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## **Functional Specification for Exposure Bluetooth Home Audio Unit**

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**Distribution:**

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# ***SOFTWARE SPECIFICATION***

## **Revision History**

Version	Date	Description	Author
V1.0.0	10Sep2008	Draft Version	Danny Chu

Authorized by	Signature	Role
Tan Eng Sui		Project Manager

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## **1. ExposureRx**

- This document is created to describe the functionality of Exposure receiver (Exposure Rx). Please refer to another document for the dongle unit specification.
- The audio output for ExposureRx is through the Left and Right audio output channel.
- The source of music being streamed is via Bluetooth only.
- When the RESET button is pressed, the ExposureRx re-initialises to the factory default state.

### **1.1 Bluetooth Functionality**

#### **1.1.1 Bluetooth Radio Specification**

- Range: Class 2 (10m line-of sight)
- Tx/Rx radio sensitivity: -80dbm
- Data rate: 723kbps (forward), 57kbps (reverse)
- Antenna: 45 GHz chip type

#### **1.1.2 Connectable Bluetooth Devices**

- Any audio source device that is compatible with Bluetooth 1.2 and supports A2DP can connect to the music streaming profile (A2DP profile).

#### **1.1.3 Bluetooth Device Name**

- The name of Bluetooth device is Exposure\_AP.

#### **1.1.4 Deletion of Pairing**

- All pairing information may be deleted using the reset button.
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#### **1.1.5 Pairing**

- ExposureRx cannot search for other Bluetooth devices and cannot be found by other non-paired Bluetooth device except in discoverable mode.
- ExposureRx can be set to discoverable mode by the user, refer to attached document for button configuration.
- Upon successful pairing, the devices' information is stored within ExposureRx even if ExposureRx and/or connectable Bluetooth device is turned off.

#### **1.1.6 Connection**

- The maximum number of active Bluetooth connection for ExposureRx is one.
- ExposureRx can only be connected to one audio dongle with A2DP profile, and AVRCP profile if available, at any one time.

#### **1.1.7 Automatic Connection**

- Automatic Connection with audio dongle is initiated by audio dongle.

## **1.2 Music Streaming Function**

### **1.2.1 Audio Streaming Specifications**

- Compression/Decompression algorithm: Sub-Band Coding (SBC)
- Bitrate: Variable (typically <300kbps)
- Digital Audio rate: 16bit at 16kHz-48kHz
- Stereo output

### **1.2.2 Volume Up/Down**

- Control output volume of the connected device speaker. Refer to attached documents for button configuration.

## **1.3 Interface**

### **1.3.1 LEDs**

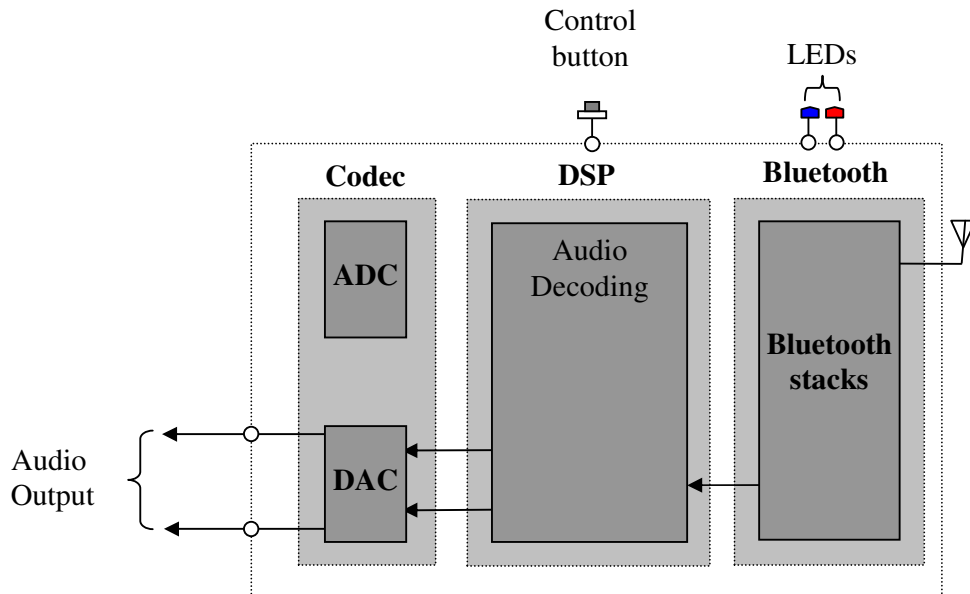
- ExposureRx has two LEDs (Red/Blue)
- Refer to attached for LED indicators.

### **1.3.2 Reset button**

- When RESET button is pressed, the ExposureRx re-initialize to factory default state.

## **1.4 Others**

### **1.4.1 Block Diagram of ExposureRx**



**1.4.2 Power Rating**

- On-board voltage: 3.7V
- Max Current: 50-60mA
- Power Source: Power Adaptor 12V DC

**1.4.3 Analog Specifications**

- Frequency Response: 100Hz - 20kHz ( $\pm 3$ dB)
- SNR:  $\sim 84$ dB
- Analog input: 1.0 Vrms
- Analog output: Line-level (0.8Vrms)

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## **Functional Specification for Exposure Bluetooth Dongle**

Date: **12 November 2008**

Document Name: **Exposure\_Tx\_Spec\_V1.0.0.doc**

**Distribution:**

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# ***SOFTWARE SPECIFICATION***

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## **1. ExposureTx**

- This document is created to describe the functionality of Exposure audio dongle unit.
- Please refer to another document for the receiver unit specification.
- The dongle unit consist a transmitter (ExposureTx) and a iPod Nano adaptor (Exposure Apt).
- ExposureTx is the processing unit that compresses and transmits the audio signals.
- ExposureApt is used for connecting ExposureTx and a iPod Nano for music input.
- The audio signal is transmit out to a Bluetooth audio sink.

### **1.1 Bluetooth Functionality**

#### **1.1.1 Bluetooth Radio Specification**

- Range: Class 2 (10m line-of sight)
- Tx/Rx radio sensitivity: -80dbm
- Data rate: 723kbps (forward), 57kbps (reverse)
- Antenna: 45 GHz chip type

#### **1.1.2 Connectable Bluetooth Devices**

- Any audio sink device that is compatible with Bluetooth 1.2 and supports A2DP can connect to the music streaming profile (A2DP profile).

#### **1.1.3 Bluetooth Device Name**

- The name of Bluetooth device is EXPOSURE\_AP.

#### **1.1.4 Pairing**

- ExposureTx is always in non-discoverable mode.
- ExposureTx can search for other Bluetooth devices, refer to attached document for button configuration.
- Upon successful pairing, the devices' information is stored within ExposureTx even if ExposureTx and/or connectable Bluetooth device is turned off.

#### **1.1.5 Connection**

- The maximum number of active Bluetooth connection for ExposureTx is one.
- ExposureTx can only be connected to one audio sink device with A2DP profile.

#### **1.1.6 Automatic Connection**

- When ExposureTx is switch on, it automatically tries to re-connect with its last paired A2DP device.
- If the audio sink device has an active A2DP profile, automatic connection would fail.

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## **1.2 Audio Source Function**

### **1.2.1 Audio Streaming Specifications**

- Compression/Decompression algorithm: Sub-Band Coding (SBC)
- Compression Ratio: 4:1 – 6:1 typically
- Bitrate: Variable (typically <300kbps)
- Digital Audio rate: 16bit at 16kHz-48kHz (stereo)

## **1.3 Interface**

### **1.3.1 Control Buttons**

- ExposureTx has one control button. Refer to attached documents for button configuration.

### **1.3.2 LEDs**

- ExposureTx has two LEDs (Red/Blue)
- Refer to attached for LED indicators.

### **1.3.3 Reset button**

- When RESET button is pressed, the ExposureTx is powered off.

### **1.3.4 Charging**

- ExposureTx has a USB mini-B connector that can be use for charging.

### **1.3.5 Analog Audio Source**

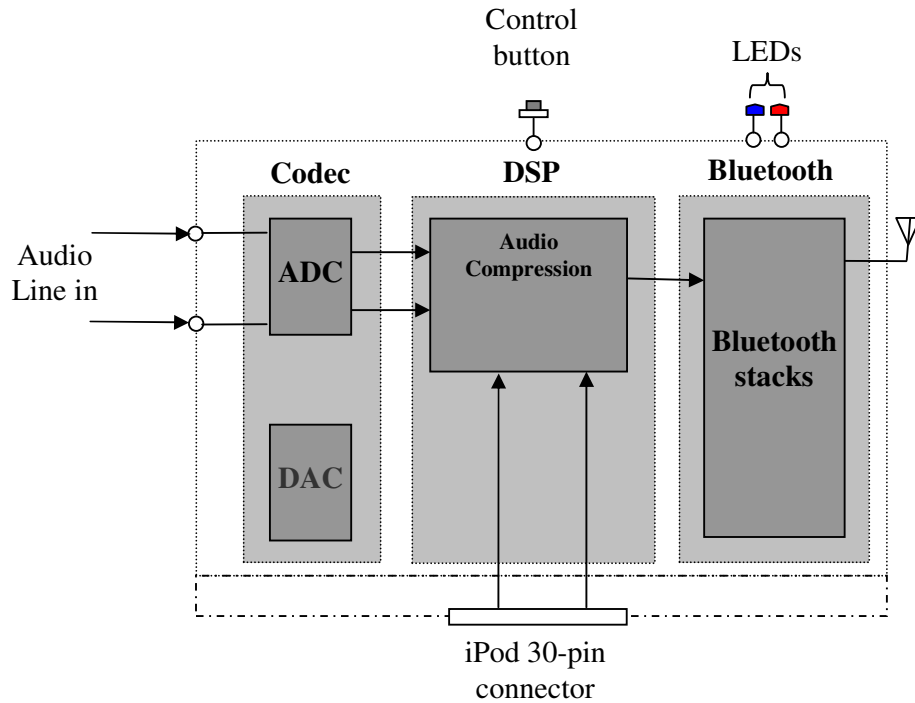
- ExposureTx has a 2.5mm audio jack that can be connected to any audio source. When the 2.5mm audio jack is used, any audio signal from the iPod will be cut.

### **1.3.6 iPod Audio Source**

- ExposureTx has a special connector that can fit with the ExposureApt.
- ExposureApt has a 30-pin connector that can fit with the iPod nano.
- When the above two pair of connections are connected and the 2.5mm audio jack is not plugged in, audio signal from the iPod is stream to ExposureTx and AVRCP commands received by ExposureTx is sent to iPod.

## **1.4 Others**

### **1.4.1 Block Diagram of ExposureTx+ExposureApt**



### **1.4.2 Power Rating**

- On-board voltage: 3.7V
- Max Current: 50-60mA
- Battery life (full running):  $\simeq$  5hour on 3.7V(300mAH)
- Battery standby time:  $\simeq$  60hour on 3.7V(300mAH)
- Charging time:  $\simeq$  1.5hour on 3.7V(300mAH)
- Charging Power Source: 4.5-6.5V DC

### **1.4.3 Analog Specifications**

- Frequency Response: 100Hz - 20kHz ( $\pm$ 3dB)
- SNR:  $\simeq$ 84dB
- Analog input: Line-level (0.8Vrms)