

**Technical Specifications and
Description
Of
GSM Quad-band /UMTS
Dual-band Digital Mobile Phone**

Model: I133

Version 1.0

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1 Abstract

This document gives brief technical specification & description of our product—I133.

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

WCDMA Wideband Code Division Multiple Access

UMTS Universal Mobile Telecommunications System

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 850/900/1800/1900 MHz UMTS 850/1900 MHz	GSM Quad-band UMTS Dual-band
Standard	GSM Phase 2+	With SIM
Size	109.5mm*47mm*13.5mm	With battery
Talk / Standby Time	80~165 minutes / 140~160hrs	3G Call Need Large current
FM radio function	87~108MHz	
Operating Temp.	Standard: -20°C ~ +60°C Limit: -40°C ~ +80°C	
Antenna	Internal	50Ω 1/4λ
Form Factor	Bar type	
Memory	Flash: 1Gbit DDR: 512Mbit	
LCD	TFT 1.77" , 128*160, 65K color	
Battery	Standard Battery: Li-ion 600mAh	
Phone book	1000 in phone	
WAP	Yes	
SMS/MMS	Yes	

GPRS	Yes	
Melody	Yes	
Vibrator	Yes	
Side Volume Key	NO	
GPS/WIFI/BT	Yes	NO GPS/WIFI

3.2 Hardware specification

Item	Feature	Remarks
Chipset	Maker: MTK BB Chipset: MT6276W RF Chipset: MT6162N	
PCB	Main Board: 4-layers	
Talk time	80~165 minutes	Estimated
Standby time	140~160hrs	Estimated
Charging time	2hrs	@ Std battery
Frequency Range	Tx: GSM 824 -849Mhz ;880-915MHz ; 1710-1785MHz;1850-1910MHz ; UMTS 824-849MHz ;1850-1910MHz; Rx: GSM 864 -894Mhz ;925-960MHz; 1805-1880MHz;1930-1990MHz; UMTS 869-894 MHz ;1930-1990MHz;	
Band Width	0.2MHz	
Vocoder	FR, EFR, HR, AMR	
Modulation/ Demodulation	GMSK	

Chip Rate	MCU 611MHz	
RX sensitivity	<-102 dBm	Conducted emission Conducted Static conditions
TX output power	Maximum: 33dBm(+/-2dB) (GSM850/900) 30dBm(+/-2dB) (DCS/PCS) Minimum: 5dBm(+/-5dB) (GSM850/900) 0dBm(+/-5dB) (DCS/PCS)	Normal test conditions
FM radio function	87~108MHz	
SIM card	Plug-In Type, 3V	
Pre-paid SIM	Yes	
Status Indicator	No	
System connector	5Pin MicroUSB	
Ear Phone Jack	3.5mm	
Speaker	8Ω	
Ear-microphone	Yes	
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 20 answered calls, last 20 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
N/A
N/A
Calculator
Stopwatch
World clock
Games
Directory groups
Conventional phone book that have three hundred name card
Call time Reminder: when approaching n seconds, a alert will be displayed
Show in-coming call
User Profiles selection. User select different ring patterns according different situations
Animation menu icon

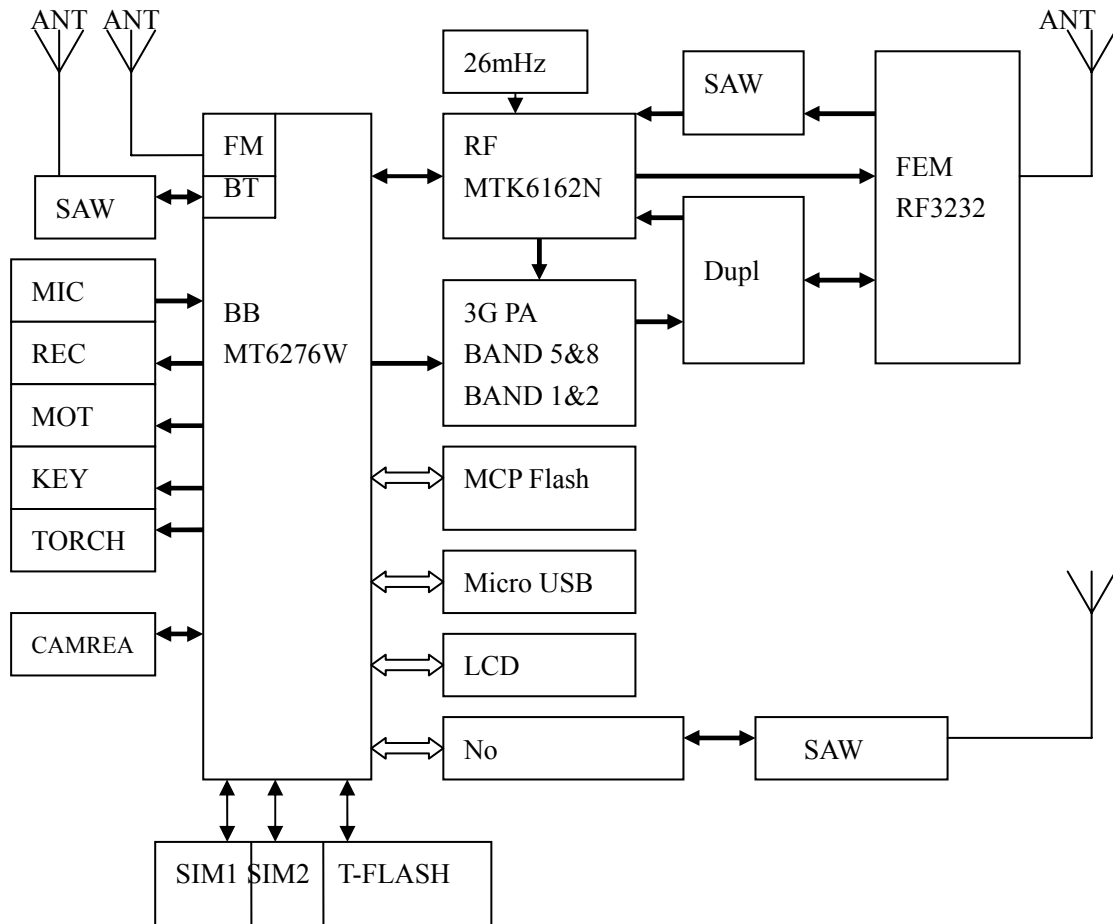
	Out-going call restriction. user can define the in- call and out-call list
	In-coming call mute. User can turn off the ring

4 Solution of the Product

The **I133** handset hardware uses MTK 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.



I133 MAINBOARD

4.1 Radio Frequency unit

The radio-unit consists of all receiver, transmitter and high frequency generation and receives sections of the I133 hardware.

It represents the transition to the air-interface, the Radio-link between the GSM/UMTS-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 two receive bands and transmit high and low band. For each of the two 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 MT6162N transceiver, a circuitry combines the quad band receive chains for GSM850, EGSM900, DCS,PCS and 3G bands(I-VI,VIII-X) into transceiver. For the transmit part, the PA with 50Ohm impedances at all RF input and output ports. The 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 MT6162N, which is a highly-integrated RF Transceiver IC for the GSM850/900/1800/1900 and 3G bands(I-VI,VIII-X) cellular systems

The receiver section of MT6162N includes Quad-band Low-Noise Amplifiers (LNAs), RF quadrature mixers, channel filters, Programmable-Gain Amplifiers (PGAs), and on-chip automatic DC-offset correction loops. The differential inputs are matched to external SAW filters.

MT6162N transmitter adopts the direct-conversion architecture with higher integration level and simpler frequency plan. It consists of BaseBand (BB) I/Q filters, I/Q modulators, frequency dividers, output buffers and a bias-core circuit.

4.2 Baseband unit

Baseband unit is composed of baseband and memory. Baseband chip uses MT6276W which is an advanced Single Chip Baseband Processor incorporating all digital,analog.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.

Memory uses COMBO FLASH/DDR, which consists mainly of the combined memory chip, FLASH and DDR into one single IC package. MT6276W provides 1.8V supply for the memory chip. The FLASH memory is a 1Gbit dual bank memory. The DDR memory is 512Mbit.

4.3 Peripherals

Display: serial interface TFT LCD with 176*220, 65K color.

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

MT6162N:Include BT/FM modules.