

SAH2217

Enhanced Atheros GPS Module with
ultra high sensitivity and antenna
open/short detection/protection

Smart Design Technology Co., Ltd.

20F-8, No.107, Sec 1, Jhongshan Rd. Sinhuang City,
Taipei County 242, Taiwan

Phone: +886-2-8522-7628

Fax: +886-2-8522-7784

Contact: sales@smartdesign.com.tw

Documentation History

| Revision | Description | Date | Remark |
|-----------------|--|-------------|---------------|
| V0.1 | SAH2217 release | Aug 2008 | |
| V1.0 | Modify application circuit | Oct 2008 | |
| V1.1 | GPIO7: input High when use active antena | Dec 2008 | |

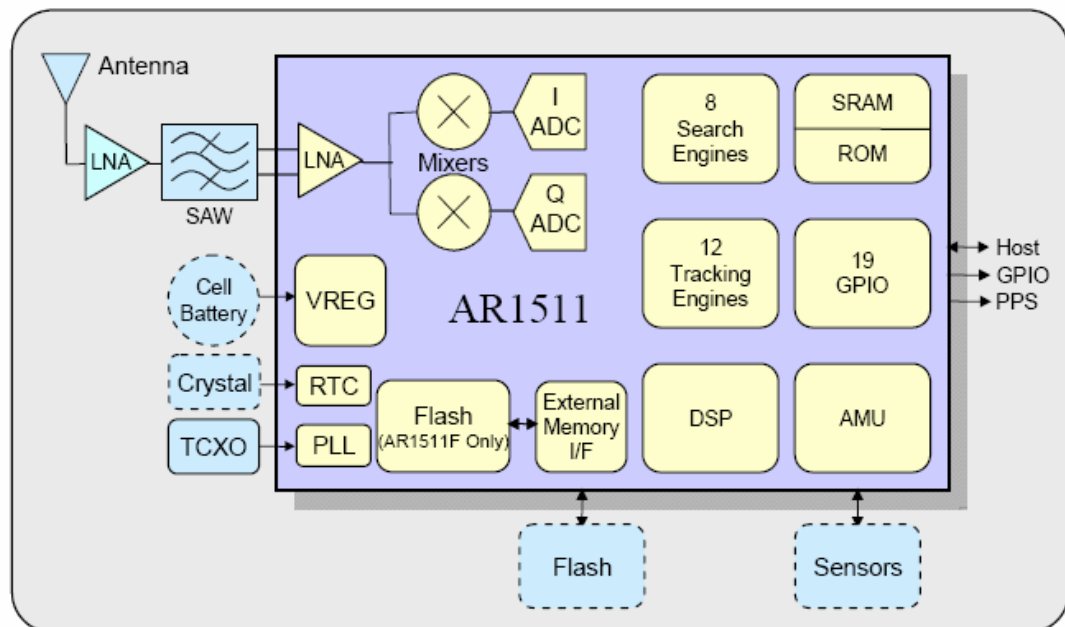
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Features

- ✓ 20 channel Atheros AR1511 positioning engine
- ✓ Ultra high sensitivity to -160 dBm
- ✓ Supports AGPS, WAAS, EGNOS and MSAS
- ✓ Support 2 USART ports
- ✓ Support 5 Hz position update rate capability @ 3D fix
- ✓ Support power saving modes.
- ✓ Support external interrupt pin (wake up) in power saving mode
- ✓ Antenna short/open circuit detection and protection
- ✓ Low power consumption 57mA
- ✓ 14 μ A backup current @ 3V
- ✓ Low position/velocity drift in static mode
- ✓ Small form factor 22.4 x 17.0 mm with SMT pads (micro package)
- ✓ RoHS compliant (lead-free)

Block diagram



SAH2217 GPS module

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Technical Specifications

1. Electrical Characteristics

| | | |
|-----------------------|----------------------|--|
| 1.1 Chipset | AR1511 | Atheros GPS chip |
| 1.2 General | Frequency | L1, 1575.42MHz |
| | Channels, C/A code | 16, 1.023 MHz chip rate, 8192 time/frequency search windows |
| 1.3 Accuracy | Position | 2.5 meters CEP |
| | Time | 1 usecond rms (1 PPS) |
| 1.5 Acquisition Rate | Cold start | 35 sec, typical |
| | Warm start | 33 sec, typical |
| | Hot start | 1.3 sec, typical |
| 1.6 Sensitivity | Tracking | -160dBm |
| | Navigation | -157dBm |
| | Cold start | -144dBm |
| 1.7 Dynamic Condition | Altitude | 18,000 meters (60,000 Feet) max. |
| | Velocity | 515 meters /sec (1000 Knots) max. |
| 1.8 Power | Main Power | 3.3 VDC typical |
| | Supply current | 57 mA |
| | Backup power | 1.5 ~ 3.6V |
| | Backup current | 14µA @ 3V |
| 1.9 Serial Port | Electrical interface | USART, |
| | Protocols | NMEA, 3GPP, 5 Hz position update rate capability @3D fix |

2. Environmental Characteristics

| | | |
|---------------------------|-----------------|--------------------------|
| 2.1 Temperature | Operating range | - 40 to + 85 |
| 2.2 Mechanical dimensions | L x W x H | 22.4 x 17.0 x 3.0 mm |
| 2.3 Interface | I/O connector | 28 pin SMD micro package |

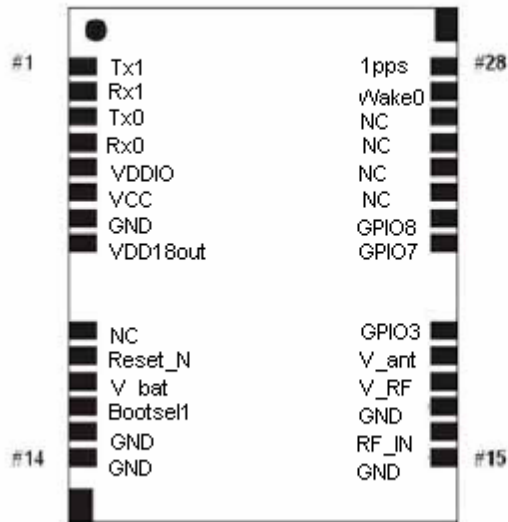
3 Antenna

| Parameter | Specification |
|---|--|
| 3.1 Antenna type | Passive and/or active antenna |
| 3.2 Active Antenna | 15 ~ 25 dB Gain recommended (50dB max.) 1.5 dB noise figure max. |
| 3.3 Antenna Supply | Using VCC_RF (pin #18) or external voltage source V_ANT (pin#19) |
| 3.4 Antenna Supervisor (see application circuit) | Short circuit detection (built-in) Open circuit detection enabled with external circuit |

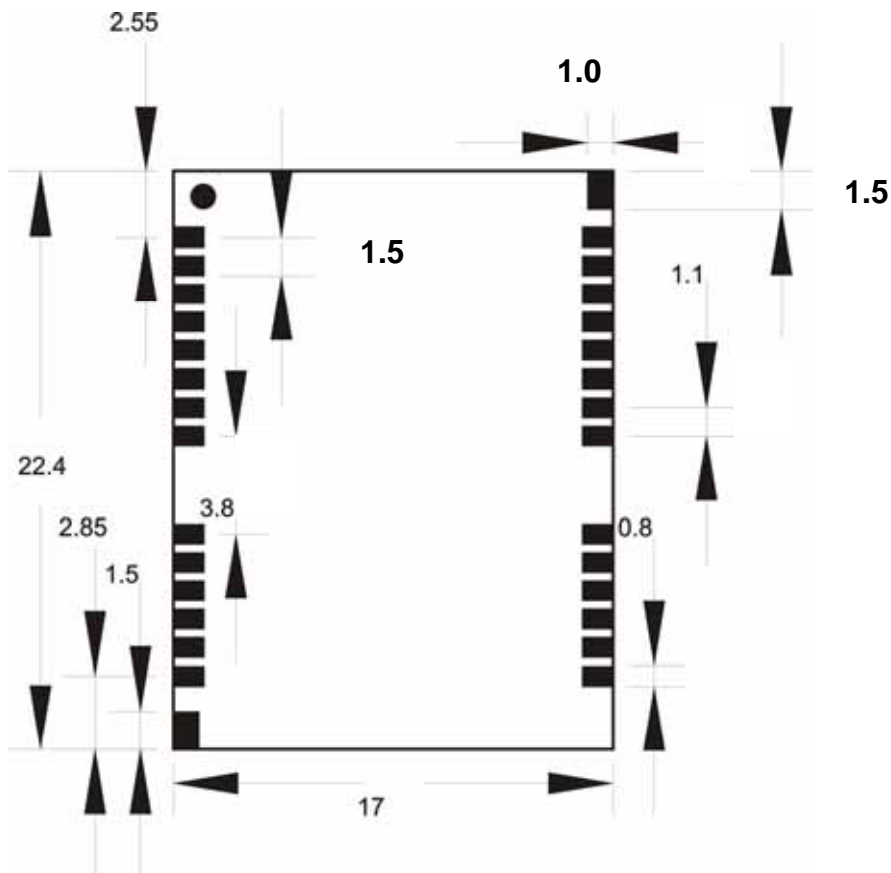
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Pin Assignment



Top View



Unit: mm

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Pin Definition

| Pin# | Name | Type | Description |
|------|-------------|------|--|
| 1 | Tx1 | O | UART1 TXD output or GPIO1 input/output |
| 2 | Rx1 | I | UART1 RXD input or GPIO0 input/output |
| 3 | Tx0 | O | UART0 TXD output |
| 4 | Rx0 | I | UART0 RXD input |
| 5 | VDDIO | PWR | GPIO Segment IO Power Input |
| 6 | Vcc | PWR | Digital Power input |
| 7 | GND | GND | Digital GND |
| 8 | NC | | Not Connected, keep floating |
| 9 | VDD18out | | Linear regulator output voltage: (Nominally 1.8V). |
| 10 | Rest_N | | Baseband RESET input. '0' = reset and '1' = normal operation |
| 11 | V_BAT | PWR | Linear regulator battery input voltage: 2 - 3.6V. |
| 12 | BootSEL1 | I | High Boot from Flash, Low Boot from serial port |
| 13 | GND | GND | Digital GND |
| 14 | GND | GND | Digital GND |
| 15 | GND_RF | GND | RF-GND |
| 16 | RF_IN | I | GPS single input |
| 17 | GND_RF | GND | RF-GND |
| 18 | V_RF | PWR | Output Voltage RF section |
| 19 | V_ant | PWR | Antenna Bias voltage |
| 20 | GPIO3/AADET | I/O | GPIO3, AADET, High antenna open, Low antenna OK |
| 21 | GPIO7 | I/O | GPIO7, Input High when use active antenna |
| 22 | GPIO8 | I/O | GPIO8 |
| 23 | NC | | Not Connected, keep floating |
| 24 | NC | | Not Connected, keep floating |
| 25 | NC | | Not Connected, keep floating |
| 26 | NC | | Not Connected, keep floating |
| 27 | Wake0 | I | Wake 0 input, Sleep Timer Output |
| 28 | 1 pps | O | 1pps output |

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Output NMEA Messages

Table 3 NMEA-0183 Output Messages

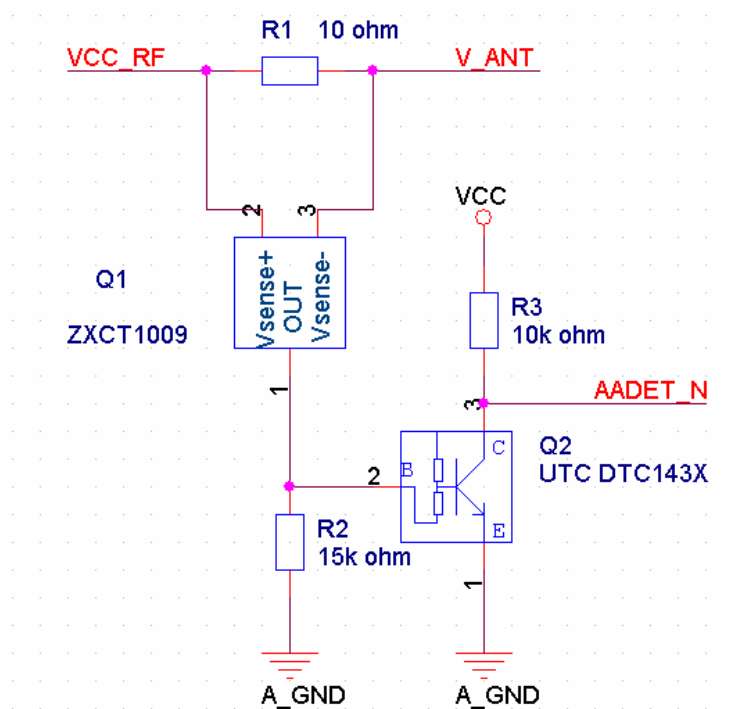
| NMEA Sentence | Description |
|----------------------|--|
| GGA (default) | Global Positioning System Fixed Data |
| GLL (default) | Geographic Position - Latitude/Longitude |
| GSA (default) | GNSS DOP and Active Satellites |
| GSV (default) | GNSS Satellites in View |
| RMC (default) | Recommended Minimum Specific GNSS data |
| VTG (default) | Course Over Ground and Ground Speed |
| ZDA (default) | Time and Date |

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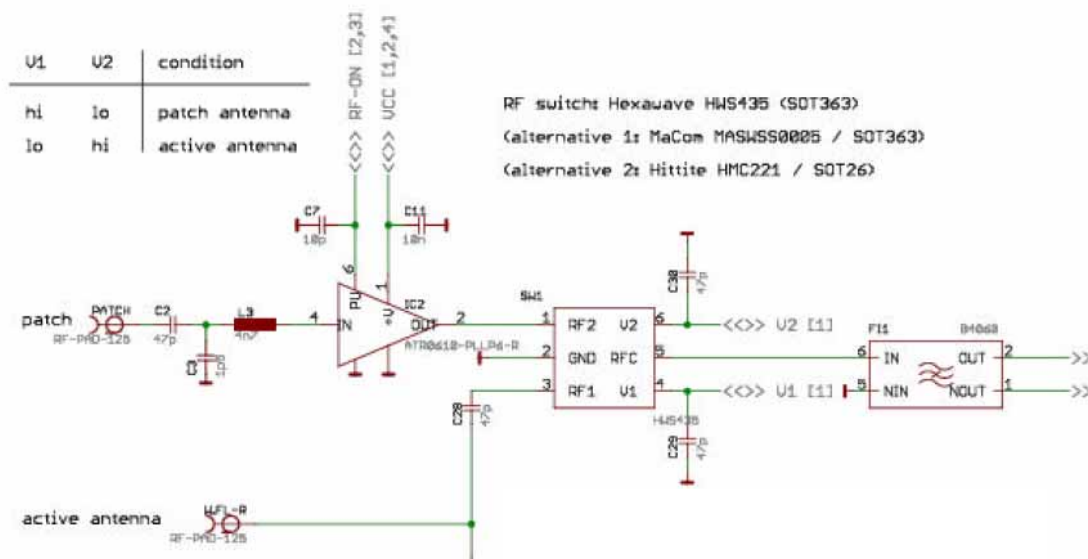
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Application Circuit

Antenna open/short detection/protection circuit



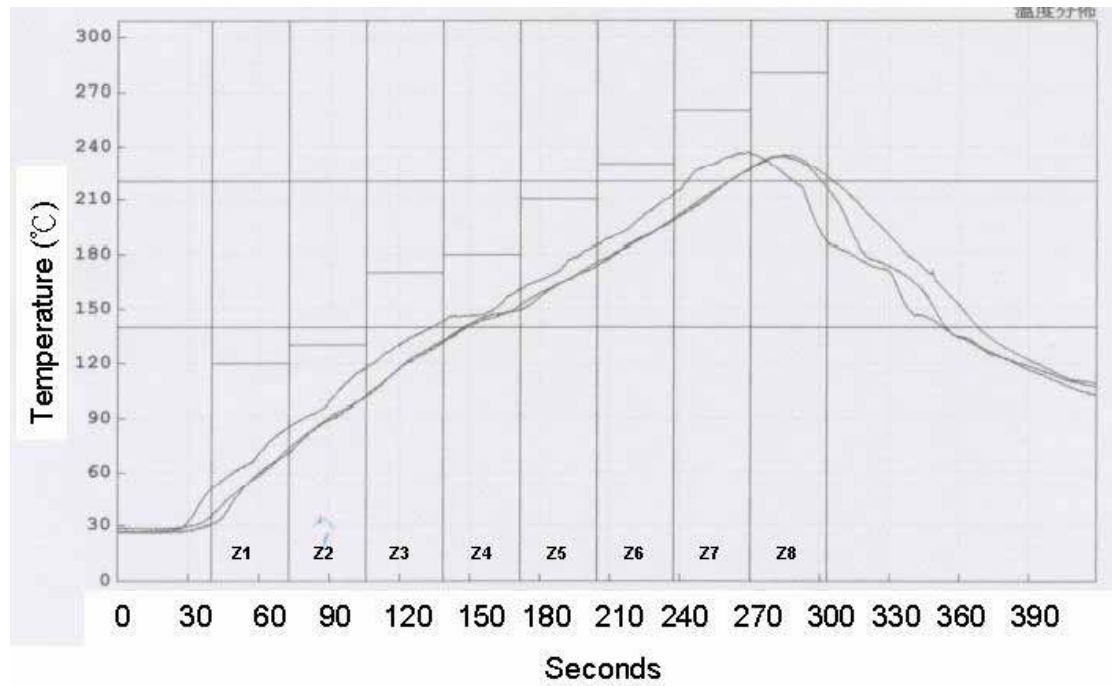
Active/Passive antenna switch circuit



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Reflow Profile



Setpoints (°C)

| Zone | Z1 | Z2 | Z3 | Z4 | Z5 | Z6 | Z7 | Z8 |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|
| Top | 120 | 130 | 170 | 180 | 210 | 230 | 260 | 280 |
| Bottom | 120 | 130 | 170 | 180 | 210 | 230 | 260 | 280 |

Conveyer Speed (cm/min): 73

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