



# LM Technologies Ltd.

## LM780-781 Hardware Description

<b>Revision</b>	<b>Date</b>	<b>Name</b>	<b>Description</b>
V1.0	06-09-2011	Kanwal	Initial Draft version
V1.1	09-01-2012	Sumeet	Added description about metal cap

# Contents

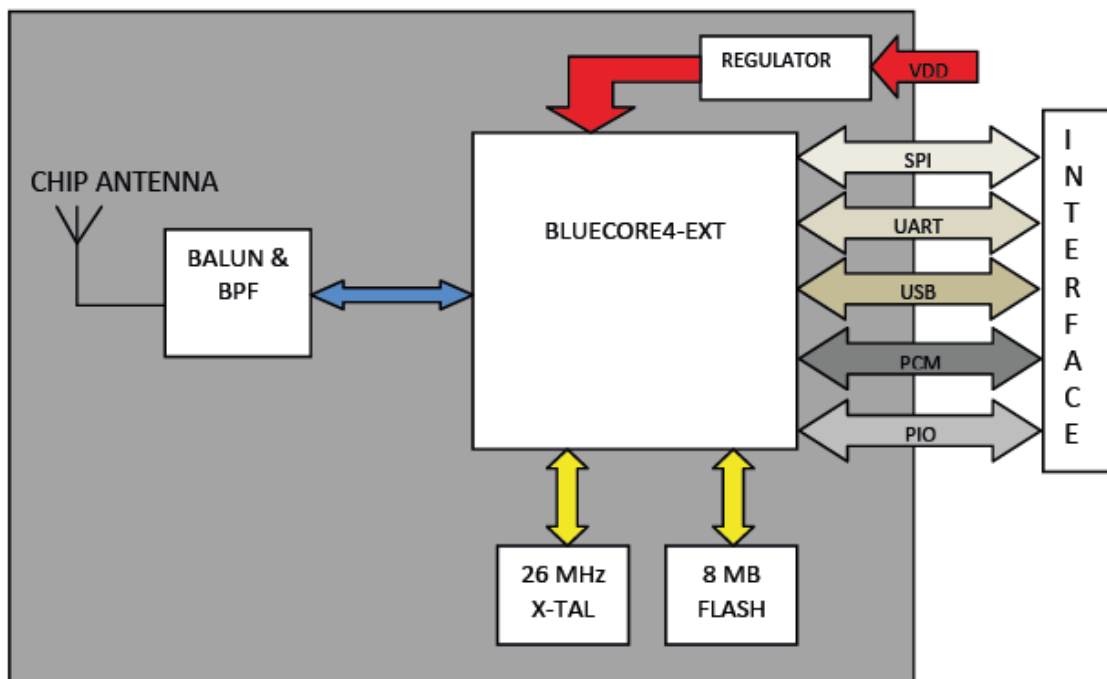
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## 1 Introduction

LM78x (LM780-781) module design is based on Bluecore4 External chipset from CSR and uses class 2 radio circuit to provide short range Bluetooth connectivity. The module is an essential component for wireless connectivity option required by developers/integrators in end user products.

## 2 Circuit Description

### 2.1 Block Diagram



#### 2.1.1 Radio Circuit

Both transmitter and receiver share common radio circuit which consists of Bluecore4 Ext chipset connected to chip antenna via Balun cum Band Pass filter. The RF output/input of Bluecore chipset are each matched to balanced port of the balun cum Band Pass Filter IC.

#### 2.1.2 26MHz Crystal

26 MHz crystal with tight tolerance (less than 10ppm) feeds clock to crystal driver circuit located inside Bluecore4 Ext chipset. The Bluecore4 Ext chipset enables frequency trimming by adjusting the chipset internal variable capacitors or by adjusting load capacitance of crystal to match the resonant frequency (i.e. 26 MHz).

### 2.1.3 Bluecore4 Ext Chipset

Bluecore4 Ext chipset is single chip radio and baseband IC for Bluetooth 2.4GHz systems including enhanced data rates (EDR) to 3Mbps. The chipset outputs radio signal which is fed to chip antenna via transmitter circuit. On reception of radio signal, the chipset process the incoming signal and interrupts the software stack running in the flash.

### 2.1.4 Flash Memory

Flash Memory stores the CSR Bluetooth stack, settings required by Bluecore4 Ext to configure the radio Tx, radio Rx, serial interface and other relevant settings. On powering up, the Bluecore4 Ext chipset reads the firmware and settings from the Flash Memory. The settings in the Flash Memory can be modified by sending specific commands from computer application to Bluecore4 Ext chipset. CSR Bluetooth stack provides a fully compliant Bluetooth system to BT 2.1+EDR specifications.

### 2.1.5 Serial Interface

The application(s) running on the computer or connected host interacts with the Bluecore4 Ext chipset using serial interface (UART 3.3V complaint interface).

### 2.1.6 SPI Interface

This is synchronous serial port interface (SPI) used for programming the firmware and configuration settings in Flash Memory via Bluecore4 Ext chipset. It is also used to switch the device in radio test modes which are required during various radio certifications/testing.

### 2.1.7 Power Supply

Input power supply is fed to specified pins of the module. The power input is routed to input of voltage regulator to get +3.3V stable output. All the hardware blocks are supplied with 3.3V regulated power supply.

### 2.1.8 Reset Circuit

The reset circuit is connected to active low RESET input of Bluecore4 Ext chipset. The RESET input will trigger chipset reset operation if it is in active low state for time period more than 5 msec.

## 3 Metal Cap

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In the Block Diagram above, all the circuit except the antenna circuit and chip antenna is covered with a metal cap. The metal caps shields any radio signal leaking out from the circuit and improves radio performance. It also provides extra grounding to the circuit beneath it.