THE CHALLENGES OF INTEGRATING A GPS RECEIVER AND ANTENNA

Integrating a GPS receiver and antenna in a tough electrical environment is a complex RF design problem. Tight space constraints often place the GPS antenna near strong transmitters, noisy power supplies and fast microprocessors. Getting it right often takes multiple expensive iterations and, in the end, engineers are frequently forced to compromise performance for time-to-market considerations.

TAKE ADVANTAGE OF TRIMBLE’S 30+ YEARS OF EXPERIENCE

Trimble has been integrating GPS receivers and antennas in all types of devices for over 30 years and can help you bring your product to market faster.

Trimble’s integrated antenna and GPS receiver product, Zelia, is comprised of a GPS receiver and antenna element on an easily integrated module.

INTEGRATED MONOPOLE ANTENNA

Zelia includes a linearly-polarized printed monopole antenna element. It is an omni-directional antenna ideal for portable device applications.

The printed monopole takes up less space than a patch antenna, giving Zelia a smaller size overall.

With this antenna design, Zelia can be installed either perpendicular to the ground plane or off the edge of the PCB, which means an even smaller footprint on the PCB.

ZELIA INTEGRATES ANTENNA, GPS RECEIVER, RTC AND LNA

The integrated antenna element is paired with the Condor C1011 GPS Receiver. The C1011 provides NMEA input and output, and PPS timing output.

The C1011 is the most compact Condor receiver. Built with the best components and the highest production quality standards, it delivers top tier positioning performance, accuracy, and sensitivity in signal acquisition and tracking.

Zelia also provides an internal 32 kHz crystal for Real Time Clock (RTC) and an internal Low Noise Amplifier (LNA).

ZELIA FITS PROJECTS ON THE GO

Zelia fits just right for performance-dependent applications that are space constrained and time and cost sensitive.

Zelia has an omni-directional antenna perfect for portability, an integrated GPS receiver module that delivers quality positioning performance, and a small footprint.
INTERFACES

Pin Out Diagram

Connector is 2-sided with 10 contacts per side

Pin Out Table

<table>
<thead>
<tr>
<th>PIN</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do not Connect</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>VCC (Main Power) V&lt;sub&gt;CC&lt;/sub&gt; = main power 3.0 V to 3.6 V</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>TXD UART (Output) Transmit (NMEA 0183) @ 2.8 V LVTTL</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>XRESET = System reset</td>
<td>For host reset of module</td>
</tr>
<tr>
<td>8</td>
<td>Reserved</td>
<td>Pull to V&lt;sub&gt;CC&lt;/sub&gt; via a 10 kΩ resistor</td>
</tr>
<tr>
<td>9</td>
<td>V&lt;sub&gt;RTC&lt;/sub&gt; (Backup Power) V&lt;sub&gt;RTC&lt;/sub&gt; = backup power 2.0 V to 3.6 V</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Do not Connect</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>RXD UART (Input) Receive (NMEA 0183) @ 2.8 V LVTTL</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>PPS Interface (Output) 2.8 V LVTTL compatible Pulse Width: Configurable 4.2 μs</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Do not connect</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Ground</td>
<td></td>
</tr>
</tbody>
</table>

Connector

0.8 pitch, 1 mm thick
Connects to:
Right angle socket P/N. .......... SAMTEC MEC8-110-01-L-D-RA1

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Model</th>
<th>Part Number</th>
<th>Packaging</th>
<th>Starter Kit P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zelia</td>
<td>77794-00</td>
<td>1 piece</td>
<td>87655-10</td>
</tr>
</tbody>
</table>

Connects to:

Specifications subject to change without notice.

PERFORMANCE SPECIFICATIONS

GPS performance statistics are clear view, stationary, autonomous (no aiding), 50% figures. Sensitivity based on signals measured at the antenna

Update Rate ..................................................... 1 Hz (default), up to 5 Hz
Accuracy
Position ........................................................ <2 m
Altitude .......................................................... <3 m
PPS .................................................................. < ±25 ns
Acquisition
Re-Acquisition .................................................. 2 s
Hot Start .......................................................... 2 s
Warm Start ........................................................ 35 s
Cold Start ......................................................... 38 s
Sensitivity
Tracking ............................................................ −160 dBm
Acquisition ........................................................ −146 dBm

Dynamic Acquisition

Acceleration ......................................................... 2 g
Velocity ................................................................... 515 m/s (COCOM Limit)

ELECTRICAL INTERFACE SPECIFICATIONS

Serial Interface

UART ................................................................. 2.8 V LVTTL level
Protocol ........................................................... NMEA 0183
Messages ......................................................... GGA, GSA, GSV, RMC (default)
Baud Rate ......................................................... 9600, 8-N-1
PPS Interface ...................................................... 1 Hz timing pulse, output
Level ................................................................. 2.8 V LVTTL level
Pulse Width ....................................................... Configurable 4.2 μs
Main Power
DC Levels ............................................................ 3.0 V to 3.6 V
Consumption ......................................................... <43 mA typical @ 20 °C
Backup Power
DC Levels ............................................................. 2.0 V to 3.6 V
Consumption ......................................................... 6 μA typical @ 20 °C

ENVIRONMENTAL INTERFACE SPECIFICATIONS

Temperature
Operating ............................................................. −40 °C to + 85°C
Storage .............................................................. −55 °C to +105°C
Humidity ............................................................ 5% to 95% non-condensing @ 60°C
Vibration
5 Hz to 20 Hz .......................................................... 0.008 g²/Hz
20 Hz to 100 Hz .................................................... 0.05 g²/Hz
100 Hz to 900 Hz .................................................. −3 dB/octave

PHYSICAL SPECIFICATIONS

Dimensions excluding connector .................. 16.0 mm x 36 mm
Dimensions including edge connector ........... 3.2 mm x 12 mm
Dimensions including edge connector ........... 19.2 mm x 36 mm