Technical Specifications and

Description

Of

GSM Dual-band Digital Mobile Phone

Model—ZTE A15

Version 1.0

25, Apr. 2006

ZTE CORPORATION

1 Abstract

This document gives brief technical specification & description of our product—ZTE A15.

2 Abbreviations

AMR Adaptive Multi Rate

BB Base Band

BAI Baseband Audio Interface

DAI Digital-Audio-Interface

DTMF Dual Tone Multi Frequency function

EFR Enhanced Full Rate

FDN Fixed dialing number

FEM Front End Module

FR Full Rate

GSM Global system for mobile communications

IC Integrated circuit

JTAG IEEE standardized test interface for IC's

LCD Liquid Crystal Display

LNA Low noise amplifiers

PA Power amplifier

PCB Printed Circuit Board

PCS Public cellular system

PMU Power Management Unit

RF Radio Frequency

RX Receiver

SIM Subscriber Identity Module

TC Transceiver

TX Transmitter

USB Universal Serial Bus

VCO Voltage controlled oscillator

VTCXO Voltage controlled temperature compensated x-tal oscillator

3 Product Features

3.1 General specification

Item	Feature	Remarks
Protocol	GSM 850/1900 MHz	Dual-band
Standard	GSM Phase 2+	With SIM
Size	105.3mm×44.3mm×18.2mm	With battery
Weight	77g	With battery
Talk / Standby Time	2 – 4h / 60 – 120h	
Operating Temp.	Standard：-15□ ～ +35□ Limit：-10□ ～ +55□	
Antenna	Internal	50Ω 1/4λ
Form Factor	Bar type	
Memory	Flash： 32Mbit SRAM：4Mbit	
LCD	Main：96 x 64 dots	
Keyboard lights	Amber	
Battery	Standard Battery： Li-ion,800mAh	
Phone book	300 names	
WAP	No	
MMS	No	

GPRS	No	
Melody	Yes	16 Midi
Vibrator	No	
Side Volume Key	No	

3.2 Hardware specification

Item	Feature	Remarks
Chipset	Maker：ANALOG DEVICES BB Chipset： AD6720ABCZ RF Chipset： AD6548	
PCB	Main Board：6-layers, 1.1mm	
Talk time	Up to 240 minutes	Estimated
Standby time	Up to 120 hrs	Estimated
Charging time	2.0hrs	@ Std battery
Frequency Range	TX： 824-849MHz ;1850-1910MHz; RX： 869 -894MHz ;1930-1990MHz;	

Band Width	0.2MHz	
Vocoder	FR, EFR,HR	AMR optional
Modulation/ Demodulation	GMSK	
Chip Rate	MCU 39MHz, DSP 78MIPS	
RX sensitivity	-102 dBm (GSM850/PCS)	Conducted emission Conducted Static conditions
TX output power	Maximum： 33dBm(+/-2dB) (GSM850) 30dBm(+/-2dB) (PCS) Minima： 5dBm(+/-5dB) (GSM850) 0dBm(+/-5dB) (PCS)	Normal test conditions
SIM card	Plug-In Type, 3V	
Pre-paid SIM	Yes	
Status Indicator	No	
System connector	18 Pin	
Ear Phone Jack	No	
Speaker	8Ω	
Ear-microphone	No	Optional
Battery Charger	No	
Travel Adapter	Yes	

3.3 Software specification

Item	Feature		Remarks
GSM 02.07 Functions	Mandatory	Display of Called Number	Support
	Mandatory	Indication of Call Progress Signals	Support
	Mandatory	Country/PLMN Indication	Support
	Mandatory	Country/PLMN Selection	Support,
	Mandatory	Keypad	Support
	Mandatory	IMEI	Support
	Mandatory	Short Message	Support
	Mandatory	Short Message Overflow Indication	Support
	Optional	International Access Function ("+" key)	Support
	Mandatory	Service Indicator	Support
	Mandatory	Emergency Calls capabilities	Support
	Mandatory	Dual Tone Multi Frequency function (DTMF)	Support
	Mandatory	Subscription Identity Management	Support
	Mandatory	On/Off switch	Support
	optional	Sub-address	Support
	Mandatory	Support of Encryption A5/1 and A5/2	Support
	optional	Short Message Service Cell Broadcast DRX	Support
	optional	Service Provider Indication	Support
	Mandatory	Ciphering Indicator	Support

Other Functions	Sending or receiving SMS
	SMS group sending
	Fixed dialing number (FDN)，if SIM card supporting pin2 service
	Out-going calls restriction
	Out-going added service (out-going call waiting, out-going, call holding, multi-parties meeting, etc.). network support is required
	Store the last 10 answered calls, last 10 missed calls and 20 dialing calls (show the date, time, number, name and duration)
	PIN error alert when opening
	large capacity of directory
	On/Off timing
	speaker, ring volume adjustable by multilevel
	battery meter and the signal intensity indicator

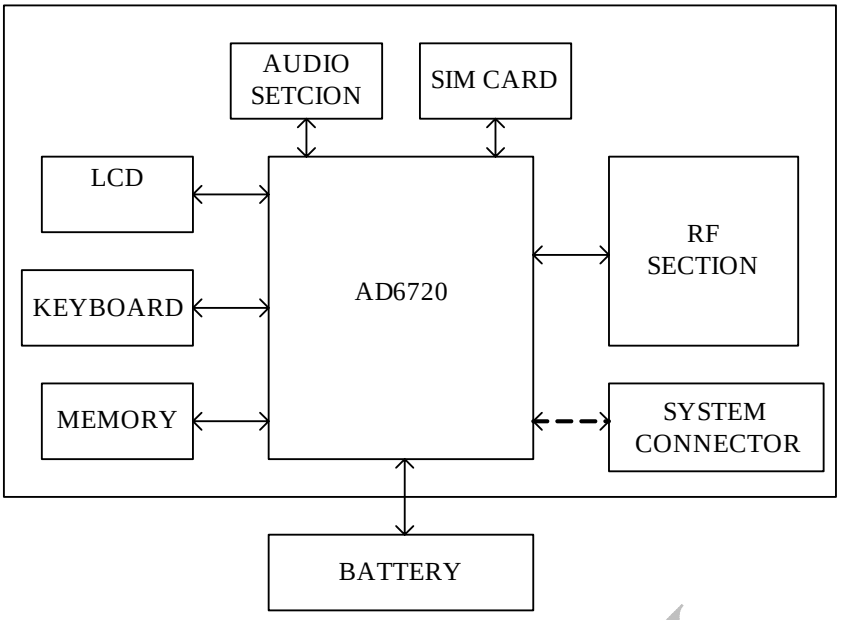
	Call metering
	Alarm
	Calculator
	Games
	Directory groups
	Conventional phone book that have three hundred name card
	Call time limit: when approaching n seconds, a alert will be displayed
	Show in-coming call
	Situation modes selection. User select different ring patterns according different situations
	Animation menu icon
	Out-going call restriction. user can define the in- call and out-call list
	In-coming call mute. User can turn off the ring

4 Solution of the Product

The ZTE A15 handset hardware uses Analog Devices (ADI) 430 family chipset, which consists of baseband (BB) unit and radio frequency (RF) unit in addition of the peripherals and accessories to build a complete mobile terminal hardware.

The block diagram shows the main building blocks inside the subsystems: RF unit, BB unit and some accessories.

Following the main building and functional blocks of the block diagram are described.



A15 MAINBOARD

4.1 Radio Frequency unit

The Radio-unit consists of all receiver, transmitter and high frequency generation and receives sections of the ZTE A15 hardware.

It represents the transition to the air-interface, the Radio-link between the GSM-network base station and the mobile terminal.

4.1.1 Transmit Module

This building block separate and switch the radio frequency signal from the receive/transmit antenna connector via an Antenna Switch Filter into the receiver and transmit part as well as a separation into the four receive bands and transmit high and low band. For each of the four receives chains the corresponding SAW-filter prevents high level out-of band signals to the following receive low noise amplifiers (LNA). To realize a full quad-band application for the receive chain, with respect to the direct conversion receive inputs of the AD6548 transceiver, a circuitry combines the quad band receive chains for GSM850, EGSM900, DCS and PCS into transceiver. For the transmit part, the quad-band Transmit Module(TQM6M4003) with 50Ohms input and output impedances at all RF input and output ports. The GSM850/900 and DCS/PCS power amplifier(PA) blocks including power control are combined with the low insertion loss quad-band pHEMT switch.

The PA is switched via the radio control signal from LB into HB frequency range. The RF input power coming from the transceiver is set on a constant level. The PA output power is controlled via the level of the analog control voltage RAMP. This control input voltage RAMP for controlling the output power as well as the GSM confirms up- and down-ramping is generated by the BB-unit. The integrated power detection and control

loop compensate output power variations via supply voltage, RF input voltage and temperature, thus the transmitted output power is fully compliant to the ETSI specification regarding power time-template and power spectrum requirements.

4.1.2 Transceiver

This building block consists mainly of the transceiver chip AD6548. On the receiver input chain the GSM-band separated signal from the Transmit Module is amplified by four differential LNAs with programmable-gain. These LNAs drive a direct conversion demodulator to baseband. The down converted signals then pass in quadrate to the baseband programmable-gain amplifiers and low pass filters for channel selection.

The AD6548 uses a single integrated LO VCO for both the receiver and the transmit circuit. An integrated fractional-N synthesizer provides fast and accurate frequency control for all bands.

Also included in the AD6548 is a complete PA power control loop. This uses a log strip to detect the PA output power and provides a voltage output suitable for controlling PA in the Transmit Module.

4.2 Baseband unit

Baseband unit is composed of baseband and memory. Baseband chip uses AD6720, which is an advanced Single Chip Baseband Processor incorporating all digital,analog,and power management functions .It consists of DSP, MCU and digital interface. It presents versatile GPIO and GPO to control LCD, SIM card, to provide JTAG signal, LCD and keyboard backlight controller, and USC interface.

Baseband chip AD6720 also consists of all voltage supply unit, power management unit, communication interface, and the modulated (TX: BBDAC) and demodulated (RX: BBADC) of baseband IQ signal generation. In order to get high quality call, the analog baseband provides abundance baseband audio (BAI) interface for terminal, including microphone, speaker, receiver and earphone.

Memory uses COMBO FLASH/SRAM, which consists mainly of the combined memory chip, FLASH and SRAM into one single IC package. AD6720 provides 1.8V supply for the memory chip. The FLASH memory is a 32Mbit dual bank memory. The SRAM memory is 4Mbit.

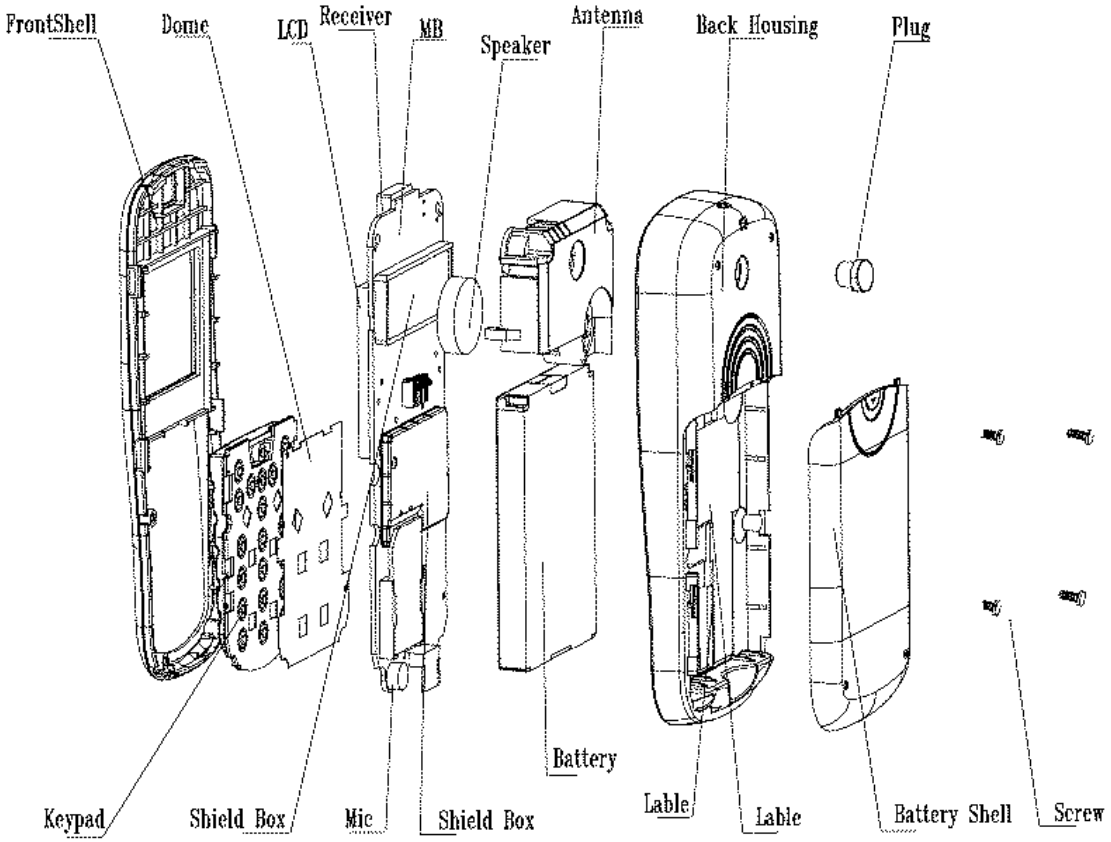
4.3 Peripherals

Display: serial interface FSTN LCD with 96*64 dots.

ESD: providing ESD protection for microphone interface, system connecter signal interface, SIM card interface and keyboard signal.

5 Mechanical Architecture

The graph shows connection of PCB and mechanical frame. Following the main building and blocks are indicated.



6 Software Architecture

ZTE A15 handset software architecture consists of foreground application layer, background application layer, and protocol stack. Foreground application layer mainly handles response of keyboard, and displays needed data. Background application layer mainly performs hardware action and controls communication with protocol layer. Protocol stack layer contains functionalities that allow peer to peer exchange with GSM networks.