

LM802B PCB Circuit Description

The main board is consists of two major sections, Sush as SoC and Analog section.

SOC:

MT6253 is monolithic GSM/GPRS handset chip solution which integrates RF, analog baseband, digital baseband as well as Power Management Unit (PMU) and can greatly reduce the component count and make smaller PCB size. Besides, it is capable of SAIC (Single Antenna Interference Cancellation) and AMR speech. Based on 32 bit ARM7EJ-STM RISC processor, provides an unprecedented platform for high quality modem Performance.

CPU

It has the ARM7EJ-STM RISC processor running up to 104 MHz, thus providing best trade-off between system performance and power consumption.

Memory

It supports up to 3 external state-of-the-art devices through its 16-bit host interface. Devices such as burst mode Flash, SRAM, and Pseudo SRAM are supported. To minimize power consumption and ensure low noise, this interface is designed for flexible I/O voltage and allows lowering of supply voltage down to 1.8V. The driving strength is configurable for signal integrity adjustment. The data bus also employs retention technology to prevent the bus from floating during turn over. In order to provide more flexibility and bandwidth for multimedia products, an additional 8/9 bit parallel interface is incorporated. This interface is designed specially for support with Camera companion chip as well as LCD panel. In addition, It has camera YUV interface that can connect to CMOS sensor of resolution up to VGA. Moreover, it can connect NAND flash device to provide a solution for multimedia data storage. For running multimedia application faster, It integrates also several hardware-based engines. With hardware based Resizer and advanced display engine, it can display and combine arbitrary size of images with up to 4 blending layers.

Connectivity and Storage

it supports UART as well as Bluetooth interface. Also, necessary peripheral blocks are embedded for a voice centric phone: Keypad Scanner with the capability to detect multiple key presses, dual SIM Controller, Alerter, Real Time Clock, PWM, Serial LCD Controller, USB 2.0 HS/FS/LS, MMC/SD/MS/MS Pro/SDIO, IrDA and general purpose programmable I/Os.

Audio

Using a highly integrated mixed-signal Audio Front-End architecture of MT6253 allows for easy audio interfacing with direct connection to the audio transducers. The audio interface integrates D/A and A/D Converters for Voice band, as well as high resolution Stereo D/A Converters for Audio band. In addition, MT6253 also provides stereo input and analog mux. And also supports AMR codec to adaptively optimize speech and audio quality. Moreover, HE-AAC codec is implemented to deliver CD-quality audio at low bit rates.

Radio

MT6253 integrates a mixed-signal Baseband front-end in order to provide a well-organized radio interface with flexibility for efficient customization. It contains gain and offset calibration mechanisms, and filters with programmable coefficients for comprehensive compatibility control on RF modules. MT6253 achieves great MODEM performance by utilizing 14-bit high resolution A/D Converter in the RF downlink path. Furthermore, to reduce the need for extra external current-driving component, the driving strength of some BPI outputs is designed to be configurable.

Integrated RF transceiver

it also integrates the RF transceiver for multi-band GSM and GPRS cellular system. In the RF modules in SOC, a high performance quad band differential input LNAs/fully integrated channel filter with $f_{3dB}=150\text{kHz}$ receiver is integrated. Also, the transmitter performs integrated TXVCO and loop filter. Furthermore, the frequency synthesizer and Digitally-Controlled Crystal Oscillator (DCXO) are build-in.

Power Management

MT6253 integrates all regulators that a voice-centric phone needs. 11 LDOs optimized for Specific

GSM/GPRS baseband sub-systems are included. Besides Li-Ion battery charge function, SIM card level shifter interface, two open-drain output switches to control the LED and vibrator are equipped. Other power management schemes such as thermal overload protection, Under Voltage Lock-out Protection (UVLO), over voltage protection and power-on reset and start-up timer are also MT6253 features. Besides, 3 NMOS switches controlling the RGB LEDs are also embedded to reduce BOM count.

ANALOG SECTION

RF FEM

The SKY77552 is a quad-band transmit and dual-band receive front-end module (FEM) with Integrated Power Amplifier Control (iPAC™) for cellular handsets comprising GSM and PCS operation. The FEM has quad-band capability in applications of U.S. or Euro dual-band platforms. Designed in a low profile, compact form factor, the SKY77552 offers a complete Transmit VCO-to-Antenna and Antenna-to-Receive SAW filter solution. The FEM also supports Class 10 General Packet Radio Service (GPRS) multi-slot operation. The module consists of a GSM PA block and a PCS PA block, impedance-matching circuitry for 50 Ω input and output impedances, Tx harmonics filtering, high linearity and low insertion loss PHEMT RF switches, diplexer and a Power Amplifier Control (PAC) block with internal current sense resistor. A custom BiCMOS integrated circuit provides the internal PAC function and decoder circuitry to control the RF switches. The two Heterojunction Bipolar Transistor (HBT) PA blocks are fabricated onto a single Gallium Arsenide (GaAs) die. One PA block supports the GSM band and the other PA block supports the PCS band. Both PA blocks share common power supply pads to distribute current. The output of each PA block and the outputs to the two receive pads are connected to the antenna pad through PHEMT RF switches and a diplexer. The GaAs die, PHEMT die, Silicon (Si) die and passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic overmold. Band selection and control of transmit and receive modes are performed using two external control pads. Refer to the functional block diagram in Figure 1. The band select pad (BS) selects between GSM and PCS modes of operation. The transmit enable (TxEN) pad controls receive or transmit mode of the respective RF switch (Tx = logic 1). Proper timing between transmit enable (TxEN) and Analog Power Control (VRAMP) allows for high isolation between the antenna and Tx-VCO while the VCO is being tuned prior to the transmit burst. The SKY77552 is compatible with logic levels from 1.2 V to VCC for BS and TxEN pads, depending on the level applied to the VLOGIC pad. This feature provides additional flexibility for the designer in the selection of FEM interface control logic.

FM

The RDA5802 is a single-chip broadcast FM stereo radio tuner with fully integrated synthesizer, IF Selectivity and MPX decoder.

BT

MT6612 is a monolithic Bluetooth single chip, It is fully compliant with Bluetooth specification with excellent radio performance.