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In-car Displays: A Blast from the Past

Displays have been introduced in cars more than 30 years ago. Looking back now, we see that there has been tremendous increase with respect to most metrics: screen size, amount of colors, number of pixels, interactivity, ease of use, and so on.

Through this article, we want to look back at the beginning of in-car displays, and then judging by the latest trends, find out where displays are headed and what the displays inside future cars could look like.

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The Birth of the In-car Display

Instrumentation Cluster Displays

As soon as electronics and display advancements allowed us to show information, car manufacturers have been interested in display technology. Indeed, digital displays allow directly showing the most accurate possible information because they are not bound to the same inertia as the needle on the mechanical dial gauge. Data shown by the display is an instant snapshot of the current metrics.

Trip computers were first introduced in 1977 by BMW on the 7 series and then in 1978 by Chrysler on the C2.

Figure 1: Chrysler C2 trip computer, 1978
Source: allpar.com

Figure 2: Aston Martin Lagonda electronic instrument cluster, 1976
Source: blenheimgang.com

Simultaneously, electronic instrument clusters were developed, as soon as 1976 in the Aston Martin Lagonda (pictured above) and then in 1978 on the Cadillac Seville. Those displays became widespread in the 1980s (see the Dodge 600 digital instrument cluster below) but were slowly abandoned in the 1990s because of several factors including bright light visibility according to Wikipedia [1]. Even to these days, many cars still only have a trip computer in the middle of the cluster, with round analog dials on each side.

Figure 3: Dodge 600 digital instrument cluster, 1984
Source: barnfinds.com

Infotainment Displays

It took another decade for infotainment displays to become a thing, and it happened first on the 1986 Buick Riviera [2]. This car had a digital infotainment system (pictured below) on a monochrome touchscreen that would display and control many of the car parameters such as fan and AC, radio tuner, etc.

Figure 4: Buick Riviera digital infotainment, 1986
Source: Digital Trends

According to MotorWeek it was powered by a pair of 8-bit processors [3], far from the current automotive architectures that include dedicated graphics and AI processing chips.

From then on, a logical next step was to bring color to those displays, which the sister company Oldsmobile achieved in the 1990 Toronado Trofeo.

Speaking of year 1990, it also saw the introduction of the mysterious Mazda Eunos Cosmo [4] in Japan. This car was the first car to ever integrate an OEM supplied GPS navigation device, and this was 30 years ago. It also provided all the usual dashboard controls of the GM Visual Information Center of the Riviera, but in addition also included a TV tuner to watch TV on the CRT display. The display was only included in the most expensive trim configuration, a configuration that included wooden dashboard elements from wood harvested in France and finished in Italy. The total volume was less than 9,000 cars [5].

Figure 5: Mazda Cosmo integrated color infotainment with GPS, 1990
Source: ausrotary.com

Learning from the Past

Screen Technologies

As we could see the first display technologies in use were the segmented alphanumeric displays and CRT screens, although touch interfaces were there from the start. After going through multiple innovation phases for the consumer industry, newer display trends now include OLED, Quantum Dot LED (QLED), backlight units with micro-LED matrix for more accurate dimming, auto-stereoscopic displays, and soon holographic 3D displays.

While this will no doubt simplify the way users deal with their cars, the main purpose of screens remains to display information and we can expect a reasonable and measured growth in terms of the number of displays (cluster, infotainment, passenger display, control display, e-mirrors, rear passenger displays, etc.) as well as display size, from a standard 7 or 8 inch display a few years ago to 10 and 12 inches now, and 16 inches in the near future.

Processing Power

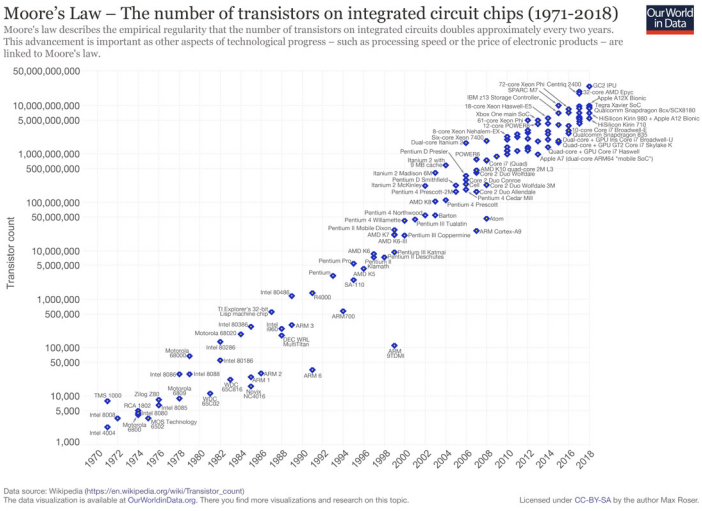
On the other hand, the more important trend we can see is how processing units evolved from the 16 bits National Semiconductor IMP-16 clocked at 0.7 MHz in the Lagonda, to the recent multicore 64 bits ARM architecture CPUs running at Gigahertz scale frequencies, and supplemented with Teraflops class GPUs.

This power improvement is far more significant than the improvement witnessed in terms of screen technology and shows no sign of stopping. This means that more and more powerful software features will be able to run on the car's display units and that this is where most of the future innovation for cars will come from. Of course, beyond visualization, current trends such as AI and natural voice recognition / speech synthesis are part of the driving force behind this additional processing power, but other unexpected applications will unavoidably surface and become important parts of tomorrow's car experience. As cars become commoditized through car-sharing and ride-hailing services, more complex frameworks will have to be run on the car itself as well, and the provision for those is already there.

Conclusion

As we went looking at the earliest designs of display systems, we realized that display systems and the hardware/software combination driving those systems, have evolved at a much different pace. While screens have barely improved in size and still suffer from the same drawbacks that they did in the early days (i.e. sunlight visibility), hardware went through countless improvements as predicted by Moore's law (see figure below) and provided more and more opportunities for software innovation. This trend is not likely to stop and builds a strong case for software innovation in the automotive industry, as can be seen at both OEM and Tier-1 level these days, with multiple initiatives and new development branches being built as we speak.

This highlights the prime position of IRYStec as an innovative automotive & software company, and the role that we have to play in this old and venerable industry.



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