



20 channels SiRF Star III GPS

MISOLIMA
EMBEDDED TECHNOLOGIES

MISOLIMA GPS Receiver



Digitals 2011

EMBEDDED SYSTEMS

FIKO
SOFTWARE



MISOLIMA



20 Channel GPS Receiver based upon SiRF Star III Generation 2 Chipset

Order No: M203010X-XXX

Features

- 20 channel all-in-view GPS/EGNOS/WAAS receiver
- Indoor/parking house reception
- Integrated SiRF Star III Generation 2 chipset
- Extremely good sensitivity of -159 dBm
- Extremely fast Time-To-First-Fix ("TTFF")
- External antenna voltage 3.3V standard
- Software reset of device
- Supports NMEA 0183 and SiRF binary protocols
- USB data communication (RS-232 TTL as option)
- 1.5m USB cable
- -40° to $+85^{\circ}$ C Operating Temperature Range
- 5Vdc voltage input (5-28Vdc for μ James GPS III PRO)
- Compact Size 40x53x20 mm (1.57x2.08x0.78 Inch)
- MISOLIMA silver anodised aluminium casing
- Fix mounting, light weight and affordable pricing

General Description

MISOLIMA eJames GPS III Receiver is an integrated 20-channels all-in-view GPS receiver powered from USB port or external 5Vdc power supply. With the rapid time-to-fix and high sensitivity, MISOLIMA eJames GPS III design and architecture is designed to meet rigorous demands for precise localisation including many indoor environment, through urban valleys, under dense foliage or in cities with many high-rise buildings. All this makes real-time navigation of vehicles, aircraft and marine boats practical without investing in expensive GPS receivers.

In traditional GPS receivers there is lengthy sequences to process time-to-fix, the MISOLIMA eJames GPS III architecture however operates to the equivalent of more than 200,000 correlates, enables fast and deep GPS signal search capabilities, resulting in significant improvement over today's architectures that contain only a few hundred to a few thousand correlate's.

New 2011



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MISOLIMA eJames GPS III is designed for light silver anodized aluminium casing and comes with MCX or SMA connector for GPS antenna fastening.



MISOLIMA eJames GPS III PCB design with SMA GPS active antenna connection.

Data communication are made via USB D+ and D-. Supply power are connected via USB connector and powered from port or external 5Vdc.



MISOLIMA μ James GPS III PRO has wide power input from 5 to 28Vdc, I/O port, Analogue to Digital Port, GPS Out, GPS Stat, Power switch and more via 14 pin data port.

MISOLIMA eJames GPS III

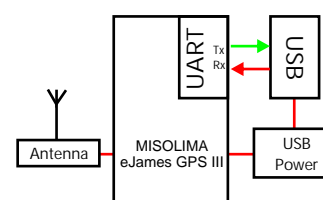
MISOLIMA GPS APPLICATIONS

manufactured by MISOLIMA

APPLICATIONS

- In-vehicle navigation systems
- Field Engineering
- Geo-referencing
- Agricultural management
- Vehicle, Marine and Experimental Aircraft Navigation
- Dead tracking
- Galileo/Glonass Integration (Data synchronisation)

MISOLIMA eJames GPS III Block Diagram



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Revisions:

VERSIONS:	DATE:	APPROVED BY:	DESCRIPTION:
1.0r0.1	2nd JAN 2005	Surachai W. - Design Engineer Apisak W - Project Manager Anne S. F. Chief Design Architect	First release in new format
1.0r0.2	24th MAR 2006	Anne S. F. Chief Design Architect	Added data and information
1.0r0.3	24th APR 2006	Anne S. F. Chief Design Architect	Modification of content
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1.0r0.6	27th JUN 2006	Anne S. F. Chief Design Architect	Modification of content
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1.0r0.8	10th JAN 2011	Anne S. F. Chief Design Architect	Modification MISOLIMA model
1.0r0.9	10th MAY 2011	Anne S. F. Chief Design Architect	Modification eJames name

For Ordering Information see last page of this User's Manual:

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P031-S01-D47-T02v1.0r09 05/11**

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MISOLIMA eJames GPS III SPECIFICATIONS

Characteristics	Conditions	Min	Typ	Max	Units
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General

Chipset	SiRF Star III G2	-	-	-	-
Frequency	L1, 1575.42 Mhz	-	-	-	-
C/A Code	1,023 Mhz chip rate	-	-	-	-
Sensitivity			-159		dBm
Channels	All-in-view	12	20	20	channels

Accuracy

Positioning	2D RMS with EGNOS/WAAS enabled	15 -	10 5	8 1	m m
Velocity		-	0.1	-	m/sec
Time	Synchronised to GPS	-	1	-	µs

Datum

Default	WGS-84	-	-	-	-
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Average Acquisition time

Re-acquisition		-	0.1	-	sec
Hot start		-	1	-	sec
Warm start		-	38	-	sec
Cold start		-	42	-	sec

Dynamic conditions

Altitude		- -	18,000 60,000	- -	m feet
Velocity		-	515 1,000	- -	m/sec knots
Acceleration		-	<4	-	G
Jerk		-	20	-	m/sec

Power

Vin	Regulated i.e. from USB port	-	5	-	Vdc
Efficiency	Power supply	-	90	-	%
Frequency		-	260	-	Khz
Capacity	Thermal shutdown and current limit protection	-	330	-	mA
Consumption	Continuous mode	116	120	125	mA
	Satellite search w/active antenna	110	120	125	mA

Digital Interface

UART RS-232	1 Start, 8 Data, 1 Stop, 0 Parity	4,800	9,600	57,600	bps
Update rate	Continuous	-	1	-	Hz
Antenna	Active	2.3	3.3*	5.5	Vdc
Connector	USB Type A Male Antenna: MCX or SMA		-		

* MISOLIMA eJames GPS III PRO - has the option of external antenna power where active antennas of 4, 5 and 12 Vdc can be used.

MISOLIMA eJames GPS III SPECIFICATIONS cont.

Characteristics	Conditions	Min	Typ	Max	Units
Physicals					
Dimensions	Circuit board assembly aluminum case	-	37x50x1.6	-	mm
		-	40x53x20	-	mm
Weight	MISOLIMA GPS III incl. housing and USB cable	-	85	-	grams

Environment

Temperature	Operational Storage	-40	-	+85	°C
		-65	-	+160	°C
Humidity	Relative Humidity	5	95	98	%
EMI	FCC and EC EMI compliant Class B	-	-	-	
Shock	> 11 ms	-	35	-	G
Vibration	5 Hz ~ 14 Hz	-	0.6	-	G
	27 Hz ~ 50 Hz	-	1.0	-	G
	50 Hz ~ 500 Hz	-	20	-	G
Rain	IEC 529 IPX5	-	-	-	

CIRCUIT DESCRIPTION

The MISOLIMA eJames GPS III receiver module circuit boards includes all the basic sensors and electronics to provide a digital indication of GPS/EGNOS/WAAS navigational data. The MISOLIMA eJames GPS III are based on the popular SiRF Star III Generation 2 chipset as GPS sensors plus necessarily RF and power supply components to provide both RS-232 and USB interfacing and power to the device. The MISOLIMA eJames GPS III system has internal 3V battery power to store fix position and port settings.

The direction of MISOLIMA GPS III is not critical to archive the right data from the GPS system. MISOLIMA eJames GPS III might need to be re-programmed with regards to baud rates and EGNOS/WAAS capabilities – see further down in this document for more info. EGNOS is available in Europe and North Africa only while WAAS is available for USA. The rest of the world has no EGNOS/WAAS coverage but might have other systems in the future.

The MISOLIMA eJames GPS III circuit uses SiRF Star III single-chip module solution for compact and reduced size. The system is supplied power by a constant current source to maintain best accuracy over wide temperature range. The MISOLIMA eJames GPS III uses ARM7DMI CPU for best performance and reliability, where an onboard 1Mb SRAM integrated circuit is employed to retain necessary data variables. MISOLIMA eJames GPS III supports FCC E911 mandate.

The power supply for the MISOLIMA eJames GPS III circuit is direct connected regulated supply voltage of +5Vdc from i.e. USB port. The power supply is a dual ground (analogue and digital) system to control internal noise and maximise measurement accuracy.

OVERVIEW

Most of MISOLIMA product for GPS, AVL, GYRO, I/O control, relays, sensors, audio etc. are developed using strong aluminium cases with 1.6mm front and back plates. The advantage of these products is that it's well designed for harsh environments and does comply with MIL-STD-818F operational environment criteria's.



Figure 4. eJames GPS III with black and purple plates

The MISOLIMA eJames GPS III module is based on the highly reliable SiRF Star III engine board with additional components to provide RS-232 communication or USB connection via RS-232 to USB interface module. The MISOLIMA eJames GPS III uses the world standard NMEA 0183 used in GPS-based navigation for marine, in-vehicle, aviation, agriculture management, mapping, survey and engineering, just to mention few. The MISOLIMA eJames GPS III saves and stores retrieved satellite data into memory backups for fast and reliable data transmission via traditional RS-232 serial interface. NMEA data from non-USB GPS receivers like our PRO and Gyro version can be connected to USB using i.e. eCharlie U2R, an RS-232 to USB converter, where our MISOLIMA.DLL software module can be used by software developers to obtain GPS integration for navigation software developments etc.

For precise localisation, the MISOLIMA eJames GPS III are able to track up to 20 channels at same time. The built-in processor re-acquires GPS satellite information every 100ms and updates positioning data every 1 second, while the standard settings updates satellite positioning information (\$GPGSV) every 4 seconds.

The smart internal memory saving of GPS satellite history data allows the MISOLIMA eJames GPS III to give its users a really fast positioning fix even if the receiver has been off for a while.



Figure 5. The top-view of MISOLIMA eJames GPS III

MISOLIMA eJames GPS III is provided as both ready to use system mounted in aluminium casing as well as provided in PCB format for those whom would like to use this system as integration into i.e. embedded navigational systems or panel mounting using the panel mounting version.

For those whom only need the GPS engine board (without power supply and connectors), they can also purchase this from us or from our dealers.

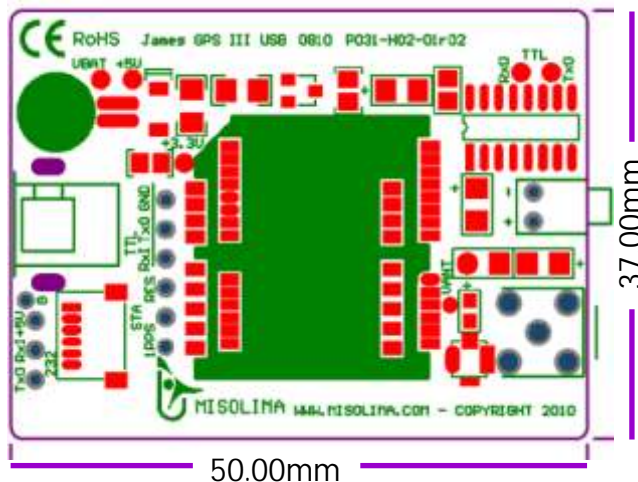


Figure 5. USB to RS-232 converter with RJ-45 connector

The eCharlie U2R USB to RS-232 converter shown above and data cable will be needed if you wish to connect eJames GPS III PRO to USB.(can be both USB 1.1 and 2.0). In this case the USB cable goes into the PC or Mac's USB port and the other goes to the MISOLIMA Port on the back of eJames GPS III PRO. Max length of such data-cable is 15 metres.

PHYSICAL CHARACTERISTICS

The circuit board for the MISOLIMA eJames GPS III solutions is 37x50x1.6 mm or 1.45x1.96x0.06 inches while in the ready mounted rugged aluminium case is 40x53x20 mm or 1.57x2.08x0.78 inches. The MISOLIMA eJames GPS III contains one PCB (Printed Circuit Boards) where components are mounted on both sides of the PCB based upon miniature SMD (Surface Mount Devices). The topside contains the GPS and interface modules while the MISOLIMA eJames GPS III, the bottom side does carry the switching power supply and other circuitry. Figure 1 shows the bottom PCB with its dimensions.



The MISOLIMA eJames GPS III module are available with integrated RS-232 level shifter, battery backup, and has reset, baudrate and EGNOOS/WAAS settings via COM-port settings. The MISOLIMA eJames GPS III receiver can be ordered with both MCX and SMA antenna connector and the front and back plate can be delivered in four colours, black, red, blue or purple with white printed text.

The default baud rate is 9,600 bps and other baud rates can be set via SiRF binary commands from virtual COM-port on any PC.

Figure 1. Top PCB side with GPS and interfaces.

There is two options for fix installation of MISOLIMA eJames GPS III. Order No: M2030100-XXX where the first X start with "0", it means that the width of the front panel is equal with of the aluminium case, so fix mounting must be done by securing the body of the aluminium case. If there is a need of panel mounting, then the first X in the order number should show "1" as the front plate will then be delivered with extended width with space for two fastening screws on each side. This is practical if you wish to fix install the MISOLIMA eJames GPS III into panel in bus, caravan, truck, train, boat etc. The advantage with fix mounting is that the GPS status LED becomes visible. If there is no need to see the status LED, then the GPS receiver can basically be installed anywhere as long as data cable reach the USB source. Information about installation is found in the following pages of this document.

The most important aspects of finding a location and installing MISOLIMA eJames GPS III is to make sure that the unit is mounted is such way that the USB connector has enough free space for mounting and cables for then to reach the USB source as needed.

If fix mounting of the GPS module is needed, then ensure that there is free space for the USB cable and connector as well as free view to the GPS LED status should be viewable to ensure GPS Fix is achieved in case of GPS communication problems.

FEATURES

Unlike other GPS receiver modules, MISOLIMA eJames GPS III provides several unique benefits to its users where such benefits includes;

- ✘ Wide input voltage that fits most battery voltages found in motorbikes, cars, aviation, marine, train, truck, caravans, busses etc. (M203010PR-XXX and M303010ST-XXX only)
- ✘ Rugged module capable of withstanding vibration, humidity and temperature above and under normal use and circumstances.
- ✘ Supplied in extra strong aluminium case for fixed mounting, made and designed with aluminium extrusion technologies.
- ✘ Silver anodised surface that guarantees protection of the aluminium close to the strength and hardness found in only diamonds.
- ✘ Brackets mounting to any surface (metal, fibre, wood etc.) with four screws that are safety-protected against easy removals of the top case.
- ✘ Two-part solution where the top case is fastened to the bottom bracket by simply sliding the top case into the bottom bracket rails.

The GPS technology used are compromised by these data:

- ✘ Integrated SiRF Star III Generation 2 high performance GPS chipset.
- ✘ Extremely good sensitivity - tracking sensitivity of -159 dBm makes it also work indoors.
- ✘ Extremely fast Time To First Fix ("TTFF") at low signal level.
- ✘ Supports both NMEA0183 and SiRF binary protocols.

MISOLIMA.DLL for fast tracking via COM-ports are available for developers of Windows navigational software.

INSTALLATION

If fix installation of MISOLIMA eJames GPS III is needed then the best way is to purchase the panel mounting version that has extended front plate with four holes for panel mounting.

Once released, it can be fixed to suitable surface and fastened with the provided four screws. If fastened to plastic, glass fibre, or metal sheet you will need to drill the four holes with a suitable drill - for other surfaces you might use double-sided tape. Once fastened, you will need to re-insert the top case for securely fastening of the unit. See next section for further installation details.

PANEL MOUNTING DRILL HOLES



Figure 6. GPS Panel mounting with 3M holes

The left image shows the positioning of the panel mounting of MISOLIMA eJames GPS III. The two holes on each side of the front plate is 3mm and has a distance of 52mm between each holes.

The cut-out size of the panel must be 41-42mm x 20-21mm with rounded corners so the aluminium case can fit into the hole.

Make sure that power is not connected to the unit during this operation.

IMPORTANT NOTICE!



If you open the case of the MISOLIMA eJames GPS III be aware to never touch the electronic parts inside the case as this could cause electronic discharge from your body and therefore damage the components causing the MISOLIMA eJames GPS III to become unusable and void any guarantee.

For fix mounting of MISOLIMA eJames GPS III you will first of all need to drill the two holes for the front fastening bracket. You will need the two 3mm screws which you find provided with the package. Figure 7 shows the placement where you need to drill the holes. If you don't have a measuring tool, then just place the bracket on the place where you like to have it mounted and use a pencil or a pen to mark the two holes for drilling and cut-out.

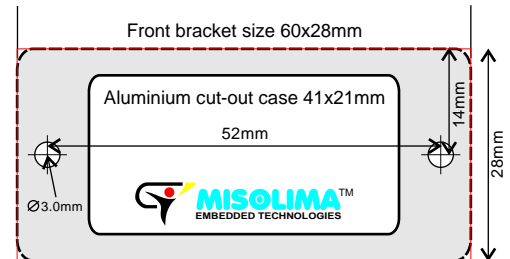


Figure 7. Drill positions for the fastening bracket M203010ST-XXX



Before making the choice for placement of eJames GPS III module, ensure enough free space on the connector side of the module to enable the aluminium case to slide onto the panel cut-out. As you need to use a small screwdriver to fasten the front plate, you need enough space for the screwdriver at the front.

CONNECTING POWER

Extra care shall be taken when connecting power to the MISOLIMA eJames GPS III PRO. Make sure that your power source is right for this unit. When mounted in vehicle, you need to use a cable with fuse holder connected to the + (plus). It is sufficient to use a fuse of 300mA. The black cable must be connected to – (ground). If you use the USB version then plug just to USB port as the device is powered with +5Vdc directly from USB.

IMPORTANT NOTICE!



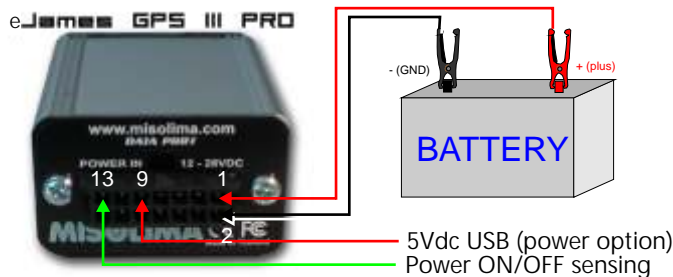
Before connecting power to the MISOLIMA eJames GPS III, make sure you understand what you're doing. If you're not sure, ask an authorised person to conduct the installation for you. As a golden rule, touch a grounded point before handling the MISOLIMA eJames GPS III. Make sure that your MISOLIMA eJames GPS III module is suited for your intended power source. If you purchased the standard version, then max voltage is +5Vdc. If you purchased MISOLIMA eJames GPS III PRO then max input power is +28Vdc which is OK to be used on motorbikes, boats, aircraft, cars, busses, trucks and trains as they normally has battery voltage of between 6-24VDC.

If you're not sure about what max voltage your MISOLIMA eJames GPS III is designed for, you can check this out by reading the label found on the top of the fastening bracket. If you need to use the MISOLIMA eJames GPS III for i.e. 48V, you will need to use i.e. 48V to 12V (or 48V to 24V) DC-DC power adapter.

WARNING! Please note that providing more than +28Vdc to the voltage input **MAY DESTROY** the MISOLIMA eJames GPS III PRO device. Make sure that you are providing regulated/unregulated power of +5 to +28Vdc between pin 1 (+Vin) and pin 2 and/or 8 and 9 (GND) on the connector. The LED at the front of the case indicates the status of GPS and not power (depending on model).

POWER CABLE EXTENSION eJames GPS III PRO

If the supplied power cable is too short to reach your battery, you will need to extend the power cable and secure the connection points against short circuit. **Make sure that you use the same thickness of cables and colours (red and black) for your cable extension where you extend the red with red and black with black.**



If you use the 5V power from the USB port to power eJames GPS III PRO then you need to connect Pin 1 of USB to Vin (+) and Pin 8 to GND.

Figure 8. The pin connection for the standard version of MISOLIMA eJames GPS III PRO (outside view)

Pin connections

Pin Number	Name	Description
1	Vin (Vout)	Power in 5 to 28Vdc
2	GND	Ground from power source (Power Ground)
3	GPS Status	Connect to external LED to indicate GPS status
4	RxD GPS	RxD to communicate directly to GPS module
5	TxD GPS	TxD to receive direct GPS data from GPS module
6	RxD μ FDEX	RxD to send DOLLx8 commands to device
7	TxD μ FDEX	TxD to receive DOLLx8-based data from device
8	GND	Ground from power source (Power Ground)
9	Vin*	Positive voltage DC input 5Vdc from USB etc.
10	GND	Ground from power source (Power Ground)
11	SWITCH1	Digital I/O switch for i.e. magnetic switch or relay
12	ADC1	10-bit Analogue to Digital converter
13	ON/OFF Power	Power ON/OFF switch (Closed to GND)
14	GPS Antenna power option	Alternative GPS antenna power like 5, 6 or 12Vdc

*Note: Use pin 9 (+Vin) to power eJames GPS III . Connector cables for power from USB here or if you use car battery or car cigarette lighter outlet use pin 1.

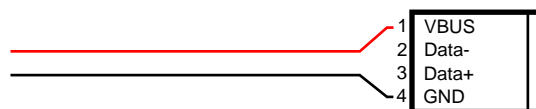


Figure 9. Pin assignment for data with USB power (use USB Type A Male connector)

For the MISOLIMA eJames GPS III PRO the TxD GPS sends out standard NMEA data based on set baudrate. However for RxD and TxD on DOLLx8, the baudrate are fixed and set to 38.400bps. If the baudrate for the GPS is set to other baudrates than 38.400, the GPS output from TxD DOLLx8 will not work even though DOLLx8 commands and functions will still be working. Therefore the best solution is to keep the GSM module at 38.400bps at all times.

DATA CABLE EXTENSION

Max length of connector cable for RS-232 shall not be more than 9 meters and you should use two-wired shield twisted pair cable for the RxD and TxD data where the shield is connected to DGND. Once connected the GPS antenna and wire to the RS-232 on your PC, you should be able to receive satellite data. If you don't have any RS-232 (COM-port) on your PC, you can also use i.e. our eCharlie U2R, an USB to RS-232 converter that will create a virtual COM-port under Windows. Please note that such converters will not work under DOS unless you have a DOS driver for the device. The serial RS-232 I/O port driver used in MISOLIMA eJames GPS III provides –10V to +10V even at supply voltage of 5V DC.

Application Notes

The MISOLIMA eJames GPS III modules communicate through ASCII code at baud rate of 9,600 bps (default). The data format is 1 Start, 8 Data, 1 Stop, and No parity bits. Some of the operating commands are:

UART COMMUNICATION PROTOCOL GPS DATA

MISOLIMA eJames GPS III modules communicate through ASCII code at baud rate of 4,800 bps. The system has one integrated Universal Asynchronous Receiver Transmitter's ("UART") The data bit format is 1 Start, 8 Data, 1 Stop, and No parity bits. Asynchronous communication has the complete menu of commands. The receiving data (RxD) towards PC or embedded computer system are indicated with National Marine Electronics Association ("NMEA") sentences that are transmitted as serial data and would look like i.e. **\$GPRMC, 171956.000,A,4729.7386,N,00654.6399,E,0.19,313.58,020406,,*0A** where;

\$GPRMC is the message header indicating that the data is being received from the NMEA protocol

171956.000 is the [UTC time \(17:19:56:000\)](#)

A is a [valid data status](#)

4729.7386,N is the [Latitude data 47 29' 7386 North](#)

00654.6399,E is the [Longitude data 006 54' 6399 East](#)

0.19 is the [Speed in Knots over ground](#)

313.58 is the [True course over ground 313.58 degrees](#)

020406 is the [date 02nd April 2006](#)

,, is magnetic variation in degrees (none)

***0A** is the [checksum](#) of the whole sentence where the sentence is terminated with <CR><LF>.

For more information about NMEA sentences see hereunder.

The GPS NMEA data **\$GPGGA**, **\$GPGLL**, **\$GPGSA**, **\$GPRMC** and **\$GPVTG** are transmitted in 1Hz for all data with exemption of **\$GPVTG** which is transmitted every 4 sec.

The eJames GPS III are capable of sending GPS data according to *National Marine Electronics Association's* NMEA-0183 interface specification defined as NMEA 0183 or just NMEA protocol where this section of this datasheet will focus on the NMEA sentences.

NMEA sentences used by the internal eJames GPS III receiver are shown as below:

NMEA Sentence	Description
\$GPGGA	Global Positioning system fixed data
\$GPGLL	Geographic Position Latitude/Longitude
\$GPGSA	GPS DOP and Active Satellites
\$GPGSV	GPS Satellites in view
\$GPRMC	Recommended minimum specific GPS data
\$GPVTG	Course over ground and ground speed

Table I NMEA-0183 output sentence format

GLOBAL POSITIONING SYSTEM FIX DATA (GGA)

The most common used NMEA sentence is the GGA or \$GPGGA. A sample of the \$GPGGA sentence for a location in France would be:

`$GPGGA,171959.000,4729.7386,N,00654.6398,E,1,06,3.1,406.7,M,48.0,M,,0000*52`

Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Time	171959.000		hhmmss.sss
Latitude	4729.7386		ddmm.mmmm
N/S Indicator	N		N=North, S=South
Longitude	00654.6398		dddmm.mmmm
E/W Indicator	E		E=East, W=West
Position Fix Indicator	1		See Table III
Satellites used	06		Range from 0 to 12 (excluding EGNOS and WAAS)
HDOP	3.1		Horizontal Dilution of Precision
MSL Altitude ¹	406.7	meters	
Units	M	meters	
Geoid Separation ¹	48.0	meters	
Units	M	meters	
Age of diff. correction		seconds	Null fields when DGPS is not in use
Diff. Ref. Station ID	0000		
Checksum	*18		
<CR><LF>			End of message termination (Carriage Return and Line Feed)

Table II NMEA-0183 GGA sentence *1 SiRF Technology Inc. does not support geoid corrections. Values given are WGS84 ellipsoid heights.

Name	Description
0	Fix not available or invalid
1	GPS SPS Mode, fix valid
2	Differential GPS, SPS Mode, fix valid
3	GPS PPS Mode, fix valid

Table III NMEA-0183 position Fix Indicator

GEOGRAPHIC POSITION WITH LATITUDE/LONGITUDE (GLL)

`$GPGLL,3723.2475,N,12158.3416,W,161229.487,A*2C`

Name	Example	Units	Description
Message ID	\$GPGLL		GLL protocol header
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=North, S=South
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=East, W=West
UTC Time	161229.487		hhmmss.sss
Status	A		A=Data Valid, V=Data NOT valid
Checksum	*2C		
<CR><LF>			End of message termination (Carriage Return and Line Feed)

Table IV NMEA-0183 GGL sentence

GPS DOP AND ACTIVE SATELLITES (GSA)

\$GPGSA,A,3,08,04,27,13,23,24,,,,,,,,,4.0,3.1,2.5*3F

Name	Example	Units	Description
Message ID	\$GPGSA		GSA protocol header
Mode1	A		See table VI
Mode2	3		See table VII
Satellite Used ¹	08		SV on Channel 1
Satellite Used ¹	04		SV on Channel 2
...			
Satellite Used ¹			SV on Channel 12
PDOP	4.0		Position Dilution of Precision
HDOP	3.1		Horizontal Dilution of Precision
VDOP	2.5		
Checksum	*3F		
<CR><LF>			End of message termination (Carriage Return and Line Feed)

Table V NMEA-0183 GSA sentence

Value	Description
M	Manually-forced to operate in 2D or 3D mode
A	2D automatic-allowed to automatically switch between 2D and 3D

Table VI Mode1

Value	Description
1	Fix Not Available
2	2D
3	3D

Table VII Mode2

GPS SATELLITES IN VIEW (GSV)

\$GPGSV,3,1,10,27,64,164,49,13,54,059,42,02,46,261,39,04,41,215,48*7E

\$GPGSV,3,2,10,08,35,190,41,10,24,303,14,23,20,071,47,24,16,180,43*71

\$GPGSV,3,3,10,16,09,032,18,06,00,331,07*7E

Name	Example	Units	Description
Message ID	\$GPGSV		GSV protocol header
Number of messages ¹	3		Range 1 to 3
Message Number ¹	1		Range 1 to 3
Satellites in View	10		
Satellite ID	27		Channel 1 (Range from 1 to 32)
Elevation	64	Degrees	Channel 1 (maximum 90)
Azimuth	164	Degrees	Channel 1 (True, Range 0 to 359)
SNR (C/No)	49	dBHz	Range 0 to 99, null when not tracking
...			
Satellite ID	04		Channel 1 (Range from 1 to 32)
Elevation	41	Degrees	Channel 1 (maximum 90)
Azimuth	215	Degrees	Channel 1 (True, Range 0 to 359)
SNR (C/No)	48	dBHz	Range 0 to 99, null when not tracking
Checksum	*7E		
Checksum	M		

Table VIII NMEA-0183 GSV sentence

*1 Depending on the number of satellites tracked multiple messages of GSV data may be required.

RECOMMENDED MINIMUM SPECIFIC GPS DATA (RMC)

`$GPRMC,171956.000,A,4729.7386,N,00654.6399,E,0.19,313.58,020406,,*0A`

Name	Example	Units	Description
Message ID	\$GPRMC		RMC protocol header
UTC Time	171956.000		hhmmss.sss
Status	A		A=Data Valid, V=Data NOT Valid
Latitude	4729.7386		ddmm.mmmm
N/S Indicator	N		N=North, S=South
Longitude	00654.6399		dddmm.mmmm
E/W Indicator	E		E=East, W=West
Speed Over Ground	0.19	Knots	
Course Over Ground	313.58	Degrees	True
Data	020406		ddmmyy
Magnetic Variation ¹		Degrees	E=East, W=West
Checksum	*0F		
<CR><LF>			End of message termination (Carriage Return and Line Feed)

Table IX NMEA-0183 RMC sentence

*1 SiRF does not support magnetic declination. All "course over ground" data are geodetic WGS48 directions.

COURSE OVER GROUND AND GROUND SPEED (VTG)

`$GPVTG,309.62,T,,M,0.13,N,0.2,K*6E`

Name	Example	Units	Description
Message ID	\$GPVTG		VTG protocol header
Course	309.62	Degrees	Measured Heading
Reference	T		True
Course		Degrees	Measured Heading
Reference	M		Magnetic
Speed	0.13	Knots	Measured Horizontal Speed
Units	N		Knots
Speed	0.2	Km/hr	Measured Horizontal Speed
Units	K		Kilometres per hour
Checksum	*6E		
<CR><LF>			End of message termination (Carriage Return and Line Feed)

Table X NMEA-0183 VTG sentence

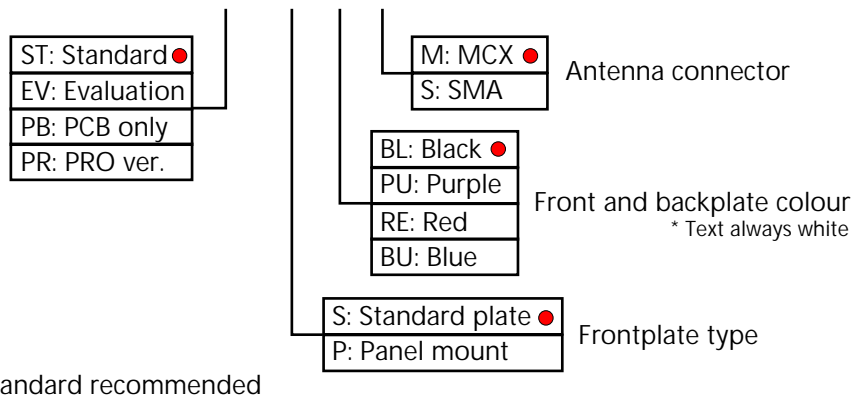
To test MISOLIMA eJames GPS III data, you can do so by starting MISOLIMA COMM Terminal Pro which is also used to change baud rate if other than 9.600 bps is required. The COMM Terminal Pro software is available for download from our website and there is a minimal fee for this software and purchase can be made online. MISOLIMA COMM Terminal Pro are also a handy tool for those that need to simulate or monitor data which is done by starting two COMM Terminal Pro connecting two COM-ports together with a NULL Modem Cable, also available from MISOLIMA.

Demo Module Kit Set

The MISOLIMA eJames GPS III Demo Module Kit Set includes GPS receiver for USB, active 3.3V GPS antenna, Driver, COM DLL and MISOLIMA COMM Terminal Pro Windows software which runs on all 32-bit Windows versions, including Windows 7. This forms a development kit for study of GPS reception. The Demo Module Kit Set includes DLL's and other development tools for rapid software developments using the MISOLIMA eJames GPS III.

Product Ordering Information for MISOLIMA eJames GPS III

M203010X-XXX



Ordering No.	Product	Product Information
M203010ST-XXX	eJames GPS III	Complete mounted in aluminium casing
M203010EV-XXX	eJames GPS III	Complete set for evaluation, including GPS antenna and software
M203010PB-XXX	eJames GPS III	PCB mounted only (Mostly used for panel mounting only)
M203011SW-001	GPS COM DLL	DLL to manage and control GPS, Gyro and COM port
M203011SW-002	COMM Terminal Pro	GPS communication and test software for eJames GPS and Gyro
M203012BA-001	Li-polymer battery	3V internal battery for GPS parameter backup
M203013US-B01	Vehicle USB power	800mA USB vehicle power supply from cigarette lighter outlet
M203013US-B02	Vehicle USB power	500mA USB vehicle power supply connecting to vehicle battery
M203014AN-T0X	GPS Antenna	3V active mini-GPS antenna with magnetic footing
M203010PR-XXX	eJames GPS III PRO	GPS system with wide DC-DC voltage input and I/O ports
M303010ST-XXX	Gyro Compass with GPS	MEMS-based Gyro Compass with GPS and I/O ports
M2070203-0XX	eCharlie U2R-RJ	RS-232 to USB converter with RJ-45 data port

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