ETAS FETK-T and -S

New interfaces for high-performance ECUs

The FETK is a new interface for high-performance ECUs that connects the ECU and the host application through XCP via Gigabit Ethernet. FETK hardware is available in two versions, T and S, for trace and serial debug interfaces.

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For measurement purposes, users can achieve maximum data throughput with FETK-T. Measurement values can be recorded from the ECU at a raw data rate of up to 300 MB/s via the trace/Aurora interface. This has almost no impact on the runtime behavior of the microcontroller (µC) in the ECU, because trace data is generated independently of the ECU program through automatic copying of the values of the relevant measurement signals, which the µC cores write to RAM cells. In FETK-T, the trace data (consisting of time stamp, memory addresses, values, and trigger events) is written to a mirror RAM. In the mirror RAM, the trace data is selected from the various measurement rasters with respect to trigger time, thus reducing the data volume.

Connection through XCP and to ETAS INCA

Using the same cable type, both FETK versions are connected to an ES891 or ES892 interface module, through which they communicate over the efficient, latency-optimized FETK protocol. Via the ES89x module, applications can access the FETK ECU interface using the XCP protocol, which allows easy integration with customized solutions or third-party tools.

Transmission of the measured data payload currently reaches speeds of 20 MB/s over the entire route from the FETK to the INCA V7.2 application on the host computer. Thanks to the µC trace mechanism's high raw data rate, the FETK-T is capable of recording signals from control processes with repetition frequencies of up to 200 kHz with great time precision. For prototyping and configuration purposes, both FETK-S and FETK-T use the microcontroller's debug interface. Through its µC connection via debug interface, FETK-S delivers a measurement performance that is well suited for many calibration tasks.

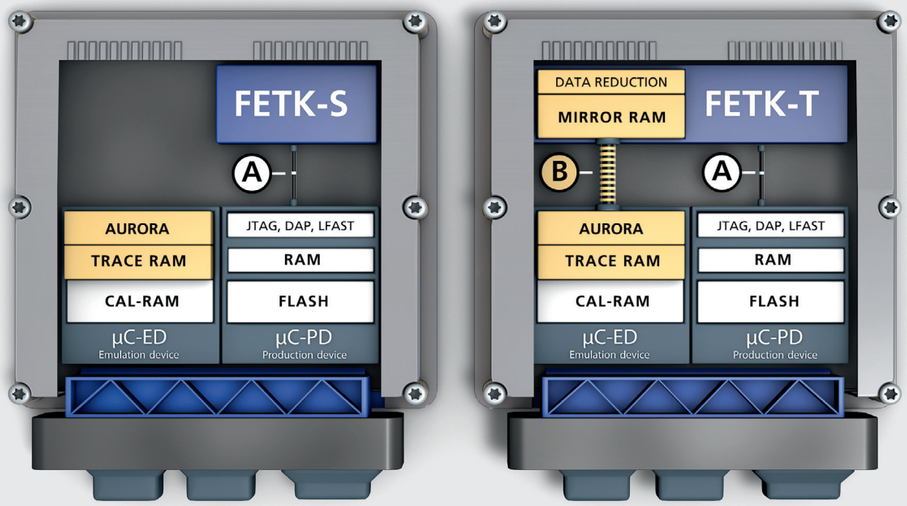
High data transmission rate and low latency

Their compact, 46 x 25 mm footprint makes the new FETKs ideal for installation in production ECU housings, allowing companies to reduce the costs of calibration projects. They assist research and application engineers as well as function developers in their work. Users can simultaneously record large volumes of measurement data from ECUs while running and adapting characteristic values in the ECU. Furthermore, real-time-capable systems can be connected, such as the ES910 prototyping and interface module. A new prototyping module to join the ES800 family, and that uses the ES800 system's PCI Express interface, is in the planning stage. It will allow users to achieve very short measurement and calibration cycles on the test bench and calculate new functions synchronously with the control unit in short time frames with very low latency and without raster offset in the external bypass. In addition, via the FETK access, users can program ECU flash memories and connect software debuggers in parallel to a development tool.

Summary

With the ES800 hardware product family and FETK ECU interface, users can record measurement data from ECUs and the system environment synchronously at high rates. This solution allows the implementation of modular systems that meet the high requirements for validating electronic systems in the next generations of vehicles. The FETK/ES800 solution makes it possible to significantly increase both the efficiency and quality of the calibration and validation of electronic systems in the vehicle and on the test bench.

Data rates: Ⓐ 2 MB/s to 10 MB/s Ⓑ Approx. 300 MB/s



FETKs are available in two versions: FETK-S (left) and FETK-T (right). Both variants use a microcontroller-specific production device (µC-PD) debug interface such as JTAG (Joint Test Action Group), DAP, or LFAST as access to the ECU. The FETK-T version additionally supports the particularly powerful µC emulation device (µC-ED) trace interfaces together with the high-performance transmission of trace data from the ECU via the serial Aurora interface.

Feature	FETK-S	FETK-T
Microcontroller (µC) support	▪ Infineon AURIX µC ▪ NXP MPC57xx and STMicroelectronics EMU57xx families	▪ Infineon AURIX µC
Data rate between µC and host application	▪ 2 MB/s (typically)	▪ 20 MB/s (currently with INCA V7.2)
Return time of a 128-byte signal between FETK and prototyping module (latency)	▪ Via Ethernet (ES910 module): 220 µs ▪ Via PCI Express: under 100 µs	
Smallest measurement grid	▪ 50 µs	▪ 5 µs
Flash programming time	▪ 8 MB/s	

Features of the two ECU interfaces FETK-S and FETK-T.