

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR00/01007

A. CLASSIFICATION OF SUBJECT MATTER
IPC7 G01C 22/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

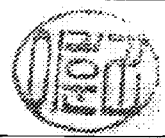
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 99-201888 B (HYUNDAI MOTOR. CORP.) 17 MARCH 1999	1 - 14
Y	KR 94-3077 B (LEE, SANG MOON) 13 APRIL 1994	12
Y	KR 97 - 770 B (LEE, JUNG JAE) 18 JANUARY 1997	3, 13, 14
Y	KR 98-61482 A (KIM, BONG TAK) 7 OCTOBER 1998	2
Y	KR 99-242203 B (HYUNDAI MOTOR CORP.) 9 NOVEMBER 1999	4-7

Further documents are listed in the continuation of Box C. See patent family annex.

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[Continued on next page]

(54) Title: APPARATUS FOR REMOTE ACCESS OF VEHICLE COMPONENTS

(57) Abstract: Vehicle internetworks provide for communications among diverse electronic devices within a vehicle, and for communications among these devices and networks external to the vehicle. The vehicle internetwork comprises specific devices, software, and protocols, and provides for security for essential vehicle functions and data communications, ease of integration of new devices and services to the vehicle internetwork, and ease of addition of services linking the vehicle to external networks such as the Internet.



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APPARATUS FOR REMOTE ACCESS OF VEHICLE COMPONENTS

BACKGROUND

Field of the Invention

5 This invention relates to the field of intelligent networks that include connection to the physical world. In particular, the invention relates to providing distributed network and Internet access to processors, controls, and devices in vehicles.

Description of Related Art

10 Typical modern vehicles include an information network within the vehicle, installed by the manufacturer. Many of the devices on this network are typically connected via a number of networks for different functions. In the near future it is expected that some of these functions will be consolidated so that a diverse set of applications will use a common Original Equipment Manufacturer (OEM) bus. The
15 Control Area Network (CAN) is a typical protocol used for such networks in the automotive industry. By this means, sensors, actuators, and computing elements for controlling the operations can all be linked in a common environment. This reduces the wiring within the vehicle, and allows for cost reduction in that the number of different kinds of interfaces is vastly reduced. Because the OEM bus or functionally equivalent set
20 of networks carries messages related to essential safety and security operations of the vehicle, only devices authenticated by the manufacturer can be added. In particular, the OEM bus needs to be guarded against devices that may cause congestion through repeated service requests, or malicious devices that issue commands that may imperil vehicle operation or safety. Further, each manufacturer may potentially use different protocols on
25 their own set of buses or proprietary buses. Consequently, it is costly to add consumer electronics to vehicles, or to perform upgrades of the information network.

 In order to address some of the limitations of present-day vehicle information networks, the Automotive Multimedia Interface Consortium (AMI-C) has developed a set of common specifications for a multimedia interface to motor vehicle electronic systems.
30 A particular aim is to accommodate a wide variety of consumer electronic and computer-

based devices in the vehicle. The AMI-C standard network architecture, adopted by nearly all automobile manufacturers worldwide, reduces time to market and facilitates upgrades of vehicle electronics, supports deployment of telematics by providing standard interfaces, and reduces relative costs of electronic components. A variety of standards are being considered for AMI-C buses, among them IEEE 1394, MOST, and Intelligent Data Bus (IDB-C), with the possibility of multiple AMI-C approved buses within a vehicle.

Particular goals of the AMI-C forum are directed towards device interoperability, software interoperability, telematics support, logical security management, failsafe operation, and remote operation and service support. Device interoperability relates to the issue that consumer electronic devices and computer devices must interoperate with other systems installed in the vehicle, including communication, navigation, diagnostic and other systems.

Software interoperability relates to the issue that systems must support convenient, automatic discovery and initialization of software and hardware introduced into the vehicle by consumers, service organizations, or the vehicle manufacturer. Software portability, serviceability, and upgradeability are requirements within software interoperability.

Telematics support relates to the issue that voice and data communication must be provided for each of the installed devices or devices that may have been introduced into the passenger compartment. Logical security management relates to the issue that security services must be provided for access to vehicle data and systems. In particular, isolation must be provided between essential vehicle systems and any unauthorized local or remote access attempts.

Failsafe operation relates to the issue that some means for physical isolation between consumer and vehicle OEM bus must be provided. Thus, consumer electronics cannot be allowed to interfere in any way with the safe operation of the vehicle. Remote operation and service support relates to the issue that the network system must provide remote access for authorized vehicle users and service providers.

While the goals of the AMI-C forum include desirable features, a standards body only issues requirements without providing means for solution. Beyond the requirements expressed by the AMI-C forum, it is also desirable to have a complete, lasting solution for

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