

LEADTEK GPS MODULE

LR9123 Specifications Sheet



Features:

- ▶ *SiRF StarIII/LPx single power chipset*
- ▶ *Compact module size for easy integration : 36 x 24 x 10.5 mm*
- ▶ *MMCX Antenna connector type*
- ▶ *RoHS compliance (lead-free)*

Revision History:			
Revision	Release Date	Issuer	Change Description
1.0	2009/02/16	J.Lee	Preliminary draft



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1. Introduction

Leadtek LR 9123 is a high performance, low power consumption, small size, easily integrated GPS module board designed for a broad spectrum of OEM system applications. This product is based on SiRFstarIII/LPx single chipset solution. **Leadtek LR9123 module board is very fit to the customers who devote themselves to AVL system integration and location-based service.**

The LR9123 design utilizes the latest surface mount technology and high level circuit integration to achieve superior performance while minimizing space and power requirements. This hardware capability combined with software intelligence makes the board easy to be integrated and used in all kinds of navigation applications or products. The application system may communicate with the module board set via two RS232 compatible bi-directional communication channels with CMOS/TTL voltage level.

2. Features

2.1 Hardware and Software

- ▶ Based on the high performance features of the SiRFstarIII/LPx single chipset
- ▶ Compact module size for easy integration: 36x24x10.5mm (1.417"x0.945"x0.413")
- ▶ 20 channels "All-in-View" tracking
- ▶ Hardware compatible with SiRF GSW software
- ▶ RoHS compliance

2.2 Physical Characteristics

- ▶ Length 36 mm (1.417 in)
- ▶ Width 24 mm (0.945 in)
- ▶ Height 10.50 mm (0.413 in)
- ▶ Weight 7g
- ▶ Antenna connector MMCX type
- ▶ Interface connector 20-pin straight header, 0.8mm pitch board-to-board

2.3 Performance

- ▶ Cold/Warm/Hot Start Time: 35/35/1 sec. at open sky and stationary environments.
- ▶ Reacquisition Time: 0.1 second
- ▶ RF Metal Shield for best performance in noisy environments
- ▶ Multi-path Mitigation Hardware

2.4 Interface

- ▶ TTL level serial port for GPS communications interface
- ▶ Protocol: NMEA-0183/SiRF Binary (default NMEA)
- ▶ Baud Rate: 4800, 9600, 19200, 38400 or 57600 bps (default 4800)

2.5 Applications

- ▶ Car Navigation
- ▶ Marine Navigation
- ▶ Fleet Management
- ▶ AVL and Location-Based Services
- ▶ Hand-Held Device for Personal Positioning and Navigation
- ▶ Ideal for PDA, Pocket PC and Other Computing Devices at GPS Application

3. Specifications

3.1 Technical Specifications

Feature	Item	Description
Chipset	GSC3f	SiRFstarIII Low power single chipset
General	Frequency	L1, 1575.42 MHz
	C/A code	1.023 MHz chip rate
	Channels	20
Accuracy	Position	10 meters, 2D RMS 5 meters 2D RMS, WAAS corrected <5meters (50%)
	Velocity	0.1 meters/second
	Time	1 microsecond synchronized to GPS time
Datum	Default	WGS-84
	Other	selectable for other Datum
Time to First Fix (TTFF) (Open Sky & Stationary Requirements)	Reacquisition	0.1 sec., average
	Snap start	1 sec., average
	Hot start	1 sec., average typical TTFF
	Warm start	35 sec., average typical TTFF
	Cold start	35 sec., average typical TTFF
Dynamic Conditions	Altitude	18,000 meters (60,000 feet) max.
	Velocity	515 meters/second (1000 knots) max.
	Acceleration	4g, max.
	Jerk	20 meters/second ³ , max.
Power	Main power input	3.3 ~ 5.0 VDC input
	Power consumption	TBD
	Supply Current	TBD
	Backup Power	1.5 ~ 5.0 VDC input.
Serial Port	Electrical interface	Two full duplex serial TTL interface.
	Protocol messages	NMEA-0183@4800 bps (Default)
Time-1PPS Pulse	Level	TTL
	Pulse duration	The 1PPS pulse width is 1 μ s, this 1PPS is NOT suited to steer various oscillators (timing receivers, telecommunications system, etc).
	Time reference Measurement	At the pulse positive edge. Aligned to GPS second, ± 1 microsecond

3.2 Environmental Characteristics

Items	Description
Operating temperature range	-40 deg. C to +85 deg. C
Storage temperature range	-55 deg. C to +100 deg. C

3.3 Physical Characteristics

Items	Description
Length	36 mm \pm 0.3mm (1.417in)
Width	24 mm \pm 0.3mm (0.945 in)
Height	10.5 mm \pm 0.3mm (0.413 in)
Weight	7g

3.4 Interface Specifications

Items	Description
I/O	20 pin SMD micro package

3.5 Recommended GPS Antenna specifications

Parameter	Specification
Antenna Type	Right-hand circular polarized active patch antenna
Frequency Range	1575.42 \pm 1.023 MHz
Impedance	50 Ohm
LNA Gain	18dB~28dB
Noise Figure	1.5dB Max.
Antenna connector type	MMCX
Antenna Voltage	DC 3V
Antenna Current	20mA Max.

3.6 Software

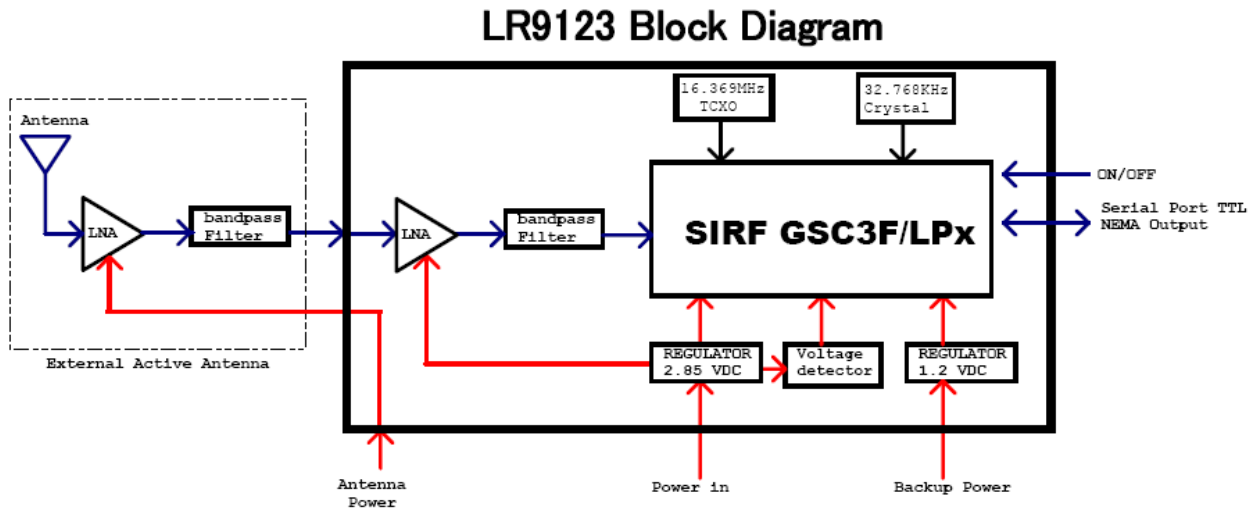
The Leadtek LR9123 module includes SiRF high sensitivity software solution.

- ▶ Features include:
- ▶ High tracking sensitivity
- ▶ High configurability
- ▶ 1 Hz position update rate
- ▶ Real-time Operating System (RTOS) friendly
- ▶ Capable of outputting both NMEA and SiRF-proprietary binary protocols
- ▶ Designed to accept custom user tasks executed on the integrated ARM7TDM1 processor
- ▶ Runs in full power operation or optional power saving modes

Item	Description
Core of firmware	SiRF GSW Software
Baud rate	4800, 9600, 19200, 38400 or 57600 bps (default 4800)
Code type	NMEA-0183 ASCII
Datum	WGS-84
Protocol message	GGA(1sec), GSA(5sec), GSV(5sec), RMC(1sec), VTG(1sec)
Output frequency	1 Hz

4. Electrical Specifications

4.1 Block Diagram



4.2 Absolute Maximum Ratings

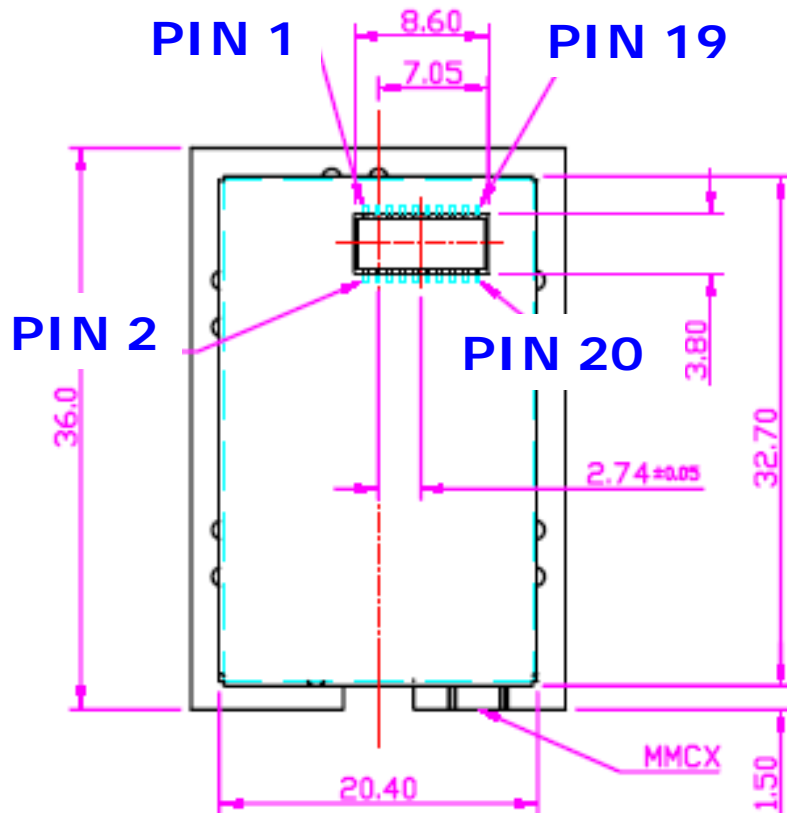
Parameter	Symbol	Min	Max	Units
Power supply voltage	VCC	-0.3	6	V
Backup battery voltage	BAT	-0.3	6	V

4.3 Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units
Power Supply					
Power supply voltage	VCC	3.2	3.3	5	V
Backup battery voltage	BAT	1.5	3.3	5	V
UART and I/O					
Input Low Voltage		-0.3		0.7	V
Input High Voltage		2		3.1	V
Output Low Voltage		-0.3		0.7	V
Output High Voltage		2		2.85	V

5. Interface Specification

5.1 Pin Positions



5.2 Pin Settings

Pin Number	Name	Type	Description
1	ANT_PWR	PWR	Antenna DC Voltage
2	N/C	N/C	Keep Floating
3	BAT	PWR	Backup Battery Input +1.5VDC ~ +5.0VDC
4	VCC	PWR	Power Input +3.3VDC ~ +5.0VDC
5	RESETB	I	System reset, active low (If not used, keep floating)
6	ON/OFF	I	Power ON/OFF control (1.2V). Momentary high pulse to turn on and off the module. Detect rising edge.
7	N/C	N/C	Keep Floating
8	N/C	N/C	Keep Floating
9	N/C	N/C	Keep Floating
10	N/C	N/C	Keep Floating
11	TXA	O	Serial Data Output A
12	RXA	I	Serial Data Input A
13	N/C	N/C	Keep Floating
14	TXB	O	Serial Data Output B
15	RXB	I	Serial Data Input B
16	N/C	N/C	Keep Floating
17	BOOTSEL	I	Pull high for programming mode.(If not used, keep floating)
18	GND	PWR	Ground
19	TIMEMARK	O	1PPS Time Mark Output
20	N/C	N/C	Keep Floating

Note:

- 1) Maximum voltage is 5.0 VDC
- 2) Pin17 is active high and float when not use

6. Mechanical Dimensions

6.1 Outline Drawing

Tolerance:

Length	36.0 ± 0.3 mm
Width	24.0 ± 0.3 mm
Height	10.50 ± 0.3 mm

