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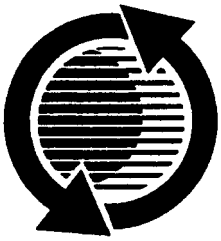

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ABSTRACT

A new multi-AV system was developed for use in the 1991 Cedric,Gloria and Cima models. This system features the world's first production vehicle application of an optical fiber gyro, which dramatically improves position finding accuracy. New map-matching logic was also created and the map database was expanded so that the map-matching function can be used throughout Japan. Another first-ever feature in production vehicles is the compatibility with roadside beacons of the Vehicle Information and Communications System (VICS) ,enabling reception of Intersection information and automatic correction of vehicle position based on the data received. A touch screen has been adopted for greater ease of operation,with screen switches newly provided for air-conditioner controls and a cellular car phone. This paper describes the configuration, functions and performance of the new multi-AV system.

1. INTRODUCTION

Although the number of vehicles on the road in Japan is continuing to increase every year, the construction of roads and highways is not keeping pace with the rise in vehicle ownership. This has given rise to a situation where traffic congestion is becoming worse with each passing year. Existing traffic control systems alone are unable to prevent this worsening of traffic congestion or the increase in traffic accidents, both of which are directly related to the rising number of vehicles on the road.

In view of this situation, there is a recognized need to introduce new traffic control and management systems in Japan. The ideal form of such a system is thought to be one that would provide drivers with information on traffic congestion in real time, based on transmission of communications from road traffic information centers to individual vehicles via a network of roadside facilities. An onboard navigation system would then use that information to infer the shortest route to a particular destination and display it on a CRT in the passenger compartment for use by the driver. Work is now proceeding toward the implementation of such a system, which is called the Vehicle Information Communication System (VICS).

Nissan Motor Company has for many years been engaged in R&D work on road and traffic information systems aimed at fostering their advancement and earliest possible implementation. This work is based on the recognition that such systems have tremendous utility and the potential to make significant contributions to society. In conjunction with the launching of a road and traffic system using a network of roadside electronic beacons, Nissan has developed and commercialized a new Multi-AV System. This system, offered in the Cedric, Gloria and Cima models, is compatible with the network of roadside beacons and is intended to promote greater use of the system for communicating road and traffic information to drivers.

This new Multi-AV System incorporates substantial improvements over previous versions of the system. It features the world's first production vehicle use of a fiber-optic gyroscope, which provides greatly improved position accuracy for navigation use. It also includes newly developed map-matching logic,

with a map database that covers the principal trunk roads throughout Japan. In addition, repeated evaluations were made of the man-machine interface during driving with the aim of improving ease of operation and safety. The results of these evaluations have been built into the system to achieve a high level of practicality.

2. System Configuration

The latest Cedric model is shown in Photo 1 and the appearance of the center console area is shown in Photo 2. Figure 1 shows the configuration of the Multi-AV System and Fig. 2 gives a block diagram of the system.

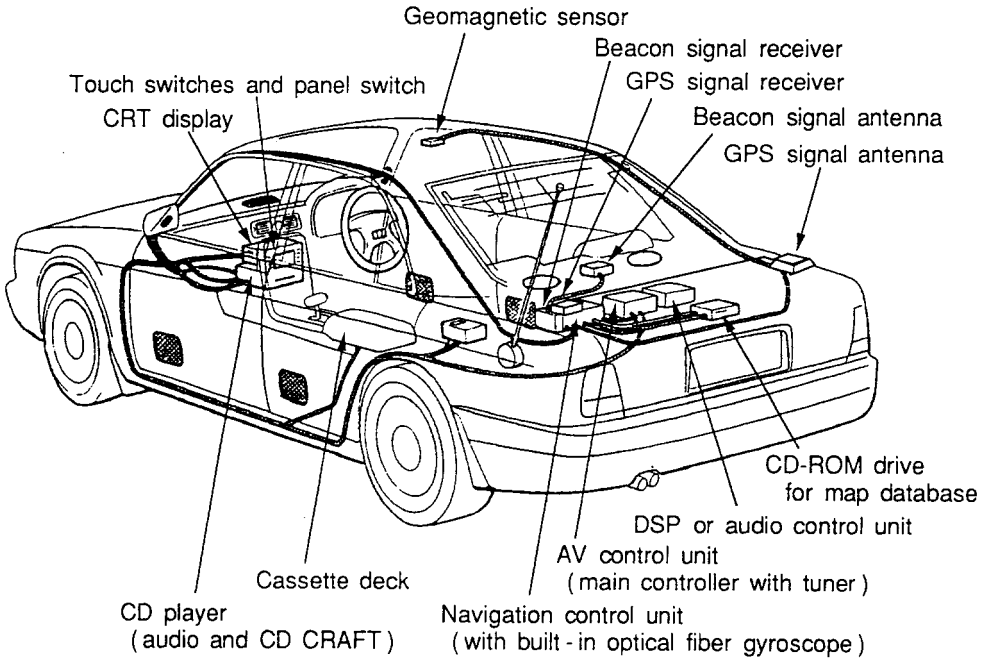

Fig. 1 Configuration of Multi-AV System

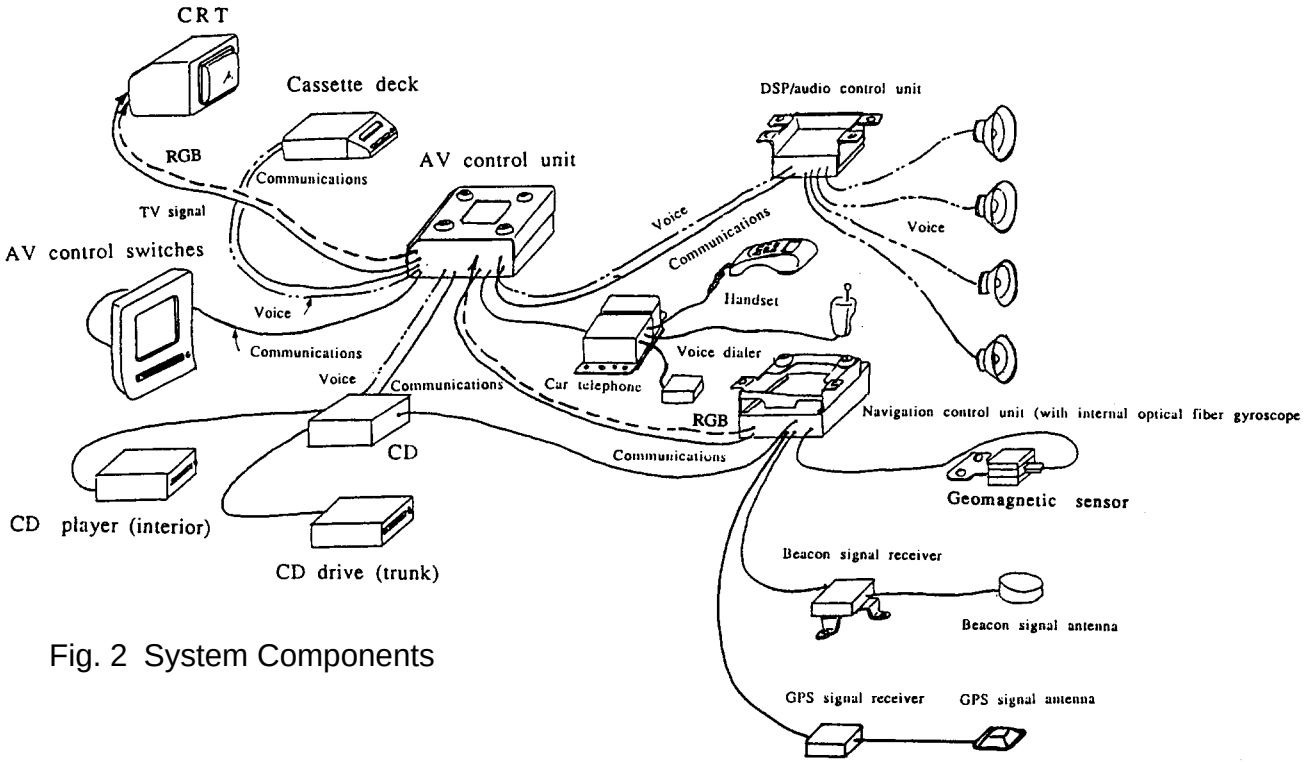

Fig. 2 System Components

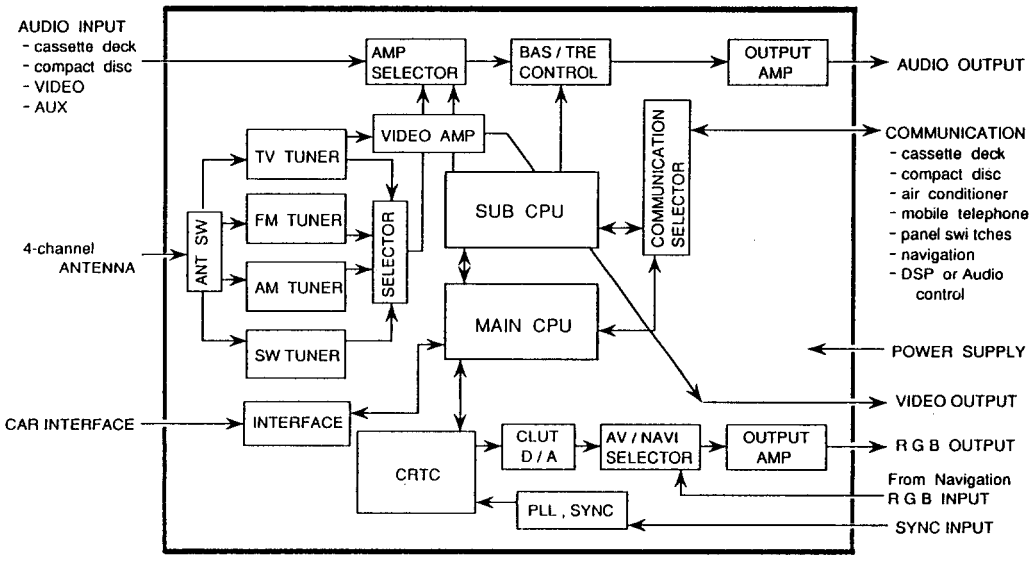

Fig. 3 Block Diagram of AV Control Unit

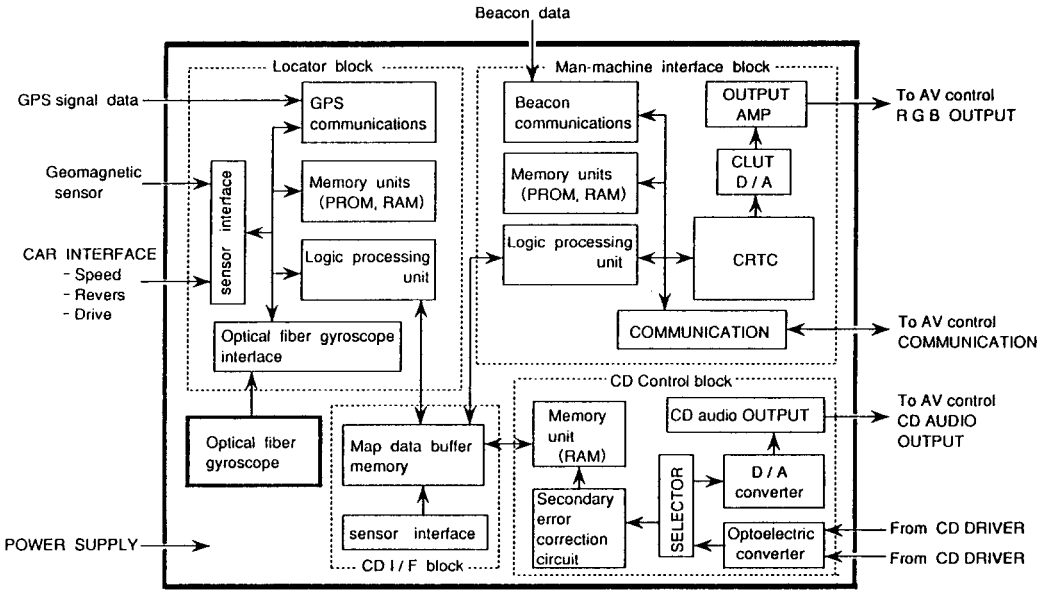

Fig. 4 Block Diagram of NAVIGATION Control Unit

An AV control unit installed in the trunk serves as the controller that manages the overall operating status of the system. As shown in Fig. 3, other main components making up the system include the TV and radio tuners, audio selector and the image processing unit.

Connected to the main CPU are the navigation control unit, which serves as a subordinate CPU, cassette deck, compact disc player, panel control switches and other units.

Optional equipment includes a digital signal processor (DSP), a car telephone control unit, a beacon signal receiver for road and traffic information and a GPS (Global Positioning System) signal receiver. The Multi-AV System automatically judges whether either of the latter two receivers is present. That judgment is activated by a connection command signal included in the communications format. The system then changes to the relevant screen display and operation menu.

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