The importance of "front-loading" in development

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The trend with respect to automotive electronic devices is towards increasing the complexity and sophistication of services and functions. There is no end in sight for vehicle control computerization, use of various types of sensors, and improvement in navigation and entertainment.

The number of types of media such as cassettes, CD, DVD, HDD and semiconductor memory devices is wide-ranging, and coordination of various function nodes via automotive LAN is also expected to progress beyond present levels. Also, in addition to radio, television, VICS and other broadcasts, service is intensifying via coordination with sensors using ETC, mobile communication, hotspot and other forms of bi-directional communication.

On the other hand, the importance of the three product faces (three factors), necessary for the realization of these was and will continue to remain unchanged:

1. Fine products (functions, performance, quality)
2. Low prices
3. Quickly accessibility

In upgrading in-vehicle electronic devices, "front loading in development" is a very important point in order to realize these three factors and to continue to come up with products accepted by customers. As a company as well, we place the burden on design at an early stage of development, treating the inclusion of functionality and performance as obvious measures, paying attention to the relationship between cost and quality, carrying out planning and design. Further, we ensure that the amount of backtracking to such issues from the second half of development is minimal, resulting in fast realization of products.

At this company "sincerity" is advocated as a corporate philosophy, and business is run with the customer focus, and with highest

possible quality in mind. With respect to the issue of "fine products", quality is an important matter both in terms of raising the level of customer satisfaction and from the perspective of its direct impact on company brand image and business.

On the other hand, the complexity of automotive electronic devices has had a tremendous impact on quality and cost. In order to surmount these challenges and to ensure quality, creative ingenuity is necessary at the early stages of development. In order to respond so as to anticipate change, I wish to recommend development: 1. That is not conservative, 2. That does not give up, and 3. That is independent.

In practical terms, the planning stage is the early stage of development, and it is here that architectural decisions become very important. Generally basic functions and structure are sufficiently discussed. However, discussion of self-diagnostics and other additional features tend to be overlooked. For example, today when use is starting of automotive LAN and communications functions, the addition of loopback functions found in general communications equipment, as well as the utilization of services from product manufacturing are necessary. Depending on the function, the decision of whether or not to make it user-open is another important issue.

Also, a very important point with respect in initial design is to give consideration to and to check for the effect on quality of device "variance". Various types of simulation and tolerance analysis are implemented with respect to the conditions that give rise to irregularities such as 1. Variation in use and environmental conditions (fluctuations in power, temperature etc.), 2. Degradation, and 3. Variance in components, and designs and items are then created based on these results, making it possible to surmount difficulties with machine complexity and to ensure quality.

However, recent automotive electronics system complexity should necessarily be considered as a system, rather than stopping at a single electronic item. For example, system simulations of the quantity of communication and busy "variance" between LAN and each of the communication nodes, as well as design, checks and other issues related to connections with machines developed by other manufacturers and the proliferation of functions in the future become more important than ever before.

I affirm on a daily basis the belief that "front loading in development" is important for the realization of products demonstrating the three factors mentioned earlier, and further that we should accept the challenge and be creative in order to put this into practice in an environment of fierce change.