STUDY GOAL AND OBJECTIVES
This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

REPORT OBJECTIVES
◆ To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
◆ To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
◆ To complement the organizations’ internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
◆ To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
◆ To help company to succeed in a competitive market, and

METHODOLOGY
Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications. Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

INFORMATION SOURCES
The primary information sources include Company Reports, and National Bureau of Statistics of China etc.
Abstract

Cockpit SoC Supports More Displays, Beefs up AI, and Improves Functional Safety

Intelligent vehicle E/E architecture ushers in a period of intra-domain integration to trans-domain convergence and to central computer from the distributed one.

Source: Visteon
For cockpit domain, the intra-domain integration calls for powerful cockpit SoC which caters to the current cockpits’ needs to support more displays, enable more AI features and fuse with ADAS, have safer functionality, among others.

**Support for More Displays**
Against the trend of one core enabling multiple screens, it remains a decisive factor to being chosen by the user that how many displays a cockpit SoC can support. The third-generation Qualcomm Snapdragon cockpit SoC based on versatile CPU and GPU is an enabler for as many as six to eight displays.

Samsung Exynos Auto V9 processor is in favor of up to six in-vehicle screens and twelve cameras synchronously, which has been already found in Audi smart cockpits.

Designed for smart cockpit, SemiDrive X9 series unveiled by Nanjing Semidrive Technology Co., Ltd in 2020 support eight FHD displays and twelve cameras.

At CES2020, NXP showcased its multi-display solution supporting as many as 11 screens that are enabled by dual i.MX 8QuadMax.

**Support for AI**
Undoubtedly, NVIDIA stays ahead of its peers as concerns support for AI. NVIDIA rolled out CUDA in 2007 and had the idea of fostering an ecosystem via CUDA then, which is helpful to both hardware sales and its superiority in software as well as to user loyalty. Despite its cockpit SoC gets a clear edge in deep learning, NVIDIA enjoys not big a share in the cockpit processor market because of its automotive business focus on autonomous driving chips.

Through acquisition of Freescale, NXP is in possession of a machine learning expert team, i.e., CogniVue, an image recognition IP development team (acquired by Freescale in September 2015) based in Ottawa, Canada. NXP’s eIQ automated deep learning (DL) toolkit enables the developer to introduce DL algorithms to application programs, and meets the strict automotive standards.
Machine Learning Functions on i.MX 8 – eIQ SDK

ML Training Frameworks
- TensorFlow
- Caffe
- mxnet
- theano
- K
- CNTK
- torch

ML Training & Management

ML Inference
- OpenCV
- OpenVX
- HAL-Cortex-A
- HAL-Cortex-M
- HAL-GPU
- HAL-3rd Party IP
- ARM Compute Lib
- CMSIS-NN
- OpenCL/OpenVX
- NN Accel Lib

Inference Engines

ML Platform
- Cortex-M
- Cortex-A
- GPU
- DSP
- ML accelerators

ML Inference
- Facial Recognition
- Speech Recognition
- Anomaly Detection
- Object Detection

Sample ML Apps

NXPeIQ SDK

Cloud

Edge

Copyright 2012 ResearchInChina
Apart from its efforts in nurturing AI capabilities, NXP has been paying attention to AI defects. Deep learning employs probabilities to recognize objects and the results are inexplicable, which is disastrous to cars with a high demanding on safety. NXP has been studying a method called “explicable AI (xAI)” that extends the machine learning reasoning and probability computing capabilities through addition of more rational and humanlike decision-making methods and extra deterministic dimensions, and that combines all merits of AI with reasoning mechanism to imitate human reaction.

**Fusion with ADAS for Higher Functional Safety**

Some ADAS features like surround view parking, pedestrian and obstacle recognition tend to be integrated in the cockpit domain, needing the cockpit SoC to consider ADAS related capabilities.

R-Car H3, for example, gets largely utilized in cockpit and can also cope with complex functions such as obstacle detection, driver status recognition, danger prediction and avoidance.

More and more smart cockpits are added with HUD, especially the latest AR-HUD integrated with ADAS, delivering capabilities like following distance warning, line press warning, traffic lights monitoring, ahead-of-time lane change, pedestrian warning, road mark display, lane departure warning, obstacles ahead, and driver status monitoring.

There will be higher requirements on functional safety once cockpit SoC is added with some ADAS features, which will, beyond doubt, pose greater challenge to the cockpit SoC suppliers.
Table of contents

1 Cockpit SoC and Its Application
1.1 Overview of Cockpit SoC
1.2 Supply Relationship of Low-to-mid-end/High-end Intelligent Cockpit SoC
1.3 Low-to-mid-end Cockpit Chip is an Obscure Corner but a Mainstay of the Market
1.4 Comparison (I) between Main Cockpit SoCs
1.5 Comparison (II) between Main Cockpit SoCs
1.6 Ranking of Cockpit Processors by CPU Compute
1.7 Ranking of Cockpit Processors by GPU Compute
1.8 Main Overseas Cockpit Platforms and the Processors Used
1.9 Automotive Infotainment Supply Chain

2 NXP and Its Cockpit SoC
2.1 NXP Cockpit Processor
2.2 Main Clients for NXP i.MX Processor
2.3 Monopoly of i.MX6 Once in the Low- and Medium-end Markets
2.4 Key Parameters of i.MX8 Series
2.5 Typical Application Schemes of NXP i.MX Cockpit Chips
2.6 Latest Advances in NXP Cockpit Chips
2.7 NXP i.MX Chip Shipments
2.8 NXP i.MX Partner Ecosystem
2.9 Operating Systems NXP i.MX Supports
2.10 AI Algorithms NXP i.MX Supports
2.11 NXP i.MX Products and Future Cockpit Systems

3 Texas Instruments and Its Cockpit SoC
3.1 TI Cockpit Chip
3.2 TI has Won a Place in Mid-end Cockpit Processor Market
3.3 Parameters of Jacinto 6 Family
3.4 Jacinto Cockpit Solutions and Partners

4 Renesas and Its Cockpit SoC
4.1 Profile
4.2 Chip Business Layout
4.3 R-CAR Family for Cockpit Processor
4.4 Cockpit Chip Product Lines
4.5 Comparison of Performance between Cockpit SoCs
4.6 Latest News about Cockpit Chip
4.7 Application in MBUX
4.8 Cooperation with Volkswagen

5 Qualcomm and Its Cockpit SoC
5.1 First- and Second-generation Cockpit SoCs
5.2 Third-generation Cockpit SoC
5.3 AI Features 820A Supports
5.4 Qualcomm 855A
5.5 Qualcomm SA8155p
5.6 Mass-produced Vehicles with Qualcomm 820am
5.7 OEMs Using Qualcomm Cockpit Chips
6 Intel and Its Cockpit SoC
6.1 Intel A3900 Processor
6.2 Main Vehicle Models with Intel A3900 Family

7 Samsung and Its Cockpit SoC
7.1 Cockpit Processors
7.2 Automotive SoC Roadmap
7.3 Application Cases of Automotive SoC

8 NVIDIA and Its Cockpit SoC
8.1 NVIDIA Parker
8.2 NVIDIA Chips and Mercedes-Benz/Audi
8.3 Mercedes-Benz MBUX and Nvidia Chips

9 Telechips and Its Cockpit SoC
9.1 Featured Products: Low-end Chips and LCD Instruments
9.2 Application Models in China Market
9.3 Cockpit Chip: Dolphin Family
9.4 Cockpit Application Schemes

10 MediaTek and Its Cockpit SoC
10.1 Cockpit Chips
10.2 Rapid Progress in MT2712
10.3 MT2712 and Lightweight Virtual Machines

11 SemiDrive and Its Cockpit SoC
11.1 Block Diagram of X9 Application
11.2 X9 Family
11.3 Four Core Technologies of X9

12 Development Trends for Cockpit SoC and Architecture
12.1 Development Trends for Intelligent Cockpit Industry
12.2 BMW Cockpit Electronics Architecture
12.3 BMW TCB, Gateway and Head Unit Architecture
12.4 BMW’s Latest Head Unit: MGU
12.5 Mercedes-Benz NTG6 Features a Dual Architecture
12.6 Audi MIB Features a Dual System Architecture
12.7 Mid-end Chips Support Single-display Linux+Android Dual System
12.8 Single Hardware System for Land Rover
12.9 820am System for Land Rover Defender
12.10 Summary
You can place your order in the following alternative ways:

1. Order online at [www.researchinchina.com](http://www.researchinchina.com)
2. Fax order sheet to us at fax number: +86 10 82601570
3. Email your order to: [report@researchinchina.com](mailto:report@researchinchina.com)
4. Phone us at +86 10 82600828

| Party A: | 
|---|---|
| Name: | 
| Address: | 
| Contact Person: | Tel |
| E-mail: | Fax |

| Party B: | 
|---|---|
| Name: Beijing Waterwood Technologies Co., Ltd (ResearchInChina) | 
| Address: Room 2-626, 6th Floor, No.1, Shanyuan Street, Haidian District, Beijing, 100080 | 
| Contact Person: Liao Yan | Phone: 86-10-82600828 |
| E-mail: report@researchinchina.com | Fax: 86-10-82601570 |
| Bank details: Beneficial Name: Beijing Waterwood Technologies Co., Ltd | 
| Bank Name: Bank of Communications, Beijing Branch | 
| Bank Address: NO.1 jinxiyuan shijicheng, Landianchang, Haidian District, Beijing | 
| Bank Account No #: 110060668012015061217 | 
| Routing No #: 332906 | 
| Bank SWIFT Code: COMMCNSHBJG | 

<table>
<thead>
<tr>
<th>Title</th>
<th>Format</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDF (Single user license)</td>
<td>2,800 USD</td>
<td></td>
</tr>
<tr>
<td>Hard copy</td>
<td>3,000 USD</td>
<td></td>
</tr>
<tr>
<td>PDF (Enterprisewide license)</td>
<td>4,200 USD</td>
<td></td>
</tr>
</tbody>
</table>

※ Reports will be dispatched immediately once full payment has been received.
Payment may be made by wire transfer or credit card via PayPal.