

China Passenger Car Driving and Parking Integrated Solution Industry Report, 2022

June 2022

Driving and parking integrated solutions stand out in high-level intelligent driving, and the mass adoption is around the corner

According to ResearchInChina, in the first four months of 2022, China's passenger car L2+ installations hit 1,772,700 units, a year-on-year upsurge of 48.6%; the installation rate jumped from 27.6% in January 2022 to 35.4% in April 2022, up 7.8 percentage points.

Against a background of the widespread use of L2+ intelligent driving technologies, increasing consumers demand for higher-level intelligent driving functions. There is an urgent need to implement high-level autonomous driving functions with low cost and high performance. Driving and parking integrated solutions thus come into being.

Driving and parking integration refers to a solution that combines the functions of the two SoCs of driving and parking into one SoC to enable high-speed driving assistance and low-speed parking assistance at the same time. This solution features low hardware cost, flexible software configurations, and efficient function iterative development.

Compared with the previous development model of separate driving and parking functions, the driving and parking integrated solution enables sensor hardware reusability, lower development cost, and availability of high-level intelligent driving functions (automatic lane change, on/off-ramp, home-AVP, valet parking, etc.) to lowand mid-end vehicle models.

China's Passenger Car L2+ Installations and Installation Rate, Jan.-Apr. 2022



Note: L2+ contains L2, L2.5 and L2.9.

Source: ResearchInChina



Driving and parking integrated solutions will sink to low- and mid-end vehicle models in quantities

In current stage, the vehicle models with driving and parking integrated solutions are led by Xpeng P7/P5, Li L9, TANK 500, IM L7, Roewe RX5, Baojun e300/Plus, Geely Xingyue L, and the NOP edition of fuel-powered vehicle JAC SOL QX. In addition, Weltmeister and Mocha plan use of the integrated solutions in their vehicles this year. BYD projects to equip its vehicles with the driving and parking integrated solution Horizon Journey 5 in 2023.

In China, local suppliers such as Freetech, Neusoft Reach, and YIHANG.AI play a dominant role in the driving and parking integrated solution market.

Freetech has rolled out high-level autonomous driving solutions based on ADAS\AD domain controllers (ADC), including three versions: ADC20 (supporting L2.9), ADC25 (urban scenarios), and ADC30 (L3-L4). Meeting the needs of L2-L4 products, they enable on/off-ramp and automatic lane change in highway scenarios, automatic follow in urban traffic jams, and automated parking in low-speed scenarios.

Freetech's High-Level Autonomous Driving Solutions Based on Driving and Parking Integrated Domain Controllers



Source: Freetech



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Freetech's latest-generation domain controller platform solution ADC20 adopts an original architecture that not only supports driving and parking integration, but also enables highway navigate on autopilot (NOA). The integrated solution provides improving functions and performance and allows more anthropomorphic system control, using embedded hardware. data optimization and OTA. It will be massproduced and delivered to passenger car customers in the second half of 2022. offering continuous function OTA updates.

In addition, the high-level autonomous driving solution based on the ADC30 domain controller platform is expected to be spawned in 2023. The solution delivers up to 500+ TOPS AI computing power. In terms of driving, it enables L3 highway pilot (HWP), traffic jam pilot (TJP) and navigate on pilot (NOP); as for parking it enables up to L4 home zone park assist (HPA) and automated valet parking (AVP) functions. The solution subject to the ISO 26262 ASIL D functional safety requirements has been designated by FAW Hongqi.

ADC30 Freetech's Driving and Parking Integrated Domain Controller ADC30



Source: Freetech



The fourth-generation autonomous driving domain controller X-Box unveiled by Neusoft Reach in 2022 is a new L2+ standard domain controller product based on SDV development model. The product driven by Horizon Journey 5 AI chip provides L2+ driving and parking functions, allows the access to 8M cameras, 4D point cloud radars and LiDARs, and covers scenarios of highways, urban expressways, some urban roads and various parking lots.

Additionally, X-Box adopts the SOA design solution where service-oriented modular software and algorithms are developed. The product supports cooperative terminal-cloud autonomous driving in a data closed-loop mechanism. It also supports newgeneration automotive E/E architectures, and enables intradomain/cross-domain service subscription and discovery, flexible software deployment, and rapid iteration of the application layer, as well as open system architecture, open multi-dimensional fullstack software capabilities, and joint development.

In security's terms, X-Box is designed in accordance with ISO 26262 functional safety and ISO 21434 information security requirements. Minimal risk strategies are implemented for typical driving and parking scenarios. Secure boot, secure storage, secure upgrade, and secure communication modules and more are deployed in connection systems at vehicle, cloud and smartphone ends.

Neusoft Reach's 4th-Generation Driving and Parking Integrated Domain Controller X-Box



Source: Neusoft Reach



YIHANG.AI's NOA Driving and Parking Integrated Solution

In May 2022, YIHANG.AI announced the launch of an NOA driving and parking integrated solution with price lower than RMB10,000. With 16TOPS computing power, the mass-produced solution enables NOA driving and parking integrated function. It boasts the following features:

- Incorporate 16 driving functions (automatic overtaking, automatic on/off-ramp, automatic road network switching, etc.) and 10 parking functions (1000m home-AVP, fusion parking, etc.);
- The abundance of 5R11V+12USS configurations and advanced fusion perception algorithms realize a centimeterlevel control accuracy;
- Even outperform an "experienced driver" on the strength of merging strategy and braking force in NOA mode;
- ◆ Cover vehicle models priced below RMB150,000.

Meanwhile, YIHANG.AI provides multiple configuration solutions such as single/dual TDA4 according to demand. Wherein, the single TDA4 solution can replace L2 ADAS functions and offer higher-level driving assistance on the premise that the cost is flat; the dual TDA4 solution has now been mass-produced for brands like Jiangling, Renault, Weltmeister and SAIC MAXUS. YIHANG.AI is about to introduce an FSD solution for all urban scenarios, and is expected to mass-produce it at the end of this year.

YIHANG.AI's NOA Driving and Parking Integrated Solution Covers Vehicle Models Priced below RMB150,000





YIHANG.AI's Intelligent Product Roadmap



ResearchinChina

As automotive E/E architecture evolves from the distributed to the centralized, large computing power chips are mounted on vehicles and some domain controller functions have been integrated, for example, the integration of vehicle control unit (VCU), body control module (BCM), and some gateway functions, and even the fusion of driving, cockpit and body domains.

Desay SV's IPU03 integrates gateway and VCU. The company plans to integrate autonomous driving and cockpit domains into its next-generation driving and parking integrated domain controller IPU04-PRO.

Driving and Parking Integrated Solutions with Cross-Domain Fusion

Driving and Parking Integrated Domain Controller Supplier	riving and Parking Driving and Parking ntegrated Domain Integrated Domain Cross-Domain ontroller Supplier Controller		SOP		
	IPU03	Gateway, VCU	Apr. 2020		
Desay SV	IPU04-PRO	To integrate cockpit domain	Planning		
Freetech	ADC20	Integrate DMS controller	2022		
EnjoyMove Technology	DCU 3.0	Integrate smart gateway	2023		
Technomous	iECU1.5	Integrate driver monitoring function	Nov. 2021		

Source: ResearchInChina



Freetech ADC20, a driving and parking integrated domain controller product, integrates driving domain controller, parking domain controller and DMS controller. ADC20 supports an 8MP front-view camera and freespace algorithms used to detect passable areas. Coupled with HD maps, high precision positioning and rear-view camera, it at most enables highway NOA and AVP functions. It has been designated by a first-tier OEM in China and is expected to be produced in quantities this year. OTA updates will be available subsequently.

Freetech's Driving and Parking Integrated Domain Controller ADC20



Source: Freetech

In the future, the evolution of automotive EEA and SOA will be accompanied by the development from centralized domain controller and cross-domain controller to vehicle central computer and intelligent zone controller, eventually realizing vehicle-cloud computing. The central domain controller therefore will pack a computing platform with higher integration level and greater computing power to support more complex sensor data fusion algorithms for higher levels of autonomous driving.



The full-stack self-development + data-driven mode accelerates the implementation of driving and parking integrated solutions.

In the phase of mass production, for the software and hardware in an autonomous driving system are highly coupled, the full-stack self-development allows better analysis of technical problems in the R&D process and meets the customization needs of automakers. In addition, collecting an enormous amount of operational data of real scenarios facilitates iteration of autonomous driving data and technology and thus builds a closed value loop. As a result, driving and parking integrated solution providers race to apply the full-stack self-development + data-driven approach to accelerate the implementation of their solutions.

Deployments of Driving and Parking Integrated Solution Suppliers in Full-Stack Self-Development + Data-Driven Mode

Supplier	Full-Stack Self-Development Deployment Data-Driven Deployment	Vehicle Models with Driving and Parking Integrated Solution	Autonomous Driving Development Route		
			Progressive	Leapfrog	
Freetech	The company boasts technical competence in end-to-end intelligent driving from perception, prediction and planning to control execution, as well as data iteration capabilities. Its R&D centers and intelligent manufacturing and testing centers lie in Hangzhou, Tongxiang and Shanghai.	The company has self-developed and built an object storage center and a data center for distributed computing power clusters, in a bid for efficient iteration of data-driven algorithms based on scenarios, higher algorithm integrity of each functional module, and robustness of system algorithms.	Geely, Lynk & Co	\checkmark	
Neusoft Reach	Since 2004, the company has begun to independently develop visual perception and fusion algorithms. Its self-development has extended to multiple algorithms including prediction and screening, planning and control, mapping and positioning, and HD map fusion. Its perception platform covers various types of sensors such as visual sensor, radar, and laser. The self-developed SOA-based autonomous driving software architecture features flexible algorithm deployment, service discovery and subscription, vehicle SOA communication and so forth, and has functional safety and cybersecurity development capabilities and qualifications from process to product.	The company implements a data- driven vehicle-cloud integrated solution that enables functions, e.g., value data terminal-cloud intercommunication, algorithm self-evolution, cooperative application of intelligent driving cloud platforms, vehicle-cloud SOA services and unified scheduling.	hin ha.co		
YIHANG.AI	The company builds perception, decision, planning and control, and software and hardware development capabilities, and constructs a R&D center and a dedicated autonomous driving camera factory in Suzhou	As of May 2022, YIHANG.AI has mass-produced and taken 100,000 vehicles on roads, and accumulated more than 1 billion kilometers of driving data.	SAIC MAXUS, Weltmeister, Volkswagen, etc.	\checkmark	
iMotion	Connect full-stack capabilities from R&D of core algorithms, software and hardware to system integration, testing and verification.	Self-developed data closed loop and cloud platform network	Chery, Great Wall Motor, etc.	\checkmark	



The full-stack self-development + data-driven mode accelerates the implementation of driving and parking integrated solutions.

Maxieye	Self-developed perception + full-stack The company develops hook system control algorithms to hook back typical and valuable data for simulation tests and product function- iterations, and eventually synchronizes them to products over the air.	\checkmark	
Haomo.AI	Self-developed full-stack software Develop the MANA data TANK 500, Haval, algorithms intelligence system. Mocha, etc.	\checkmark	
Hong Jing Drive	Full-stack development of driving and Independently develop the parking integrated domain controller Hyperion Data Infrastructure data 2021 Li ONE products from hardware system to cloud platform.	\checkmark	
Nullmax	Self-developed middleware MaxOS Create the One Cycle data closed loop.	\checkmark	
Baidu	The company has built a closed loop Baidu ANP implements a closed- covering underlying computing power, loop model based on the same Weltmeister W6, software and hardware development, etc. Baidu Robotaxi.		\checkmark
HoloMatic	The company has made a complete layout Cooperate with GAC to empower from vehicle-by-wire and multi-sensor iteration and upgrade of products technologies to upper-level autonomous and technology through GAC's driving core algorithm modules. data access.	\checkmark	
AutoBrain	The company has full-stack autonomous Build a data closed-loop cloud driving core technologies, including platform. perception, decision, control, planning, prediction, map-based positioning, domain controller, cloud operating system, cloud computing platform, etc.	\checkmark	

Source: ResearchInChina



For example, iMotion's IDC, a self-developed driving and parking integrated domain controller, can provide L2+ intelligent driving experience. As concerns hardware design, it complies with ISO 26262 ASIL-B(D) functional safety requirements and allows continuous iteration and upgrade of scalable platforms with great computing power. As for software architecture, it offers SOA-oriented software architecture, presets basic software, standard middleware and various development tools, and deploys layered software architecture for efficient decoupling of software and hardware.

A set of data closed-loop system released by iMotion can collect a mass of data and haul them back to the cloud platform, improve function algorithms, realize constant product iteration, and ensure the safety of NOA.

iMotion's self-developed data closed-loop and cloud platform network adopt the native cloud architecture design approach which is scalable and enables interconnection with the national central cloud platform, so that the data of vehicles equipped with iMotion's solutions can be traced and monitored.

The solution is scheduled to be delivered in the third quarter of 2022, and has been designated by Chery and Eezi Tech among others for their production vehicle models.

iMotion's Big Data Closed-Loop System Drives All-Scenario Implementation





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