

# In Vehicle Communication Interface

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**Abstract**— Generally the ECU manufacturers offer a dedicated diagnostics unit for each type ECU/model combination. This situation can lead to proliferation of several diagnostic unit. we proposes special kind of VCI development which will be supported today's modern GUIs device platforms like android. Android is the latest Software platform for mobile Device applications. Resources for android development is easily available in market like Development IDEs, APIs, Hardware Simulators for development .With the help of android platform we can easily log data in to handheld mobiles which will be easily carried and available in current market. For same VCI should capable to connect such platforms. Wireless technology plays an important role in today's technical products and have a great need .Wi-Fi development with this special kind of VCI will play important role in vehicle diagnostics where need of cables will remove from diagnostic activity. We can directly communicate with VCI through Wi-Fi and android based software.

## I. INTRODUCTION

In Vehicle Diagnostics Interface is Interface Module Designed For Vehicle Communication Interface For Different Standard Communication Protocol Supported In Vehicle ECU

Existing VCI have several problems as, High investment in several types of diagnostics units, High maintenance. ,High cost, The unit needs to be upgraded for every revision of hardware/software of ECU. Logistics problems of providing correct type, of diagnostics unit at dealer locations.

To address above issues we proposes special kind of VCI development which will be supported today's modern GUIs device platforms like android. Android is the latest Software platform for mobile Device applications. Resources for android development is easily available in market like Development IDEs, APIs, Hardware Simulators for development .With the help of android platform we can easily log data in to handheld mobiles which will be easily carried and available in current market. For same VCI should capable to connect such platforms. Wireless technology plays an important role in today's technical products and have a great need .Wi-Fi development with this special kind of VCI will play important role in vehicle diagnostics where need of cables will remove from diagnostic activity. We can directly communicate with VCI through Wi-Fi and android based software. There is n number of display devices available for android platform in various sizes and prizes. we can use these devices as vehicle dashboard system also which will remove complex dashboard device.

## II. SYSTEM ARCHITECTURE

### Propose Hardware Block Diagram

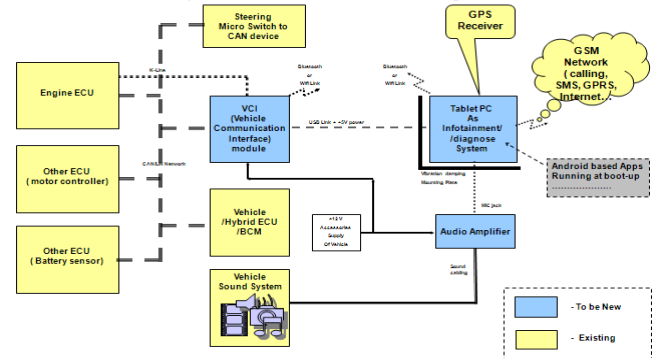


Figure 1: System architecture

Development Android application which is capable of using all the Tablet features plus extra features as follows :-

- Music system (developed audio amplifier to connect to vehicle sound system).
- GPS system (link with Map my India).
- GSM Networking features (calling, SMS, GPRS etc...).
- Data interface to vehicle ECU through VCI (vehicle communication interface) module.
- Hybrid information display panel (engine rpm, vehicle speed, fuel level, etc).
- BCM features like windows up-down, AC on/off, AC FAN speed.

## III. VEHICLE ECU CIRCUIT

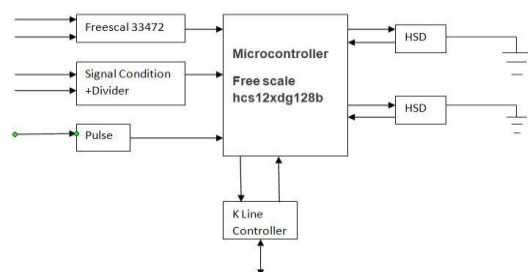


Figure 2: Vehicle ECU Circuit

Above figure shows the block diagram of vehicle ECU demo hardware. Four main layers for this block diagram as follow :

- 1] I/P and Signal conditioning
- 2] Microcontroller

- 3] O/P
- 4]K Line Interface.

Free scale 33472 chip is used for connecting Inputs for the ECU Side. Microcontroller of free scale is used which is hcs12xdg128b. At o/p side Load is attached line controller will manage the Bi directional Data Bus for transmission of data on K Line using ISO14230 protocol. Signal conditioning will be used for supply input to the controller. Pulse will be designed for the timing operations of the microcontroller.

#### IV. HARDWARE BOARD

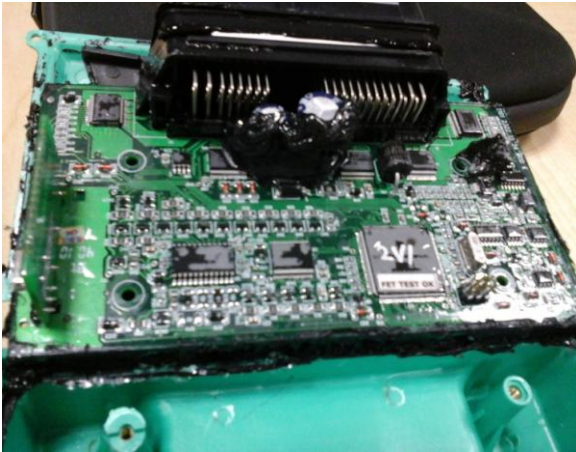


Figure 3: Hardware Board Design

This picture shows demo hardware designed as per above block diagram. Hardware is tested for k line communication. I/O's can be connected and respective data will be manipulated through microcontroller.

#### V. ADVANTAGES AND DISADVANTAGES

##### Advantages:

- It can be implementing to any passenger vehicle.
- Very cheap solution using Tablet PC on market.
- Vehicle weight reduction or fuel economy.
- VCI module can be later use for wireless replacement of existing diagnostic system (CCP CAN-USB).
- Remove Audio/music system module with just Amplifier. Get control from steering.
- Android development tool is free and open-source.
- Reduce slip-ring on steering by using CAN-base Micro-switch.
- USB based power supply solve on-board Tablet charging.
- Tablet PC can be take-off for personal/other uses.

- Additional functionality which can be added in future:-
- Rear view Wi-Fi /wired base camera, integrated to android application.
- Front night view camera/ thermal imaging for driver assist, integrated in android application.

##### Disadvantages:

- Bluetooth and Wi-Fi uses same frequency spectrum in the ISM band.
- SPP profile of Wi-Fi is not same in different tablet PC/Mobile phone.
- Wireless security and un-deterministic communication. USB guided communication will solve this issue.
- Tablet/Tab PC is not recommended to use as a vehicle. Improper packaging and vibration can damage the device easily.
- Maintenance of Android application to cope-up with new Device and fast upgraded Android OS.
- Mounting Tablet PC, Connecting USB and MIC jack every time before driving might be a problem for some people. For those people permanent mounting of Tablet PC might be a good solution.

#### VI. CONCLUSION

Wireless technology plays an important role in today's technical products and have a great need. Wi-Fi development with this special kind of VCI will play important role in vehicle diagnostics where need of cables will remove from diagnostic activity. We can directly communicate with VCI through Wi-Fi and communicate with android based software. There is n number of display devices available for android platform in various sizes and prizes. We can use these devices as vehicle dashboard system also which will remove complex dashboard device.

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