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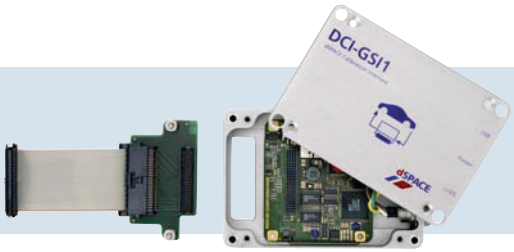
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Generic Serial Interface DCI-GSI1

Measurement, calibration, and ECU function bypassing



Key Features

- **ECU adaptation via connector adapter and firmware update**
- **Compact size, installation inside or outside the ECU enclosure**
- **Fast ECU flash programming**
- **Direct connection to host PC via USB for measurement and calibration**
- **Arbitration logic for parallel access of debuggers**
- **Low-latency LVDS interface to dSPACE prototyping systems for bypassing**

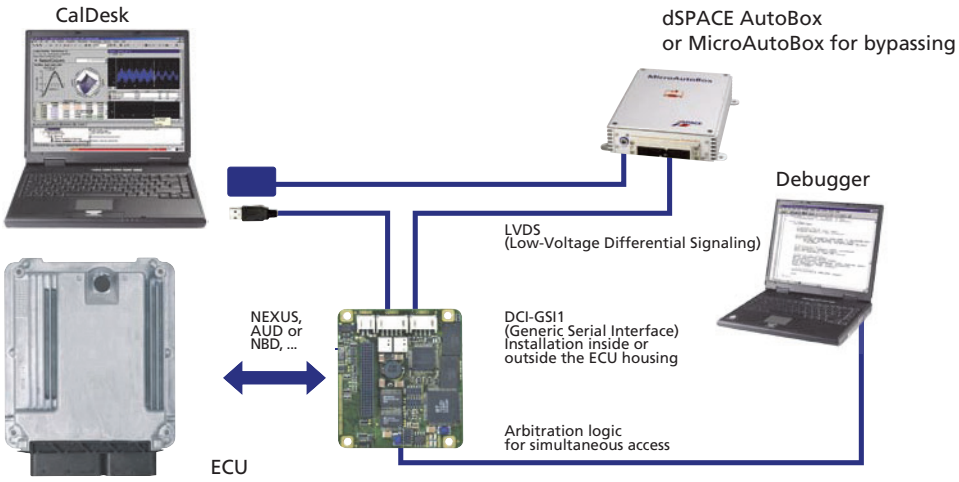
Description

Application Areas

For processor bus architectures with less external or off-chip visibility, dSPACE provides a generic serial interface (GSI) which supports different on-chip debug ports for measurement, calibration, and bypassing. Adaptation to a specific electronic control unit (ECU) can be done via an individual connector adapter and a firmware update on the DCI-GSI1.

Operation Modes

For measurement, the DCI-GSI1 supports two strategies: with ECU service (data aquisition is triggered by a small piece of code included in the ECU code) and without ECU service (data aquisition is triggered by an ECU event). For example, data capturing can be triggered via digitial I/O pins of the microcontroller or by the GSI, which is capable of detecting write accesses to specific ECU memory addresses. In addition, it is also possible to perform measurements according to the GSI's on-board timer. To calibrate ECU parameters, the DCI-GSI1 supports both overlay units that are provided by the ECU´s micro-controller and an external RAM for the calibration data. During bypassing, the DCI-GSI1 performs the data transfer and triggers the bypass system, which calculates the controller function outside the ECU. If bypass, calibration, or measurement accesses to the ECU are requested at exactly the same time, the GSI gives bypass access the highest priority. This way, minimal latencies in communication between the ECU and the prototyping system are always guaranteed without compromising the measurement bandwidth.



Example of a wiring scenario for measuring, calibrating, and bypassing in parallel, including an optional third-party debugger.

Technical Details

Parameter		Specification
General		■ 64 MB RAM for buffering measurement data ■ USB host interface for measurement and calibration ■ Low-voltage differential signaling (LVDS) bypass interface for connection to dSPACE prototyping hardware ■ Interface for connecting an additional tool (for example, a debugger) to the ECU via its on-chip debug port (according to the ECU interface and requirements) ■ Offline check and display of allocation status of overlay RAM for calibration parameters in CalDesk ■ Quick-start measurement ■ ECU flash programming via dSPACE ECU Flash Programming Tool (p. 260)
ECU interface		■ READI/Nexus: Freescale's MPC56x microcontroller series[1)] ■ AUD/AUD2: Renesas' SH2 and SH2A family ■ NBD: NEC's V85x microcontroller series, Renesas' M32R ■ Toshiba TMP1984FDF ■ JTAG/OCDS: Infineon´s TriCore family ■ JTAG/SDI: Renesas´ M32R family ■ JTAG/Nexus: Freescale´s MPC5554 and MPC5553
Target / tool connector		■ SAMTEC FOLC-125-01-S-Q-LC to interface individual connector adapters ■ Various connector adapters available from dSPACE. Some adapters also have a tool connector.
Physical characteristics	Enclosure	■ Aluminum box (to be ordered separately) ■ Protection classes IP 54 and IP66 on request
	Size	■ DCI-GSI1 with aluminum box: 102.5 x 71 x 21.4 mm (4.04 x 2.80 x 0.84 in) ■ DCI-GSI1 without aluminum box: 62.4 x 56 x 10.5 mm (2.46 x 2.21 x 0.41 in)
	Weight	■ DCI-GSI1 with aluminum box: approx. 214 g (0.47 lb.) ■ DCI-GSI1 without aluminum box: approx. 29 g (0.06 lb.)
	Temperature range	■ -40 ... +85 °C (-40 ... +185 °F) ambient temperature ■ -65 ... +125 °C (-85 ... +257 °F) storage temperature
Electrical characteristics	Power supply	■ 6 V ... 48 V
	Protection	■ Protected against overvoltage ■ Load dump protection up to 60 V ■ Protected against reverse battery up to -60 V
	Power consumption[2)]	■ 2.3 W max., using full bandwith ■ 1.5 W typ., without traffic ■ 12 mW max. in standby mode

[1)] The DCI-GSI1 uses chip-internal overlay units of the MPC56x. There is an error in some versions of MPC56x chips with regard to using these overlay units; Freescale has confirmed this (published as CDR_AR_1073). Ensure that your application or chip version is not affected by this error. You can also contact dSPACE to exclude problems in connection with this error.

[2)] If READI/Nexus is used.

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