Application Note No.08-1

GPS Antenna Handset Installation

This application note is intended for handset designers using the M1575CQA series of compact antennas. Antenna installation for various handset mounting configurations is described along with the recommended printed circuit board layout guidelines for optimal performance. Two antenna connector options are detailed: a 2-pin solder on connector and a snap-lock connector.

Antenna Installation Overview

The M1575CQA1020 Compact Quadrifilar Antenna is an innovative GPS antenna offering the highest efficiency and the lowest axial ratio in its class. Its compact size and ground–plane independence makes it ideal for integration in handsets. The M1575CQA series of antennas exhibit excellent immunity to antenna detuning because current flow from the antenna to the host device PCB is minimized by leveraging Maxtena's differential interface technology.

Figure 1 shows an example integration of the M1575CQA into a typical handheld GPS device. The integration consists of antenna element with phase shifter board (2), differential connector (3), and 0805 balun placed on the host device PCB board (4). The balun part number is Johanson 1600BL15B100. It is important to follow the recommended layout guidelines as outlined in the part description document. A minimum separation distance of 5 mm is required between the antenna and the closest metallization, in this case host device PCB, as illustrated by (1).

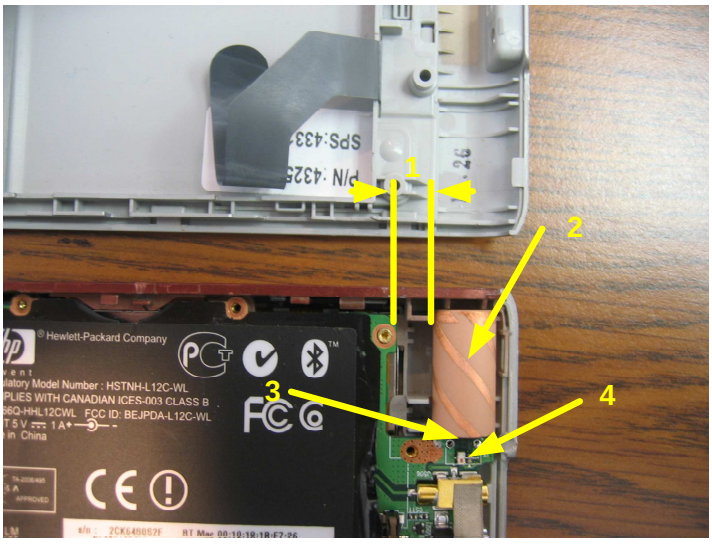


Figure 1. M1575CQA1020 integration in a handheld GPS device.

M1575CQA ANTENNA CONNECTOR OPTIONS

The M1575CQA1020 antenna is available with two connector options depending on the host device installation requirements. A 2-pin bare wire connector is available for direct soldering of the antenna to the host PCB board. A snap-locking molded connector is also available for easy integration into the host device.

The M1575CQA1020 with the 2-pin differential connector is shown in **Figure 2**. The differential connector consists of two pins that are directly connected to M1575CQA1020 phase shifter board. The differential pins are then soldered to the host device PCB. The differential pins then connect to the balanced output ports of the host device balun (port 3 and 4). **Figure 3** shows the typical host PCB layout. The land pads on the host PCB should be same length as the antenna differential connector. The traces between the connector pin1 and balanced port of the balun should be short lengths in order to maximize the antenna efficiency.

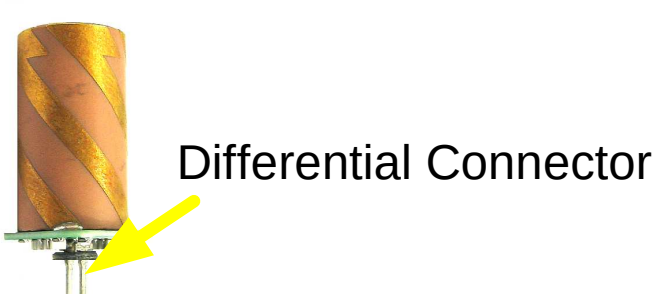


Figure 2. Antenna and a differential connector.

The snap-lock connector is a quick release integrated connector packaged designed to ease manufacturing pick-and-place processes. It is useful in host devices where antenna soldering to the host PCB is not desired. The advantage of the snap lock connector is ease of installation and quick disconnect. It does not require the antenna to be directly soldered to the host PCB. The snap-lock connector is available in a straight connect and a right angle option depending on the host device mounting requirements. The straight connect option is illustrated in Figure 4.

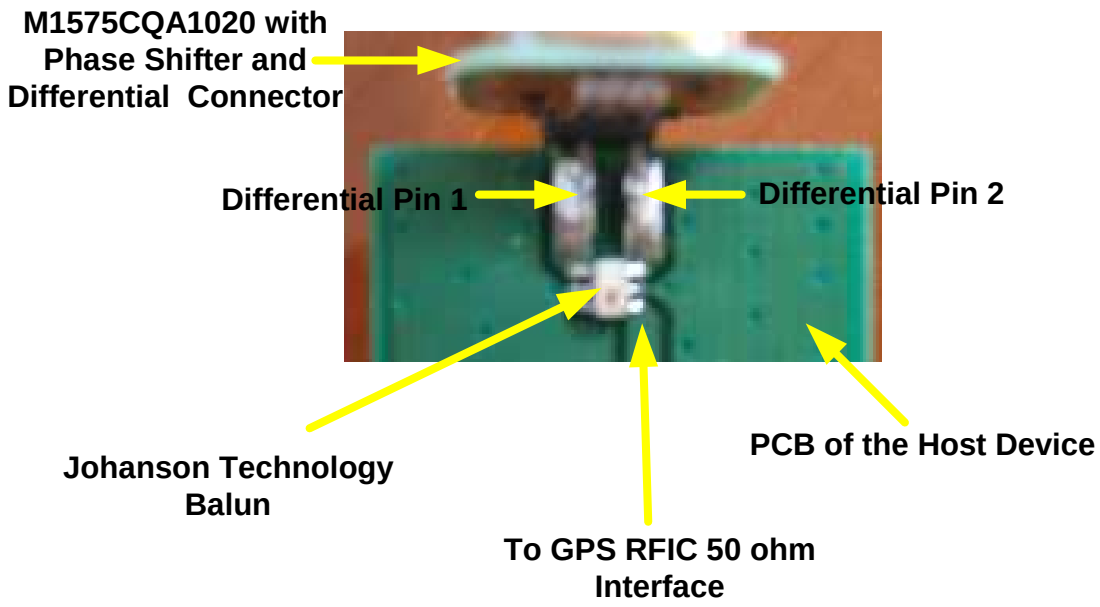


Figure 3. Balun and host PCB connection.

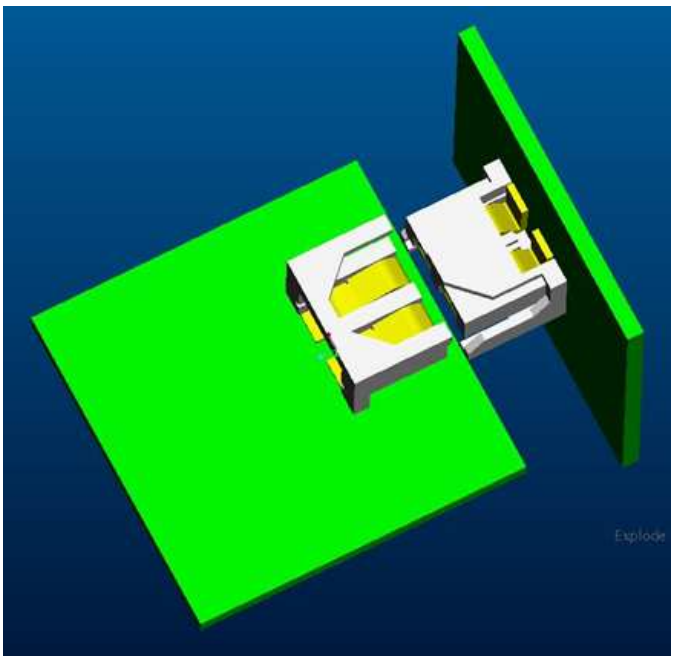
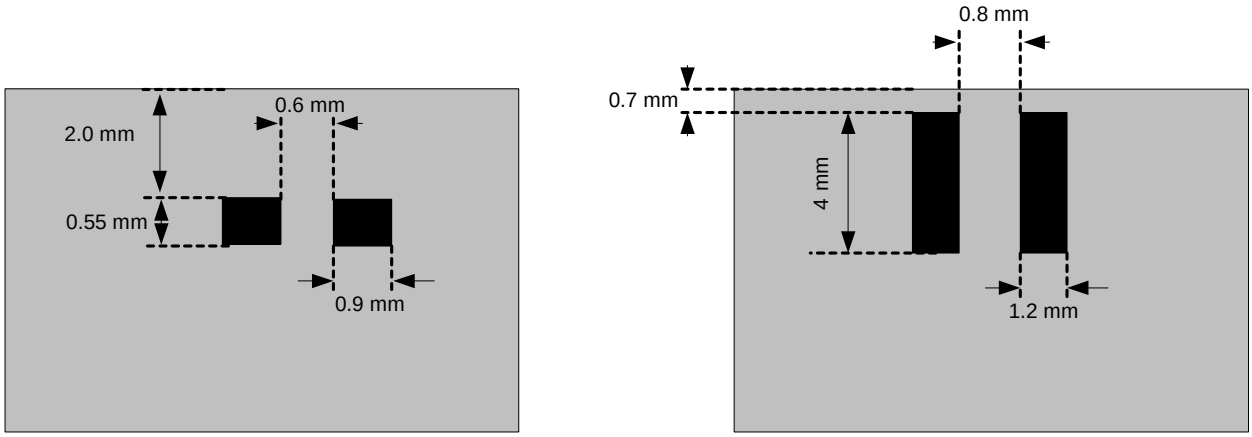


Figure 4. Snap-locking connector.

PCB LAYOUT

The recommended PCB pad layout for both the snap-lock connector and the 2-pin bare connector are shown in Figure 5.



(a) Snap-lock connector (b) 2-pin bare connector

Figure 5. Printed circuit board pad layout for connector options.