripts to uncover any power failure conditions such as unstable or marginal voltage supply, sudden power loss and power spikes that cause glitches.



#### Joint Validation Test (Memory Cards)

Compatibility and function tests with client-supplied host devices and systems to proactively detect failures and optimized system in prototype design phase.



Click [here](#) for a video showing detailed information on the Joint Validation program:

### MP Level

#### Rapid Diagnostic Test

Applying the experiment of NAND Flash IC validation and P/R test, ATP is able to conduct NAND screening test (RDT) in mass production level. RDT involves complete, block-by-block testing of the entire drive including firmware, user and spare areas to improve drive reliability and endurance.

ATP has the capability to run high-low temperature testing in the chamber at mass production volumes





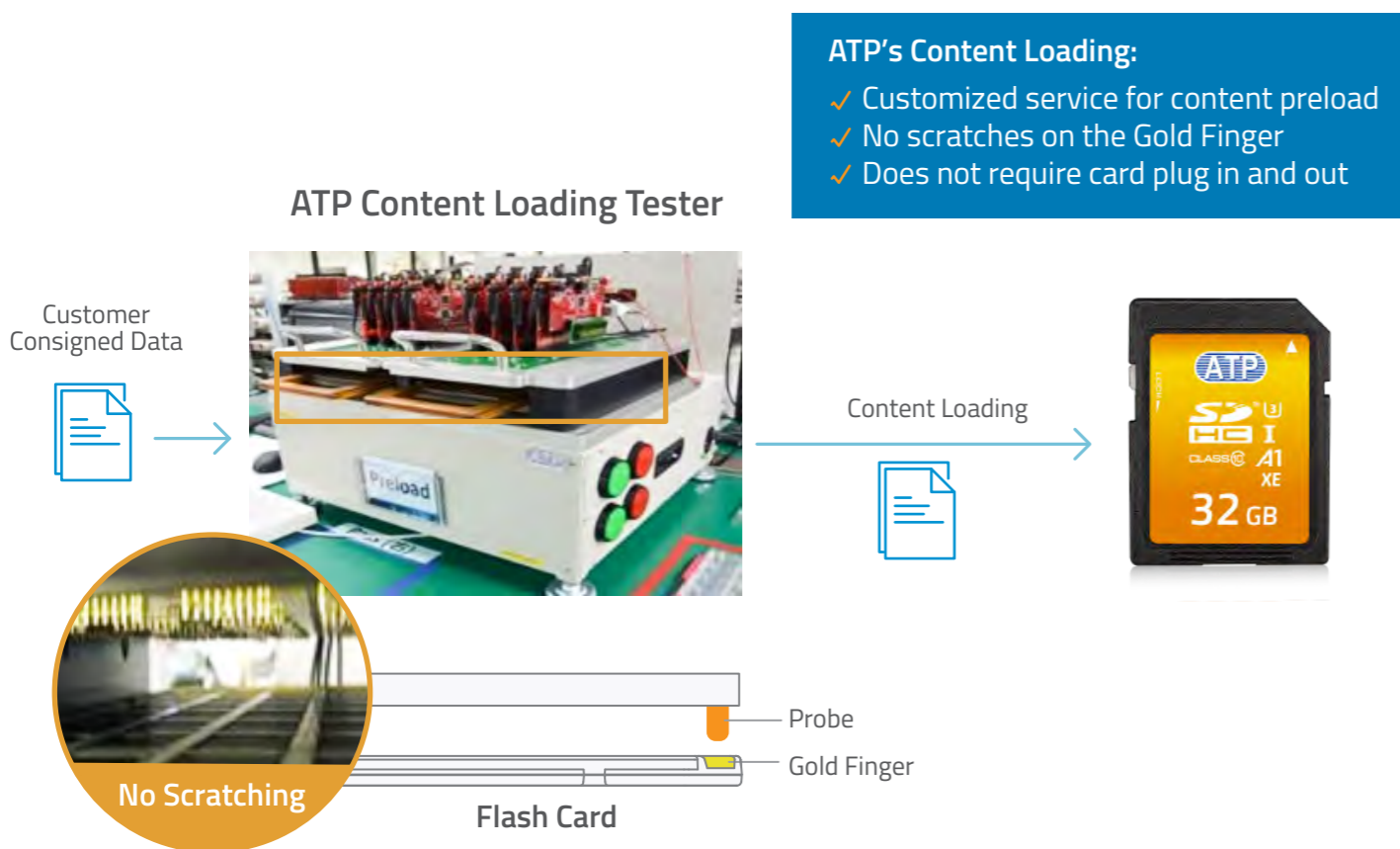
## Value-Added Services Going the Extra Mile

ATP delivers total solutions not only by manufacturing best-in-class products, but also offering top-notch value-added services to meet customers' diverse requirements.

### ATP Customized Content Loading Service

ATP provides this service to preload customer-consigned data into the flash card. The ATP Content Loading Tester consists of:

- ATP-designed testing board/platform
- ATP-developed testing Program/AP/UI
- Touch pin type testing

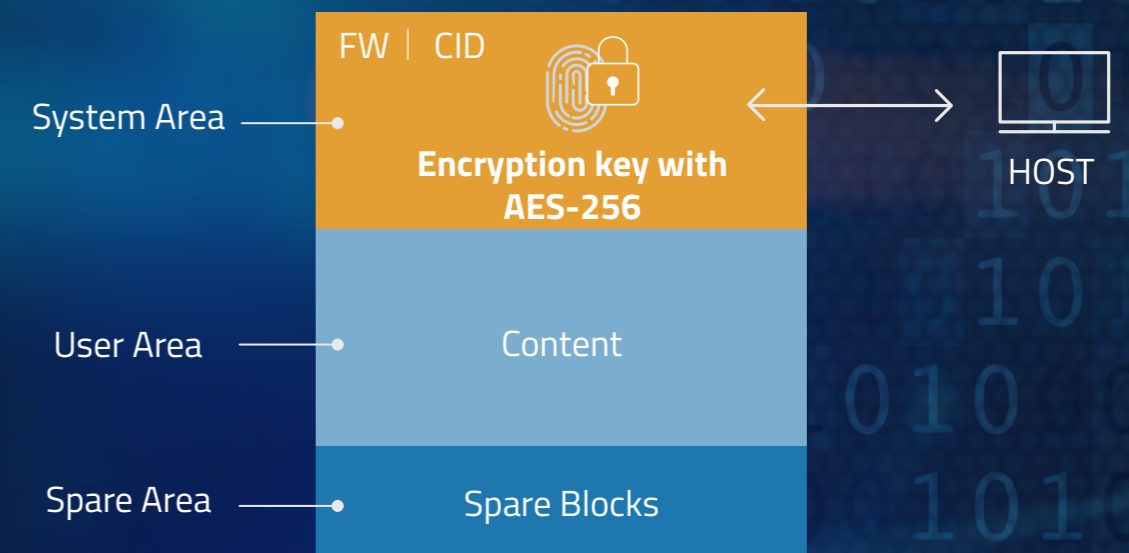


## ATP Secure SD/microSD: Customized AES-256 Security



The pre-defined key is encrypted with AES-256, the proven encryption standard certified by the National Security Agency (NSA) to make sure that the host will not accept unauthorized cards with unlicensed content. The authentication code is safely hidden within the card's System Area and can only be accessed by a special vendor command.

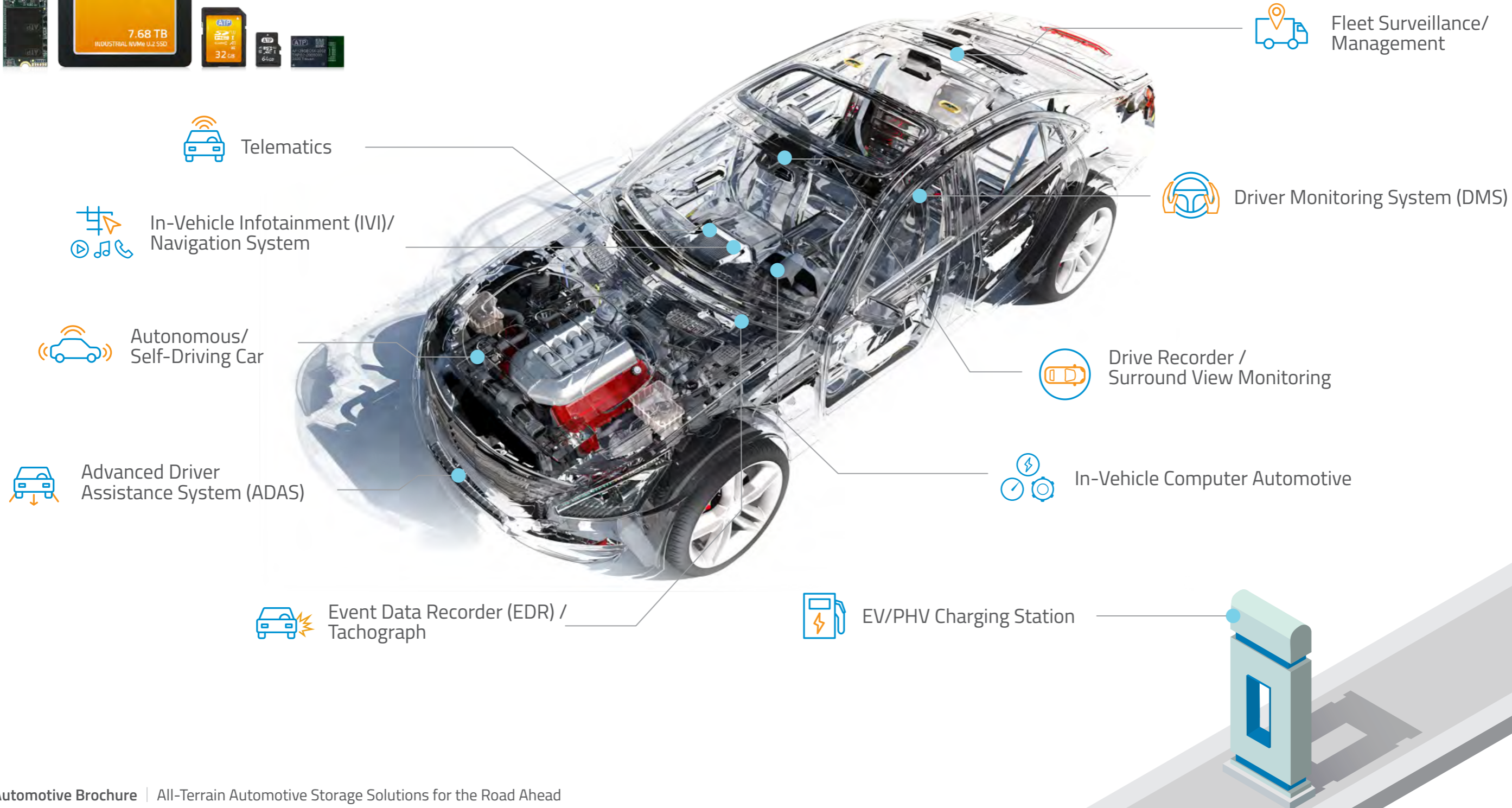
ATP can develop the encryption formula together with the customer's software team. As soon as the authentication code is authorized, the host can access and read the memory card's contents. Only the key is encrypted/decrypted, so normal operation is not affected after the authentication process.



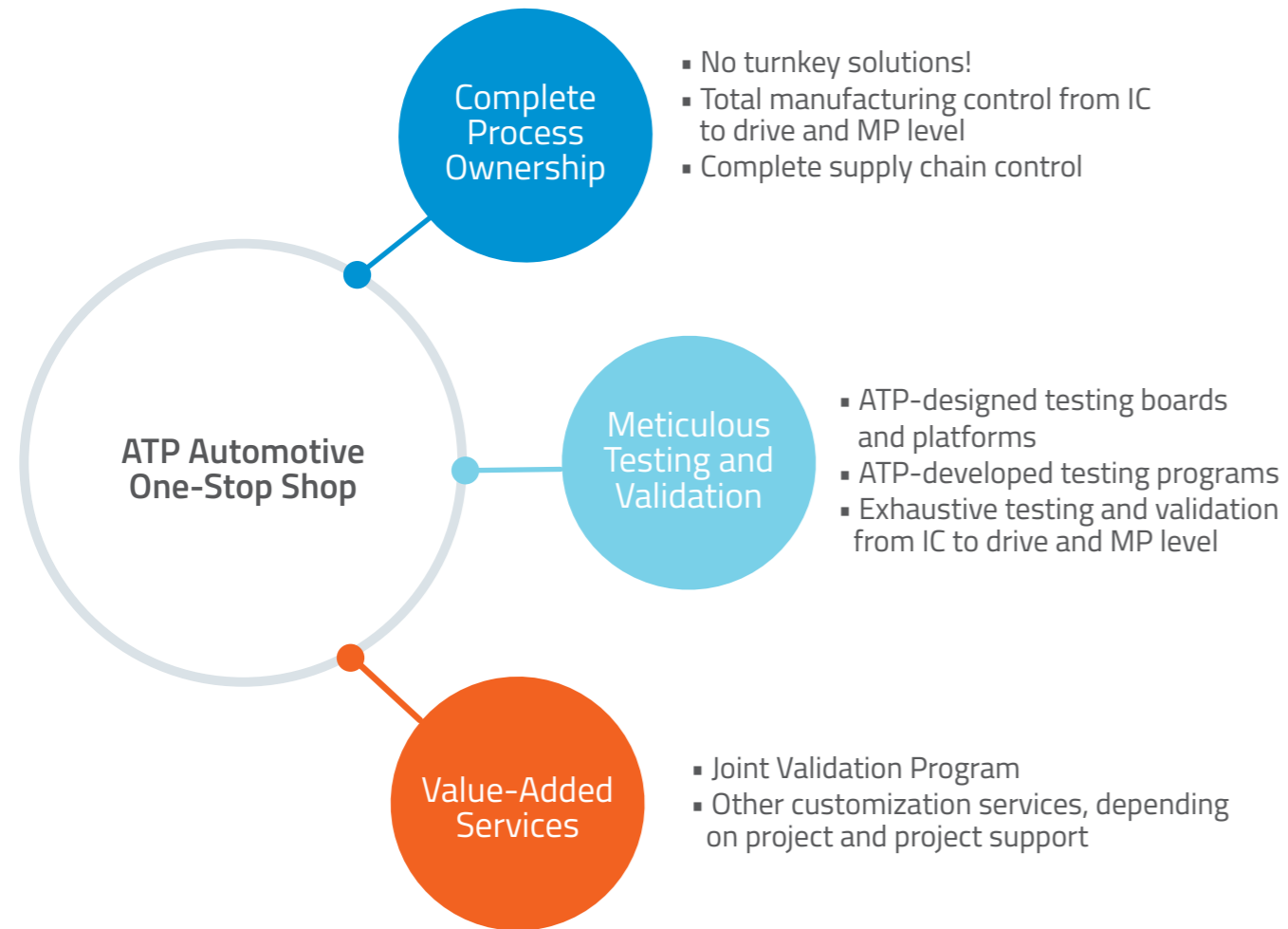


# Applications

Vehicles typically traverse areas with little or no network connectivity, move between varied climates and temperatures, and constantly generate and record vast amounts of data. Automotive storage, therefore should be able to keep data accurate, secure, and available when needed.



## Summary of ATP Capabilities and Key Differentiators

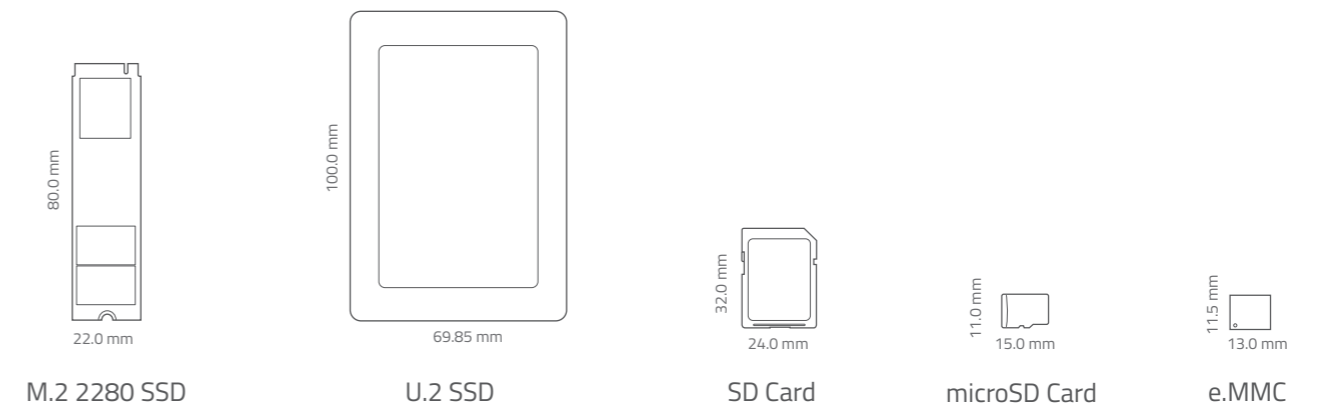


## Complete Automotive Storage Portfolio

Form Factor	Product Line Naming	Interface	Recommended Capacity	NAND	Reliability TBW (max)*	Sequential Performance MB/s (up to)		Operating Temperature (°C)
						Read	Write	
M.2 2280	N600Si / Sc	PCIe G4 x4	240 GB to 3.84 TB	3D TLC	11,400	6,450	6,000	-40 to 85 / 0 to 70
	N600Si / Sc	PCIe G3x4	120 GB to 3.84 TB	3D TLC	10,600	3,420	3,050	-40 to 85 / 0 to 70
U.2	N600Si / Sc	PCIe G4 x4	960 GB to 7.68 TB	3D TLC	22,800	3,900	3,800	-40 to 85 / 0 to 70
	N600Si	PCIe G3x4	960 GB to 7.68 TB	3D TLC	21,000	3,100	1,400	-40 to 85
SD/SDHC/SDXC	S600Sia / Sca	UHS-I	8 GB to 16 GB	MLC	19	68	23	-40 to 85 / -25 to 85
	S600Sia / Sca	UHS-I	32 GB to 64GB	3D TLC (Longevity)	116	96	35	-40 to 85 / -25 to 85
	S650Sc / Si	UHS-I	32 GB to 64GB	3D TLC (High Endurance)	291	96	29	-40 to 85 / -25 to 85
	S600Sc / Si	UHS-I	64 GB to 256 GB	3D TLC (Low Latency)	698	96	65	-25 to 85 / -40 to 85
microSD/microSDHC/microSDXC	S600Si / Sc	UHS-I	32 GB to 64GB	3D TLC (Longevity)	116	96	35	-40 to 85 / -25 to 85
	S650Si / Sc	UHS-I	32 GB to 64GB	3D TLC (High Endurance)	291	96	29	-40 to 85 / -25 to 85
	S600Si / Sc	UHS-I	32 GB to 256 GB	3D TLC (Low Latency)	698	96	65	-40 to 85 / -25 to 85
e.MMC	E700Paa	v5.1, HS400	8 GB to 64 GB	3D MLC (pSLC mode)	1,213	300	240	-40 to 105 (AEC-Q100 Grade 2)
	E600Saa	v5.1, HS400	16 GB to 128 GB	3D MLC	309	300	170	-40 to 105 (AEC-Q100 Grade 2)
	E700Pia	v5.1, HS400	8 GB to 64 GB	3D MLC (pSLC mode)	1,320	300	240	-40 to 85 (AEC-Q100 Grade 3)
	E600Sia	v5.1, HS400	16 GB to 128 GB	3D MLC	824	300	170	-40 to 85 (AEC-Q100 Grade 3)

\* Under highest Sequential write value. May vary by density, configuration and applications.

## Product Dimensions (Size) Comparison



The Global Leader in Specialized Storage and Memory Solutions

**WE BUILD WITH YOU**

Product spec and its related information are subject to change without advance notice. Please refer to [www.atpinc.com](http://www.atpinc.com) for latest information

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