Continental

Automotive Systems

Product Description Document (PDD):
UHI-BTIM

Version: Draft 1

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Abstract:
This document defines the functional baseline for the UHI-BTIM release including the system and subsystem architectures, itemized feature list, and high-level feature descriptions.

Revision History:

Date dd-mm-yyy	Revision	Revision Author	Comments
20-06-2006	Draft	U. Schaefer	Initial Version
10-08-2006	V1.0	Kunitz/Zoidl	Various corrections

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1. Purpose

This document defines the functional baseline for the UHI BTIM release including the system and subsystem architectures, itemized feature list, and high-level feature descriptions offered in Ref [1]. This document is intended for use in defining the framework and domain of the detailed system requirement specifications for BTIM development not to describe the design of the product.

2. Overview

UHI Bluetooth Phone Module is the Continental Telematics BTIM release for CDMA and GSM Bluetooth Handsfree communication products. It is an instance of what is commonly referred to as a Class1 BTIM within the Continental Telematics architectural framework. It consists of the Bluetooth Phone Module (BTIM).

The UHI-BTIM will provide consumers with the ability to make and receive hands-free personal calls within their vehicles by interacting with the BTIM through in-vehicle HMI. The BTIM uses the capabilities within the consumer's personal Portable Phone connected via Bluetooth to access the cellular network. Key feature is high quality handsfree audio processing . Additionally, the BTIM provides run-time and on-demand diagnostics capabilities.

There is only one BTIM variant.

2.1 System Architecture

The system architecture diagram is presented to illustrate the major end-to-end system entities and their relationship to the UHI-BTIM. Figure-1 specifies those components needed for the completion / packaging of the UHI-BTIM system.

The UHI-BTIM will have the ability to operate with a limited number of third party portable devices that are either compliant with the supported Bluetooth profiles.
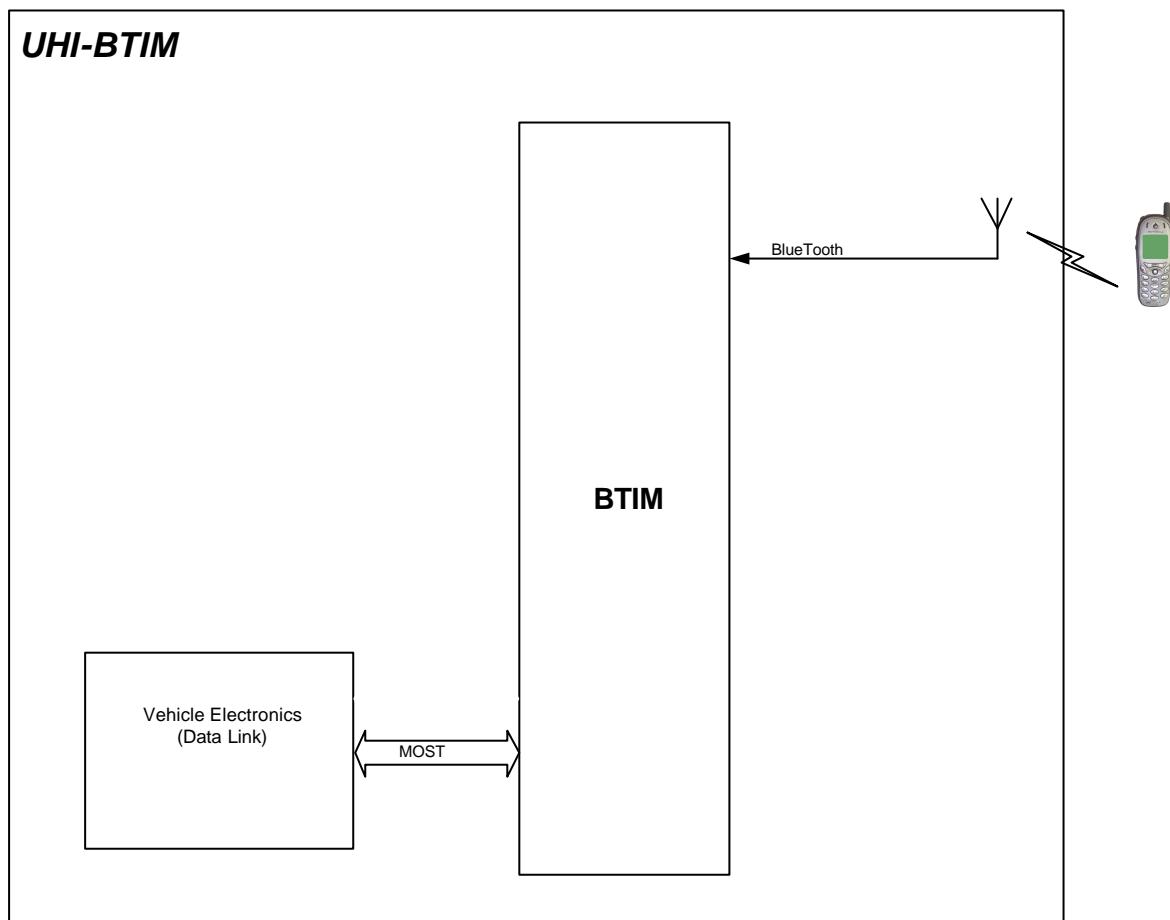
Figure 1: System Architecture Diagram for UHI-BTIM

2.2 UHI-BTIM Sub-System Architecture
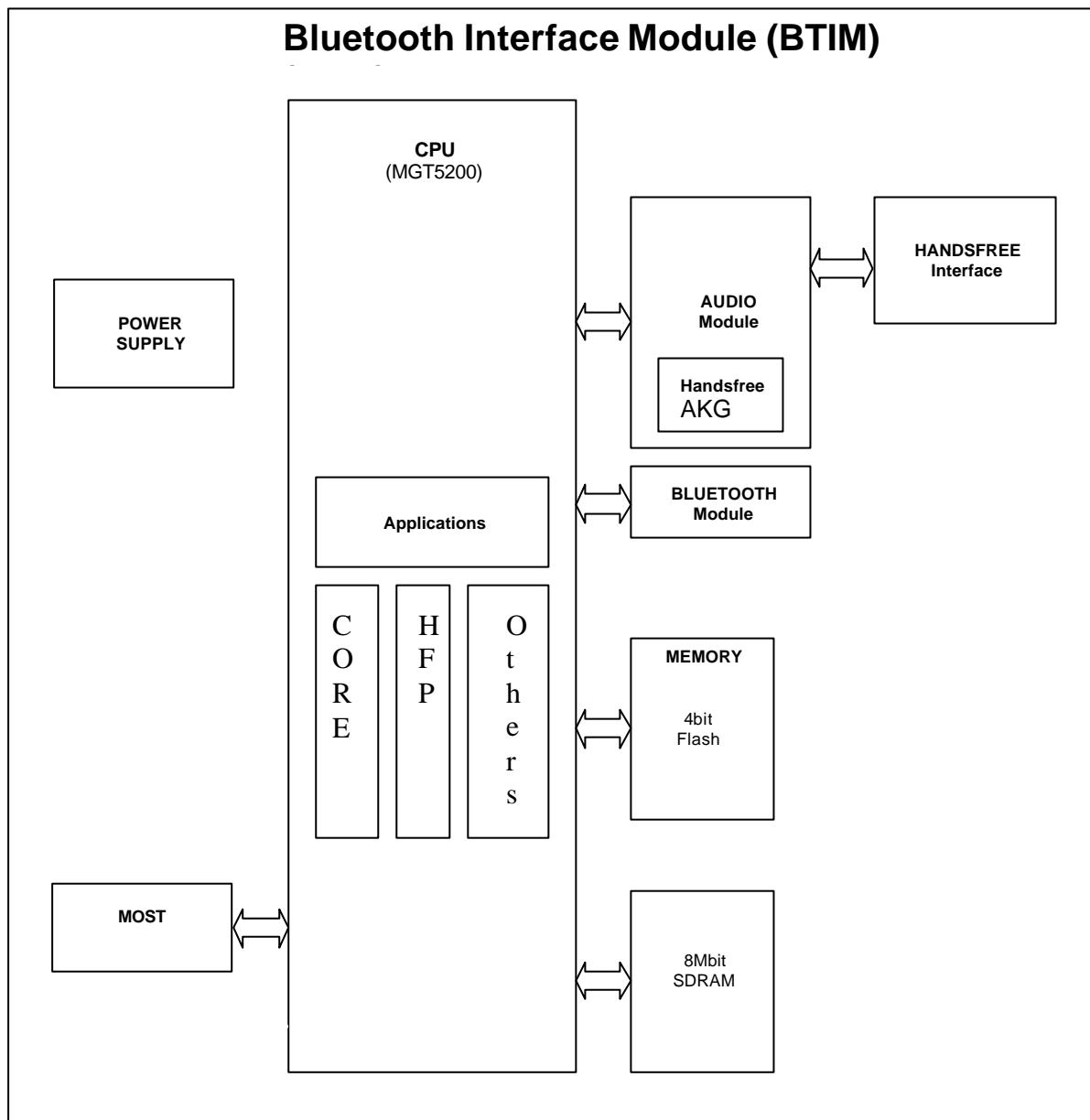
Figure 2: UHI-BTIM subsystem architecture.

3. Feature Matrix

This section contains more detailed specification of the system behaviour and shows how components collaborate for achieving this system behaviour.

Bluetooth Profiles

- Core
- Handsfree

Operations and Maintenance

- BTIM Self Diagnostics
- End of Line Configurable Parameter Management
- Service/Dealer Diagnostics

Handsfree

- Echo Cancellation
- Noise Suppression

HMI

- BTIM Status Reporting
- Command Interface from HMI

Personal Calling

- BT Device status (Network Signal Strength, Roaming Indication) *
- Mobile Originated
- Mobile Terminated
- DTMF Send

Phonebook

- List
- Speed Dial

Power Management

- Wake-up from MOST
- Delayed Power Down

System Interfaces

- Standard MOST
- External Bluetooth Antenna

Enablers

- Processor
- Static Memory
- Dynamic Memory

Physical

- Size Max(mm) = 133 (W) x 194 (L) x 30 (H)
- Mass Max = 570 grams

Connectors

- Main I/O – 32 Pin Tyco Automotive style with positive locking and keying
- Bluetooth Antenna – Fakra style with zinc die-cast body, code A, exceeding USCAR requirements and Fakra industry standards.
- MOST – Standard 2 channel / 4 pin optical transmitter/connector from either Tyco or Molex.
- Continental will use its preferred suppliers to meet its manufacturing needs.

Power Consumption (BTIM Only)

- Quiescent (BTIM OFF) = Less than 300 micro Amperes.
- Operating = Less than 1.5 Amperes.

Note

*   - Bluetooth Profile Dependent
**   - Cellular Phone Network Dependent

Table 1: UHI-BTIM feature reference

4. System Feature Description

4.1 Bluetooth Profiles

4.1.1 Core

The Bluetooth feature group profiles specified require the General Access Profile and the Serial Port Profile.

4.1.2 Hands Free Profile (HFP)

The Hands-Free Profile (HFP) is a phone centric specification defining the minimum set of functions such that a Portable Phone can be used in conjunction with the BTIM, with a Bluetooth Link providing a wireless means for both remote control of the Portable Phone by the BTIM and voice connections between the Portable Phone and the BTIM.

4.2 Operations and Maintenance

4.2.1 BTIM Self Diagnostics

The Self diagnostics provides logging, reporting and testing of hardware and software conditions that occur within the BTIM subsystems. The intention is to provide information that will assist in the determination of whether or not a repair or a configuration change is necessary. In terms of logging information, the BTIM is capable of storing subsystem diagnostic information for later interpretation. The BTIM checks the subsystems such as:

Antennas (Bluetooth) when cooperative antennas are fitted and Vehicle Bus.

Internal Diagnostics capability is configured to execute while the BTIM is operating. Internal Diagnostic information is used to determine why a particular service is not operating as expected. The diagnostic data retained within the BTIM is available at the Diagnostic interface for extraction by the appropriate external Diagnostic Tool.

4.2.2 BTIM End of Line Configuration Parameter Management

Configuration parameter management will be established to allow (via appropriate diagnostic/test tool) for the manipulation of the BTIM configuration, including: audio settings covering in-vehicle audio systems, and where applicable the desired language.

This service allows the settings, software, and hardware on the BTIM to be updated to accommodate different vehicle interfaces, external devices, or network connections.

4.2.3 BTIM Service/Dealer Diagnostics

The UHI-BTIM will support the Diagnostic Tool interface over MOST. The purpose of the dealer diagnostics is to allow for post-factory testing and general inspective access to the BTIM. The Diagnostic reports will be across MOST.

4.3 Handsfree

4.3.1 BTIM Noise Suppression and Echo Cancellation

The Hands-free Communication capability supports access to audio without having to use tactile functions. The Audio Interface provides mechanisms for noise reduction and echo cancellation. The UHI-BTIM will use AKG audio processing algorithms for full duplex Handsfree operation. The UHI-BTIM will be compliant with VDA 1.1 specifications.

4.4 HMI

4.4.1 BTIM Status Reporting

The UHI-BTIM will provide Status reports to the in-vehicle Intelligent HMI. This status relates directly to the currently active service and is intended to provide the Consumer with action confirmations in a simple HMI independent format.

4.4.2   Command Interface

The UHI-BTIM will provide Command Interface with the in-vehicle Intelligent HMI. This allows an intelligent HMI to convey validated and previously authenticated Consumer requests in a simple HMI independent format to the BTIM.

4.5   Personal Calling

The Personal Calling service is the ability for a consumer with his Portable Phone to use the vehicle's audio system and Head Unit (if applicable) to initiate phone calls and to accept phone calls.

4.5.1   Bluetooth Device Status

The UHI-BTIM will provide Portable Phone status of Network Signal Strength and Roaming State from the currently active Phone.

4.5.2   Mobile Originating/Terminating

Mobile originated allows the Consumer to make a phone call from the vehicle using the hands-free capability provided by the BTIM. The Consumer initiates the Voice Call using the interface provided by the HMI. The Consumer converses using Microphone and Speaker. When finished, the Consumer can terminate the call by interacting with the provided interface of the HMI.

Mobile terminated allows the Consumer to receive a telephone call in the vehicle using the hands-free capability provided. In this scenario, a 'Ring' indication is provided and the Consumer accepts the call by pressing the button provided at the Portable Phone or the HMI. The Consumer uses the microphone and speakers to converse and terminates the call by interacting with the provided interface of the HMI.

4.5.3   Calling Line ID (CLI)

The Calling line ID (CLI) also known as "caller ID" is used to identify the originating incoming phone number. It should be recognized that Call Waiting feature could be limited by the capabilities of the Portable Phone, the Consumers Network contractual agreements or the specific Cellular Network.

4.5.4   DTMF Send

The UHI-BTIM will support the transmission of DTMF tones to the Portable Phone.

4.6 Phonebook

4.6.1   Calling and Scrolling

The ability to retrieve, call, list and store BTIM located phonebook entries. The vehicle MOST bus will be the medium of communication between the BTIM and the vehicle when applicable.

4.7   Power Management

4.7.1   Wake-up

The BTIM will Wake-up when the MOST interface is considered to be in an active state. A wake-up of the BTIM from vehicle bus activity would not necessarily cause the BTIM to be available to the Consumer.

4.7.2   Delayed Power Down

The deliberate intervention of the BTIM to delay the power down of the BTIM by a configurable period as determined by the service currently making such request. Delayed Power down, prevents the BTIM commencing the Power down sequence during short interruptions of its valid wake-up conditions, such instances occur during CRANK, or short cycles of a valid wake-up. The other significant use is to maintain operations while a Call is in progress and a wake-up condition is removed.

4.8 System Interface

4.8.1 MOST

The BTIM will support a MOSTCO compliant MOST interface with MOSTCO Standard Function Blocks. The MOST interface will be realized with two MOST NIC's, the first configured in serial mode and used in the transmission of audio and control messages, the second IC configured in support of parallel asynchronous mode and used in the transmission of packet data. The maximum theoretical data rate supported is 2.822 Mbits/s. The BTIM is considered a Slave device.

4.8.2 BT Antenna Support

Bluetooth devices within the BTIM require the availability of a dedicated antenna. The UHI-BTIM incorporates a provision for a dedicated external Bluetooth antenna. The BT Antenna design will require Diagnostic capabilities to facilitate the BTIM in determining the presence of such an external Antenna.

4.9 Phone Management

Given that the UHI-BTIM will support a Bluetooth interface, the BTIM will adopt a strategy that maintains the established connection during an active call. The UHI-BTIM will support (establish connection) with only one Portable Phone device at a time.

4.9.1 Dock/Undock

The term "docked" is used to describe when a Portable Phone has been paired and bonded to the BTIM. When a Portable Phone is docked, a service level connection is established between the BTIM and the phone. Only one phone can be docked at a time.

4.10 Enabler

4.10.1 Processor – MGT5200

The UHI-BTIM will be centralized on the MGT (mobile GT) 5200 PPC core architecture microprocessor.

4.10.2 Memory - Flash

The UHI-BTIM will be configured with eight (4) Meg of flash memory.

4.10.3 Memory – SDRAM

The UHI-BTIM will be configured with sixteen (8) Meg of SDRAM memory.

4.10.4 Bluetooth - CSR Class 2

The UHI-BTIM will use class 2 Bluetooth chipset as provided by the vendor CSR.