

ST 215

Manual Técnico

Suntech do Brasil

Sumário

1. Descrição	3
2. Dimensionamento	4
3. Diagrama	5
4. Cabo de Alimentação	6
5. Especificações GSM.....	6
5.1 Faixa de Frequência	6
5.2 Características Elétricas	7
5.3 Características RF	7
5.4 Características Elétricas	8
5.5 Componentes Chave	8
5.6 Especificação Antena GSM/GPRS.....	12
6. Especificação GPS	13
6.1 Visão Geral	13
6.2 Destaques e Recursos	13
6.3 Características Elétricas	14
6.4 Especificação Antena de GPS	16
7. Como fazer uma chamada com equipamento de teste	19

1. Descrição



ST215E



ST215I



ST215LC

O ST215 é um dispositivo, composto por tecnologia GPS e GSM, permitindo LBS (Location Based Service) na rede GSM, foi concebido especialmente para aplicação em veículos. O modulo recebe a localização a partir de satélites e transmite estes dados para o servidor pré-definido ou terminal de comunicação.

Além da função básica o modulo possui sensor de movimento. Com este sensor é possível identificar se o veículo esta em movimento ou parado, facilitando a instalação e deixando a operação mais inteligente. Além disso, o sensor de movimento pode ser utilizado para efetuar um relatório de acidente e dirigibilidade do condutor.

A linha de produtos ST215 é apresentada em 3 versões:

ST215I é um dispositivo que possui 3 entradas e 2 saídas e ambas as antenas internas.

ST215E é um dispositivo que possui 3 entradas e 2 saídas, o que difere o mesmo da ST210I é a sua antena de GPS externa.

ST215LC é um dispositivo que foi desenvolvido com foco na aplicação simples e econômica como uma versão de baixo custo, possui somente 1 entrada e 1 saídas e antena de GPS e GPRS interna.

2. Dimensionamento

Comprimento : 87 mm

Largura : 57 mm

Altura : 23 mm para ST215E and ST215LC, 27.5 mm para o ST215I

Peso : 100g com bateria



ST215LC



ST215I



ST215E

Consumo : 140 ~ 160 mA no modo ativo

3mA em “sleep mode”

Menor de 1.5 mA em “sleep mode” e alimentação externa 12V

Umidade : up to 75 %

Temperatura : - 20 deg C ~ 60 deg C

Interfaces externas

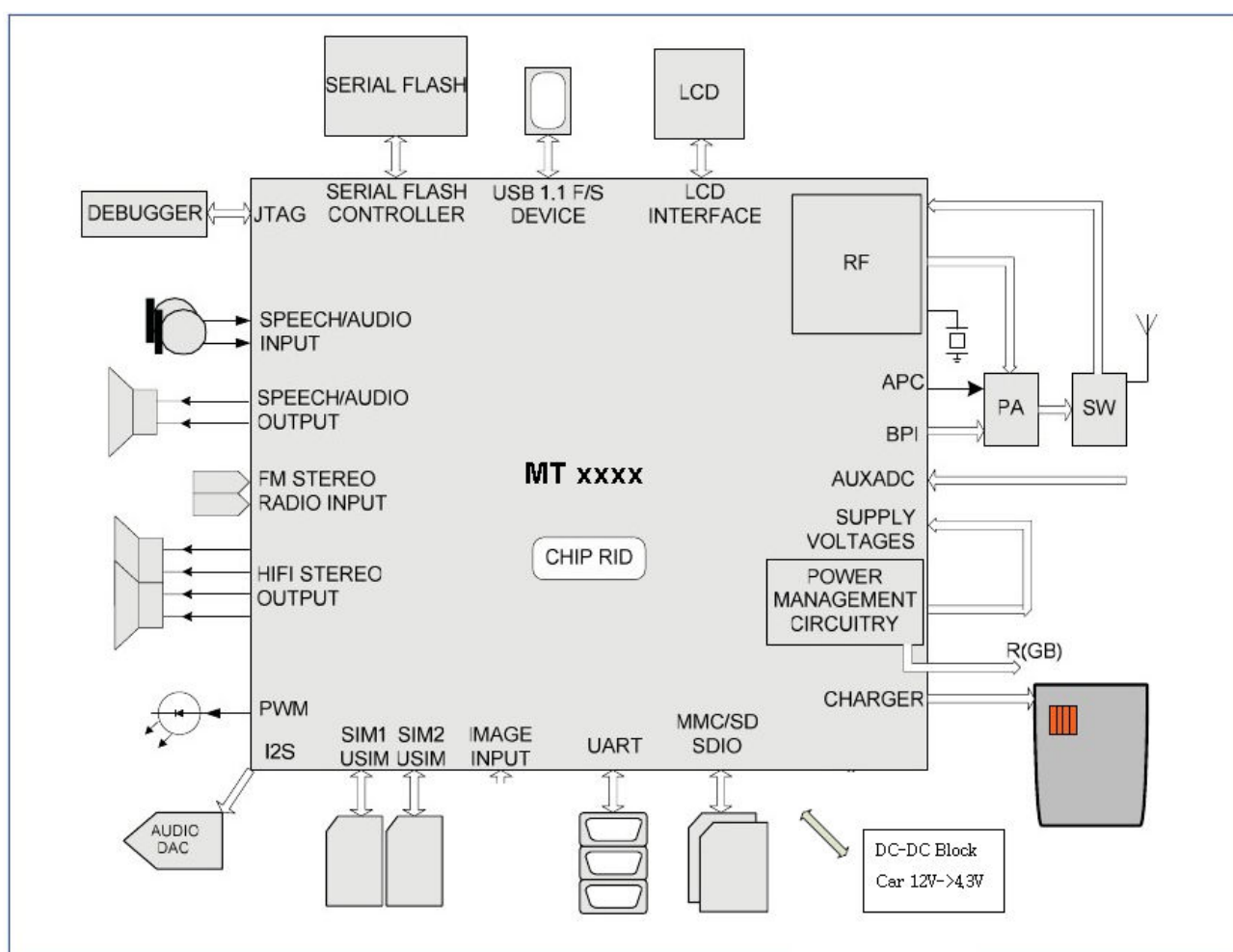
Cabo de alimentação

SIM CARD

LED indicador der GPS e GPRS

Bateria backup

3. Diagrama



4. Cabo de Alimentação

Cabo alimentação serve para interligar o ST215 com o veículo. O ST215E e St215I tem 8 fios, entre os quais três fios são para Vcc, GND e ignição, e os outros 5 fios são para entradas ou saídas. O ST215LC possui somente 4 fios.

Nu	Nome	Cor
1	Entrada 1	Branco
2	GND	Preto
3	Ignição	Azul
4	VCC	Vermelho
5	Saída 1	Laranja
6	Saída 2	Marrom
7	Entrada 2	Amarelo
8	Entrada 3	Verde

ST215E e ST215I

Nu	Nome	Cor
1	VCC	Vermelho
2	GND	Preto
3	Saída 1	Laranja
4	Entrada 1	Branco

ST215LC

5. Especificações GSM

5.1 Faixa de Frequência

VBAT = 3.9 V, VCCD = 2.8 V, Ta = 25 °C unless otherwise specified.

Frequency Band		Min.	Typ.	Max.	Unit
GSM850	Receiver Frequency (RF)	869		894	MHz
	Transmitter Frequency (RF)	824		849	MHz

ST215 - Manual Técnico

GSM900	Receiver Frequency (RF)	925		960	MHz
	Transmitter Frequency (RF)	880		915	MHz
DCS1800	Receiver Frequency (RF)	1805		1880	MHz
	Transmitter Frequency (RF)	1710		1785	MHz
PCS1900	Receiver Frequency (RF)	1930		1990	MHz
	Transmitter Frequency (RF)	1850		1910	MHz

5.2 Características Elétricas

Parameter	Test Condition	Min.	Typ.	Max.	Unit
Peak VBAT current	GSM900			2.0	A
Average VBAT	GSM900 (2 Tx slot)		500		mA
Average Standby mode			5.0		mA
Supply Voltage		3.4	3.8	4.2	V
Ambient temperature	Operation	-10	25	55	Degree
	storage	-40		85	Degree

5.3 Características RF

Parameter	Test Condition	Min	Typ	Max	Unit
RF Output Power	GSM 850 Power Level 5	31	33	35	dBm
	GSM 900 Power Level 5	31	33	35	dBm
	DCS Power Level 0	28	30	32	dBm
	PCS Power Level 0	28	30	32	dBm
	GSM 850 Power Level 19	0	5	10	dBm
	GSM 900 Power Level 19	0	5	10	dBm
	DCS Power Level 15	-5	0	5	dBm
	PCS Power Level 15	-5	0	5	dBm
RMS Phase Error	GSM, DCS and PCS			5	Degree
Phase Error	GSM, DCS and PCS			20	Degree

5.4 Características Elétricas

	SYMBOL	MIN	TYP	MAX	UNIT
Digital Core Voltage LDO (Vcore)					
1.2V Output Voltage	Vcore	1.1	1.2	1.3	V
Digital IO Voltage LDO (Vio)					
Output Voltage	Vio	2.7	2.8	2.9	V
Analog Voltage LDO (Va)					
Output Voltage	Va	2.7	2.8	2.9	V
RTC Voltage LDO (Vrtc)					
2.8V Output Voltage	Vrtc	2.7	2.8	2.9	V
Memory Voltage LDO (Vm)					
1.8V Output Voltage	Vm	1.7	1.8	1.9	V
2.9V Output Voltage	Vm	2.8	2.9	3.0	V
SIM Voltage LDO (Vsim)					
1.8V Output Voltage	Vsim	1.65	1.8	1.95	V
3.0V Output Voltage	Vsim	2.82	3.0	3.18	V
Reference Voltage Output					
Reference Voltage		1.17	1.18	1.19	V

5.5 Componentes Chave

PARAMETER	ITEM	DESCRIPTION
Baseband Chipset	MT62xx	GSM/GPRS Baseband Digital Processor
RF Chipset	RF71XXX	Quad band Front-end Module

MT62xx GSM/GPRS Baseband Digital Processor

General

Integrated voice-band, audio-band and base-band analog front ends

11.6 mm×12.1 mm, 305-ball, 0.5 mm pitch TFBGA package

MCU Subsystem

ARM7EJ-S 32-bit RISC processor

High performance multi-layer AMBA bus

Java hardware acceleration for fast Java-based games and applets

Operating frequency: 104 MHz

On-chip boot ROM for factory Flash programming

Watchdog timer for system crash recovery

4 sets of General Purpose Timers

Circuit switch data coprocessor

Division coprocessor

Frame check sequence coprocessor

Serial Flash Interface

Supports various operating frequency combinations for Serial Flash

Supports QPI and SPI Serial Flash

User Interfaces

8-row × 8-column keypad controller with a hardware scanner

Supports multiple key presses for gaming

SIM/USIM controller with hardware T=0/T=1 protocol control

Real Time Clock (RTC) operating with a separate power supply

General Purpose I/Os (GPIOs)

1 set of Pulse Width Modulation (PWM) output

Maximum 7 external interrupt lines

Security

Supports the security key and chip random ID

Connectivity

Three sets of UARTs with hardware flow control and speed of up to 921600 bps

FS/LS USB 1.1 device controller

Multimedia Card/Secure Digital Memory Card

DAI/PCM and I2S interface for audio applications

Low Power Schemes

Power Down Mode for analog and digital circuits

Processor Sleep Mode

Pause Mode of 32 kHz clocking at Standby State

2-channel auxiliary 10-bit A/D converter for application usage
other than battery monitoring

Processor Sleep Mode

Pause Mode of 32KHz clocking at Standby State

3-channel Auxiliary 10-bit A/D Converter for application usage other than battery monitoring

Power and Supply Management

Charger Input up to 8 V

Thirteen sets of LDOs optimized for specific GSM sub-systems

Built-in LDO for RF transceiver

High operation efficiency and low standby current

Li-Ion battery charge function

Multi- SIM Card Interface Four open-drain output current regulators to
supply/control the LED

LDO-type vibrator

One NMOS switch to control R(GB) LED

Thermal Overload Protection

Under-voltage Lock-out Protection

Over-voltage Protection

Test and Debug

Built-in digital and analog loop back modes for
both audio and baseband front-ends

DAI port complying with GSM Rec.11.10

Modem Feature

Integrated RF Receiver

Quad-band differential input LNAs

Quadrature RF mixers

Fully integrated channel filter

Integrated RF Transmitter

Precise transmission modulator

Low noise SAWLESS transmitter

Integrated RF Frequency Synthesizer

Programmable fractional-N synthesizer
Integrated VCO
Integrated loop filter
Fast settling time suitable for multi-slot GPRS applications

Integrated Digitally controlled Crystal Oscillator (DCXO)

MHz crystal oscillator
On-chip programmable capacitor array for coarse tuning
On-chip programmable capacitor array for fine-tuning

Radio Interface and Baseband Front Ends

High resolution A/D converter for downlink baseband I and Q signals
Calibration mechanism of offset and gain mismatch from analog baseband
10-bit D/A Converter for automatic power control
Programmable radio Rx filter with adaptive bandwidth control
Dedicated Rx filter for FB acquisition
Baseband Parallel Interface (BPI) with programmable driving strength
Multi-band support

RFxxxx FEM for Quad Band Transmit Module

Features

Enhanced Performance Transmit Module
Ultra Compact Size – 6.6x5.2x1.0mm
High System Efficiency – GSM850/900 42%, DCS/PCS 37%
Low RX Insertion Loss
Symmetrical RX Ports
0dBm to 6dBm Drive Level > 50Db of Dynamic Range

Applications

3V Quad-Band GSM/GRPS Handset

GSM850/PCS1900 or EGSM900/DCS1800 Products

GPRS Class 12 Compliant

Portable Battery-Powered Equipment

5.6 Especificação Antena GSM/GPRS

Specifications/Special Features :

Global System for Mobile Communication

850/900/1800/1900 MHz phone antenna,

Broadband design for GSM systems.

No.	Contents	Standards			Unit	Conditions
		Min.	Typ.	Max.		
1	GSM850 Band	824		894	MHz	Tx: 824~849MHz Rx: 869~894MHz
	GSM900 Band	880		960	MHz	Tx: 880~915MHz Rx: 925~960MHz
	DCS Band	1710		1880	MHz	Tx: 1710~1785MHz Rx: 1805~1880MHz
	PCS Band	1850		1990	MHz	Tx: 1850~1910MHz Rx: 1930~1990MHz
2	Impedance		50		Ω	
3	Gain of GSM850	-3	-1		dBi	Max. Gain in all direction
	Gain of GSM900	-3	0		dBi	Max. Gain in all direction
	Gain of DCS	0	2,5		dBi	Max. Gain in all direction
	Gain of PCS	0	2		dBi	Max. Gain in all direction
4	VSWR of GSM850		3,5	6,0		824 MHz
			3,0	4,5		894 MHz
	VSWR of GSM900		3,0	4,5		880 MHz
			5,0	6,5		960 MHz
	VSWR of DCS		3,5	5,0		1710 MHz
			2,5	4,0		1880 MHz
	VSWR of PCS		3,0	4,0		1850 MHz
			2,5	4,0		1990 MHz

6. Especificação GPS

6.1 Visão Geral

O receptor de GPS u-blox 6 foi projetado especialmente para aplicações que necessitam de tamanho reduzido, custo e alta velocidade. Sua arquitetura altamente integrada traz completa precisão no posicionamento. Hardware de baixo consumo e recursos inovadores de software permitem o receptor GNSS operar com 50 mW. Isso garante longos tempos de vida da bateria, uma característica crítica para aplicações portáteis.

6.2 Destaques e Recursos

Cost and Size Efficiency

Intelligent, user configurable power management for radically lower power consumption
Ublox 6 position engine with over 2 million effective correlators featuring < 1 s acquisition,-
147 dBm coldstart acquisition sensitivity and 5 Hz update rate
Supports u-blox' AssistNow Online / AssistNow Offline A-
GPS services and is OMA SUPL compliant
Cost and size effective

SuperSense[®] Indoor GPS

-160 dBm acquisition, reacquisition and tracking sensitivity
Best-in-
class tracking and navigation in difficult signal environments such as urban canyons
or indoor locations

Galileo Capable

Ready to receive and track Galileo-L1 signals on all tracking engine channels
Combined GPS and Galileo will bring improved coverage and accuracy

Innovative RF Architecture

Low IF frequency reduces interference and eliminates need for external IF filters
Fractional-
N frequency synthesizer supports wide range of clock reference frequencies and
enables re-use of the main application oscillator

Low Power Consumption

50 mW power consumption during tracking and navigation

Tbd mW power consumption during acquisition

Integrated DC/DC converter

Fully integrated power management unit generates required core voltages for RF and Base band.

Supports flexible power supply configurations

Advanced power saving modes

Assisted GPS

Supports u-blox AssistNow™ online A-GPS services

Supports u-blox AssistNow™ offline A-

GPS services with AlmanacPlus® differential almanac correction

Supports A-GPS mobile standards

6.3 Características Elétricas

Alimentação

Symbol	Parameter	Min.	Typ.	Max.	Unit
VDD_Cx, VDD_Bx VDD_PLL	Supply Voltage digital cores	1.1	1.2	1.3	V
VDD_IO	Supply Voltage I/O ring	1.65	1.8	3.6	V
VDD_USB	Supply Voltage USB	3.0	3.3	3.6	V
VDD_RF	Supply Voltage RF Front-end	1.75	1.8	2.0	V

Unidade de gestão da alimentação

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
V_BCKP	Input voltage for VDD_B LDO	Backup mode	1.3		4.8	V
V_RUN	Input voltage for VDD_B LDO	Normal mode	1.3		4.8	V
V_DCDC	Input voltage for VDD_C LDO		1.3		3.6	V
VDD_3V	Input voltage for VDD_RF LDO		2.5		3.6	V
VDDO_B	VDD_B LDO output voltage	LDO1_val_register=00 0		1.2		

ST215 - Manual Técnico

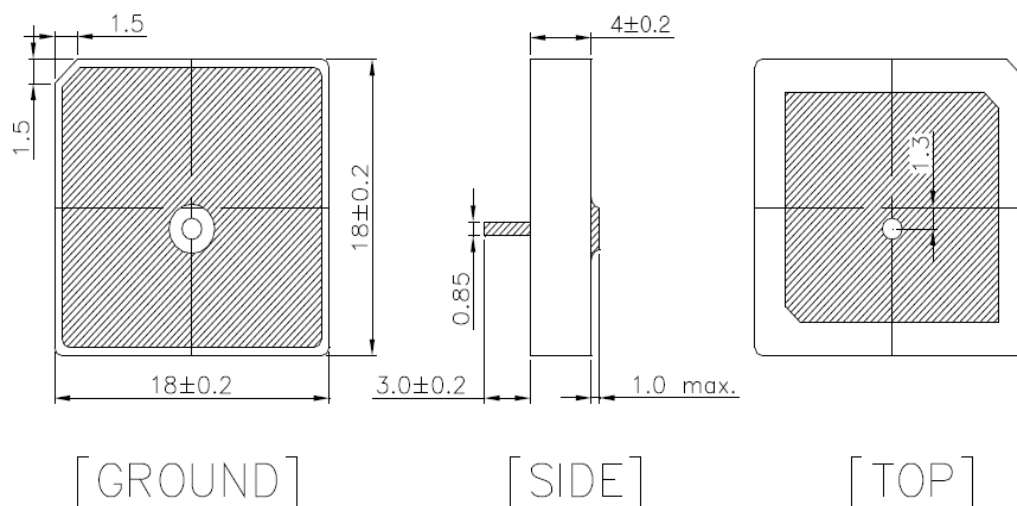
VDDO_C	VDD_C LDO output voltage	LDO2_val_register=00 0		1.2		
VDDO_RF	VDD_RF LDO output voltage			1.8		
LDO2_OUT	VDD_ANA LDO output voltage			1.7		
VDDO_LNA	VDD_LNA LDO output voltage			1.7		
DCDC_out	DC/DC output voltage	DCDC_val_register=00 DCDC_val_register=0 1 DCDC_val_register= 10 DCDC_val_register =11		2.5 1 .9 1. 8 1.3		V
I_Ldo_b	VDD_B LDO max. output			5		mA
I_Ldo_c	VDD_C LDO max. output			100		mA
I_Ldo_dig	VDD_RF LDO max. output			30		mA
I_Ldo_ana	VDD_ANA LDO max. output			30		mA
I_Ldo_lna	VDD_LNA LDO max. output			6		mA
I_DCDC	DC/DC max. output			100		mA
POR_B_u	Upper tripper level for VDD_B	VDD_B = 1.2 V		1.14		V
POR_B_l	Lower tripper level for VDD_B	VDD_B = 1.2 V		1.11		V
POR_C_u	Upper tripper level for VDD_C	VDD_C = 1.2 V		1.14		V
POR_C_l	Lower tripper level for VDD_C	VDD_C = 1.2 V		1.11		
POR_MR_u	Rising Threshold value for V_R reset	V_TH open V_TH = 0V		1.65 2.45		V
POR_MR_l	Falling Threshold value V_Rese t	V_TH open V_TH = 0V		1.60 2.35		V

Pinagem digital “I/O”

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Ileak	Leakage current input pins				10	nA
Vil	Low level input voltage				0.2*VDD ¹	V
Vih	High level input voltage		0.7*VDD ¹		Tbd	V
Vol	Low level output voltage	Iol=4mA			0.4	V
Voh	High level output voltage	Ioh=4mA	VDD ¹ -0.4V			V
Rpu	Pull-up resistor			113		kΩ
Rpd	Pull-down resistor			83		kΩ

6.4 Especificação Antena de GPS

Interna, utilizada no ST215I e ST215LC:

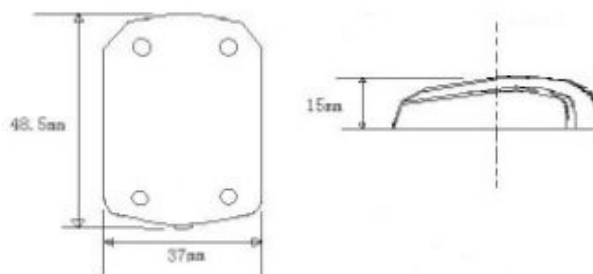


Other Specified Tolerance : ± 0.10
Unit:mm

No.	ITEM	Specification	Typical Data
1	Frequency	1575.42 MHz	1575.42 MHz
2	VSWR	3.0 max	2.5 Max
3	Total Gain(Peak)	Peak Gain : 1 dBi min	2.5 dBi
4	Impedance	50 Ω	50 Ω
5	Polarization	Circular (RHCP)	Circular

ST215 - Manual Técnico

Externa, utilizada no ST215E:



Weight < 110gram

Size 48*37*15mm

Cable RG174 3 /1.5 meters

Connector SMA

Mounting Magnetic base

Housing Black

Weatherproof 100%Waterproof

V.S.W.R < 2.0

DC Voltage 3.0V to 5.0V

DC Current 10mA Max

Active Antenna

Center Frequency 1575.42MHz $\pm$ 3 MHz

V.S.W.R 1.5:1

Band Width $\pm$ 5 MHz

Impedence 50 ohm

Peak Gain > 3dBic Based on 7 $\times$ 7cm ground plane

Gain Coverage > -4dBic at $-90^\circ < 0 < +90^\circ$ (over 75% Volume)

Polarization RHCP

LNA/Filter

LNA Gain (Without cable) 28dB Typical

Noise Figure 1.5dB

Filter Out Band Attenuation ($f_0=1575.42$ MHz)

7dB Min $f_0 \pm 20$ MHz ;

20dB Min $f_0 \pm 50$ MHz;

30dB Min $f_0 \pm 100$ MHz

Configuração e Instalação

Consulte outros documentos.

7. Como fazer uma chamada com equipamento de teste

Insira o SIN CARD

Instale os conectores antes de ligar a alimentação, figura abaixo.



Aperte o botão “connect mobile” na estação.



The call is automatically made (The dummy is made for making a call without any tool and command)