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Fujitsu Semiconductor (Shanghai) Co., Ltd.
Application Note

MCU-AN- 500057-E-10

F²MC-8FX FAMILY
8-BITMICROCONTROLLER
MB95200 SERIES

BT HAND FREE DEMO REFERENCE SOLUTION

APPLICATION NOTE

FUJITSU

Revision History

Date	Author	Change of Records
2009-11-4	Kevin Lin	V1.0

This manual contains 12 pages.

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CONTENTS

1 Overview

The PRC new driving policy has been announced to avoid drivers talking mobile phone directly, and it creates an increasing need for Car Hand Free Kit.

The driver can communicate with the kit by turning on the Bluetooth in the mobile. The kit will act as a hand free phone so that the driver can talk freely during driving.

This demo set has such features:

- Noise cancellation
- Caller ID display
- Transfer audio to FM radio

2 Demo Platform

As shown in Figure 2-1, this demo is mainly made up of three parts: MCU, noise cancellation DSP and Bluetooth module. When the Bluetooth hand free kit works, it will receive the audio data from the mobile through Bluetooth module and transfer it to the audio DSP for echo cancellation; on the other hand it will transfer the audio data from the microphone to the mobile.

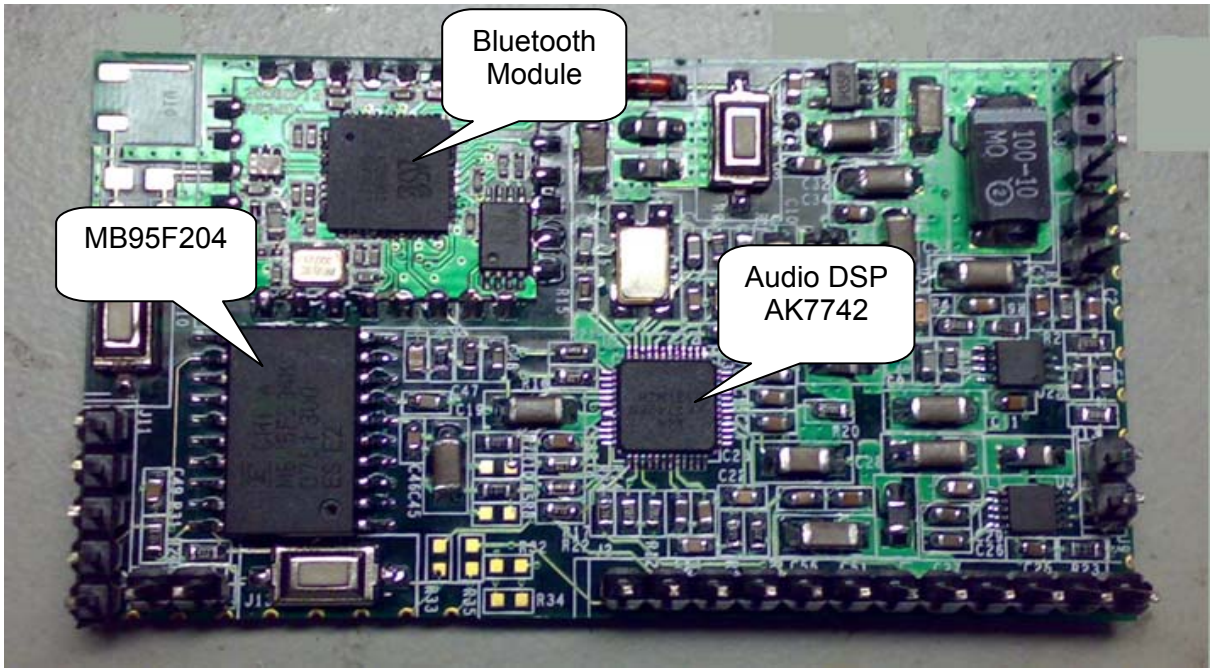

Figure 2-1: Bluetooth Hand Free Demo

3 Hardware

3.1 System Block

Figure 2-1 shows the system block. There are two editions. One is a simple edition using MB95F214. Another is an advanced edition using MB95F204 and with the functions of caller ID display and transferring the audio to the FM radio on the car.

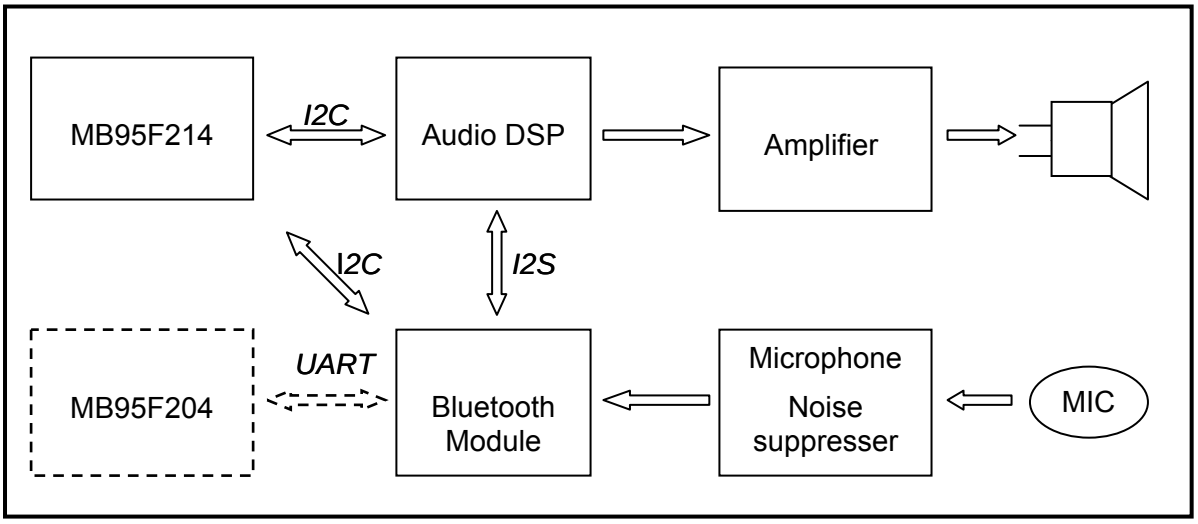

Figure 3-1: System Block Diagram

3.2 Schematic Diagram

In this system, a compatible design was made. The MCU can be MB95F214 or MB95F204 which will control audio DSP and Bluetooth module. AK7742 is used to implement echo cancellation. It is easily controlled by I2C bus. When DSP detects the echo noise, it will immediately generate the inverted phase of this noise and impose to the output thus cancel the noise at the output. Figure 3-1 shows the schematic diagram.

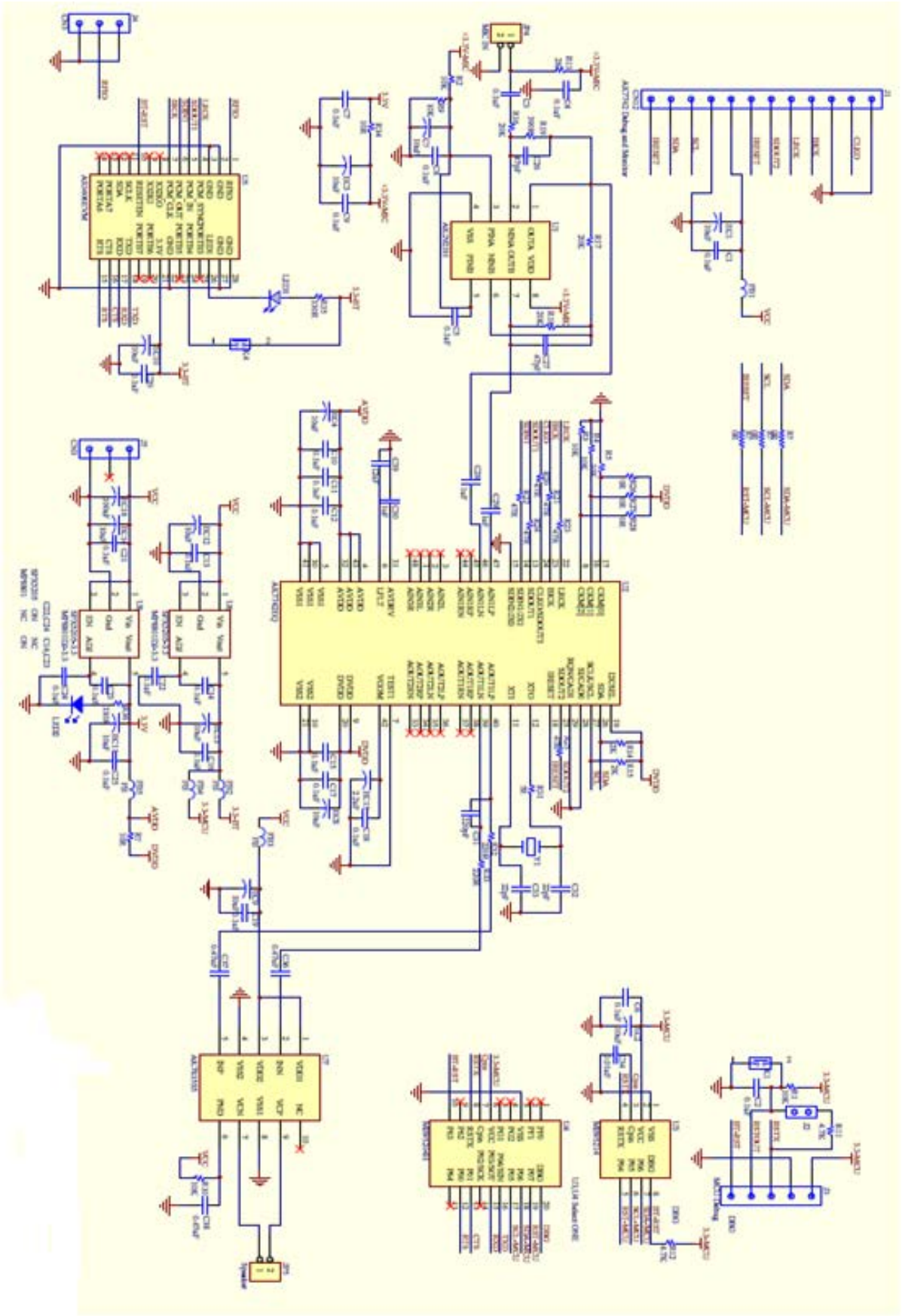

Figure 3-2: Blue Tooth Hand Free Kit

3.3 MCU Pin Assignment

Table 3-1 shows the MB95F214 Pin Assignment in this system.

Table 3-1: Pin Assignment

Number	Pin	Function
5	P04	Reset output for AK7742
6	P05	SCL of I2C bus
7	P06	SDA of I2C bus
8	P12	Reset output for Bluetooth module

4 Firmware

For this demo, the firmware just initializes the Bluetooth and DSP. When the power is on, MCU will reset the Bluetooth and the DSP first by a reset signal, and then simulate I2C bus with two general I/Os to communicate with DSP and Bluetooth Module.

Figure 4-1 shows the flow chart when MB95F214 is used.

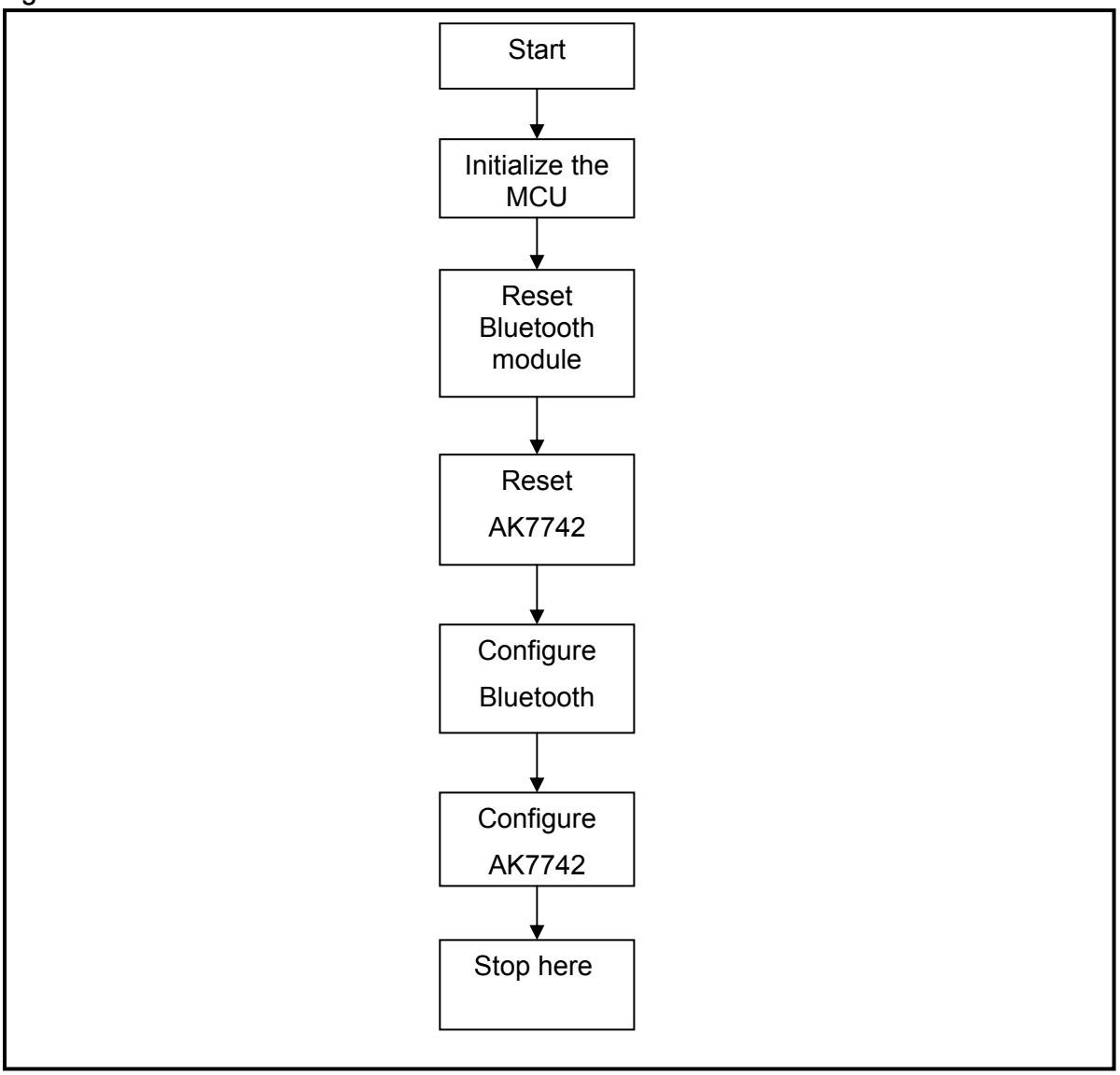

Figure 4-1: Flow Chart

5 Operations

■ **Matching**: Press the **ON** for 5 seconds until the speaker sounds “KA”. Then release the button. The Bluetooth starts searching the BT facility around your mobile phone. The target name is “ASC-Master1”. Select this name and match it with your phone, security code is “0000”.

■ **Connection**: Follow the BT user manual of your phone to connect the BT car HF kit.

■ **Dialing**: After BT is connected, use the dialing function in your phone to dial out.

■ **Talk**: User can directly talk to the HF kit.

■ **Hang up**: Press the hang up key in your phone can disconnect the call.

■ **Disconnecting**: Follow the BT manual of your phone to disconnect the BT HF kit.

Please refer to Figure 5-1 to find the corresponding parts.

Figure 5-1: Bluetooth Hand Free Appearance

6 More Information

For more information on FUJITSU MB95200 products, please visit following website:

English version:

http://www.fujitsu.com/cn/fsp/services/mcu/mb95/application_notes.html

Simplified Chinese Version:

http://www.fujitsu.com/cn/fss/services/mcu/mb95/application_notes.html

7 Appendix