

車輛控制網路技術之研究及車上電瓶電量即時監控網路之研製

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摘要

現在消費者對於汽車的舒適性、安全性、馬力性能，以及較低的燃油消耗率等要求日益提高，而各國政府對於廢氣排放控制標準又日益嚴格，因此一輛現代的高級汽車內包含有許許多多的功能裝置，如防鎖死煞車系統、引擎控制系統等，使得汽車不僅線束重量增加、製造困難，更因而降低汽車的品質可靠率。世界各大汽車廠、研究單位、汽車零組件供應商、儀器製造商等不斷尋找相關的因應對策，而汽車控制網路為其解決方法之一。汽車控制網路系統中，每個節點皆能傳送與接收網路資料，以享資源共用之益處。本研究以目前汽車業界中最為盛行之控制區域網路(CAN)為研究重點，並自訂簡易協定，模擬電氣負載作動情形並進行引擎怠速控制。利用筆記型電腦透過資料擷取卡(DAQ)擷取電氣負載作動訊號後，經由程式模擬成 CAN 封包形式，經由 PCMCIA-CAN 卡送出到匯流排網路上，再由桌上型電腦之 PCI-CAN 卡接收，經計算處理以找出最佳的怠速值，最後再透過 PCI-DAQ 卡控制引擎的怠速空氣控制閥步進馬達進行怠速控制。未來計畫將以單晶片取代目前之電腦任務，研發出能量測電氣負載之電

壓及電流值、具有 CAN 能力之智慧型感測器，並架構一電瓶殘電量即時監控網路系統。

關鍵字: 電池電力供應;即時偵測網路系統;控制器區域網路

The Research of Controller Area Network Technology and the Construction of a Real-Time Vehicle Battery Residual Power Monitoring Network System

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Abstract

The requirements relating to driving safety, driving comfort, exhaust emissions and fuel economy for vehicles are becoming more and more stringent. This entails more electronic control units and more complex wiring systems in the vehicle, and more intensive information exchange between control units. A well-engineered solution is necessary to reduce the size and weight of wiring harness and to ensure that the vehicle's quality and reliability can be maintained, or even improved. One of the technologies to achieve these goals is the vehicle control network. In a vehicle control network, each node can access the network bus and share data with one another. Currently most widely used vehicle control network is the controller area network (CAN), which is one of the focuses of this study. By applying CAN technology, whenever the starting motor, air conditioning, lighting system and power windows are functioning, these signals are acquired by a notebook through data acquisition card (DAQ card). The data are encapsulated into CAN frames and sent to central control computer (a desktop) through CANbus. The desktop then decodes the frames, calculates the corresponding optimal engine idle speed, and sends out the control signal through another DAQ card to the idle air control valve stepping motor to adjust the engine idle speed. In the future, a smart transducer which can measure the current and voltage of in-vehicle electrical devices, will be developed. Also, based on CAN technology, the vehicle's battery-residual-power can be calculated and displayed on vehicle's instrument panel for real-time monitoring.

Key words: Battery power supply;Real time monitoring network system;
Controller area network (CAN)