Mars900-mini is a GPS Mouse receiver build-in high performances -160dBm Atheros GPS chipset. **Mars900-mini** provides customer high position, velocity and time accuracy performances as well as high sensitivity and tracking capabilities. Customers benefit from the strength of both companies.

Thanks to the low power consumption technology, the GPS-Mouse receiver is ideal for many portable applications such as PDA, Tablet PC, smart phone etc.

Features

- Built-in high performance Atheros GPS chipset.
- Current consumption 65mA
- 44 channels parallel
- Supports AGPS, WAAS, EGNOS and MSAS
- Support UART RS232 ports
- Support 5 Hz position update rate capability @ 3D fix
- Average Cold Start in 35 seconds.
- -160 dBm sensitivity in tracking mode
- NMEA0183 compliant protocol
- Extreme fast TTFF at low signal level
- Water proof IPX6

Applications

- Automotive
- Personal/Portable Navigation (PDA)
- Geographic Surveying
- Sports and Recreation
- Marine Navigation
- Fleet Management
- AVL and Location-Based Services

Specifications

General	
GPS Chip	AR1511 Atheros GPS chip
Frequency	L1, 1575.42MHz
C/A Code	1.023 MHz chip rate
Channels	44 CH
Sensitivity	
To – 160Bm Tracking, Superior Urban Canyon Performance	
Acquisition Rate	
Cold Start	35 sec, average
Warm Start	33 sec, average
Hot Start	3.1 sec, average
Reacquisition	0.1sec, average
Accuracy	Snap start 2 sec, average
Power	
Operation Power	5.0 VDC+10%
Current Consumption	65mA
Environmental	
Operating Temperature	- 20 ℃ to + 80 ℃
Relative Humidity	5% to 95% non-condensing

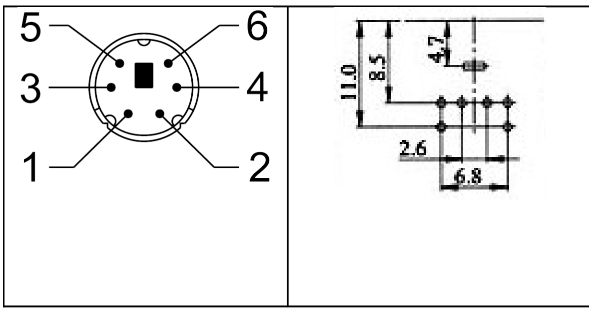
Accuracy	
Position	
2.5 meters CEP	
	0.1 m/sec
Time	1us synchronized to GPS time
Datum	
WGS-84	
Dynamic Conditions	
Altitude	<18,000 m (60,000 feet)
Velocity	<515 m/sec (1,000 knots)
Acceleration	<4g
Motional Jerk	<20 m/sec
GPS Protocol	
Default: NMEA-0183, GGA(1), GSA(1), GSV(1), RMC(1), Band rate 9600 bps, Data bit : 8, stop bit : 1 5 Hz position update rate capability @3D fix	
Device Size	
41.0x36.0x15.0 mm	
Water Proof	
IPX6	

Hardware Interface

The Mars-mini9 includes an antenna in a unique style waterproof gadget. We can manufacture variable connector cable to suit your demands. Like USB, PHR(JST), GHR(JST), Molex, PS2, RJ11, D-Sub 9..etc. You provide me specification, we manufacture the cable and connector.

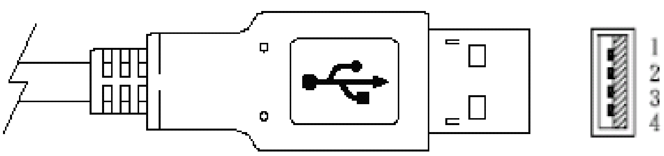
Mars-mini9 Standard PIN OUT

- Pin Assignment of standard PS2 male Din Jack (figure 1)



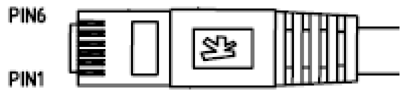
Pin	Signal
1	GND
2	VCC 5.0V
3	N.C.(RS-232_Rx on demand)
4	TTL_RX
5	N.C.(RS-232_Tx on demand)
6	TTL_TX

- Pin Assignment of A Type USB connector (figure 2)



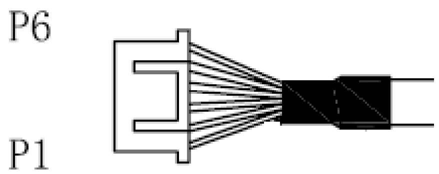
Pin	Signal
1	+5.0 VDC
2	D−
3	D+
4	GND

- Pin Assignment of RJ11 connector



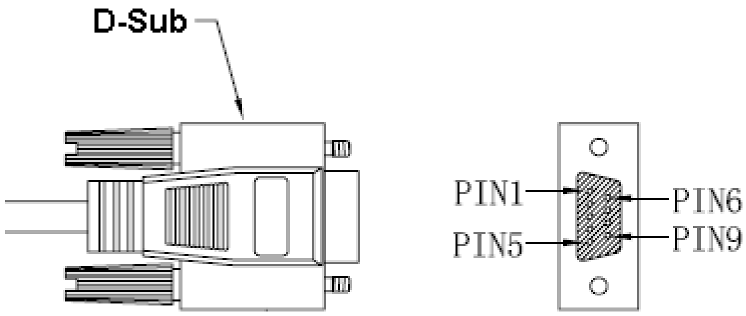
Pin	Signal
PIN1	VCC 5.0V
PIN2	RX (RS232)
PIN3	TX (RS232)
PIN4	GND
PIN5	N.C.
PIN6	N.C.

- Pin Assignment of PHR 6 PIN connector



Pin	Signal
PIN1	VCC 5.0V
PIN2	RX (RS232)
PIN3	TX (RS232)
PIN4	GND
PIN5	N.C.
PIN6	N.C.

- Pin Assignment of D-SUB 9 PIN Female connector



Pin	Signal
PIN1	N.C.
PIN2	TTL-TX
PIN3	TTL-RX
PIN4	N.C.
PIN5	GND
PIN6	VCC 5.0V
PIN7	N.C.
PIN8	N.C.
PIN9	N.C.

Appendix A: NMEA output message

※NMEA-0183 Output message

NMEA record	Description
GGA	Global positioning system fixed data
GSA	GNSS DOP and active view
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data
GLL	Geographic position- latitude/longitude
VTG	Course over ground and ground speed

GGA--Global positioning system fixed data

$GPGGA,hhmmss.dd,xxmm.dddd,<N/S>,yyymm.dddd,<E/W>,v,ss,d.d,h.h,M,g.g,M,a.a,xxxx*hh<CR><LF>

hhmmss.ddd	UTC time of the fix. hh = hours. mm = minutes. ss = seconds. ddd = decimal part of seconds.
xxmm.dddd	Latitude coordinate. xx = degrees. mm = minutes. dddd = decimal part of minutes.
<N/S>	Character denothing either N = North or S =South.
yyymm.dddd	Longitude coordinate. yyy = degrees. mm = minutes. dddd = decimal part of minutes.
<E/W>	Character denothing either E = East or W = West.
v	Fix valid indicator 0 = Fix not valid 1 = Fix is valid
ss	Number of satellites used in position fix, 00-12. Notice: Fixed length field of two letters.
d.d	HDOP – Horizontal Dilution Of Precision.
h.h	Altitude (mean-sea-level, geoid)
M	Letter M.
g.g	Difference between the WGS-84 reference ellipsoid surface and the mean-sea-level altitude.
M	Letter M.

a.a	NULL (not implemented)
xxxx	NULL (not implemented)
*hh	Check sum
<CR><LF>	End

Example :

$GPGGA,084053.39,6016.3051,N,02458.3735,E,0,00,0.0,46.6,M,18.2,M,,*5D

GSA--Geographic position- latitude/longitude

$GPGSA,a,b,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,p.p,h.h,v.v*hh<CR><LF>

a	Mode: M = Manual, forced to operate in 2D or 3D mode. A = Automatic, allowed to automatically switch 2D/3D.
b	Mode: 1 = Fix not available, 2 = 2D, 3 = 3D,
xx	ID (PRN) numbers of GPS satellites used in solution
p.p	PDOP
h.h	HDOP
v.v	VDOP
*hh	Check sum
<CR><LF>	End

Example :

$GPGSA,A,3,06,10,15,16,21,25,30,,,,,,2.1,1.2,1.8*38

GSV--GNSS satellites in view

$GPGSV,n,m,ss,xx,ee,aaa,cn,………… ,xx,ee,aaa,cn*hh<CR><LF>

n	Total number of messages, 1 to 9
m	Message number, 1 to 9
ss	Total number of satellites in view
xx	Satellite ID (PRN) number
ee	Satellite elevation, degrees 90 max
aaa	Satellite azimuth, degrees True, 000 to 359
cn	Signal-to-noise ration (C/No) 00-99 dB-Hz. Value of zero means that the satellite is predicted to be on the visible sky but it isn't being tracked.
*hh	Check sum
<CR><LF>	End

Example :

$GPGSV,4,1,14,03,66,207,50,08,09,322,44,11,01,266,42,14,00,155,00*79

$GPGSV,4,2,14,15,41,088,48,17,21,083,44,18,57,087,51,21,57,173,50*78

$GPGSV,4,3,14,22,05,203,00,23,52,074,49,26,17,028,44,27,00,300,00*79

$GPGSV,4,4,14,28,32,243,00,31,48,286,00*70

RMC--Recommended minimum specific GNSS data

$GPRMC,hhmmss.dd,S,xxmm.dddd,<N/S>,yyymm.dddd,<E/W>,s.s,h.h,ddmmyy,d.d,<E/W>,M*hh<CR><LF>

hhmmss.ddd	UTC time of the fix. hh = hours. mm = minutes. ss = seconds. ddd = decimal part of seconds.
S	Status indicator A = valid V = invalid
xxmm.dddd	Latitude coordinate. xx = degrees. mm = minutes. dddd = decimal part of minutes.
<N/S>	Character denothing either N = North or S =South.
yyymm.dddd	Longitude coordinate. yyy = degrees. mm = minutes. dddd = decimal part of minutes.
<E/W>	Character denothing either E = East or W = West.
s.s	Speed in knots.
h.h	Heading.
ddmmyy	UTC Date of the fix. dd = day of month mm = month yy = year
d.d	Magnetic variation in degrees, i.e. difference between geometrical and magnetic north direction.
<E/W>	Letter denothing direction of magnetic variation. Either E = East or W = West.
M	Mode indicator A=autonomous N=data not valid
*hh	Check sum
<CR><LF>	End

Example :

$GPRMC,095035.91,A,6016.3066,N,02458.3832,E,1.08,210.6,131204,6.1,E,A*0A

GLL--Geographic position-latitude/longitude

$GPGLL,xxmm.dddd,<N/S>,yyymm.dddd,<E/W>,hhmmss.dd,S,M*hh<CR><LF>

xxmm.dddd	Latitude coordinate. xx = degrees. mm = minutes. dddd = decimal part of minutes.
<N/S>	Character denothing either N = North or S =South.
yyymm.dddd	Longitude coordinate. yyy = degrees. mm = minutes. dddd = decimal part of minutes.
<E/W>	Character denothing either E = East or W = West.
hhmmss.dd	UTC time of the fix. hh = hours. mm = minutes. ss = seconds. dd = decimal part of seconds.
S	Status indicator A = valid V = invalid
M	Mode indicator A=autonomous N=data not valid
*hh	Check sum
<CR><LF>	End

Example :

$GPGLL,6016.3073,N,02458.3817,E,090110.10,A,A*61

VTG--Course over ground and ground speed

$GPVTG,h.h,T,m.m,M,s.s,N,s.s,K,M*hh<CR><LF>

h.h	Heading in degrees.
T	Letter 'T' denoting True heading in degrees.
m.m	Magnetic heading in degrees.
M	Letter 'M' denoting Magnetic heading in degrees.
s.s	Speed in knots.
N	Letter 'N' denoting speed in knots.
s.s	Speed, km/h.
K	Letter 'K' denoting speed in km/h.
M	Mode indicator A=autonomous N=data not valid
*hh	Check sum
<CR><LF>	End

Example：

$GPVTG,202.6,T,208.7,M,0.38,N,0.7,K,A*0D