ALPHA
明泰科技
Alpha Networks Inc.

E11727 2006/12/6

505924530099G		
ANTENNA 2.4G 5GHz CAF94400		
Centurion Wireless Components (M)SDN BHD(511200)	CAF9440	
	03-3129292#137	

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CENTURION
WIRELESS TECHNOLOGIES, INC.

SPECIFICATIONS AND
APPLICATION NOTES (MAF94192)
Sept 18, 2006

D-Puck Antenna

CENTURION
WIRELESS TECHNOLOGIES, INC.

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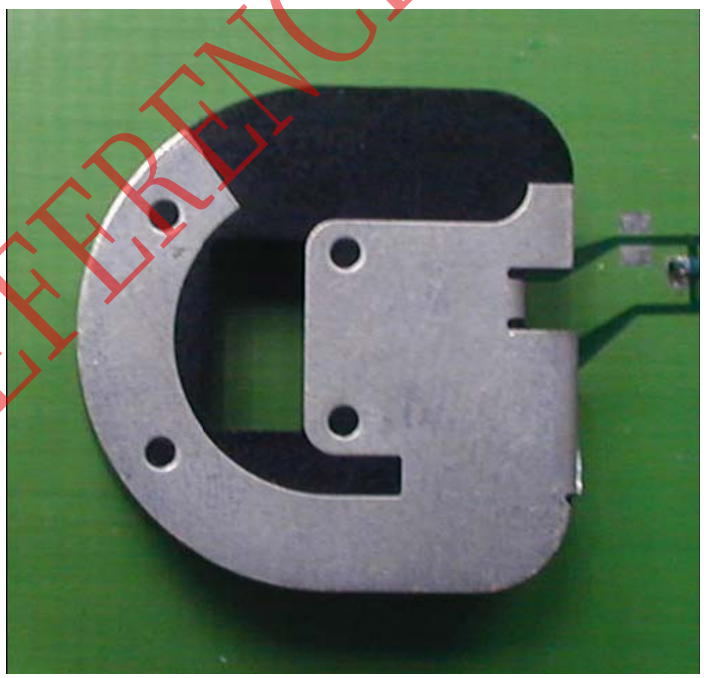
Technology

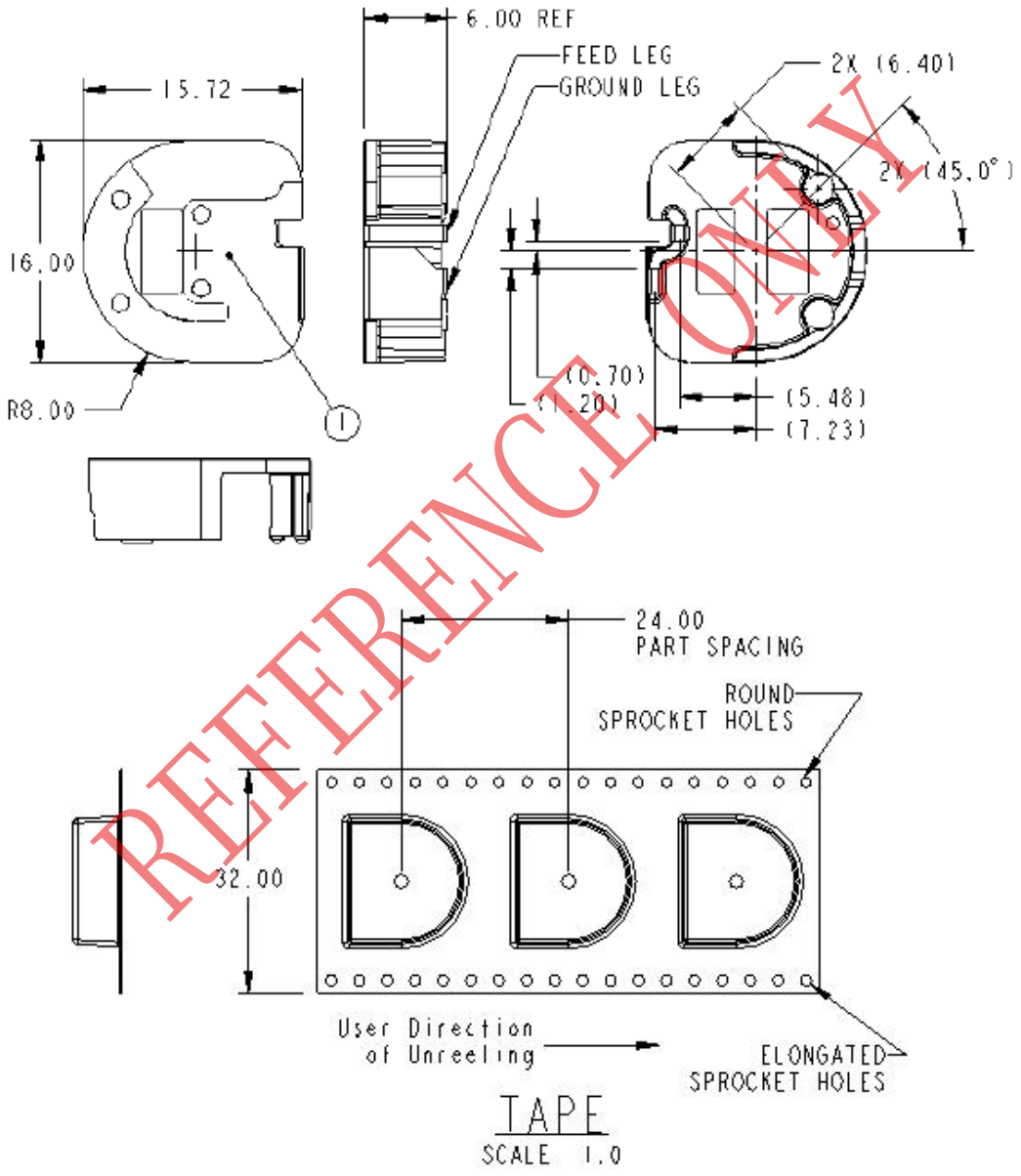
The D-Puck is a versatile and easy to use antenna for IEEE 802.11a and b devices. Designed for high volume pick-and-place manufacturing processes, it can be successfully used in many different applications.

The D-Puck is a form of a PIFA (Planar Inverted F Antenna). As a PIFA, D-Puck requires a ground plane to radiate efficiently. Thus, the ground plane configuration of the device in which the D-Puck is installed will have a significant impact on electrical performance (VSWR and gain). The polarization and radiation patterns are also affected by ground plane size, placement and geometry.

There are many ground plane configurations that will provide a 50 ohm impedance match for the antenna. Contact Centurion Wireless Technologies for engineering assistance with your custom application.



Physical Dimensions/Tape and Reel Information

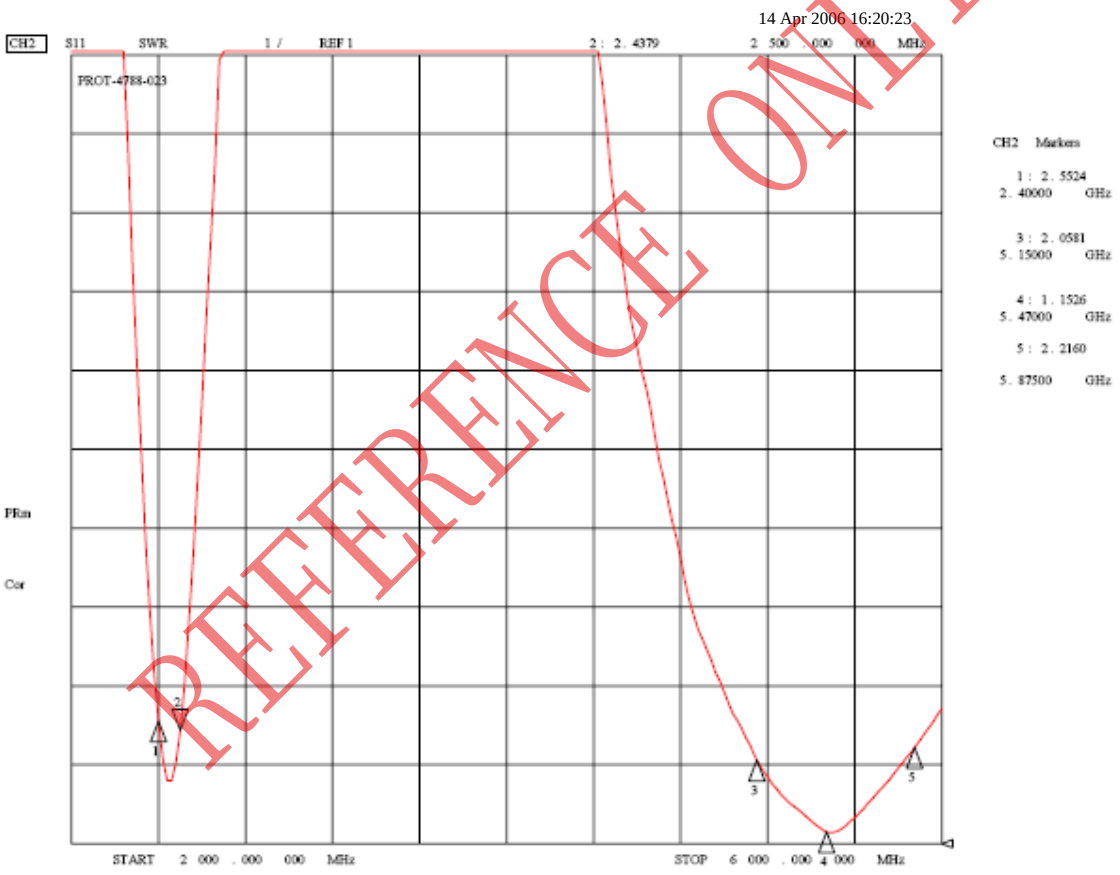


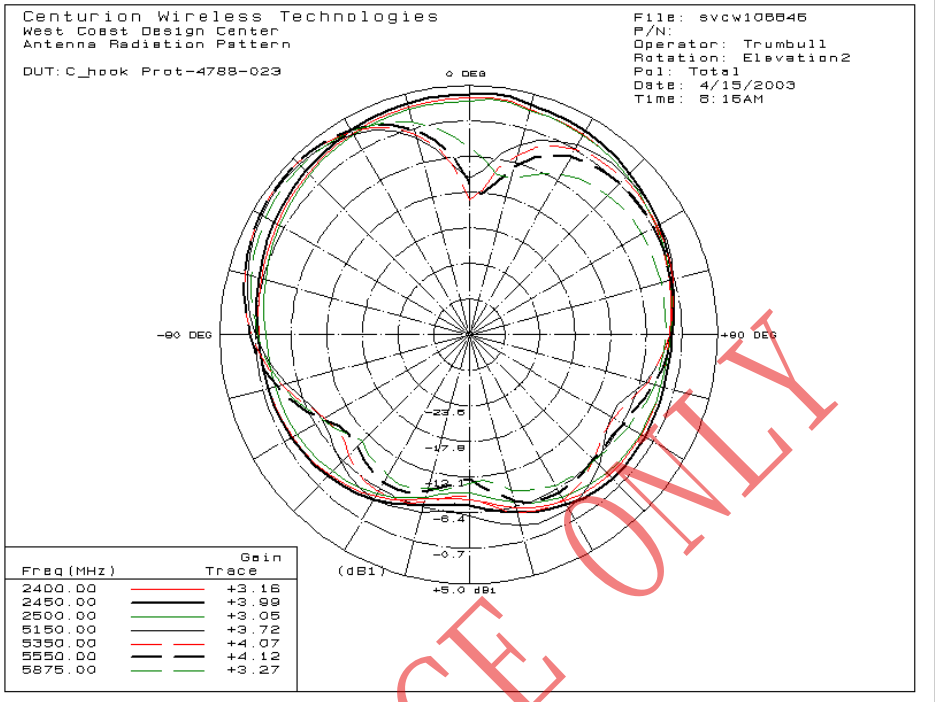
Electrical Performance

Typical electrical performance results:

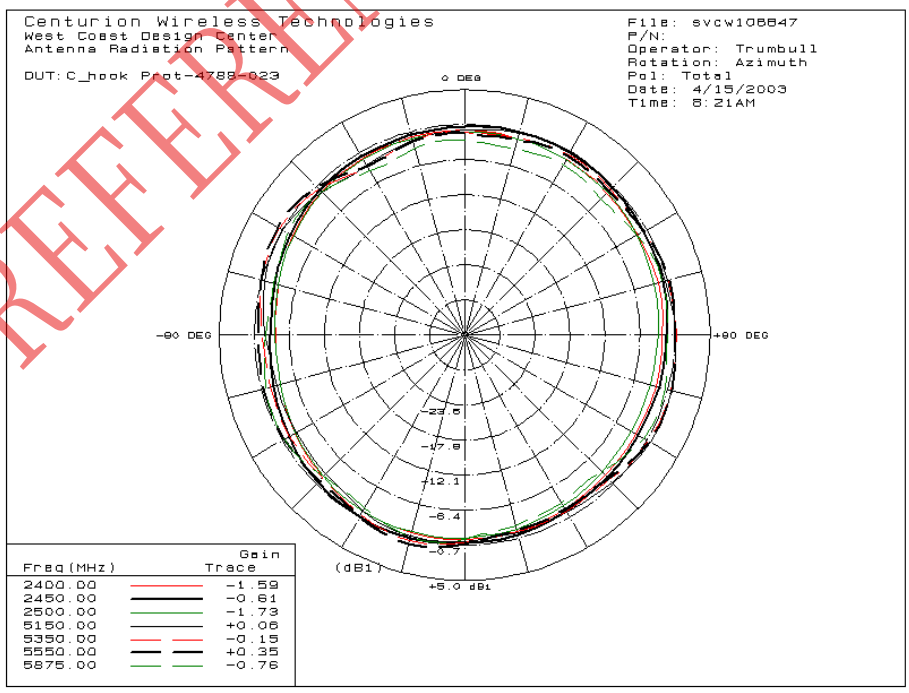
	2.4 – 2.5 GHz	5.15 – 5.875 GHz
VSWR	< 2.5:1*	< 2.5:1*
Peak Gain	> 3 dBi*	> 3 dBi*

*As measured on 2.0 [51.0 mm] X 2.4 [62.0 mm] Evaluation Board





Elevation: Total Gain



Azimuth: Total Gain

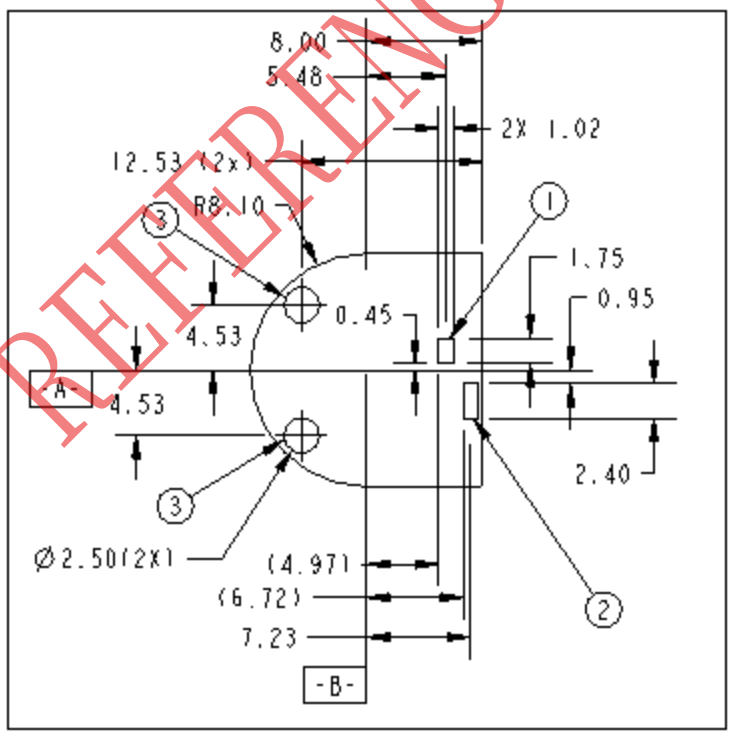
Feed Configuration

D-Puck has four tabs for solder attachment to PCB solder pads:

- Tab #1 is for the RF feedline
  - o line impedance must be 50 ohms for optimum antenna performance
- Tab #2 is for ground contact
  - o MUST be connected to ground
- Tab #3 and #4 are primarily for mechanical support
  - o May be connected to the ground plane or other floating copper

PCB Solder Pad Size and Placement

- Four solder pads are required for attachment to a PC board
- Solder pads on the PCB should be laid out as shown below
- D-Puck antenna is best attached by using a surface mount solder reflow operation



PCB FOOTPRINT LAYOUT

Tuning Techniques

• The simplest way to tune the D-Puck antenna for one's application is by use of a matching network in the feed line of the antenna. The matching network and the electrical performance of the D-Puck antenna is influenced by the physical characteristics of the surrounding devices and materials. This can be used as an advantage by manipulating certain parameters to overcome induced parasitics.

- Ground plane configuration
  - Distance from antenna
  - Topology around antenna
  - Size of ground plane
  - Position of antenna on ground plane
- Feed point transmission line impedance
  - Trace width
  - Trace length
- Matching network location (Typically Close to Antenna)
- Capacitive loading
  - Dielectric loading
  - Proximity to the housing or other non-conductive components
- Using discrete components for matching components for the upper bands (i.e. > 5 GHz) will be more difficult than the lower band. In general small packages (0201) or distributed circuits should be used.

Ground Plane Restrictions

- The PCB ground plane must extend under the D-Puck antenna.

- RF GND should be the layer the antenna is soldered to.
  - For single sided boards, a coplanar waveguide transmission line can be used to feed the antenna on the surface that the antenna is soldered to, e.g. for .060” [1.5 mm] FR-4 substrate: use a .087” [2.2 mm] trace width with .015” [0.4 mm] gaps.
  - For double sided boards, a microstrip transmission line on the side opposite can be used to feed the antenna.

- The antenna can be integrated onto an existing PCB or placed onto a separate dedicated RF GND.
  - Keep a minimum isolation distance of .24” [6 mm] between the antenna and any other components mounted on the same PCB (the isolation distance may need to be greater for physically large components).

- The location of the antenna on the PCB contributes to the electrical performance.
  - If the antenna is to be located near the edge of the PCB, mount the antenna with the Feed and GND pads nearer to the edge, i.e. the antenna hook will be away from the edge. Mounted in this configuration, the antenna “drives” the GND; bandwidth will be improved but patterns will be more directive.
  - If the antenna is centered on the GND, the physical size of the GND affects tuning. Mounted in this fashion patterns will be more symmetric.

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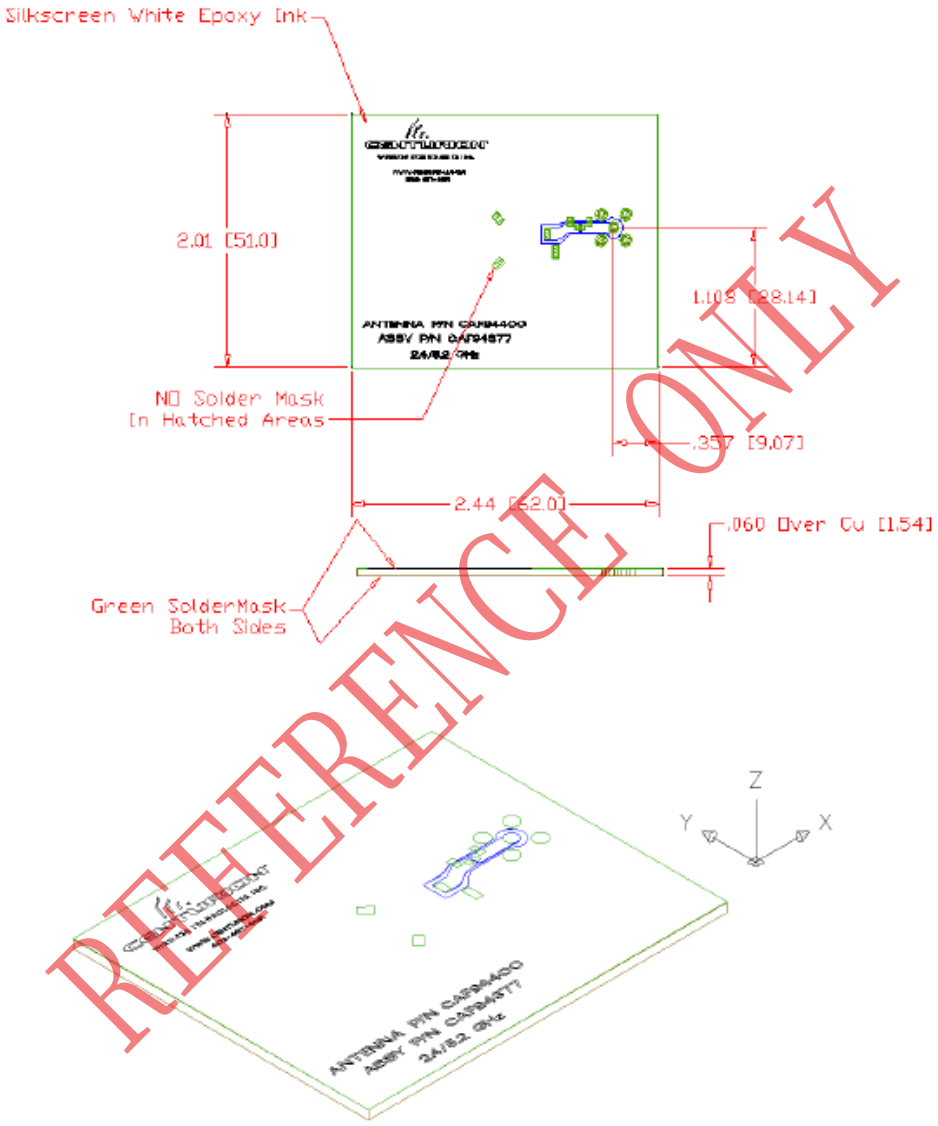
Evaluation Board Specifications

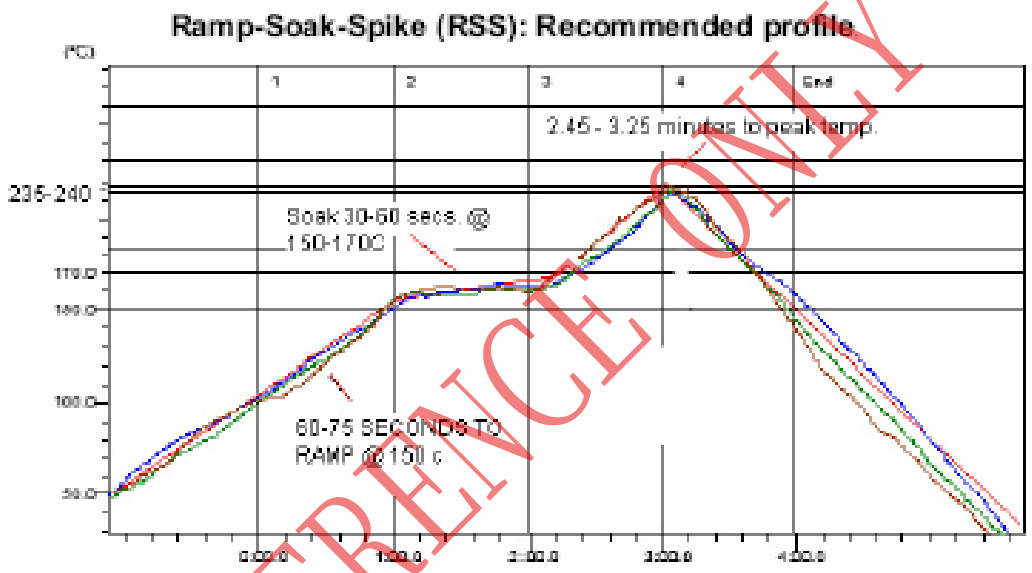


Substrate: .059 [1.5 mm] FR-4, ½ or 1 oz. Cu 1 side

Connector: SMA Straight Jack Receptacle (AMP P/N 901-144-8-RFX or Equiv.)

SMT Reflow Profile

A hypothetical lead-free reflow profile is shown here. As there are many variables which control the amount of heating into the parts during reflow, this to be used only as a guide and the customer or their PCB assembly house should develop a suitable process.



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Product Functionality Warranty

Please be informed that we are making a minor change for D-Puck product CAF94400 to MAF 94192. The changes are on the metal element to be tin plated. The reason being is that to have a lead free product.

Centurion warrants the following to be true:

1. All products shipped are good to be used
2. The tin plating on the antennas are good to be used.
3. The RF performance shall maintain its performance as specified on the product specification.

Authorized Signature,

30-Oct-06

(QA Manager)