EC's New Products Introduction Journal Issue 1/2026

The New Products Journal

Published by the Engineering Association Yerevan, June 22, 2026

The Purpose of the Journal is to introduce the new products, solutions, and technologies that have been designed and developed in the Engineering City.

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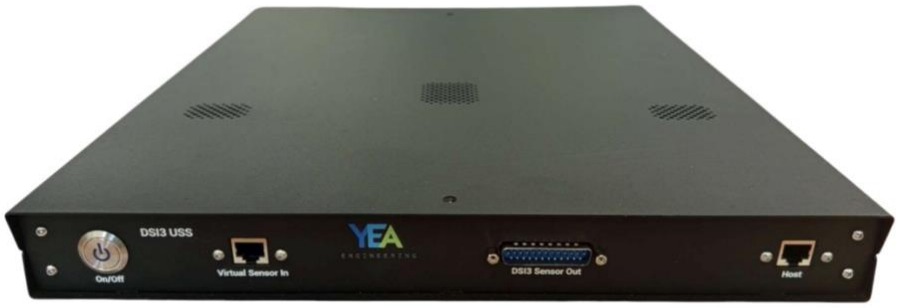
. Editorial

We used to have a section on *New Products* in the general *EC Journal*. We have decided to take that section out and dedicate a separate Journal to it. This is because creating products, solutions, and technologies for the marketplace is the main purpose of the Engineering City and its companies.

It is also our hope that having a dedicated journal for the new products will encourage companies to announe them to the EC Community first. This will insure that all EC companies are aware of the new products, solutions, and technologies that are designed and developed by their peers in the EC and will use them in their own work.

. USS DSI3 Ultrasonic Sensor Simulator – *by YEA Engineering*

by YEA Engineering



Modern vehicles are equipped with multiple features for driving assistance. One such feature is the Park Assist System (Parktronic), which helps drivers easily locate free parking spaces and perform accurate and safe parking. This system utilizes multiple ultrasonic sensors installed on the front and rear bumpers, along with an advanced, high-technology parking control module (Ultrasonic ECU) that enables these capabilities. The YEAE DSI3 USS Ultrasonic Sensor

Simulator can emulate up to 16 ultrasonic sensors using the 3rd Distributed Systems Interface (DSI3) to test the functionality of the parking control module.

Key Features

▪ Ability to receive the input scene and object information of the parking scenario through an Ethernet port from the virtual vehicle simulation platform to convert the received UDP packets into proper DSI3 slave response commands by using three discrete current-level signal structures according to the **DSI3 Reverse Communication Channel Physical Layer** requirements.

▪ Customizable readable DSI3 master request commands to send appropriate DSI3 slave responses.

▪ Ability to receive master commands according to the **DSI3 Forward Channel Physical Layer** requirements and decode the Manchester-1 format signals.

▪ Currently support Elmos E524.17 and E524.20 ICs.

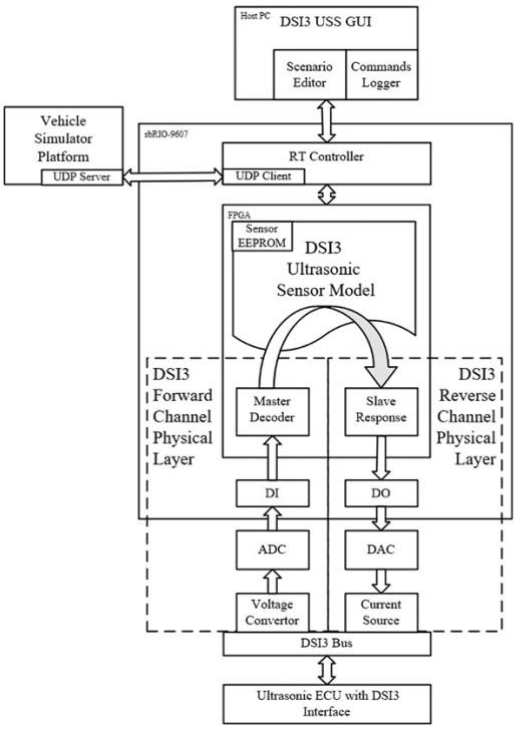
▪ Support for the DSI3 ultrasonic sensor model EEPROM data structure.

▪ Available in bench top and rack mount form factors.

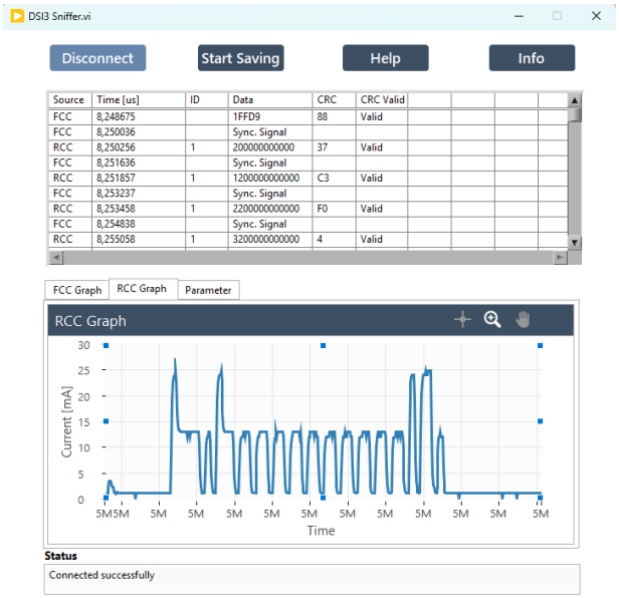
▪ User-friendly GUI (it can be installed on any Windows PC) that allows the user to set specific object distance values to be simulated for each ultrasonic sensor (for self-testing purposes), as well as numeric indicators displaying the object information received from the virtual vehicle simulation platform.

▪ DSI3 Reverse and Forward channel data logging to perform DSI3 bus messaging analysis between the DSI3 Master (Ultrasonic ECU) and DSI3 Slave (Sensor).

High Level Architecture



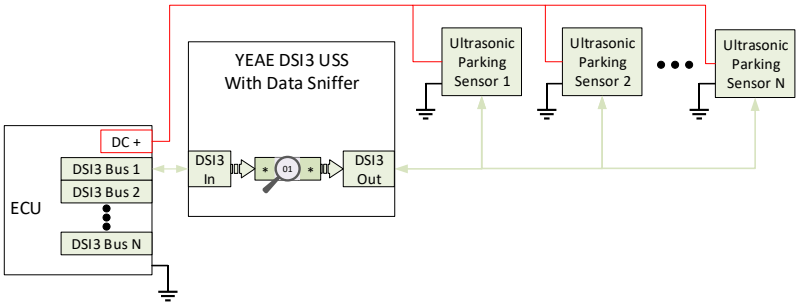
DSI3 Data Sniffer



The integrated DSI3 Data Sniffer enables non-intrusive, real-time monitoring of communication between the DSI3 Master and Slave devices. It captures both Forward and Reverse channel messages without disturbing bus operation, providing engineers with a powerful tool for debugging, protocol compliance analysis, and validation. By allowing message sequences to be logged and reviewed, the sniffer helps accelerate root-cause analysis, supports regression testing, and reduces development time when integrating ultrasonic sensors with the ECU.

The DSI3 Data Sniffer feature is available as both a **hardware add-on module** and a **software analysis package**, supplied under separate part number. The hardware module provides physical bus monitoring with isolation and timestamp accuracy, while the software package offers decoded frame visualization, filtering, and logging capabilities for post-analysis also permits real-time observation of Forward and Reverse channel waveforms.

The sniffer can be configured to monitor from one up to four independent DSI3 buses simultaneously, each supporting multiple slave channels, enabling scalable analysis for single-bus and multi-bus system configurations.

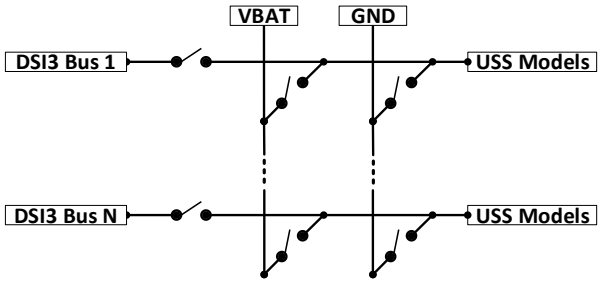


Fault Insertion Unit

The integrated Fault Insertion Unit (FIU) allows controlled injection of electrical faults into the DSI3 communication lines to evaluate the robustness and fault-handling capability of the ultrasonic ECU. It supports configurable short-to-ground, short-to-VBAT, and cross-connection faults between DSI3 buses, enabling comprehensive validation of diagnostic functions and ECU response mechanisms.

By simulating real-world fault conditions, the FIU helps engineers verify system safety, diagnostic coverage, and fault recovery algorithms in compliance with automotive reliability standards. The module is fully software-controlled through the host GUI or via TCP commands, allowing automated fault scripting and repeatable test sequences without manual rewiring. The Fault Insertion Unit is available as an optional hardware expansion, supplied under a separate part

number, and can be combined with the YEAE DSI3 USS and YEAE DSI3 Data Sniffer for advanced debugging and validation use cases.



Technical Specifications

Parameter	Value
Modes	CRM PDCM BDM (on demand)
Bus Topologies	Point-to-Point (1x12) Parallel (3x4ch, 4x3ch, 4x4ch, 2x6ch,)
Connection to Virtual Environments Systems	UDP
UDP Instream for Targets	SlaveID & Time Stamp, Time of Flight, Sound/Echo Amplitude
DSI3 output latency in accordance to the UDP input	0,2 – 1 ms
DSI3 Sensor EEPROM data support	Yes
Simulated ultrasonic sensor model	Any DSI3 ultrasonic sensor model can be simulated upon requirements
DSI3 Data Sniffer Support	Up to 4 independent DSI3 buses, Forward and Reverse channel capture
DSI3 Data Sniffer Software	Frame decoding, filtering, and logging via GUI
Fault Insertion Unit (FIU)	Short-to-Ground, Short-to-VBAT, and Cross-Connection between DSI3 buses
FIU Control Interface	GUI or TCP command interface
Supply Power	24VDC ±10%, 1A
Operating Temperature Range	-15 °C to +50°C degrees
Mechanical Form Factors	Bench-top / 19″ rack-mount

Ordering Information

Part Number	Description
YEAE-DSI3-USS-4xB	DSI3 Ultrasonic Sensor Simulator for up to 4 buses
YEAE-DSI3-USS-8xB	DSI3 Ultrasonic Sensor Simulator for up to 8 buses
YEAE-DSI3-USS-12xB	DSI3 Ultrasonic Sensor Simulator for up to 12 buses
YEAE-DSI3-USS-DSN1	1-Bus DSI3 Data Sniffer HW+SW add-on package, includes basic master and slave commands viewer
YEAE-DSI3-USS-DSNV	DSI3 Data Sniffer Software Package (analysis, decoding, logging)
YEAE-DSI3-USS-FI4	Fault Insertion Unit Hardware Module HW+SW addon package for 4 DSI3 buses
YEAE-DSI3-USS-FI8	Fault Insertion Unit Hardware Module HW+SW addon package for 8 DSI3 buses
YEAE-DSI3-USS-FI12	Fault Insertion Unit Hardware Module HW+SW addon package for 12 DSI3 buses



Pic. Showcasing the product in the EC Cafeteria

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