TOSUN

GW2208+ Product Manual

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tosunai.com

Copyright Information

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In an effort to provide users with the best possible service, Shanghai TOSUN Technology Ltd. (hereinafter referred to as "TOSUN Technology") has made every attempt to present accurate and detailed product information as possible in this manual. However, due to the time-sensitive nature of the content, TOSUN Technology cannot guarantee the timeliness and applicability of the information at all times.

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What Are the Advantages of GW2208+?

- **Multi-Bus Technology**

The GW2208+ supports simultaneous communication over CAN/CAN FD and LIN buses. In complex in-vehicle networks, a single GW2208+ device enables communication with multiple ECUs across different bus technologies.

- **Gateway Functionality**

The GW2208+ supports not only CAN-to-CAN FD conversion but also CAN-to-LIN and LIN-to-LIN routing. Conversion rules can be freely configured and persistently stored. (*Offline gateway functionality to be supported in future updates.)

- **Multi-Channel Support**

Equipped with 8 CAN/CAN FD channels, 2 LIN channels, 2 digital outputs, and 4 digital inputs, the GW2208+ meets the needs of multi-channel communication across a variety of application scenarios.

- **High Performance**

Built with high-performance hardware, GW2208+ ensures reliable data processing even under demanding network loads. It connects to the PC via Ethernet, ensuring high-speed and stable data exchange with the host system.

- **Cost Efficiency**

By integrating multiple bus technologies, GW2208+ reduces the need for separate communication modules, effectively lowering hardware costs and simplifying wiring complexity.

- **Seamless Software Integration**

The GW2208+ is fully integrated with the TSMaster software, enabling streamlined monitoring, analysis, and simulation of multi-bus communication. It also supports UDS diagnostics, ECU flashing, and CCP/XCP calibration.

- **Message Filtering**

The GW2208+ supports ID-based message filtering and conversion to reduce CAN bus load and eliminate unwanted traffic.

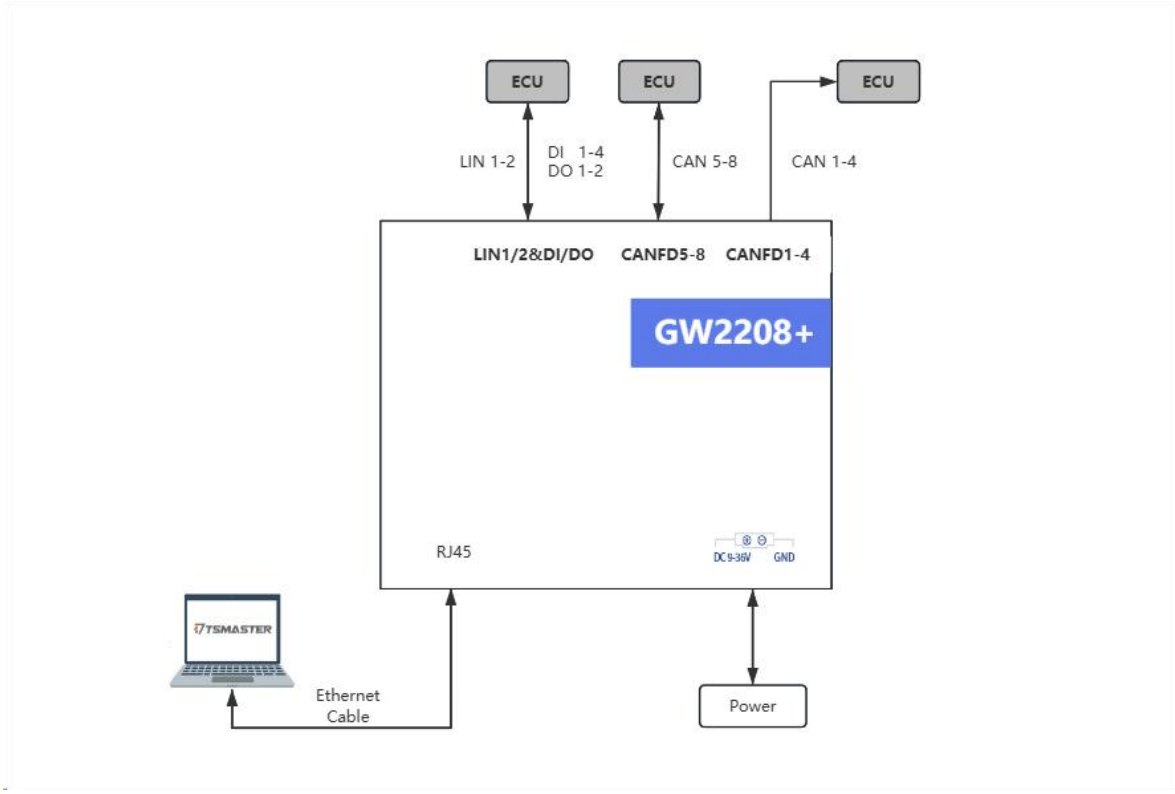
- **Rate and Data Length Adaptation**

In networks where CAN and CAN FD coexist, the gateway can handle differences in data rate and length — for example, splitting 64-byte CAN FD frames for forwarding to legacy CAN devices using a programmable routing mechanism.

- **Relay & Load Expansion**

The GW2208+ functions as a repeater to extend communication range and support additional load nodes, effectively expanding network capacity.

How to Use the GW2208+ Device?



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1. About this User Manual

1.1 Disclaimer

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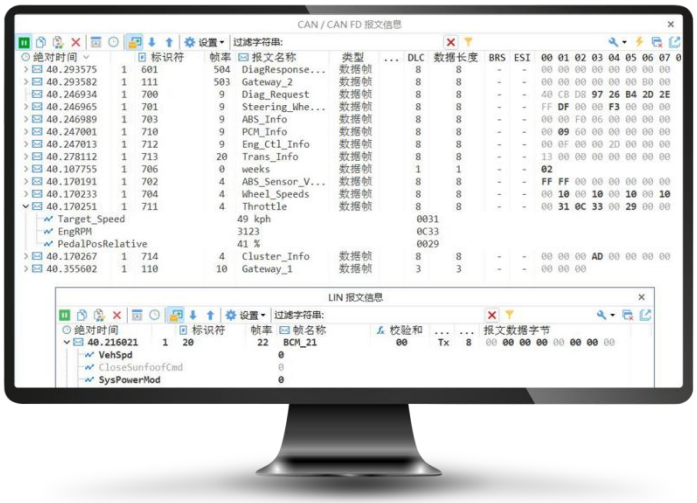
2. General Information

2.1 Bus Data Collection and Analysis



When used with TSMaster software, GW2208+ supports message transmission/monitoring/playback, bus statistics/logging, and graphical/numerical data analysis.

- **Bus Statistics**

  Bus statistics include: bus load rate, peak load rate, data frame rate, data frame count, error frame rate, error frame count, controller status, and transmit error count.

- **Database**

  Supports loading DBC, LDF, XML, ARXML format databases. Provides database structure view, signal communication matrix, and message communication matrix views.

- **Message Playback**

  Supports offline and online playback of recorded files in formats such as BLF and ASC.

- **Message Transmission**

  Supports manual transmission, hotkey triggering, and cyclic transmission. Message generator

and both custom and database-based messages are supported.

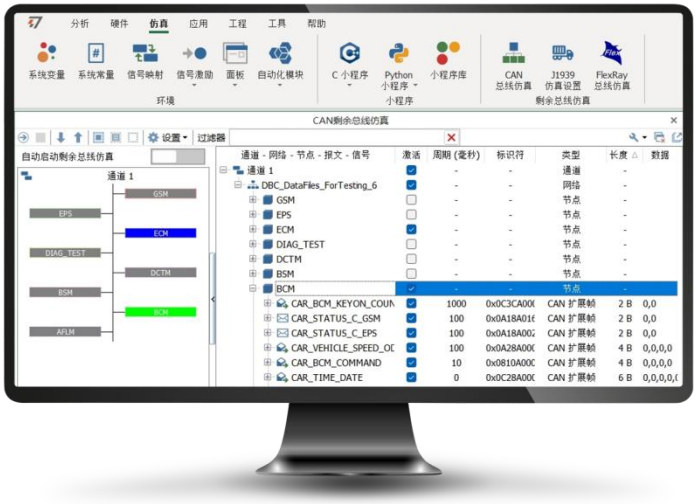
- **Message Monitoring**

Offers multiple display modes, and supports DBC decoding to view signal values. Channel and ID filtering can be configured.

- **Graphical & Numerical Display**

Y-axis of signals is fully configurable. Supports multi-axis and split-display modes, as well as pinpoint data visualization, making analysis more intuitive and accurate.

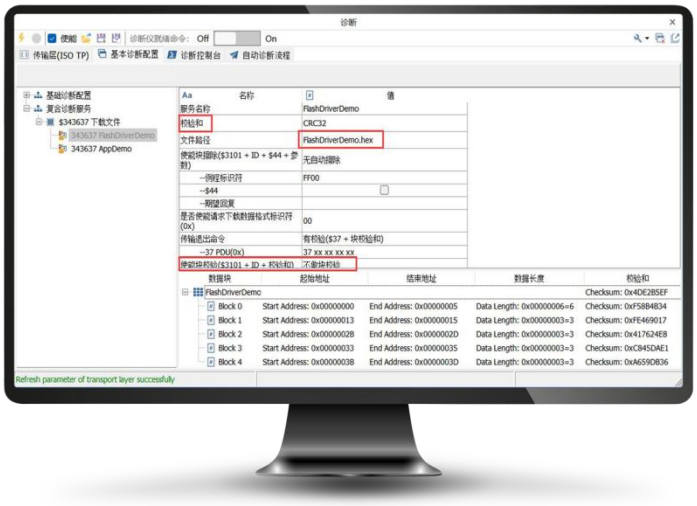
2.2 Bus Simulation



Together with TSMaster software, GW2208+ enables multi-bus simulation including CAN, LIN, and FlexRay, as well as code simulation via Desktop HIL (hardware-in-the-loop) features. The built-in Panel function allows graphical visualization of signal data linked to bus channels.

- Supports CAN bus simulation
- Supports LIN bus simulation
- Supports J1939 protocol simulation

2.3 Diagnostic



Diagnostics are a key functionality of modern ECUs. During vehicle operation, sensors throughout the system detect various potential faults in electrical and electronic subsystems. TOSUN toolchain supports the development, verification, and UDS-based ECU flashing needed for these diagnostic operations.

- **Diagnostic Parameter Configuration**

  Includes timeout settings, TesterPresent configuration, SeedKey DLL configuration. Built-in SeedKey editor allows custom algorithms without third-party tools.

- **Basic Diagnostic Configuration**

  Users can define custom diagnostic database, including: service setup, request/response parameters, and more.

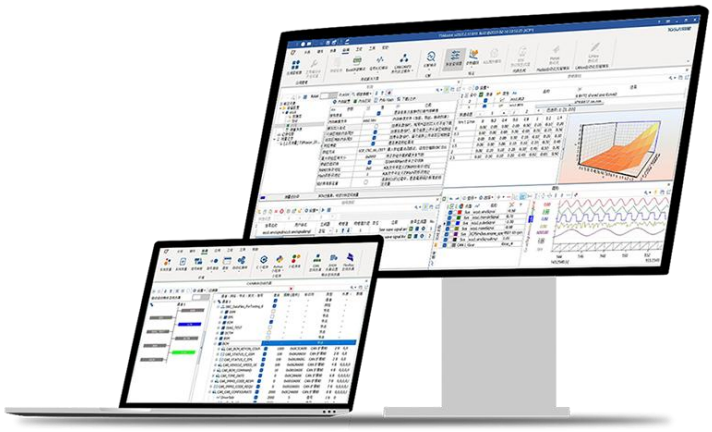
- **Diagnostic Console**

  Executes configured diagnostic database, with support for automatic verification of response results.

- **Automated Diagnostic Process**

Supports creating customized diagnostic flows and services, enabling streamlined Flash Bootloader programming processes.

2.4 Calibration



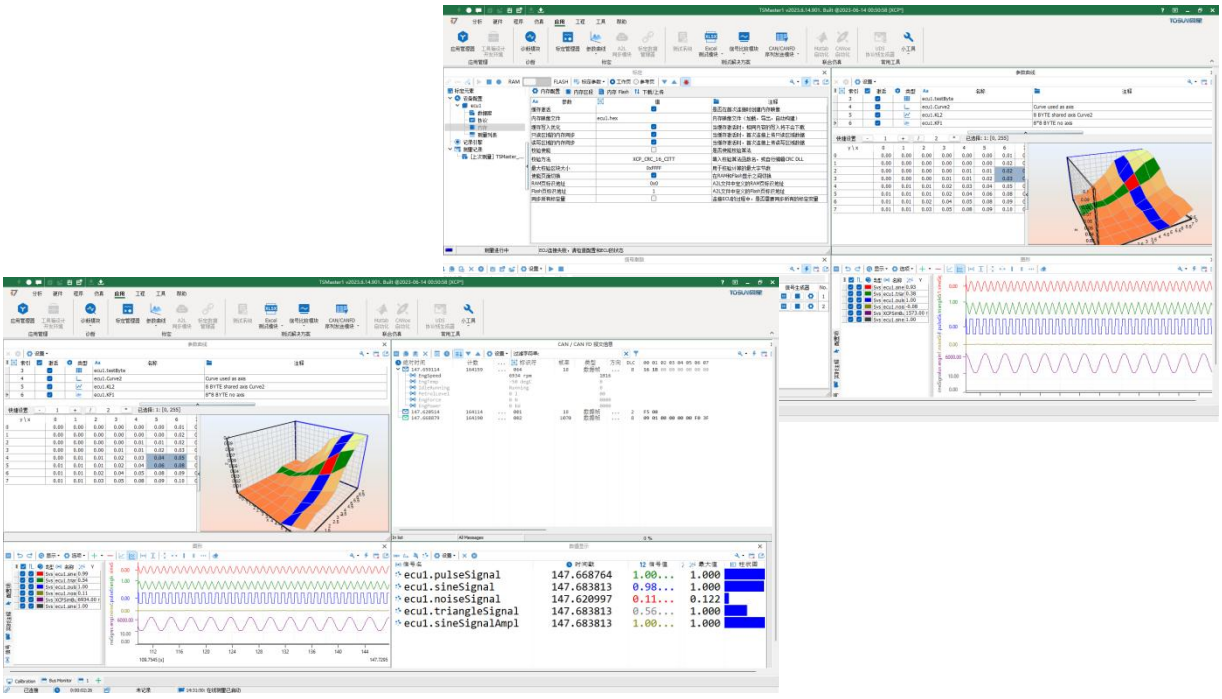
CCP (CAN Calibration Protocol): A CAN-based protocol mainly used for ECU calibration and parameter tuning. It allows engineers to read/write parameters and perform real-time testing and adjustment.

XCP (Universal Measurement and Calibration Protocol): A versatile protocol supporting multiple communication interfaces such as CAN and Ethernet. It offers high-speed data transfer and advanced diagnostic capabilities.

The automotive calibration function is a technique used in ECU development and diagnostics. It involves adjusting ECU parameters and calibration values to optimize vehicle performance and functionality. CCP and XCP allow for efficient communication between engineers and the ECU for tuning and optimizing vehicle performance.

- Supports importing A2L files

- Supports DAQ/Polling measurement modes
- Memory configuration with image loading and checksum methods
- Supports parameter curves and MAP visualizations
- Supports MDF/MF4 file storage and playback
- Graphical display for variables
- Supports management in **.par** or **.hex** format
- Integrated view for message analysis, diagnostics, calibration, and system variables
- Supports automation through system variable scripting
- Supports both single and multiple file downloads



3.GW2208+

3.1 Overview

The GW2208+ is powerful gateway device capable of converting CAN/LIN bus data to Ethernet, supporting both online and offline modes (*offline gateway functionality to be supported in future updates.). It integrates advanced CAN/CAN FD and LIN bus technologies, supporting a wide range of communication protocols and flexible data processing capabilities. GW2208+ supports conversion between CAN and CAN FD, but also enables CAN-to-LIN and LIN-to-LIN communication, This allows GW2208+ to facilitate seamless communication across different bus protocols, greatly simplifying integration in complex networked systems.

GW2208+ is equipped with 8 CAN/CAN FD channels (125 kbps ~ 1 Mbps for CAN, up to 8 Mbps for CAN FD), 2 software-configurable LIN master/slave channels (0 ~ 20 kbps), and multiple digital I/O interfaces for versatile signal measurement and integration.

GW2208+ connects to a PC via Ethernet, ensuring high-speed data transmission and avoiding communication bottlenecks when processing large volumes of bus data. When paired with the powerful TSMaster software, the GW2208+ enables users to load and utilize database files in DBC, LDF, XML, and ARXML formats. It supports comprehensive monitoring, analysis, and simulation of bus traffic, and offers advanced functionalities such as UDS diagnostics, ECU flashing, CCP/XCP calibration.

3.2 Features

- ✓ Hardware-based message timestamping with microsecond-level accuracy, meeting advanced timing requirements
- ✓ Driver-free design for Windows
- ✓ 8 CAN/CAN FD channels, and 2 LIN channels
- ✓ Supports 2 digital output (DO) and 4 digital input (DI)
- ✓ Enables conversion between CAN, CAN FD, and LIN protocols
- ✓ Configurable CAN bit rate from 125 kbps to 1 Mbps; CAN FD supports up to 8 Mbps
- ✓ LIN protocol compliant with LIN1.3 and 2.x, supporting 0~20 kbps baud rate
- ✓ LIN master/slave node configuration via software
- ✓ Software-configurable 120Ω termination resistors for CAN channels
- ✓ Support Self-ACK (self-acknowledgment) mode for CAN
- ✓ Supports message filtering for CAN/CAN FD/LIN frames
- ✓ Bus relay and expansion capabilities
- ✓ Supports BLF and ASC data recording formats, with online/offline playback functionality
- ✓ Example project and API interfaces provided, simplifying secondary development
- ✓ Customizable conversion rules with persistent storage; offline gateway function (*to be supported in future updates)

3.3 Technical Data

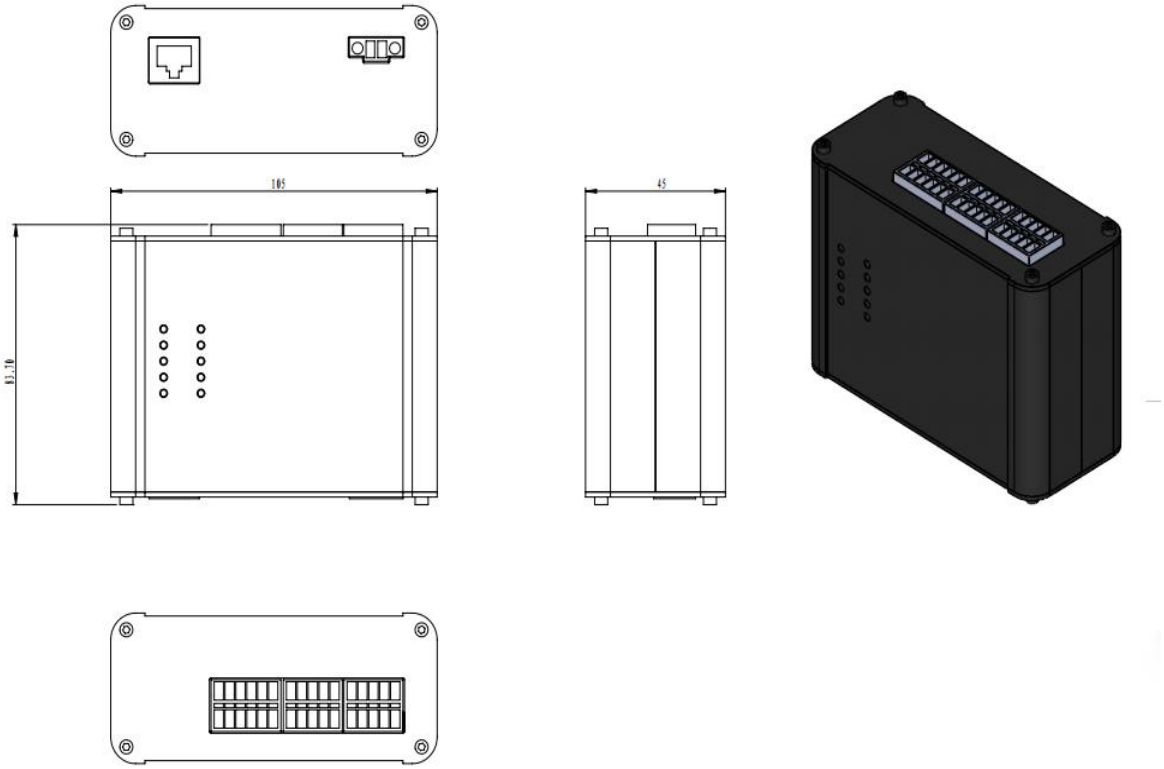
Channel	8* CAN FD 2* LIN 4* DI 2* DO
PC Interface	RJ45 Ethernet
CAN Interface	Pluggable Terminal Block
LIN Interface	Pluggable Terminal Block
I/O Interface	Pluggable Terminal Block
Driver	Driver-free for Windows
Buffering	Hardware-level buffering to ensure no frame loss
CAN	Supports CAN 2.0A/B per ISO 11898-1, with baud rate 125 kbps ~ 1 Mbps
CAN FD	Supports both ISO and non-ISO CAN FD, with baud rates from 125 kbps ~ 8 Mbps
LIN	Supports LIN 1.3 and LIN 2.x, with baud rates from 0 to 20 kbps
FlexRay	FlexRay channel (A and B)
Cold Start	Supported
Timestamp	1μs hardware-level timestamp accuracy
Termination (CAN)	120Ω software-configurable termination for CAN channels
Isolation	DC 2500V isolation per CAN channel
Power Supply	DC
Power Consumption	5 W
Enclosure Material	Metal enclosures
Dimensions	105*83.70*45 mm
Weight	Approx. 300g (without packaging)/470g (with packaging)
Operating Temp.	-40℃~80℃
Operating Humidity	10% ～ 90% RH (non-condensing)
Environment	Avoid corrosive gases

3.4 Electrical Data

Parameter	Test Conditions	Min	Typical	Max	Unit

Operating Voltage	DC input	Under 8-channel CAN and 2-channel LIN transmission/reception	9	12	36	V
Operating Current	DC input	Under 8-channel CAN and 2-channel LIN transmission/reception	--	0.4	--	A
Power Consumption	DC input	Under 8-channel CAN and 2-channel LIN transmission/reception	--	5	--	W
CAN Interface	Bus pin voltage tolerance	CANH, CAHL	-58	--	58	V
	Terminal resistor	Enabled	--	120	--	Ω
	Isolation voltage	Leakage ＜ 1mA	2500	--	--	VDC
LIN Interface	Bus pin voltage tolerance	LIN1, LIN2	-40	--	40	V

3.5 Mechanical Dimensions

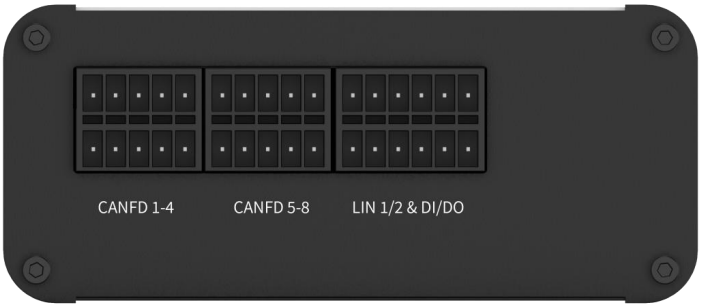


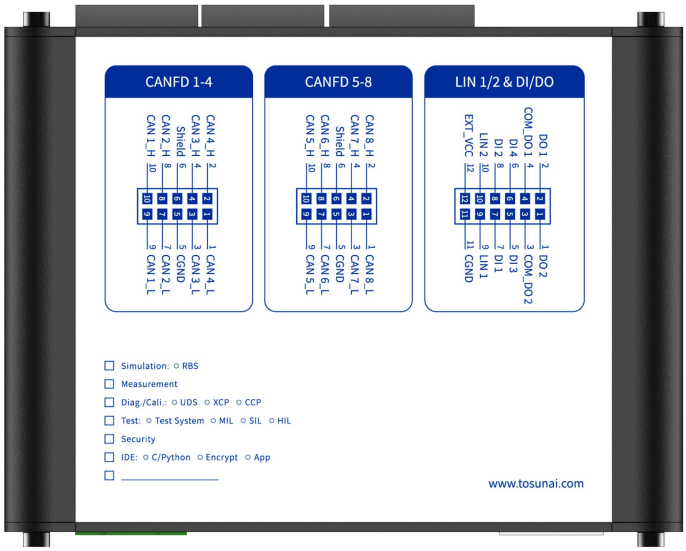
3.6 Packing List

✓ Main device: GW2208+

✓ Category 6 Gigabit Ethernet cable

3.7 Hardware Interface





- 1000Base-T Ethernet (RJ45)
- Phoenix terminal interface for DC 12V power supply
- 10-pin pluggable connector for CAN FD1-4
- 10-pin pluggable connector for CAN FD5-8
- 12-pin pluggable connector (LIN, DIDO)

3.8 LED Indicators

Diagram of LED indicator:

Description of indicator:

Indicator	**Definition**
LIN 1-2	Indicators for LIN channels
CAN FD1-8	Indicators for CAN FD channels

Description of LED color/status:

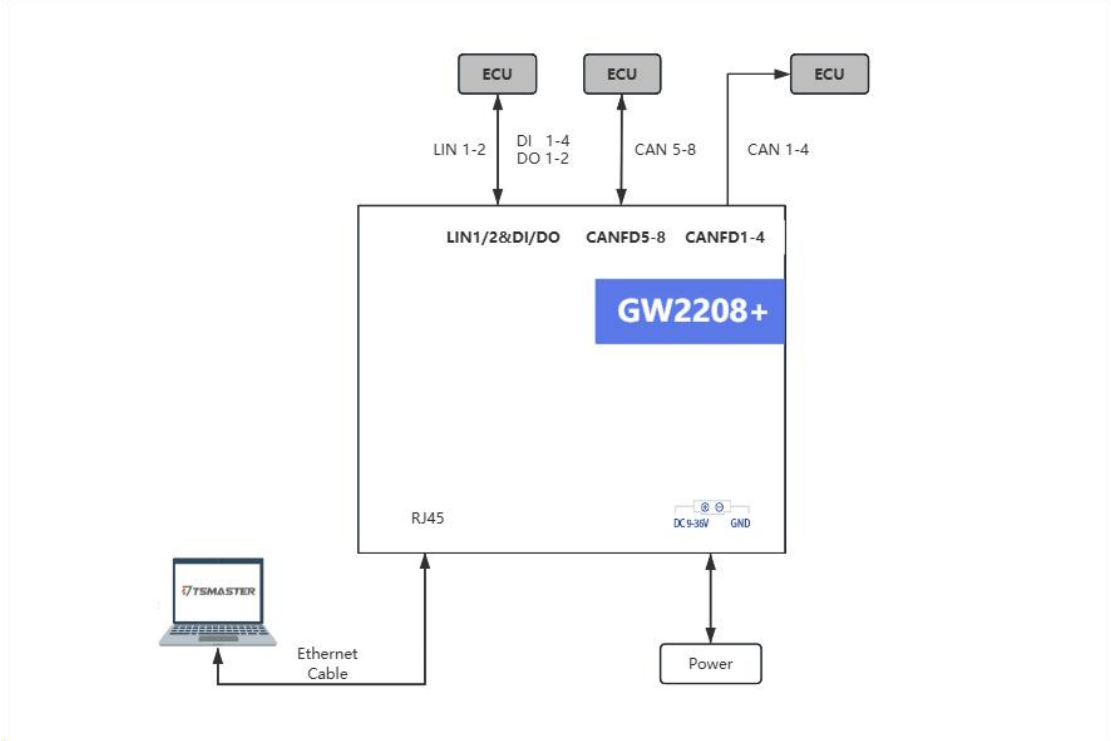
Color/Status	**Description**
LIN: Green (blinking)	LIN channel transmitting or receiving data correctly
LIN: Red (blinking)	LIN channel error (e.g., protocol mismatch, wiring issue)
CAN FD: Green (blinking)	CAN FD channel transmitting or receiving data correctly
CAN FD: Red (blinking)	CAN FD channel error (e.g., configuration or protocol error)

3.9 Optional Accessories

NA

4. Quick Start

4.1 System Connections



The GW2208+ is powered via a 12V DC Phoenix terminal. By connecting the device's RJ45 Ethernet port to a PC and interfacing the CAN/CAN FD, LIN, and DIDO ports with the ECU as required, users can control the GW2208+ from the PC to communicate with the ECU.

4.2 Driver Installation

Driver-free design for Windows, ensuring excellent system compatibility.

4.3 Software Overview

TSMaster is a powerful and versatile tool designed to interface with, configure, and control all TOSUN hardware devices. It supports automotive bus-related functions such as embedded code generation, monitoring, simulation, development, UDS diagnostics, CCP/XCP calibration, ECU flashing, I/O control, measurement, and testing.

TSMaster also supports co-simulation with MATLAB Simulink and CarSim dynamic models for soft real-time HIL testing of ECU algorithms. It provides integrated scripting environments for C and Python, allowing users to execute ECU logic directly within the platform. Additionally, TSMaster offers customizable applets for simulation panels, test sequences, logic design, and automated report generation—making it easy to build complete, automated test systems. Code written within TSMaster is hardware-independent, allowing for easy reuse and deployment across different platforms.

TSMaster is compatible with a wide range of third-party tools and hardware interfaces including Vector, Kvaser, PEAK, IXXAT, and mainstream instruments (e.g., oscilloscopes, waveform generators, DMMs) and I/O cards (AI, DI, DO, etc.). It is designed for seamless integration into test environments, enabling multi-device and multi-channel simulation and testing.

This makes TSMaster ideal for PV/DV testing of automotive ECUs and assemblies, as well as for end-of-line testing in production.

4.4 Software Installation

TSMaster software download link:

https://www.tosunai.com/downloads/

If the site is inaccessible, please contact your sales representative or visit the TOSUN official website. Alternatively, you can scan the QR to get the download link.

Once installation, the software icon will be appear on your PC desktop as shown below:

5. Inspection and Maintenance

The GW2208+ primarily contains semiconductor components, which typically have a long service life. However, adverse environmental conditions may accelerate aging and degrade performance. To ensure proper operation, regular inspections are recommended to maintain the required environmental conditions.

It is recommended to inspect the device at least once every 6 to 12 months. In harsher environments, inspections should be performed more frequently. Refer to the table below for inspection criteria and recommended actions. If issues persist, please contact Shanghai TOSUN Technology Ltd.

Item	Inspection	Standard	Action
Power Supply	Check voltage fluctuation at power input	+12V DC at power port	Use a voltmeter to verify input voltage. Take corrective actions if out of range.
Ambient Conditions	Check ambient temperature (including internal temperature within enclosures)	-40℃~+80℃	Use a thermometer to ensure temperature is within specified range.
	Check the ambient humidity. (Including internal humidity within enclosures)	10% - 90% RH, non-condensing	Use a hygrometer to ensure humidity is within specified range.
	Check for accumulation of dust, powder, salt, and metal debris	No accumulation	Clean the device and prevent future contamination.
	Check for exposure to water, oil, or chemicals	No exposure	Clean the device and improve environment protection.
	Check for corrosive or flammable gases	No presence	Use sensors or smell detection to verify.
	Check for vibration and	Within allowable	Install padding or vibration

	mechanical shock	limits	isolation measures if necessary.
	Check for noise sources near the device	No significant noise sources nearby	Isolate or shield the device from noise sources.
Installation & Wiring	Check crimped connectors in external wiring	Adequate clearance between connectors	Visually inspect and adjust as needed.
	Check for damage to external wiring	No visible damage	Visually inspect and replace damaged cables if necessary.

TOSUN

Engineer Everything !

Software

Support CAN(FD)/LIN/FlexRay/SOME/IP and DoIP

UDS diagnostics/ECU flashing/CCP/XCP calibration

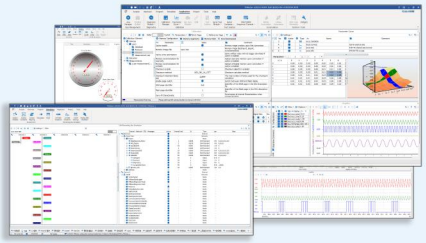
Embedded code generation/Application builder

Encrypted release/Logging and bus replay

Graphical programming/Residual bus simulation

C and Python scripting

Bus monitoring/Transmiting/Automated testing



TSMASTER

Hardware

1/2/4/8/12-channel CAN FD/CAN to USB/PCIe device

1/2/6-channel LIN to USB/PCIe device

Multi channel FlexRay/CAN FD to USB/PCIe device

Multi channel automotive Ethernet/CAN FD to USB/PCIe device

Automotive Ethernet media conversion device (T1 to Tx)

Multi-channel CAN FD/Ethernet/LIN datalogger

TTS test systems

-CAN FD/CAN/FlexRay/LIN communication boards

-Relay and fault injection boards

-Resistors for sensor simulation

-Digital I/O, Analog I/O boards available

CAN CAN FD LIN FlexRay OPEN ALLIANCE

Solutions

- Bus Conformance
- Network Automation Testing System
- Charging Testing System
- EMB Calibration Testing Equipment
- Information Security Solutions
- Steer-by-Wire Chassis Testing Solutions
- EOL Testing Equipment
- Motor Performance
- Durability Testing Solutions
- FCT

About TOSUN

The core product, TSMaster, is a comprehensive tool for automotive R&D, testing, production, and after-sales. It integrates essential functions with hardware support to streamline processes and ensure precision, making it ideal for automotive professionals.

International Organization

ASAM CiA

Quality Assurance

ISO9001:2015

CE Certification

CE

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