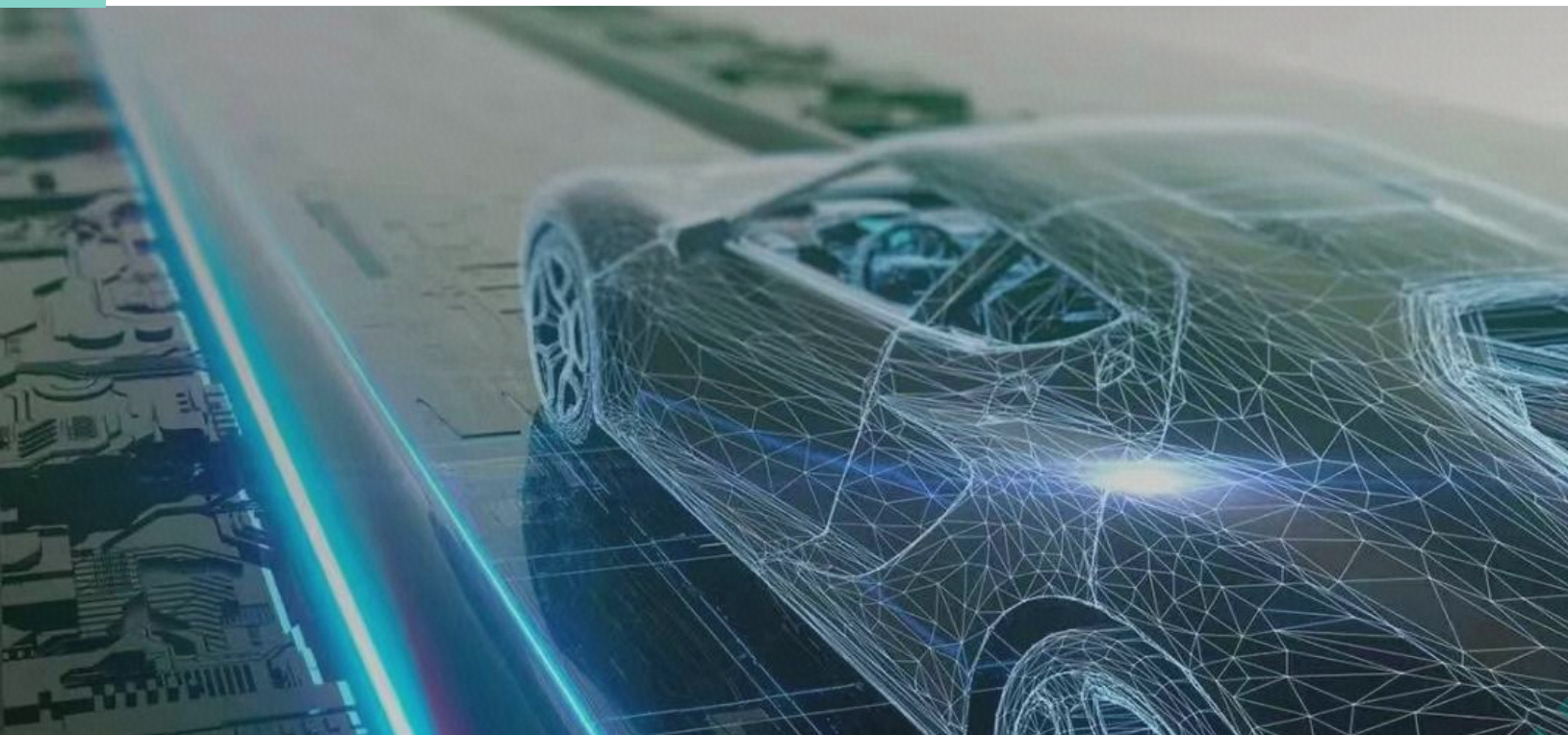


# 【CyberCobra】 series

## Desktop data injection system **CB2**



Version 1.0



[ CyberCobra ] series desktop data injection system CB2, is a set of data injection system solutions independently developed by SZ Sensing TECH CO.,LTD (hereinafter referred to as SENSING), with high integration, versatility, etc., can be widely used in hardware-in-the-loop HIL simulation system, digital mining injection system, digital twin scenario injection and other scenarios.

The hardware part of CB2 is mainly composed of compact I9 edge computing system, NVIDIA GPU graphics card, video injection card, and vehicle Ethernet CAN injection card. The system has powerful processing capabilities to simulate GMSL video signals, Vehicle Ethernet signals, CAN bus signals, and adopts high-precision time synchronization technology to ensure that multi-channel data can be output synchronously.

CB2 can realize long time operation and support desktop level configuration. With high performance and strong stability, the system can help industry customers easily reproduce various specific scenes and environments, and improve the efficiency of the research and development.

# Product Advantages

As an efficient solution, data back injection technology is becoming increasingly important for algorithm development and validation in intelligent driving research and development. CB2, launched by SENSING is an efficient solution applied to driving algorithm validation and optimization, which can provide customers with powerful tool support to achieve data closure.

## Self-developed design

Optimization of algorithm validation for autonomous driving and other industries, providing efficient solutions that integrate software and hardware

## High degree of integration

Can realize up to 8-channel GMSL video signal or 16-channel GMSL video signal injection; at the same time support 12-channel CAN/CANFD and 6-channel Vehicle Ethernet data injection

## Highly versatile

Support many common GMSL serializer models;  
Corresponding deserializer support many common models

## Scalability & Flexibility

Support multi-card parallelism and strong scalability; miniaturized design, can be applied flexibly in different places

## Full-stack service

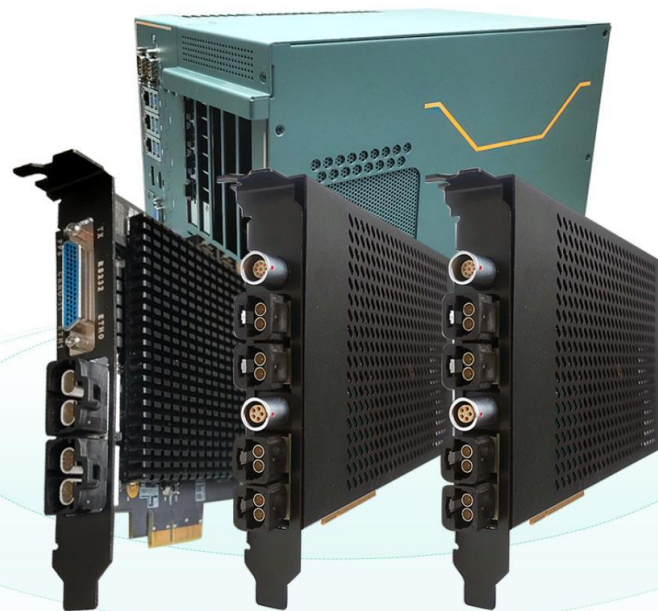
Rapid response to customers' individual needs, providing experienced adaptation support team

# 6 highlights

As a modular system equipment, CB2 can work together with corresponding boards according to customer needs. It can not only achieve millisecond level synchronization accuracy data injection, but also meet the hardware interface requirements in various specific scenarios during the injection process, providing comprehensive and accurate data support and solid technical support for R&D personnel.

## 16 Channel Video Output

Supports 16 channels 3840 × 2160@30fps GMSL video data injection



## All Data Synchronous Output

Supports high-precision synchronization of PTP/gPTP, The accuracy of the entire system is less than 1ms

## 6 Channel Vehicle Ethernet Output

Supports up to 6 100/1000BASE-T1 data injection

## Sensor Fault Simulation Injection

Support fault injection testing, Improve security testing coverage

## 12 Channel CANFD Output

Supports up to 12 channels CAN /CANFD data injection

## Camera Function Safety Simulation Injection

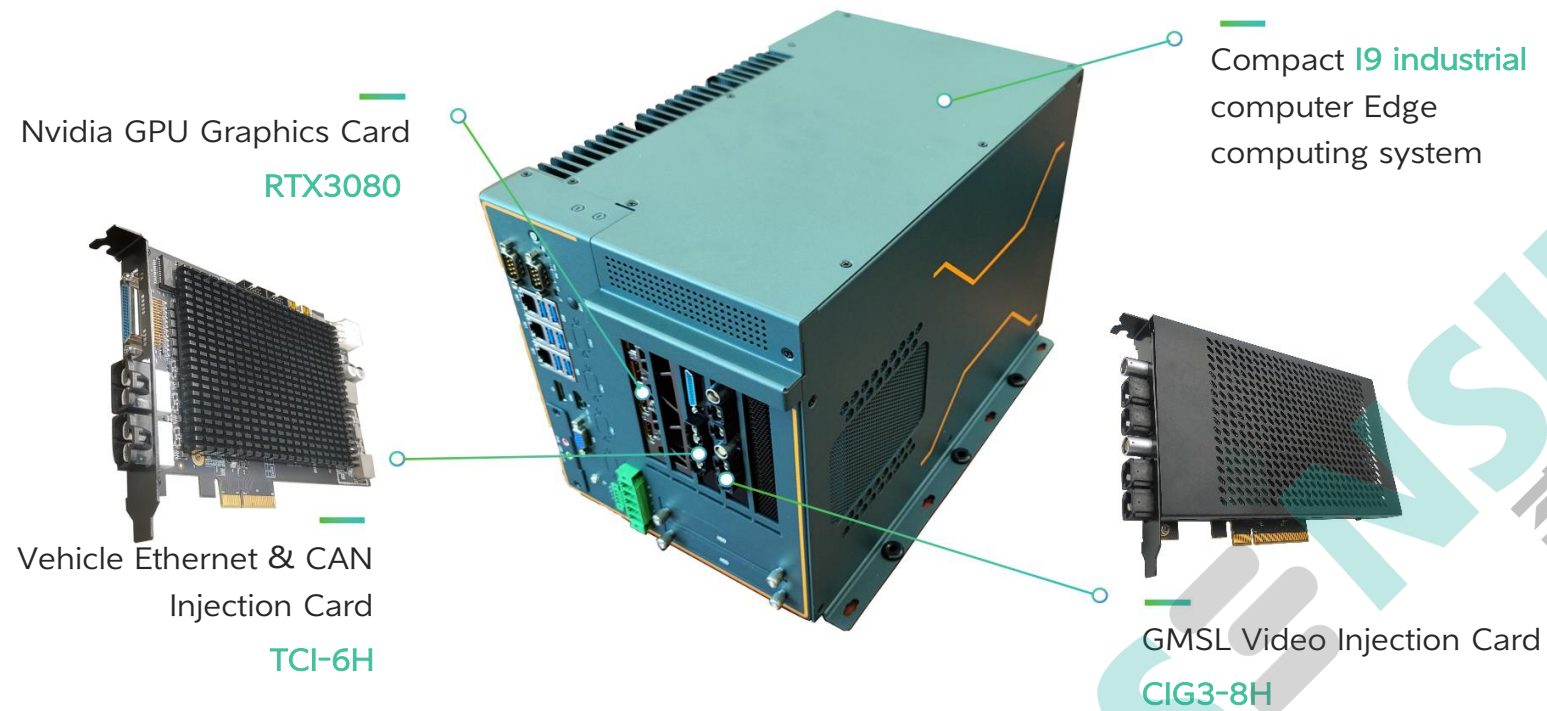
Supports camera ISO26262 Functional safety content injection

## CB2 Key parameters

CPU	Intel I9-13900
Memory	32GB DDR5
Hard disk	512GB SSD System disk, 2TB M.2 Data disk
Graphics card	Default Nvidia RTX3080, support optional
IPC I/O Interface	3*RJ45 Gig-LAN; 4*USB3.2(gen2.0 10Gbps, Type A); 2*USB3.2(gen1.0 5Gbps, Type A)
Serializer	MAX9295A/MAX96717F/MAX96717...
Deserializer Support	MAX9296A/MAX96712/MAX96716...
Video Out Support	up to 16 video output
Video Resolution	1-8Mega pixel
Video Format	8 bit (YUV422), 10/12/14 bit (RAW)
External Trigger	Support external trigger of domain controllers
Vehicle Ethernet	1000BASE-T1*4, 100BASE-T1*2
CAN	CAN/CANFD*12
OTA	Support PC firmware upgrade
OS	Linux 64-bit Ubuntu 20.04
Power consumption	Less than 80W (excluding graphics card)
Operating Temperature	-20°C to 60°C
Storage Temperature	-40°C to 85°C
Storage Humidity	10~95%@40°C non-condensing
External dimensions	(L*W*H): 245*376.8*254.8 mm

# System Hardware

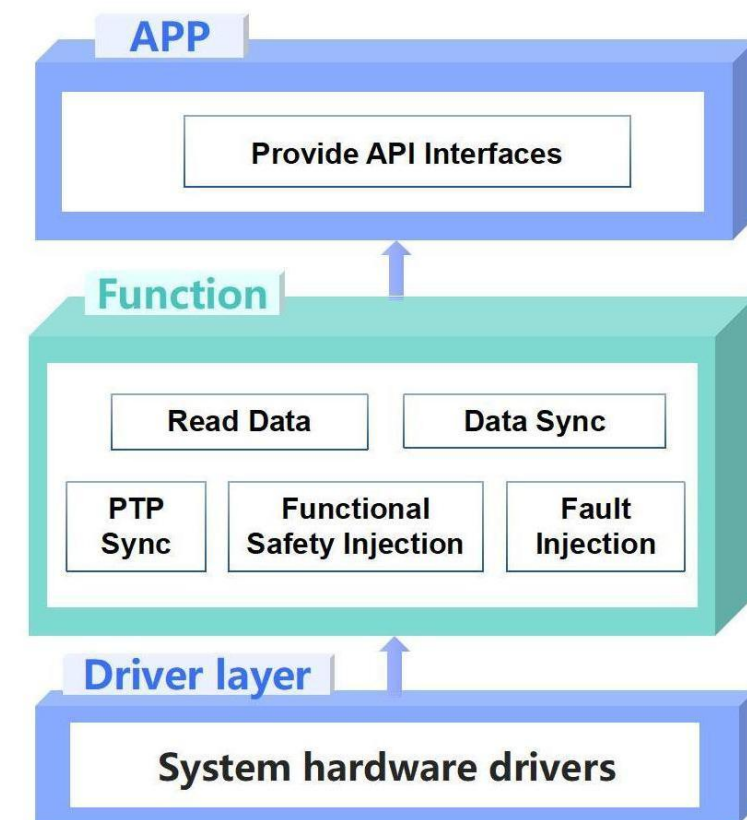
The hardware equipment of CB2 consists of a compact I9 edge computing system, NVIDIA GPU Graphics Card, Video Injection Card, and Vehicle Ethernet & CAN Injection Card.



Appearance of reinjection system CB2

# System Software Functions

CB2 has powerful software functions that can provide customers with rapid realization of the injection data configuration, injection process control, injection status monitoring and other functions, providing comprehensive data support and evaluation basis for the functional verification of the system under test.



Software architecture diagram

## Self-developed back injection card series

**Vehicle Ethernet & CAN Injection Card TCI-6H**  
 Adopting PCIe Gen3 technology, it can realize 4-channel Gigabit T1, 2-channel 100Mbps Vehicle Ethernet, 12-channel CANFD, 1-channel RS232 data injection, and adopts high-precision multi-channel time synchronization technology to ensure multi-channel data can be output synchronously.

**GMSL Video Injection Card CIG3-8H** is a high-speed image product based on FPGA, which adopts PCIe Gen3 technology, can realize 8-channel video/image injection, supports up to 8 megapixels of 30fps, and adopts high-precision multi-channel time synchronization technology to ensure that multi-channel data can be output synchronously.

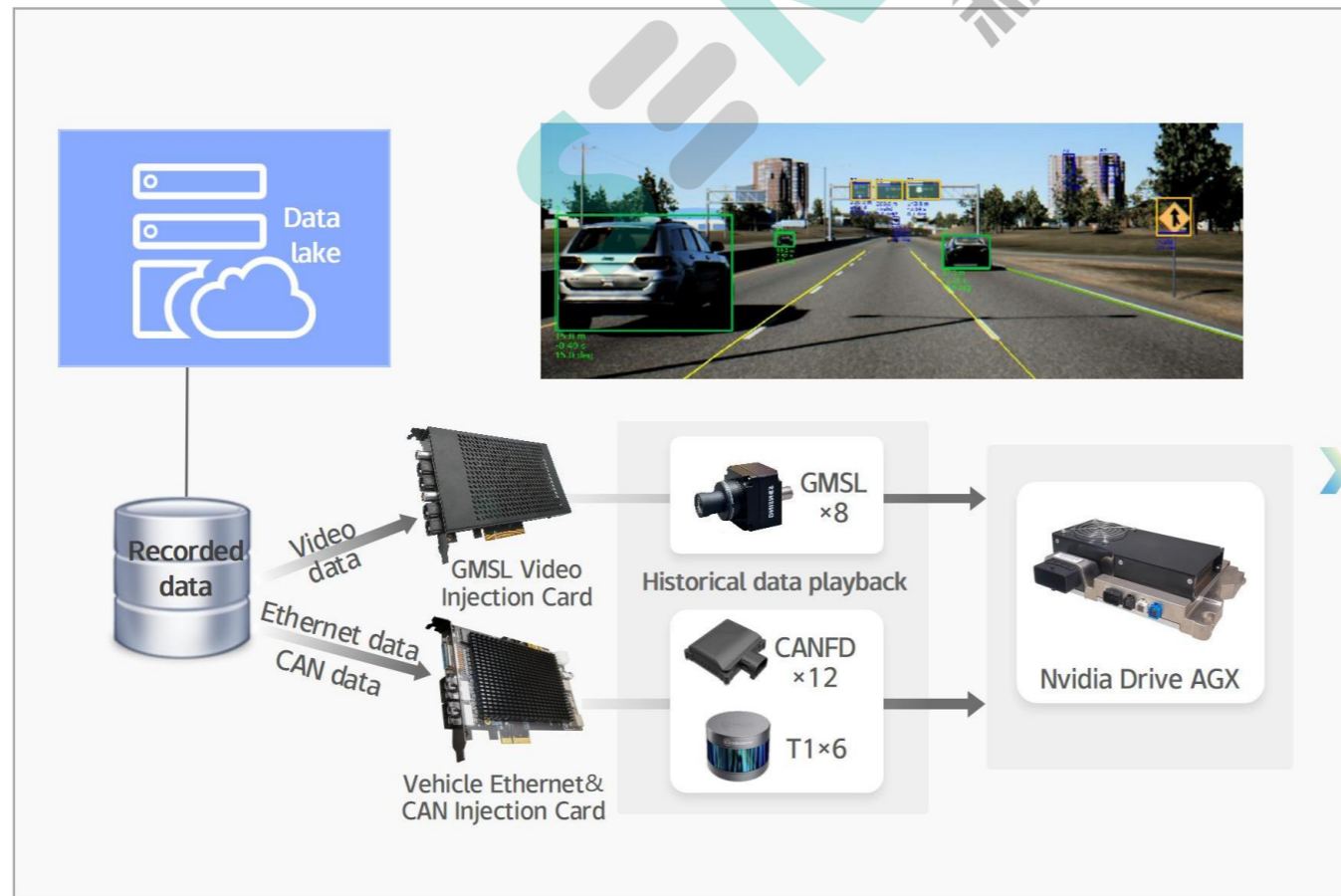
# Typical application 1 Intelligent driving data injection

After a vehicle equipped with Advanced Driver Assistance System (ADAS) or Autonomous Driving (AD) functionality has captured video data, Lidar data, CAN data and store to hard disk, it needs to be optimized for algorithm validation, which requires the CB2 to inject the stored data back into the ADAS/AD domain controller. For the verification of the ADAS/AD function, accurate playback based on the timestamp given during the recording process is key.

CB2 can parse the video data, Lidar data, and CAN data synchronously through the timestamps, and transmit them to the Video Injection Card and the Vehicle Ethernet & CAN Injection Card through the PCIe interface. The Video Injection Card outputs 8-channel video to the ADAS/AD domain controller, and the Vehicle Ethernet & CAN Injection Card outputs 12-channel CANFD and 6-channel network data to the ADAS/AD domain controller.



CB2



## Service Advantages

- Customized solutions are available to accommodate various types of serial deserializers.
- Multiple camera resolutions can be customized to meet the scene requirements for playback or simulation.
- Supports synchronized triggering of video image frames via domain-controlled trigger signals.
- Help customers easily improve the efficiency of sensing algorithm development and testing.
- Can also support Horizon, Black Sesame, Qualcomm and other domain controllers.

## Customer



Algorithm company



Domain control vendor



HIL system integrator

# Typical application 2

## Unmanned vehicle data injection

After the unmanned vehicle collects video data, Lidar data, CAN data and store to hard disk, it needs to optimize the algorithm validation, which requires the CB2 to inject the stored data back to the ADAS/AD domain controller.

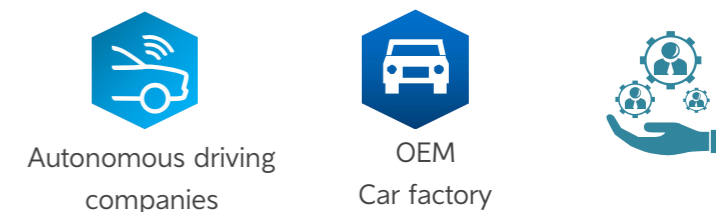
CB2 can parse out the video data,Lidar data and CAN data synchronously through timestamps, and transmit them to the Video Injection Card and the Vehicle Ethernet & CAN Injection Card through the PCIe interface. The Video Injection Card outputs 8-channel video to the ADAS/AD domain controller, and the Vehicle Ethernet & CAN Injection Card outputs 12-channel CANFD and 6-channel network data to the ADAS/AD domain controller.



### Service Advantages

- Multi-camera resolution can be customized to meet the needs of the scene of injection or simulation.
- Support synchronized triggering of video image frames through domain-controlled trigger signals.
- Provide various serial deserializer solutions according to the needs of unmanned vehicle customers.
- Help unmanned vehicle customers to improve the efficiency of sensing algorithm development and testing.
- Can also support Horizon, Black Sesame, Qualcomm and other domain controllers.

### customer



CB2

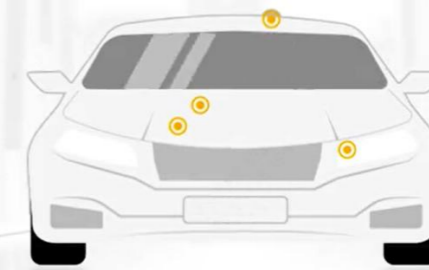
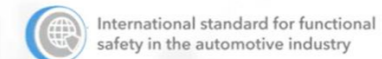


# Typical application 3

## Sensor malfunction injection

## Functional safety injection

CB2 supports sensor malfunction injection/functional safety simulation, in the process of injecting back the relevant sensor failure simulation, such as simulating the phenomenon of camera losing frames, repeating frames, green screen, blue screen, etc.; in terms of functional safety simulation, CB2 supports the simulation of the camera's functional safety ISO26262 project injection.



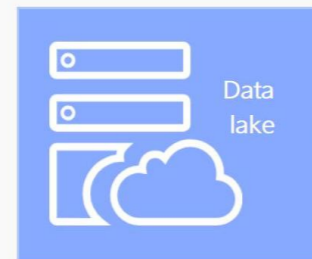
CB2



- Image blur fault injection  
CB2 also supports injecting fault phenomena such as frame loss, duplicate frames, green and blue screens into simulated cameras.



- Functional safety simulation  
CB2 supports camera functionality and safety. Simulation injection of ISO26262 project.



Historical data playback

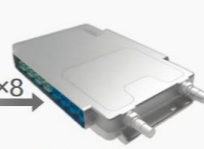


Video data



GMSL Video Injection Card

GMSLx8



Nvidia Drive AGX

### Service Advantages

- Supports various types of fault injection tests to improve the coverage of security tests
- Provide customers with a wealth of test scenarios for failure simulation training in the laboratory environment Support
- the camera's functional safety ISO26262 project simulation injection
- Help customers to minimize the development cycle and reduce costs

### Customers



Domain control vendor



Autonomous driving companies





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