6 Environmental Considerations and Contributions of Products and Technologies

The Fujitsu Ten Group established a system for Product Environmental Assessment in 1995. We implement assessments for every product from the design stage and only put into production the designs that have cleared our set of standards. Furthermore, we are promoting environmental consideration in products by implementing a system of recognizing as "green products" those that have implemented significant improvements, especially in energy and resource conservation and the elimination of harmful substances.

In fiscal 2002, 25% of our newly designed products, 547 out of 2150, qualified as green products.

Green Products

Symbol identifying green products

1. Working to Meet Europe's End-of-Life Vehicle Directive

Europe has implemented the End-of-Life Vehicle (ELV) Directive, beginning in July 2003, which, with limited exceptions, prohibits the inclusion of lead, cadmium, hexavalent chromium, and mercury. We had already completed the elimination of the use of lead and cadmium by July 2003.

From 2004 on, we will work towards the complete elimination of the use of prohibited substances part-by-part, staying ahead of ELV Directive restriction deadlines.

Periods for Restriction of Substances and the Fujitsu Ten Group's Elimination Plan

ELV restriction period
Fujitsu Ten Group elimination period (based on product shipments)

	Parts Containing Substance	Fiscal 2003	Fiscal 2004	Fiscal 2005	Fiscal 2006	Fiscal 2007
Lead	PVC (electric wire sheaths, tubes, electrolytic condenser sleeves), terne coated sheets, coatings	July / April	Completed elimination before European deadline			
	Light-bulb glass	January	January			
	Aluminum for machine processing (1% < lead ≦ 2%)	July	July	July	(Lead ≦ 1% to be restricted from July 2008)	
	Solder	Lead-free with the exception of high-temperature solder in parts		Restriction period not yet determined / July (beginning with new products)		
Cadmium	Motor commutators, fuses, connectors, pigments, NiCad batteries	July / April	Completed elimination before European deadline			
	Thick film paste			July	July	
Hexavalent chromium	Chromate treatment		January			July
Mercury	Liquid crystal backlights			Restriction period not yet determined		

■ Measures to Eliminate Hexavalent Chromium

Hexavalent chromium is used in the zinc-coating of steel plates in, for example, brackets and deck chassis, and of screws. We are developing alternative technologies in order to eliminate its use entirely by the end of 2004.

In 2002, we began to use alternative parts that have had their quality verified.

Airbag control computer

Engine control computer

Products that use zinc-coated steel plates that are free of hexavalent chromium

■ Lead-Free Solder

From July 2005, we intend to use lead-free solder in all new products. For this purpose, we are working on establishing new soldering methods, and changing to different parts.

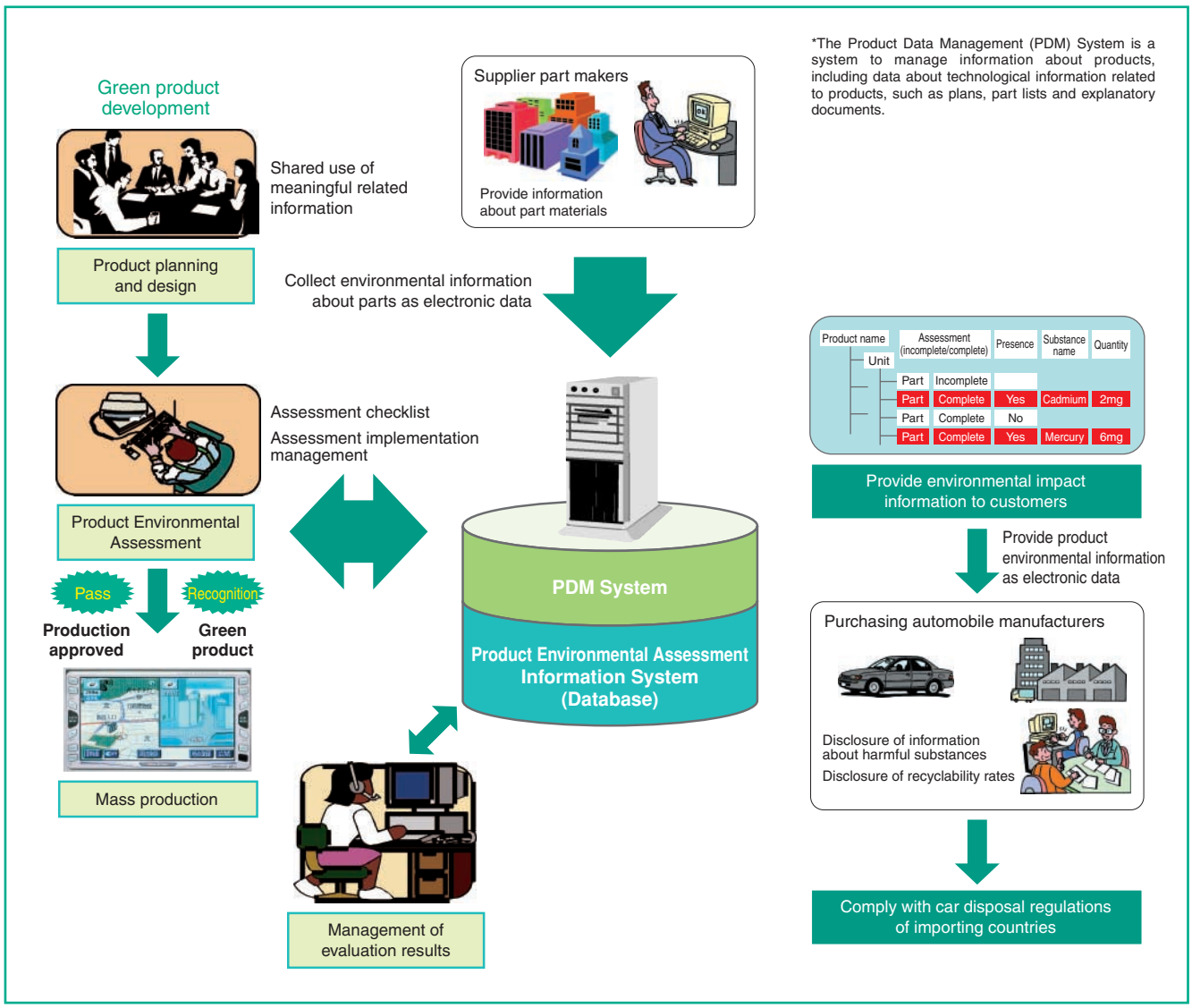
In July 2002, we put our first product with lead-free solder on the market, the Eclipse AVN3302D, an audio-visual unit with a built-in DVD-based navigation system. In 2003, we will introduce other customer-oriented audio devices and we will continue to expand the number of products that use lead-free solder from now on.

ECLIPSE AVN3302D

Main circuit board that uses lead-free solder

2. Product Environmental Information System

We created a Product Environmental Information Management System that is linked with our PDM System*. About 600 designers are using it as a tool to support the development and design of green products. We are going to improve this system and use it as a means to provide automobile manufacturers with quantitative product environmental information in a timely manner.



*The Product Data Management (PDM) System is a system to manage information about products, including data about technological information related to products, such as plans, part lists and explanatory documents.

3. Environmental Consideration in Speakers

Seeking to reduce the environmental impact of 11 types of speakers sold in North America, including the SW918 Pro sub-woofer, we changed the construction of the speakers so that their magnets can be removed. Speakers can be divided into basic parts, including magnets, cone paper and frames. When speakers break, usually it is the moving parts such as the cone paper and coils. The magnets themselves do not have any moving parts and the chance of one breaking is extremely low, so their reuse could contribute to the protection of material resources and the reduction of transportation energy costs.

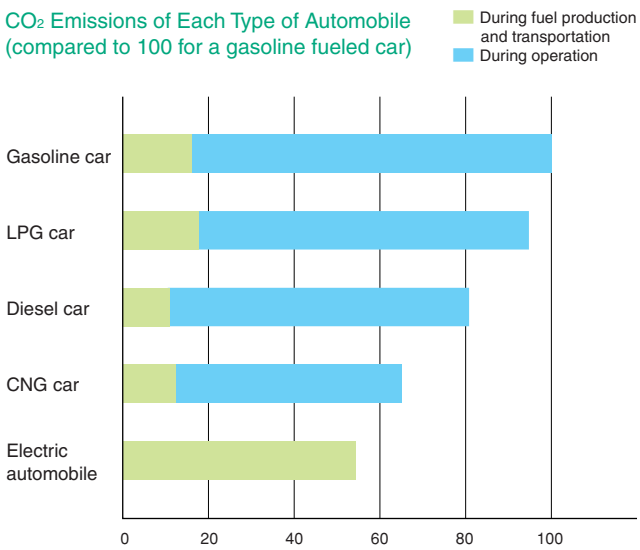
Furthermore, repair costs for customers could be reduced if their speakers break. Other merits could be the ability to leave the magnet in place when, in the future, different color cone paper is sold, so that only the paper needs to be replaced.

4. Reduction of Automobile Gas Emissions: CNG Engine Control Computer

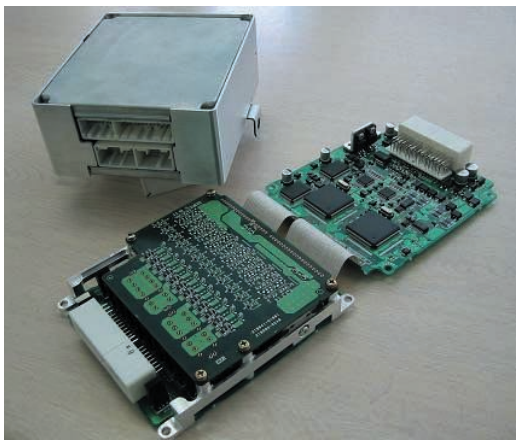
The Toyota Motor Corporation uses our control computer for the Compressed Natural Gas (CNG) V12 engine in their flagship saloon model, the Century.

The CNG engine cuts the amount of global warming causing CO_2 emissions by 20% from standard gasoline engines. In addition, it also reduces the emission amounts of NOx, CO and HC, which cause photovoltaic smog, acid rain and other environmental pollution, and it emits almost no SOx or particulate matter (PM), making it a green engine. (75% reduction from 2000 standard gas emissions is equivalent to the ultra-low emission level.)

CO_2 Emissions of Each Type of Automobile
(compared to 100 for a gasoline fueled car)



CNG V12 engine



CNG engine control computer

5. Improving Automobile Fuel Efficiency with the Engine Control Computer and the Intelligent Idling Stop Computer

The Toyota Motor Corporation's Vitz U-Intelligent Idling Stop achieved the best fuel efficiency in its class at 25.5 km/L. Fujitsu Ten was responsible for the development of the engine control computer and the intelligent idling stop computer.

■ Engine Control Computer

In addition to CVT control, we added new items to improve fuel efficiency.

CVT Control

Continuously Variable Transmission (CVT) can set gear ratios at any time in response to traveling conditions by taking advantage of a system with two pulleys that can freely change their effective diameters. One pulley on the engine side and one on the tire side are connected by a belt in this structure. Use of this unique feature can greatly improve efficiency by controlling the transmission gear ratio to keep the engine at the revolution rate with the maximum torque.

Battery Charging Control System

This system manages electric voltage generation according to vehicle moving conditions, speed increase and decrease. This should reduce engine load from electricity generation and improve engine fuel efficiency.

Fuel Pump PWM Control

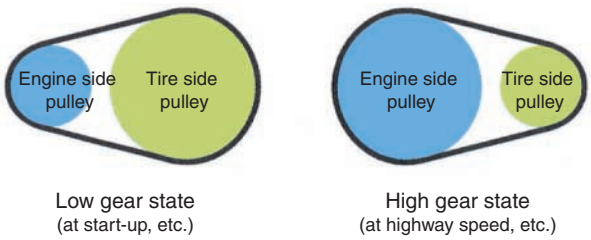
Pulse Width Modulation (PWM) control manages the amount of fuel used by responding to factors including the engine revolution rate. Use of PWM should result in lengthening the use life of the fuel pump and reducing the amount of electricity consumed.

Cooling Fan PWM Control

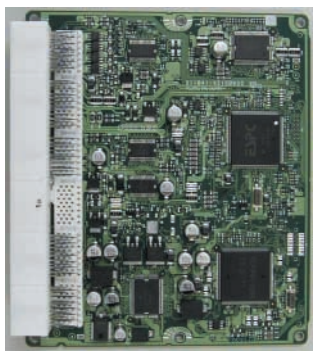
PWM control manages the cooling fan by responding to the engine state, resulting in both improvement of its cooling function and quieter operation.

External Control Continuously Variable Capacity Compressor

With an external control continuously variable capacity compressor, compressor operation capacity can be managed in response to air-conditioning burden, resulting in better energy efficiency.



Continuously Variable Transmission (CVT)

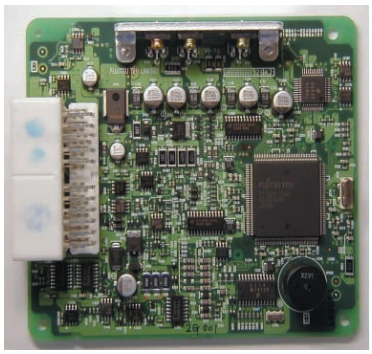


Engine control computer

■ Intelligent Idling Stop Computer

This system causes the engine to stop and restart automatically when the vehicle comes to a halt and recommences movement. When the gearshift is set to drive (D) and the break is applied, the engine will stop along with the vehicle, and then restart when the break is released. By stopping the engine with the vehicle, fuel efficiency should improve by 2 km/L.

In past systems, the engine stop function only worked when in neutral (N) gear. This is the first system in Japan to add the function of automatic engine stop with vehicle stop in the drive gear.



Intelligent idling stop computer