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China Passenger Car Cockpit-Parking Industry Report, 2023

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Cockpit-parking vs. driving-parking, which one is the optimal solution for cockpit-driving integration?

Currently, automotive E/E architecture is evolving from the distributed to domain centralized architecture, and will eventually be integrated into a central computing platform. In this process both cockpit-parking integration and driving-parking integration are products of domain centralized E/E architecture, and the ultimate form in the future is cockpit-driving integration.

Subject to the maturity of current chip and software technologies, the cockpit-parking solution is a transitional form to cockpit-driving integration. The solution integrates the parking function into the cockpit and allows the cockpit domain controller to receive parking signals, eliminating the cost of parking controllers.

The cockpit-parking integration offers the following benefits: first, cost reduction: the implementation of APA in the cockpit domain only needs addition of ultrasonic sensor (USS) and connector, bringing little cost pressure; second, better human-computer interaction design: the integration of the parking function into the cockpit enable the cockpit domain controller to gain more parking signals and use the rendering capability of the cockpit to improve the overall user experience of HMI; third, the computing power on the cockpit can be brought into full play.

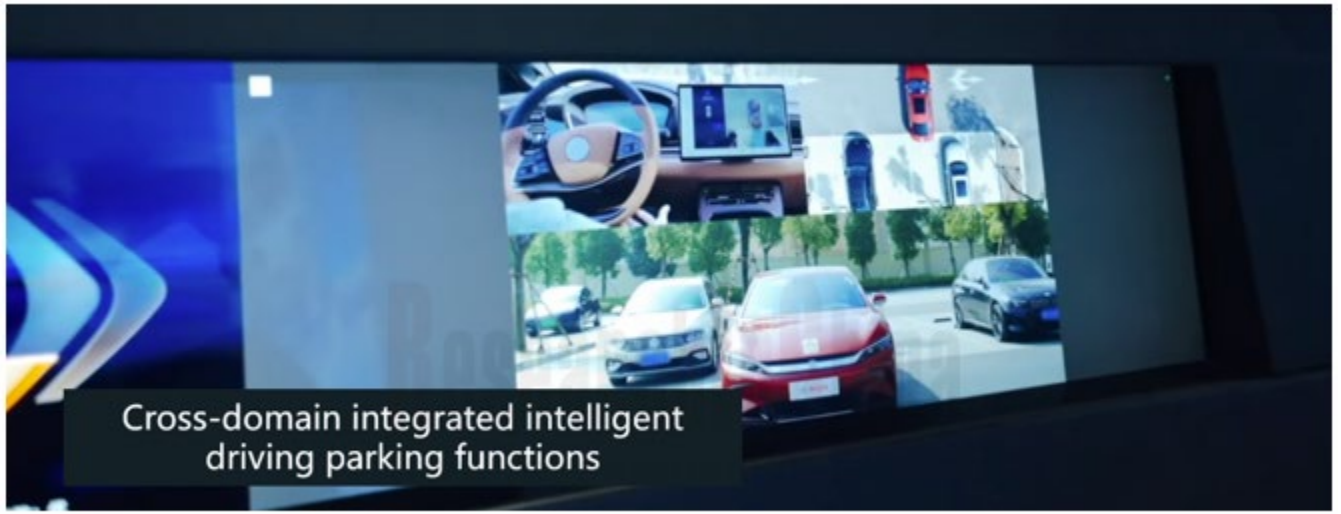
From the comparison between the cockpit chip and the intelligent driving chip, it can be seen that the cockpit domain controller main SoC more highlights CPU and GPU, favoring the realization of such functions as environment puzzle and 3D rendering.

In terms of application fields, the cockpit-parking integrated solution is fitter to integrate basic parking functions, while for advanced parking functions like HPA and AVP, the driving-parking integrated solution is more suitable due to the needs for the driving perception system, and the functional safety level requirements.
Considering cost, lowly configured vehicle models are thus more likely to use the cockpit-parking solution, while medium and highly configured models with medium- and high-compute domain controller platforms will apply the driving-parking integrated solution.

The cockpit-parking integration track is heating up, and there are already more than ten Tier 1 players

At present, more than ten Tier 1 suppliers have launched cockpit-parking integrated solutions. At the Auto Shanghai, six players introduced their solutions, including Bosch, ADAYO, Zongmu Technology and Voyager Technology. Among them, Bosch's Intelligent Cockpit Technology Interaction Experience 4.0, equipped with Qualcomm's high-compute chip, enables an infotainment domain platform providing seamless cockpit experience, and supports the cross-domain function of the "cockpit-parking integration".

Bosch Intelligent Cockpit Technology Interaction Experience 4.0



Source: Bosch

At the Auto Shanghai, Desay SV introduced DS06C, its cockpit domain control platform based on SemiDrive's latest chip X9SP. The single chip can support multiple HD displays such as LCD cluster, center console, co-pilot entertainment, HUD and intelligent rearview mirror, and are available to application scenarios like 360° surround view, parking assist, DMS, voice recognition, gesture recognition, game interaction, and HD films.

Summary of Cockpit-parking Integrated Solutions at the Auto Shanghai

Summary of Cockpit-parking Integrated Solutions at the Auto Shanghai

Supplier	Cockpit-parking Integrated Solution	Chip	AI Compute	Supported Functions	SOP
Bosch	2nd-generation intelligent cockpit domain controller	Qualcomm 8295	30 TOPS	Support 12 physical displays and 16 cameras; add ultra-HD LCD instrument panel/center console, co-pilot/air-conditioner screen, AR navigation, UHD entertainment domain camera, multi-person multi-modal interaction, dynamic gesture interaction, automated parking, etc.	-
ADAYO	Cockpit-parking integrated cockpit domain controller	SemiDrive X9HP	0.4 TOPS	Support voice control, OTA, wired/wireless smartphone integration, online applications, IVI, instrument cluster, and APA	-
Desay SV	DS06C Domain Control Platform	SemiDrive X9SP	8 TOPS	Support multiple HD displays (e.g., LCD cluster, center console, co-pilot entertainment, HUD and intelligent rearview mirror), 360° surround view, parking assist, DMS, voice recognition, gesture recognition, game interaction, HD films, etc.	SOP: 2023H2
Visteon	Cockpit-parking integrated solution	Two Siengine " Long Ying No.1"	16 TOPS	Support multiple HD 4K screens and large 3D games, and provide L0-L2 driving assistance functions including APA (automated parking assist) and RPA (remote parking assist)	-
Zongmu Technology	Single SoC-based cockpit-parking integrated solution	SemiDrive X9U	1 TOPS	Support cockpit scenarios, e.g., instrument cluster, center console, co-pilot, and HUD; and 360° surround view and parallel/vertical/diagonal automated parking scenarios.	-

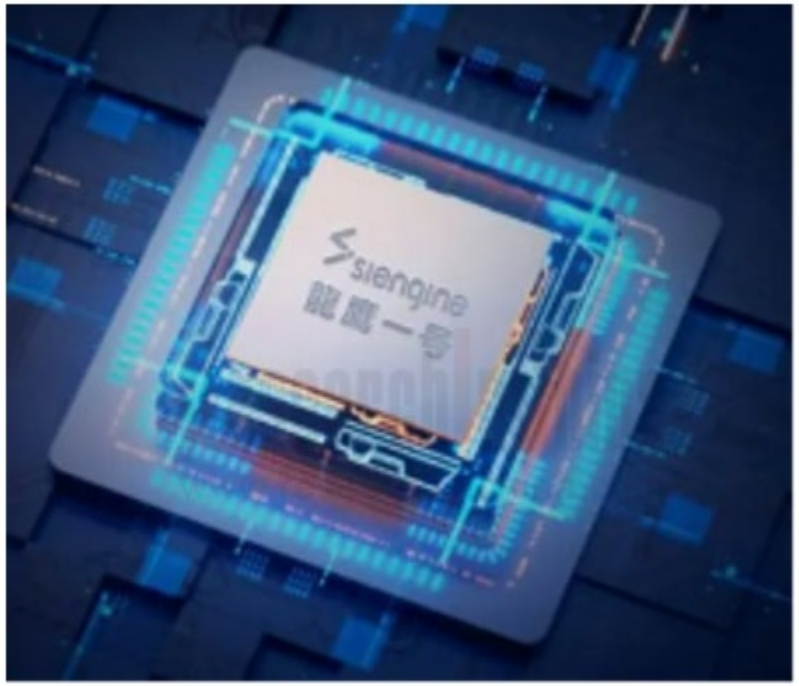
Source: ResearchInChina

High-end intelligent cockpit platform master chips show the trend of replacing foreign counterparts

In the field of high-end intelligent cockpit platform master chip, there is a trend of replacing foreign products. For example, the "Long Ying No.1", a 7nm cockpit chip that Siengine launched in 2021, has broken the monopoly of Samsung, Qualcomm and Nvidia in this field.

The chip is equipped with Arm China's self-developed "Zhouyi" NPU and Arm IP. It adopts the ultra-large multi-core heterogeneous SoC design and integrates 87-layer circuits with 8.80 billion transistors. It packs an 8-core CPU with integral computing power up to 90K, of which the large core is Cortex-A76; a 14-core GPU with up to 900G floating-point operations; integrated programmable NPU core with the INT8 computing power up to 8TOPS; high-bandwidth low-latency LPDDR5 memory channel. It features a built-in cyber security engine that complies with national cryptographic algorithms, and the ASIL-D-compliant safety island design. At present, the chip has been installed in cockpit-parking integrated solutions of Visteon and ECARX.

Siengine's 7nm cockpit chip "Long Ying No.1"



Source: Siengine

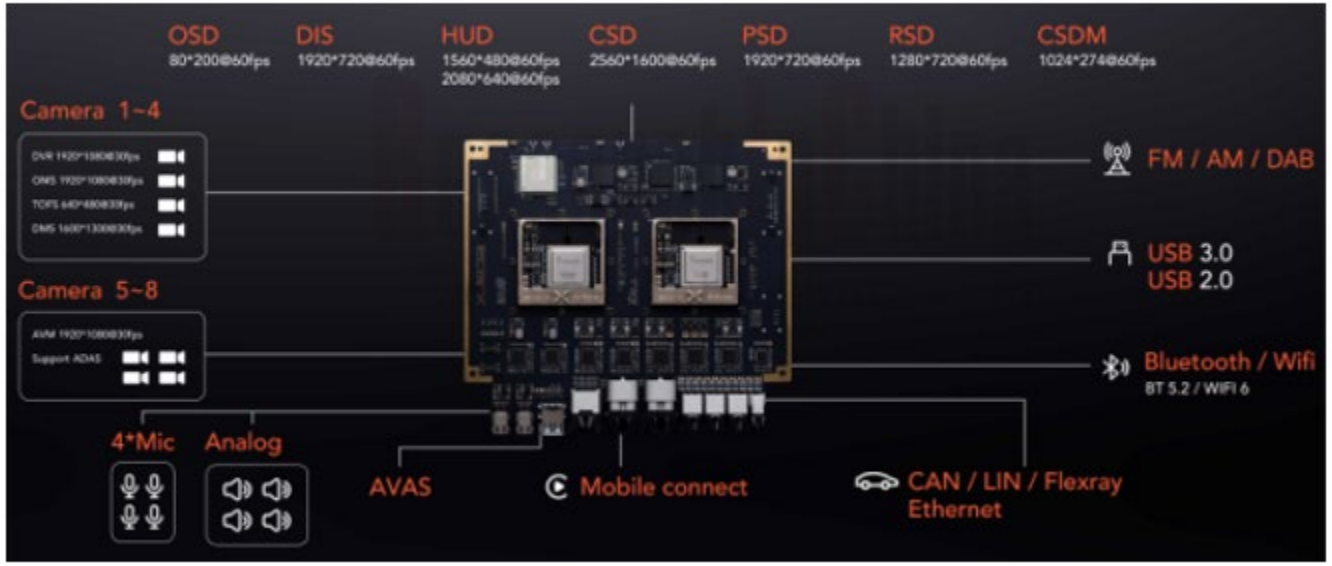
2023 is the first year of mass production of cockpit-parking integrated solutions, and software capability building facilitates an upgrade to the cockpit-driving integration

At present, the cockpit-parking integrated solution has been spawned and designated, including the cockpit-parking integrated platform jointly developed by Aptiv and ZEEKR and expected to debut in late 2023. Lynk 08 will carry ECARX's Antora 1000 Pro computing platform with total NPU compute of 16 TOPS and total GPU compute of 1800G FLOPS, and is expected to be rolled out in August 2023. Dongfeng Forthing flagship MPV and Forthing Leiting will bear Yuanfeng Technology's intelligent cockpit platform based on Qualcomm 8155. In terms of production time, 2023 can be called the first year of volume production of cockpit-parking integrated solutions.

In response to the future trend for centralized architecture, Tier 1 suppliers work hard on planning and have even launched cockpit-driving integrated products. One example is Trinity Series, a cockpit-driving integrated product Zongmu Technology announced at the Auto Shanghai. SemiDrive is exploring centralized computing and has created a driving-parking-cockpit integrated solution which uses SemiDrive's EMOS Platform to connect the centralized computing, cockpit and autonomous driving domains. The solution is based on service-oriented architecture (SOA) and introduces DDS communication.

The cockpit-driving integration requires an entire vehicle OS that manages all the tasks of the clusters for intelligent cockpit and autonomous driving. For this purpose, ECARX together with Volvo founded HaleyTek, an operating system company (with a 100-people team), and in March 2023 unveiled CloudPeak, an intelligent cockpit OS that features cross-domain system capabilities, is available to the Antora platform and also has access to 22 markets worldwide.

ECARX Cockpit-parking Integrated Computing Platform - Antora 1000 Pro



Source: ECARX

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