High-end graphics, audio, and CAN FD

Full-digital instrument panels that give a high-end feel to any car are coming to the mid and entry ranges, through technology from ST. Its chip integration brings a digital head unit with features like smartphone mirroring.

(Photo: ST)

STMicroelectronics' Accordo 5 family of automotive processors meets display-performance and security demands in a low-power compact platform suitable for lower-cost vehicles. The devices enable state-of-the-art digital instrument clusters and audio/video/navigation (AVN) head units to become more affordable by integrating the complete graphics, video, and audio functionality on-chip to save design costs and simplify the assembly.

Accordo 5 devices provide smartphone mirroring that gives access to content such as music and navigation services on the phone safely through the vehicle's own user interface. The host processor and high-performance video and graphics engines can present complex information displays, such as simultaneous user-interface plus rear-view camera with navigation and video preview. There is also video playback for major formats including H.264 and DivX, 2D and 3D graphics with effects such as blending and overlays, as well as USB connections and SD-Card interfaces.

Less visible to users, but critically important to today's increasingly connected cars, the chips integrate a high-performance micro-controller that secures the interface between the head unit and the main vehicle network. Built-in features of this micro-controller include boot-code authentication, secure interconnect, and high-performance data encryption.

The family strengthens security by dedicating an ARM Cortex-M based micro-controller for managing the secure CAN interface between digital instruments and the main vehicle network. This micro-controller integrates three CAN ports including support for the CAN FD high-speed standard, a hardware accelerator for crypto algorithms including SHA-2, PK and AES, and One-Time-Programmable (OTP) memory for master-key storage and tamper prevention. The micro-controller draws very little current in standby mode, and complements careful power management throughout the chip to minimize drain on the vehicle's electrical supply.

"Replacing conventional dials, switches, and indicator lamps with advanced graphical instrumentation gives drivers more convenient access to information about the vehicle and surroundings, and digital head units can enhance safety and convenience. By integrating state-of-the-art features in a cost-effective single-chip solution, our Accordo 5 family now enables car makers to deliver such benefits to more customers in more markets than ever before," said Fabio Marchio, Automotive Digital Division General Manager, Automotive & Discrete Group Vice President of STMicroelectronics.

The Accordo 5 family is the latest generation of ST's Accordo line, leveraging ARM Cortex-A7 processor as the main computing CPU. The Cortex-A7 architecture is area-efficient, and therefore cost-effective, with high processing and memory-streaming performance. The range gives designers a choice of single-core Cortex A7 with a 16-bit interface to high-performing off-chip DDR3, or dual-core Cortex-A7 with a 16/32-bit DDR3 interface.

Although targeting mid-range vehicle markets, Accordo 5 delivers best-in-class graphics performance from its 500 MHz 3D graphics processor core. The architecture supports 2D and 3D graphics up to 1080 p resolution, in formats like Open VG, Open Gles-2.0, and is capable of effects such as flexible blending of up to four layers with multiple modes and video overlay. The multi-format video subsystem provides post-processing for effects such as picture-in-picture, and audio performance comes from a high-performance audio DSP, six stereo-audio analog channels, and support for multiple industry-standard audio interfaces. The built-in display controller supports TFT-LCD touch panels up to Full HD definition.

Additional advances include increased thermal dissipation versus execution performance, which helps simplify thermal management for optimum reliability, as well as flexible signal routing that simplifies audio design. ST supports designers using the chips with comprehensive software and middleware IP that streamlines the design of displays and instruments.

ST exhibits at the SPS IPC Drives 2016, in hall 6, stand 341.

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