CASE STUDY
Intel® Atom™ Processor Z520PT and
Intel® System Controller Hub US15WPT
In-Vehicle Infotainment Systems

Are we there yet?

Compal and Intel plot the most direct route for the delivery of feature-rich in-vehicle infotainment solutions.

Compal is a leading manufacturer of computing platforms and has just released its first ruggedized IVI platform based on Intel® architecture.

Overview

Like the kids riding in the back seat, consumers are impatiently awaiting an in-vehicle experience that's entertaining, informative, and a lot like the rest of their digital world. You can almost hear them asking: Are we there yet?

To which you can now confidently answer: yes, we've arrived. New standards-based Intel® architecture platforms are enabling automakers to accelerate delivery of feature-packed in-vehicle infotainment (IVI) solutions. That's because Intel's scalable and pin-compatible family of processors support multiple I/O interfaces, networking protocols, and software applications – all the digital technologies that power the consumer's connected world today.

One example is the application-ready Compal* KAX50 IVI platform based on the Intel® Atom™ processor Z520PT and Intel® System Controller Hub US15WPT. This low-power, industrial temperature solution is flexible and open so that it can be integrated into a wide array of vehicles and run many different applications.

It can easily connect to the existing entertainment systems already deployed in cars today as well as to new solutions and technologies that may be developed tomorrow.

Compal engineers claim that it's quick and easy to develop IVI solutions based on Intel architecture because one design effort can yield many different options. It doesn't require a new development cycle to scale the solution up or down. What's more, the Intel® platform contains advanced features that make it ideal for a rugged operating environment and vehicle-based systems – such as power management technologies, industrial temperature support, and low power consumption.

The Compal experience is one example of how Intel is accelerating the development of new IVI solutions while also paving the way for a long and successful IVI roadmap.

To succeed, automakers need platforms that are open – and stay open – to make it fast, easy, and cost-effective to update and modify solutions over time.

Challenge #1: Go Long

Finicky consumers want their experience in the car to be as productive and enjoyable as it is everywhere else. Just like they do in their homes and on the job, they want to make use of their favorite devices and media, plus have access to sophisticated entertainment, information, communications and connectivity – immediately and seamlessly. And they want this experience to last the life of their vehicle. They expect the car they buy today to work with the computer, mp3 player, smart phone or other device that they will buy years from now.

But consider this: It can take years to design and manufacture new vehicles. During that period, consumer expectations are likely to change several times, along with the devices, applications and technologies they favor. And because people buy cars less often than they do technology devices, purchase cycles – and therefore development cycles – are vastly out of synch between the two industries.

To succeed, automakers need platforms that are open – and stay open – to make it fast, easy, and cost-effective to update and modify solutions over time. Ideally, IVI developers would complete a single design effort that could last through multiple generations of automobiles, technology devices, applications and more.

Challenge #2: It's Going to be a Wild Ride

Automakers *are* working hard to deliver IVI solutions that satisfy consumers. But in so doing, they must consider the unique environment of the car. Even the smoothest ride is subject to vibration, dirt, moisture, and both high and low temperature extremes. These are the normal operating conditions for a vehicle, yet considered rugged for a computing system. So automakers require systems that are reliable and can withstand these pressures.

INTEL® IN-VEHICLE INFOTAINMENT REFERENCE DESIGN

Specifications

CPU - Intel® Atom™ Processor Z520PT 1.33G

Chipsets - Intel® System Controller Hub US15WPT

Memory - 1G, DDR2, 533Mhz; (Max to 2GB)

LCD - 6.95" WVGA LCD (800 x 480 resolution)

Storage - 2.5" Internal 40GB wide temperature HDD

ODD - DVD-ROM

Graphic - Intel System Controller Hub US15WPT based

GPS module - Built-in

FM/AM Radio - Built-in

Dimension - 2 Din Size 7" (W) x 4" (H) x 6" (D), Slop down

Power Requirement - Operating Voltage: DC 12V (operating range: 9V~16V)

HD Radio - Built-in

WLAN - 802.11 b/g

Bluetooth - Built-in

CAN BUS - Built-in

HMI - Touch screen and Button

Amplifier - 40W x 4

Net Weight - 2850g

Operating System - Windows* XP

Solution: Take the Intel Route

The Intel Atom processor Z520PT and Intel System Controller Hub US15WPT were engineered for industrial temperature support, compact enclosures, and rugged operating conditions. They support multiple networking and connectivity options, I/O interfaces, operating systems and device applications. They are pin-compatible with the rest of Intel architecture and can be scaled up or down to meet the demands of an entire car line. This makes Intel architecture – and the new extended temperature version of the Intel Atom processor – an ideal platform for an IVI solution. Compal agrees.

In fact, Compal is one of the first developers to develop a universal IVI module using the extended temperature Intel Atom processor-based platform. Their design is scalable to yield a variety of IVI solutions and options. Automakers can use it throughout their model lineup, changing only the applications and user interface to differentiate features between high-end and budget models.

The Compal KAX50 IVI module is the company's first IVI solution. They chose Intel architecture because it is "perhaps the easiest to integrate with all kinds of existing digital devices and networking protocols," says Brian Chen, Line Director, Compal. "We can easily implement a solution that supports USB, PCI Express,* WiMAX, Wi-Fi, Bluetooth*, 3G/4G and a range of other connections."

Plus, Intel architecture supports most of the world's popular operating systems and applications, making it solution-ready for anxious consumers. It's possible to fully extend the PC experience into the vehicle using the Intel platform. Internet telephony, USB security cameras, even online gaming; all traditionally PC-based experiences can now be deployed in the car.

Compal says the Intel platform also addresses the consumer's preference for efficiency. For example: "The power management capabilities of the Intel® platform are good for the vehicle, because when you stop and start your car for just a few minutes, the system will wake up instantly. When it's turned off for longer periods, the Intel platform will automatically go into a deeper sleep state." This saves the battery and conserves energy; a big plus for automakers and consumers alike.

Chen believes choosing Intel architecture is a win for developers and automakers both because it saves significant development time and cost – as much as 50 percent or more. "Because so many third party solutions are designed for use with Intel® architecture, it doesn't take as much time to integrate the platform and deliver an application-ready product." What's more, standards-based Intel architecture is scalable across product lines and generations, enabling one design effort to become multiple solutions by simply changing out the processor or software. This greatly reduces development cost, speeds time to market and allows IVI developers to focus on product differentiation and meeting finicky customer requests.

A GLIMPSE AT COMPAL'S IVI ROADMAP

The Compal KAX50 IVI module is the first one on their roadmap to be fully "auto grade," which means that all components are built to withstand the rugged operating conditions of the vehicle. It's also the first to use embedded Intel architecture with industrial temperature support – an off-the-shelf computing solution that extends the digital home, office and consumer lifestyle to the vehicle.

The Compal module is full featured and solution ready, supporting several popular IVI applications, including:

Multimedia Entertainment: high definition radio, AM/FM, DVD, HDD, USB, SD/MMC, mp3 players, A/V in/out

Driver Assistance: GPS/navigation, reversing assistant, OBD information

Communications: Bluetooth*, Wi-Fi, WiMAX, CAN

Telematics: Internet access, vehicle tracking

The Compal KAX50 module supports both Windows* and Linux operating systems and comes with a 6.95 inch digital display panel (screen resolution 800x480). The human interface includes both touch-screen and button controls, while future versions will use gestures and voice recognition for additional driver-friendly commands.

The Race is On

Just imagine how much more fun and interesting the drive would be if everyone in the car was sufficiently entertained. If you never got lost getting there. If you could be productive during time spent in traffic jams or while waiting for passengers. If you could stay informed about the things you care about most. Or if you could choose from and enjoy any of the music and movies and recorded books that are stored on your home entertainment system or mp3 player.

That's the experience your customers would like to see. Compal and Intel are making it possible for you to deliver. Now. So you might never hear "are we there yet?" again.

www.intel.com/go/infotainment
www.compal.com/index_En.htm

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