# Ultra Low Power
## GPS Receiver

## BT-R700

### Key Benefits

*Compact design -easy to carry*

*Light Weight*

*Ultra low power -up to 18 hours after fully charged (850mA Li-ion Battery)*

*High*

*Integrated GPS receiver, Active antenna, and Bluetooth transceiver*

*Power consumption: 45mA@3.6V (typ.)*

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*Ultra Low Power*

*Real-time navigating just got easier!*

The Wonder-X BT-R700 GPS Receiver with uetooth combines proven wireless technologies that allows you to receive positioning data and connect to mobile computing devices wirelessly. The EverMore BT-R700 provides high position accuracy and has reliable tracking capabilities. The ultra low power design gives you up to 18 hours of continuous usage and eliminates constant recharging between uses.

With optional waterproof case, you can put it on the roof of a vehicle that boosts your reception capabilities when driving through congested urban.

It's easy to connect the GPS receiver to your mobile devices, such as pocket PCs, PDAs and mobile phones using Bluetooth wireless connectivity. A few simple steps will have you connected and navigating in minutes.

### Applications

◆ Automotive
◆ Fleet management/Asset tracking
◆ Personal/Portable Navigation (PDA, Pocket PC etc.)
◆ Location Based Services enabled devices
◆ Sports and Recreation
◆ Geographic Surveying

# *Specifications*

## General

| | |
|---|---|
| GPS Chip | NEMERIX GPS Module |
| Frequency | L1, 1575.42MHz |
| C/A Code | 1.023MHz chip rate |
| Channels | 16 CH all in view tracking |
| Antenna (Intemal) | Built-in low noise |

Extemal Antenna Port Active MMCX Antenna

## Sensitivity

To – 152Bm Tracking, Superior Urban Canyon Performance

## Acquisition Rate

| | |
|---|---|
| Cold Start | 60 sec, average |
| Warm Start | 38 sec, average |
| Hot Start | 12 sec, average |
| Reacquisition | 1sec |
| Accuracy | |
| Position | 5m CEP (50%), 9m (90%) |
| Velocity | 0.1m/sec, without SA |
| Time | ±100ns synchronized to GPS time |

## Power

Built-in rechargeable 850mAh Li-ion battery and 5 V DC input

| | |
|---|---|
| Operation Current | 45mA (Typical) |
| Operation Time | 18hrs, after fully charged, in continuous |
| Charging time | 2.5hrs. (Typical) |

## Environmental

Operating Temperature - 20 ℃ to + 60 ℃

Relative Humidity    5% to 90% non-condensing

*: (1):1sec output 1msg , (3): 3sec output 1msg

## Accuracy

Position

3meters CEP (50%), without SA (Horizontal) 7 meters (90%)

| | |
|---|---|
| Velocity | 0.1 m/sec. without SA |
| Time | ±100 ns synchronized to GPS time |

## Datum

WGS-84 (or by demanded)

## Dynamic Conditions

| | |
|---|---|
| Altitude | <18,000m |
| Velocity | <515m/sec |
| Acceleration | <4g |
| Motional Jerk | 20 m/sec. |

## Interface

Communication Protocol

Communicate with host platform via

Bluethooth (class 2) serial port profile

Bluethooth communication distance 10 M. TYP.

GPS Protocol

Default: NMEA-0183 (V3.01) – GGA(1), GSA(3),

GSV(3), RMC(1),VTG(1),Band rate 9600 bps,

Data bit : 8, stop bit : 1(Default) *

## Device Size

81 (L) X 44 (W) X 20 (H) mm

3.2 (L) X 1.75 (W) X 0.79 (H) inch

Accessories          AC adaptor (5.3V output, 500ma)

# Appendix : Software Specification

## NMEA Protocol

The software is capable of supporting the following NMEA message formats

| NMEA Message Prefix | Format | Direction |
|---|---|---|
| SGPGGA(1)* | GPS fix data. | Out |
| SGPGLL | Geographic position Latitude / Longitude. | Out |
| SGPGSA(3)* | GNSS DOP and actives satellites | Out |
| SGPGSV(3)* | Satellites in view. | Out |
| SGPRMC(1)* | Recommended minimum specific GNSS data. | Out |
| SGPVTG(1)* | Velocity and track over ground. | Out |
| SGPZDA | Date and time. | Out |

*: (1): 1sec output 1msg , (3): 3sec output 1msg , 9600 baud rate (Standard output)

## General NMEA Format

The general NMEA format consists of an ASCII string commencing with a '$' character and terminating with a <CR><LF> sequence. NMEA standard messages commence with 'GP' then a 3-letter message identifier. NemeriX specific messages commence with $PNMRX followed by a 3 digit number. The message header is followed by a comma delimited list of fields optionally terminated with a checksum consisting of an asterix '*' and a 2 digit hex value representing the checksum. There is no comma preceding the checksum field. When present, the checksum is calculated as a bytewise exclusive of the characters between the '$' and '*'. As an ASCII representation, the number of digits in each number will vary depending on the number and precision, hence the record length will vary. Certain fields may be omitted if they are not used, in which case the field position is reserved using commas to ensure correct interpretation of subsequent fields.

The tables below indicate the maximum and minimum widths of the fields to allow for buffer size allocation.

## $GPGGA

This message transfers global positioning system fix data. The $GPGGA message structure is shown below:

| Field | Format | Min chars | Max chars | Notes |
|---|---|---|---|---|
| Message ID | $GPGGA | 6 | 6 | GGA protocol header. |
| UTC Time | hhmmss.sss | 2,2,2.3 | 2,2,2.3 | Fix time to 1ms accuracy. |
| Latitude | float | 3,2.4 | 3,2.4 | Degrees * 100 + minutes. |
| N/S Indicator | char | 1 | 1 | N=north or S=south |
| Longitude | float | 3,2.4 | 3,2.4 | Degree * 100 + minutes. |
| E/W indicator | Char | 1 | 1 | E=east or W=west |
| Position Fix Indictor | Int | 1 | 1 | 0: Fix not available or invalid. 1: GPS SPS mode. Fix available. |
| Satellites Used | Int | 2 | 2 | Number of satellites used to calculate fix. |
| HDOP | Float | 1.1 | 3.1 | Horizontal Dilution of Precision. |
| MSL Altitude | Float | 1.1 | 5.1 | Altitude above mean seal level |
| Units | Char | 1 | 1 | M Stands for "meters". |
| Geoid Separation | Int | (0) 1 | 4 | Separation from Geoid, can be blank. |
| Units | Char | 1 | 1 | M Stands for "meters". |
| Age of Differential Corrections | int | (0) 1 | 5 | Age in seconds Blank (Null) fields when DGPS is not used. |
| Diff Reference Corrections | int | 4 | 4 | 0000. |
| Checksum | *xx | (0) 3 | 3 | 2 digits. |
| Message terminator | <CR> <LF> | 2 | 2 | ASCII 13, ASCII 10. |

## $GPGLL

This message transfers Geographic position, Latitude, Longitude, and time. The $GPGLL message structure is shown below:

| Field | Format | Min chars | Max chars | Notes |
|---|---|---|---|---|
| Message ID | $GPGLL | 6 | 6 | GLL protocol header. |
| Latitude | Float | 1,2.1 | 3,2.4 | Degree * 100 + minutes. |
| N/S Indicator | Char | 1 | 1 | N=north or S=south. |
| Longitude | Float | 1,2.1 | 3,2.4 | Degree * 100 + minutes. |
| E/W indicator | Character | 1 | 1 | E=east or W=west. |
| UTC Time | hhmmss.sss | 1,2,2.1 | 2,2,2.3 | Fix time to 1ms accuracy. |
| Status | Char | 1 | 1 | A   Data Valid.<br>V   Data invalid. |
| Mode Indicator | Char | 1 | 1 | A   Autonomous |
| Checksum | *xx | (0) 3 | 3 | 2 digits. |
| Message terminator | <CR><LF> | 2 | 2 | ASCII 13, ASCII 10. |

## $GPGSA

This message transfers DOP and active satellites information. The $GPGSA message structure is shown below:

| Field | Format | Min chars | Max chars | Notes |
|---|---|---|---|---|
| Message ID | $GPGSA | 6 | 6 | GSA protocol header. |
| Mode | Char | 1 | 1 | M   Manual, forced to operate in selected mode.<br>A   Automatic switching between modes. |
| Mode | Int | 1 | 1 | 1   Fix not available.<br>2   2D position fix.<br>3   3D position fix. |
| Satellites Used | Int | 2 | 2 | SV on channel 1. |
| Satellites Used | Int | 2 | 2 | SV on channel 2. |
| … | . | .. | .. | .. |
| Satellites Used | Int | 2 | 2 | SV on channel 12. |
| PDOP | Float | 1.1 | 3.1 | |
| HDOP | Float | 1.1 | 3.1 | |
| VDOP | Float | 1.1 | 3.1 | |
| Checksum | *xx | 0 | 3 | 2 digits |
| Message terminator | <CR> <LF> | 2 | 2 | ASCII 13, ASCII 10 |

## $GPGSV

This message transfers information about satellites in view. The $GPGSV message structure is shown below. Each record contains the information for up to 4 channels, allowing up to 12 satellites in view. In the final record of the sequence the unused channel fields are left blank with commas to indicate that a field has been omitted.

| Field | Format | Min chars | Max chars | Notes |
|---|---|---|---|---|
| Message ID | $GPGSV | 6 | 6 | GSA protocol header. |
| Number of messages | Int | 1 | 1 | Number of messages in the message sequence from 1 to 3. |
| Message number | Int | 1 | 1 | Sequence number of this message in current sequence, form 1 to 3. |
| Satellites in view | Int | 1 | 2 | Number of satellites currently in view. |
| Satellite Id | Int | 2 | 2 | Satellite vehicle 1. |
| Elevation | Int | 1 | 3 | Elevation of satellite in degrees. |
| Azimuth | Int | 1 | 3 | Azimuth of satellite in degrees. |
| SNR | Int | (0) 1 | 2 | Signal to noise ration in dBHz, null if the sv is not in tracking. |
| Satellite Id | Int | 2 | 2 | Satellite vehicle 2. |
| Elevation | Int | 1 | 3 | Elevation of satellite in degrees. |
| Azimuth | Int | 1 | 3 | Azimuth of satellite in degrees. |
| SNR | Int | (0) 1 | 2 | Signal to noise ration in dBHz, null if the sv is not in tracking. |
| Satellite Id | Int | 2 | 2 | Satellite vehicle 3. |
| Elevation | Int | 1 | 3 | Elevation of satellite in degrees. |
| Azimuth | Int | 1 | 3 | Azimuth of satellite in degrees. |
| SNR | Int | (0) 1 | 2 | Signal to noise ration in dBHz, null if the sv is not in tracking. |
| Satellite Id | Int | 2 | 2 | Satellite vehicle 4. |
| Elevation | Int | 1 | 3 | Elevation of satellite in degrees. |
| Azimuth | Int | 1 | 3 | Azimuth of satellite in degrees. |
| SNR | Int | (0) 1 | 2 | Signal to noise ration in dBHz, null if the sv is not in tracking. |
| Checksum | *xx | (0) 3 | 3 | 2 digits. |
| Message terminator | <CR> <LF> | 2 | 2 | ASCII 13, ASCII 10. |

## $GPRMC

This message transfers recommended minimum specific GNSS data. The $GPRMC message format is shown below.

| Field | Format | Min chars | Max chars | Notes |
|---|---|---|---|---|
| Message ID | $GPRMC | 6 | 6 | RMC protocol header. |
| UTC Time | hhmmss.sss | 1,2,2.1 | 2,2,2.3 | Fix time to 1ms accuracy. |
| Status | char | 1 | 1 | A   Data Valid. |
|  |  |  |  | V   Data invalid. |
| Latitude | Float | 1,2.1 | 3,2.4 | Degrees * 100 + minutes. |
| N/S Indicator | Char | 1 | 1 | N=north or S=south. |
| Longitude | Float | 1,2.1 | 3,2.4 | Degrees * 100 + minutes. |
| E/W indicator | Char | 1 | 1 | E=east or W=west. |
| Speed over ground | Float | 1,1 | 5.3 | Speed over ground in knots. |
| Course over ground | Float | 1.1 | 3.2 | Course over ground in degrees. |
| Date | ddmmyy | 2,2,2 | 2,2,2 | Current date. |
| Magnetic variation | Blank | (0) | (0) | Not used. |
| E/W indicator | Blank | (0) | (0) | Not used. |
| Mode | Char | 1 | 1 | A   Autonomous |
| Checksum | *xx | (0) 3 | 3 | 2 digits. |
| Message terminator | <CR> <LF> | 2 | 2 | ASCII 13, ASCII 10. |

## $GPVTG

This message transfers Velocity, course over ground, and ground speed. The $GPVTG message format is shown below.

| Field | Format | Min chars | Max chars | Notes |
|---|---|---|---|---|
| Message ID | $GPVTG | 6 | 6 | VTG protocol header. |
| Course (true) | Float | 1.1 | 3.2 | Measured heading in degrees. |
| Reference | Char | 1 | 1 | T = true heading. |
| Course (magnetic) | Float | 1.1 | 3.2 | Measured heading (blank). |
| Reference | Char | 1 | 1 | M = magnetic heading. |
| Speed | Float | 1.1 | 4.2 | Speed in knots. |
| Units | Char | 1 | 1 | N = knots. |
| Speed | Float | 1.1 | 4.2 | Speed |
| units | Char | 1 | 1 | K = Km/h. |
| Mode | Char | 1 | 1 | A   Autonomous |
| Checksum | *xx | (0) 3 | 3 | 2 digits. |
| Message terminator | <CR> <LF> | 2 | 2 | ASCII 13, ASCII 10. |

## $GPZDA

This message transfers UTC Time and Date. Since the latency of preparing and transferring the message is variable, and the time does not refer to a particular position fix, the seconds precision is reduced to 2 decimal places. The $GPZGA message format is shown below.

| Field | Format | Min chars | Max chars | Notes |
|---|---|---|---|---|
| Message ID | $GPZDA | 6 | 6 | ZDA protocol header. |
| UTC time | hhmmss.ss | 2,2,2.2 | 2,2,2.2 | 00000000.00 to 235959.99 |
| UTC day | dd | 2 | 2 | 01 to 31, day of month. |
| UTC month | mm | 2 | 2 | 01 to 12. |
| UTC Year | yyyy | 4 | 4 | 1989-9999. |
| Local zone hours | Int | (-)2 | (-)2 | Offset of local time zone (-13) to 13. |
| Local zone minutes | Unsigned | 2 | 2 | |
| Checksum | *xx | (0) 3 | 3 | 2 digits. |
| Message terminator | <CR> <LF> | 2 | 2 | ASCII 13, ASCII 10. |