Wireless ECU Monitoring System

Team WEMS

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Introduction

- **ECU (Electronic Control Unit)** – responsible for monitoring and controlling engine parameters (fuel injection ratio, RPMs, etc).
- ECU keeps track of vital engine performance statistics that can be used for diagnosing of malfunctions.
- Notifies of problem through “Check Engine” light.
- Provides OBD-II (OnBoard Diagnostics) connector to retrieve information.
ECU and OBD-II

ECU

OBD-II

http://www.carplugs.com/images/Obd.jpg

http://www.ashspecz.com/ashspec/ECU/16-bit%20images/16-bitECU-1.jpg
WEMS

- **WEMS** - Wireless ECU Monitoring System.
- WEMS is a system for wirelessly monitoring ECU parameters via a personal computer.
- These parameters can be used to diagnose current engine malfunctions or help to predict future malfunctions.
- Most OBD-II scanners are intended for in-shop diagnostics. WEMS will provide logging during vehicle operation.
Features

- Provide logged and real time ECU data to the user through a wireless interface.
- Notify the user when statistics reach specified thresholds.
- Display and clear ECU error codes (through LCD and buttons or wireless interface).
System Diagram – Car Module

- ELMB27 Support Circuitry
- ELM327
- Serial
- ATMega 128
- Debug LCD
- Serial
- XBee Pro
- Power Supply Unit
- Car ECU
System Diagram – PC Module

XBee Pro <-> FTDI FT232R <-> USB <-> PC

Power Supply Unit
Major Components

- Wireless transmission/reception – XBee Pro.
- UART to USB – FTDI FT232R.
- Atmel ATmega 128.
- ELM327 ODB-II interface IC.
- Power supply circuitry.
## Cost Analysis

<table>
<thead>
<tr>
<th>Component</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELM327</td>
<td>$26</td>
</tr>
<tr>
<td>J1962M Cable</td>
<td>$16</td>
</tr>
<tr>
<td>2 x XBee Pro</td>
<td>$32 x 2</td>
</tr>
<tr>
<td>ATmega128</td>
<td>$15.00</td>
</tr>
<tr>
<td>1 x UART to USB (FTDI)</td>
<td>$5</td>
</tr>
<tr>
<td>1 x LCD</td>
<td>$8</td>
</tr>
<tr>
<td>Miscellaneous components</td>
<td>Estimated $10-$15</td>
</tr>
<tr>
<td><strong>Estimated total cost</strong></td>
<td>$144-149</td>
</tr>
</tbody>
</table>

A similar product, the ElmScan 5 Bluetooth costs $200. Another product offered by the same company (that provides no wireless connection) costs $140.
Questions?