Integration Guide

CMM7700/CMM7700/8700

MicroBurst ™
Cellular Modem Module

Standard Communications Corp.
1111 Knox St.
Torrance, CA 90502

800-767-2831

Document Changes:

Date	Document Revision	Details

RF SAFETY WARNING

This device and associated antenna must be installed in a location at least 20cm from the body of the user or other nearby persons in order to comply with the FCC RF exposure guidelines.

The above warning must be included in the user documentation of the final product that these modules are incorporated into. A warning label should also be included on the exterior of the device.

WARNING

While this device is in operation, a separation distance of at least 20 centimeters must be maintained between the radiating antenna and the body of all persons exposed to the transmitter in order to meet the FCC RF exposure guidelines.

IMPORTANT!!

Performance and compliance with FCC rules are heavily influenced by final packaging and antenna configuration of the end-product. Installations not complying with the 20cm minimum separation requirement, using substantially different antenna configurations from those described herein, or utilizing operating voltages outside of the normal specifications must be evaluated for compliance with FCC Rules and RF exposure requirements. Responsibility for compliance of the final product is the responsibility of the end-product manufacturer.

Refer to the following resources for additional information regarding FCC rules and RF Safety Guidelines for this type of devices:

47CFR Part 22 Subpart H

47CFR Part 1.1307 – 1.1310

47CFR Part 2.1091, 2.1093

Federal Communications Commission (FCC) Primary website:

www.fcc.gov

Federal Communications Commission Office of Engineering and Technology web site:

www.fcc.gov/oet/rfsafety

The following guide is designed to provide the developer / designer additional information regarding hardware considerations. The sections include detailed design ideas along with tips and tricks we have used in implementing various applications. Each section has a brief description and diagrams to assist you in your planning stages with the CMM7700/8700.

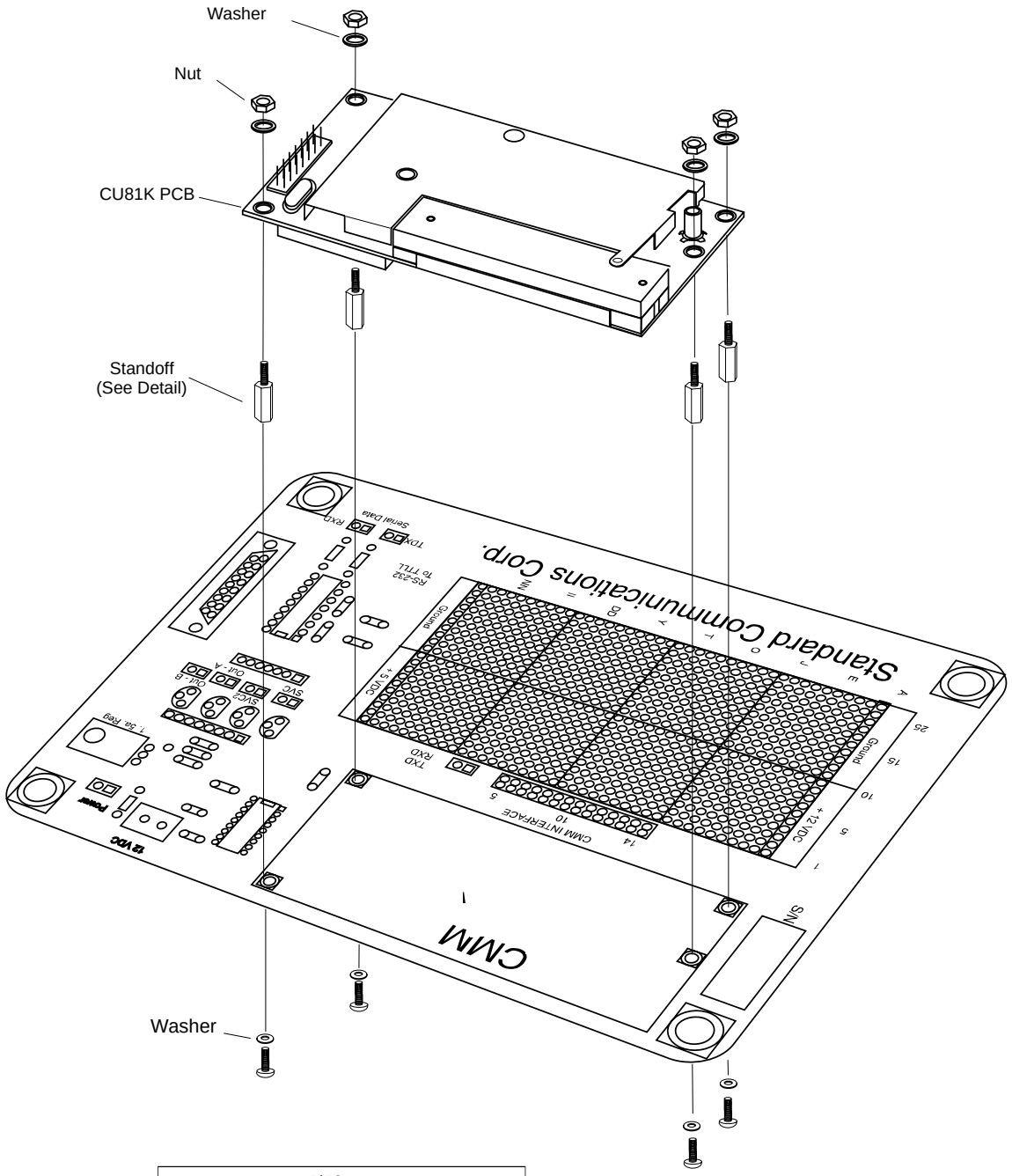
MOUNTING

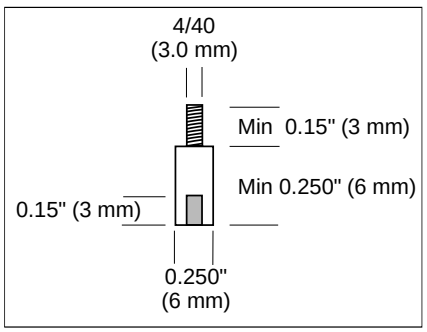
The CMM7700/8700 has four mounting holes arranged in the pattern shown in figure 1.

If stand-offs are to be used, metal type is the recommended due to added ground potential. In figure 1, the stand-offs set the CMM7700/8700 unit slightly higher than the host PCB. An air gap is not necessary but will allow for PCB to PCB isolation and noise immunity. The standoff used on the evaluation PCB is exaggerated to display the CMM7700/8700. The height of these stand-offs are not necessarily ideal and space can be greatly conserved by using shorter ones.

Figure 2. Shows an example of a plate shield already used on an application with the modification of bent tabs to allow for mounting of the CMM7700/8700. This is a relatively inexpensive method of mounting and can be implemented easily when the plate is initially punched. Care should be taken so that the tabs do not extend past the flash area of the mounting holes.

Figure 3. Shows the mechanical drawing of the CMM7700/8700 units. These dimensions should be used for mounting and placement purposes. The drawing is illustrated from the bottom side perspective. The antenna and interface connectors are located on the topside of the PCB.





7728b

Figure 1. Mounting Details

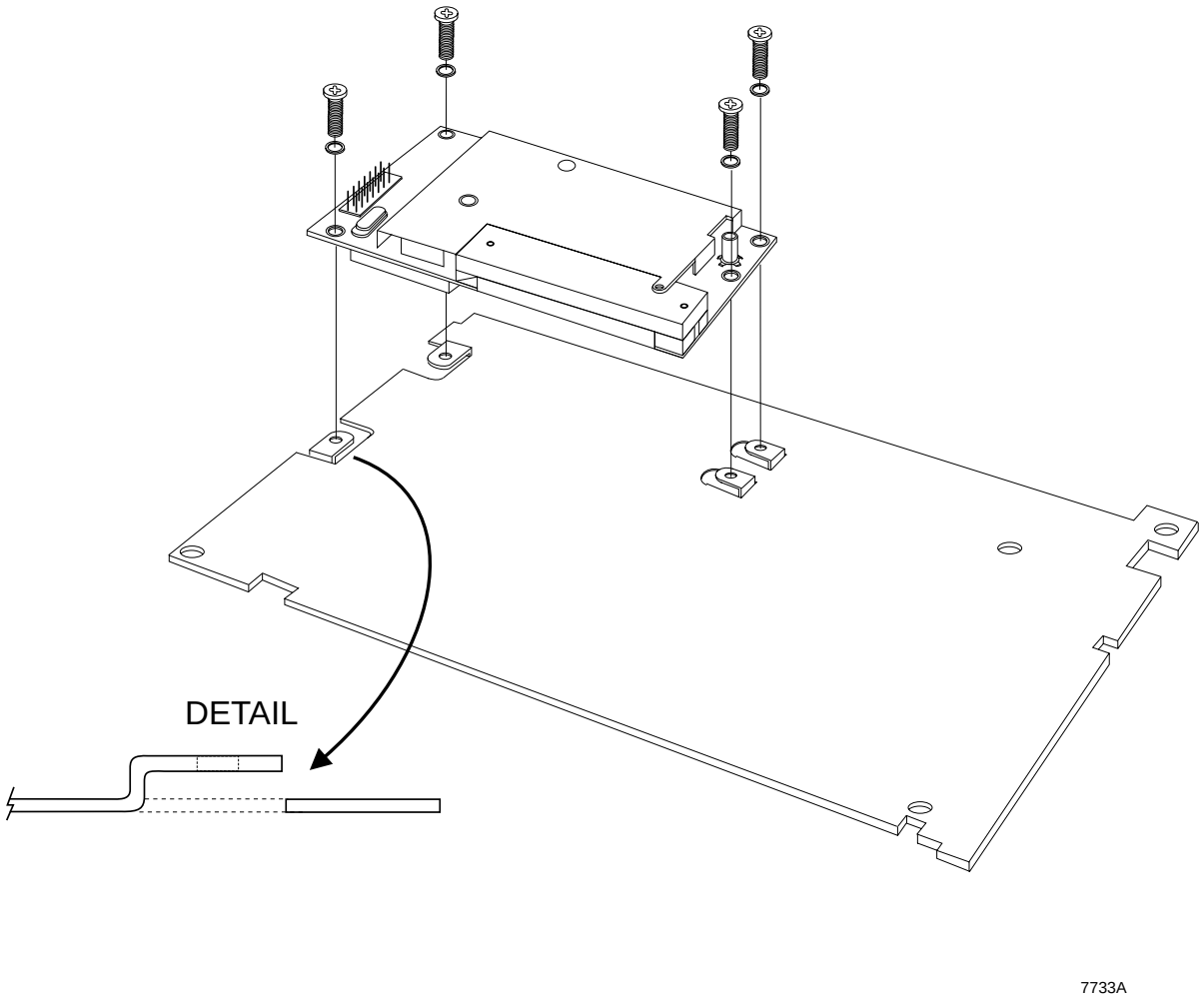


Figure 2. Sheet Metal Tab Detail

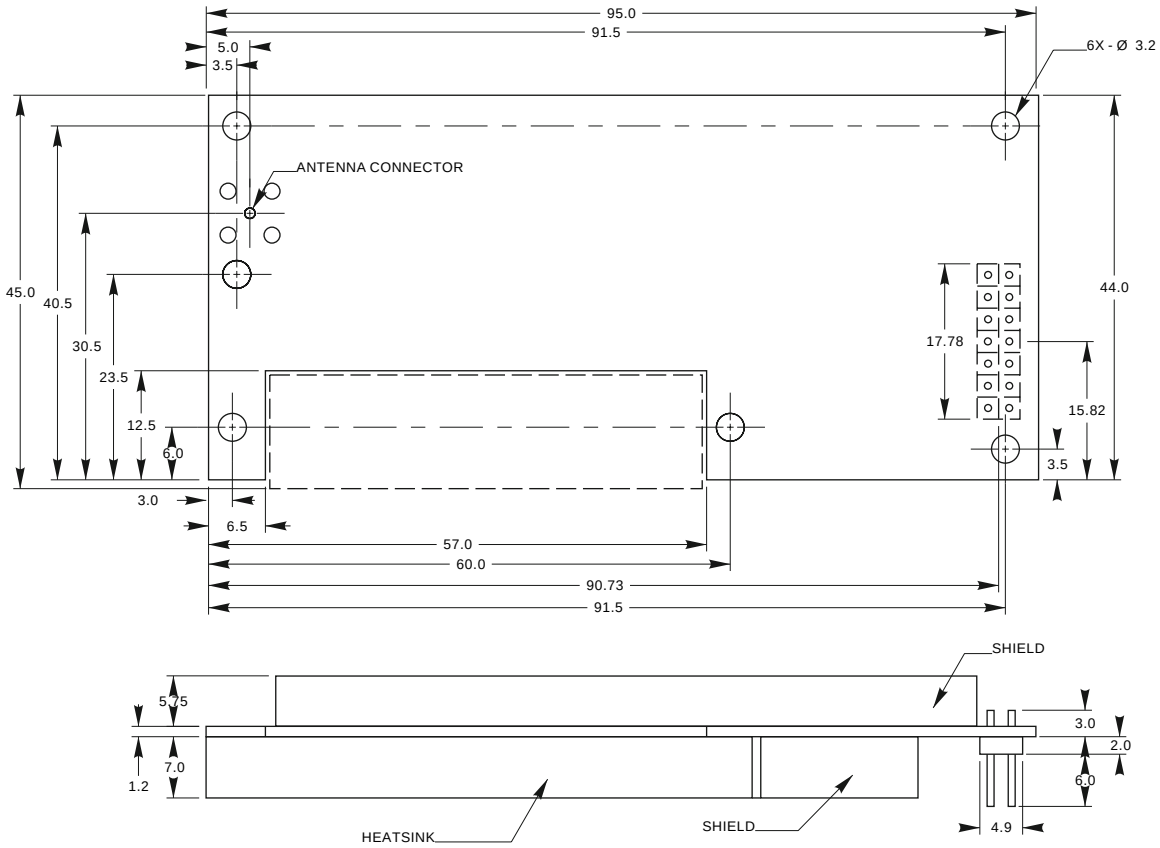


Figure 3. Dimensions

ANTENNA CONSIDERATIONS

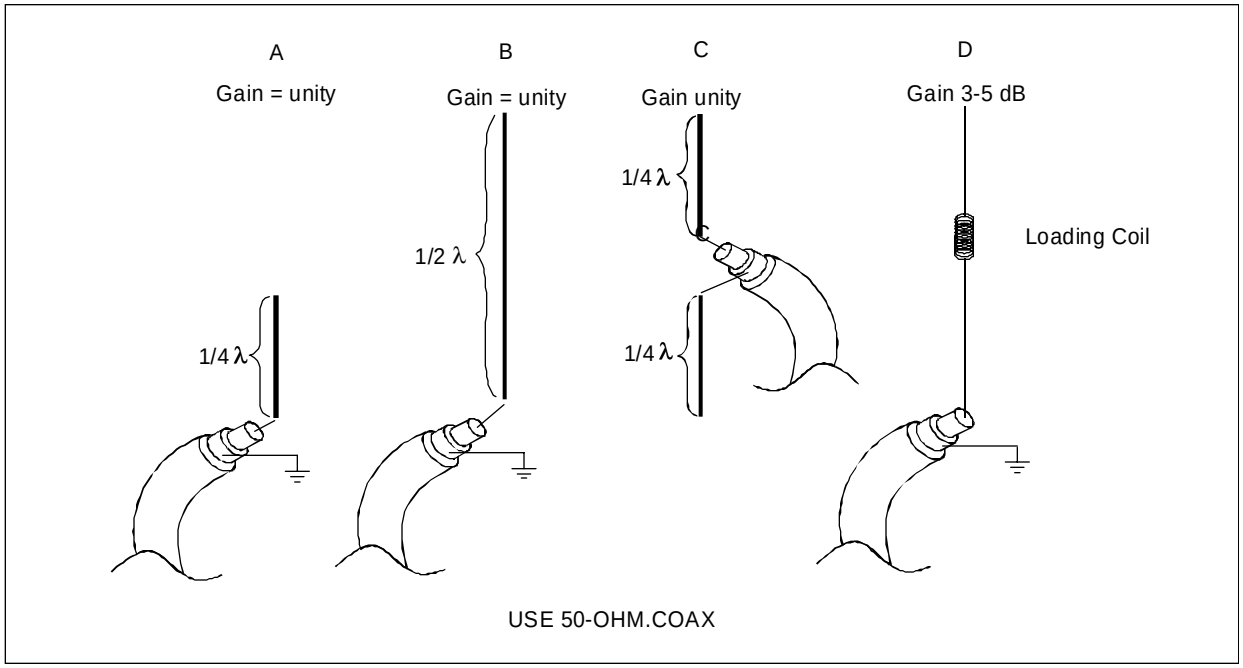
The diagrams below illustrate the different antenna selections used for applications. Each example has implementation criteria due to its performance and operation.

A. The quarter wave antenna is small and lends itself well into tight applications where space is critical. A ground plane radius of greater than 100mm is required for proper operation. Failure to provide this grounding will result in erratic radiation patterns, signal loss and mismatched impedance to the CMM7700/8700.

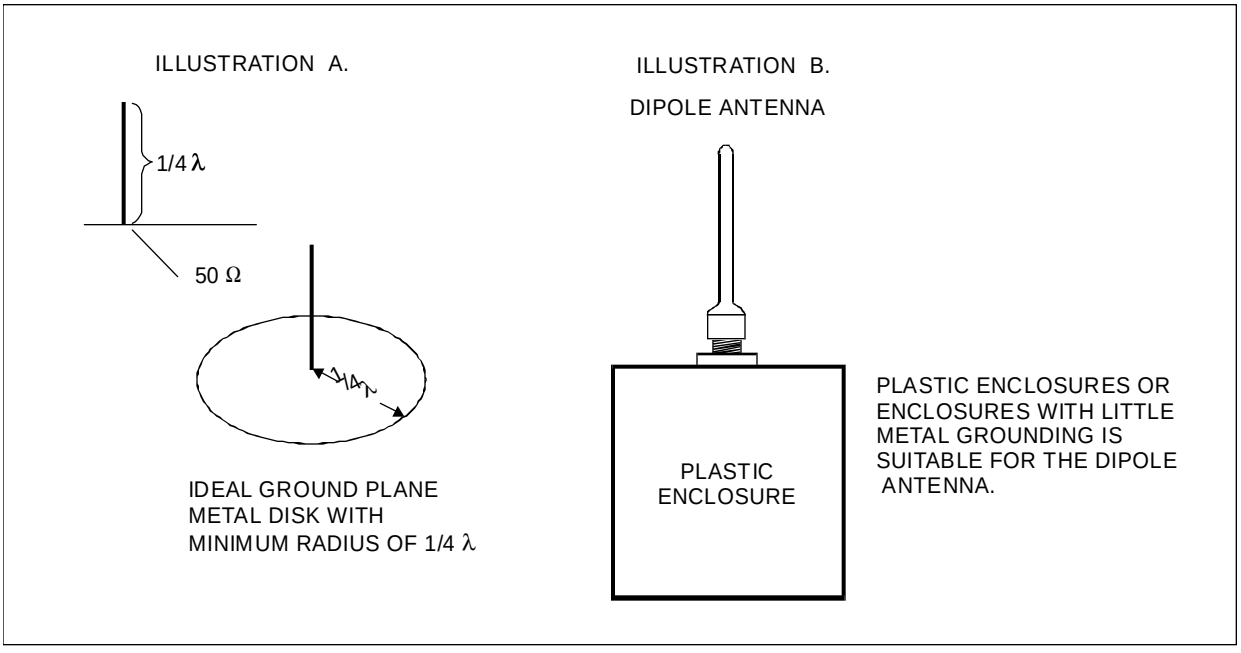
B. The half wave antenna is twice the length of the quarter wave. It's properties require less ground plane which make it more ideal for applications that have less metal mass. The antenna has a better radiation pattern.

C. The dipole antenna provides a ground-plane-free operation with optimum gain for its size. This antenna provides its own ground-radiating element and can be used with plastic enclosures.

D. The loading coil antenna is the largest of the four mentioned but has a gain advantage over the dipole. The loading coil located in the center of the antenna provides electrically longer antenna to radiate the signal better.

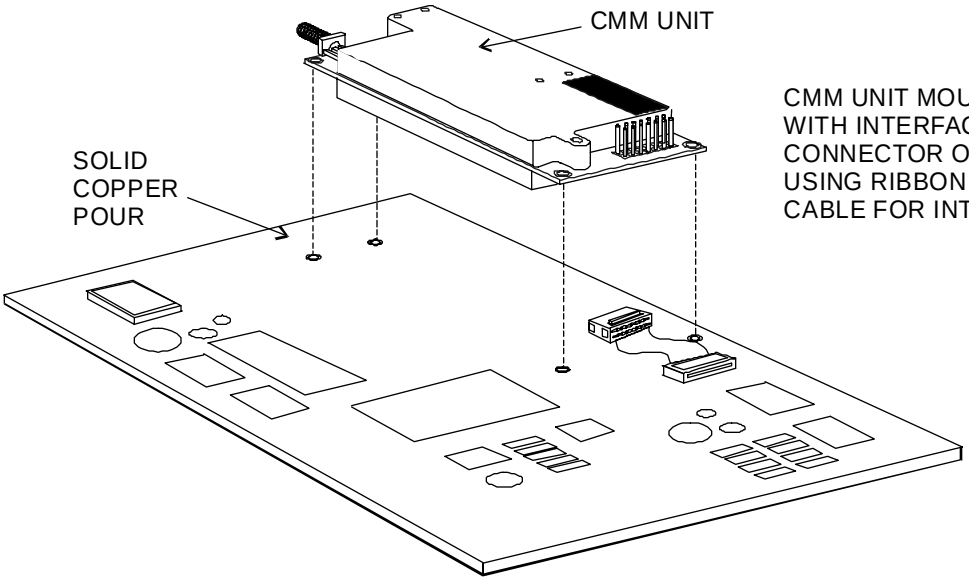


A. QUAITER WAVE ANTENNA, WITH GROUND PLANE
B. HALF WAVE ANTENNA, LESS DEPENDENT UPON GROUND PLANE
C. DIPOLE ANTENNA, INDEPENDENT OF GROUND PLANE (NO GROUND PLANE REQUIRED)
D. LOADING COIL ANTENNA, INDEPENDENT OF GROUND PLAN WITH GAIN 3 -5 db

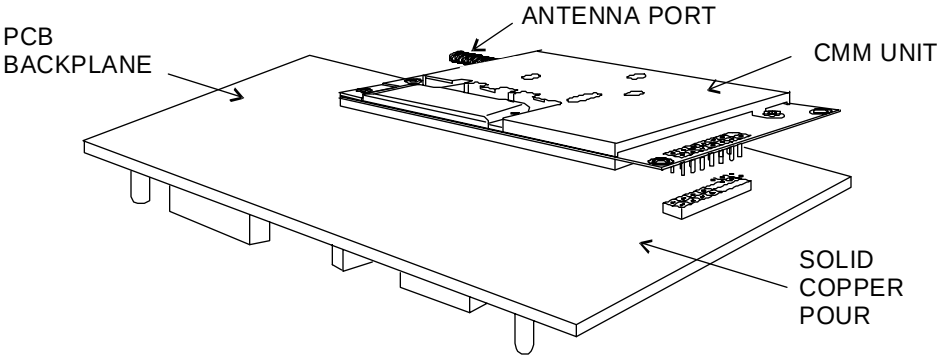


SHIELDING CONSIDERATIONS

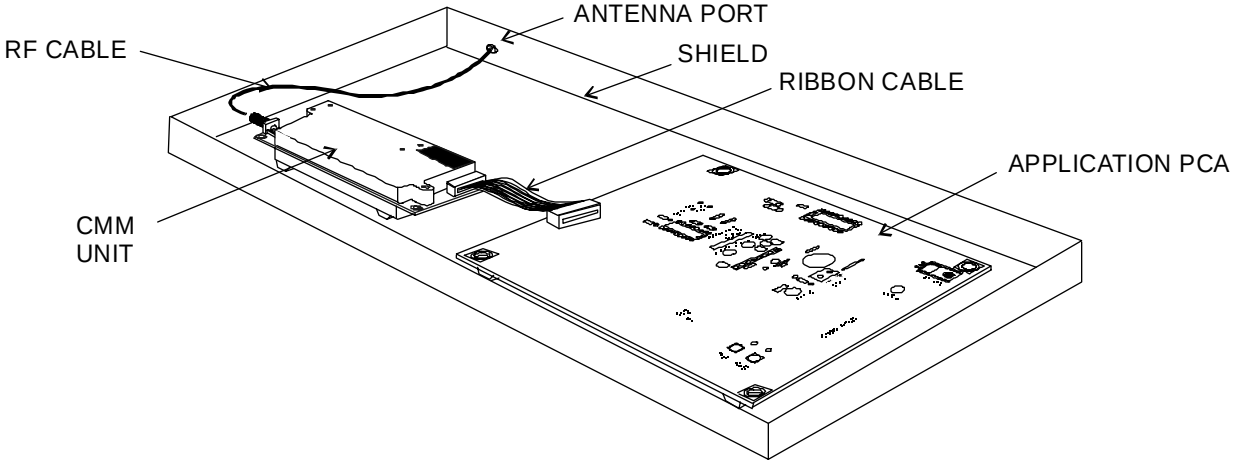
When planning the PCB layout for an application some design rules and layout plans should be considered. The following diagrams show various mounting configurations with respect to shielding. Often the application PCB does not allow for separate ground plane implementation. In these cases a list of design rules should be used in order to prevent inter-circuit problems. The last section of this document deals with common design practices used with RF module implementations.

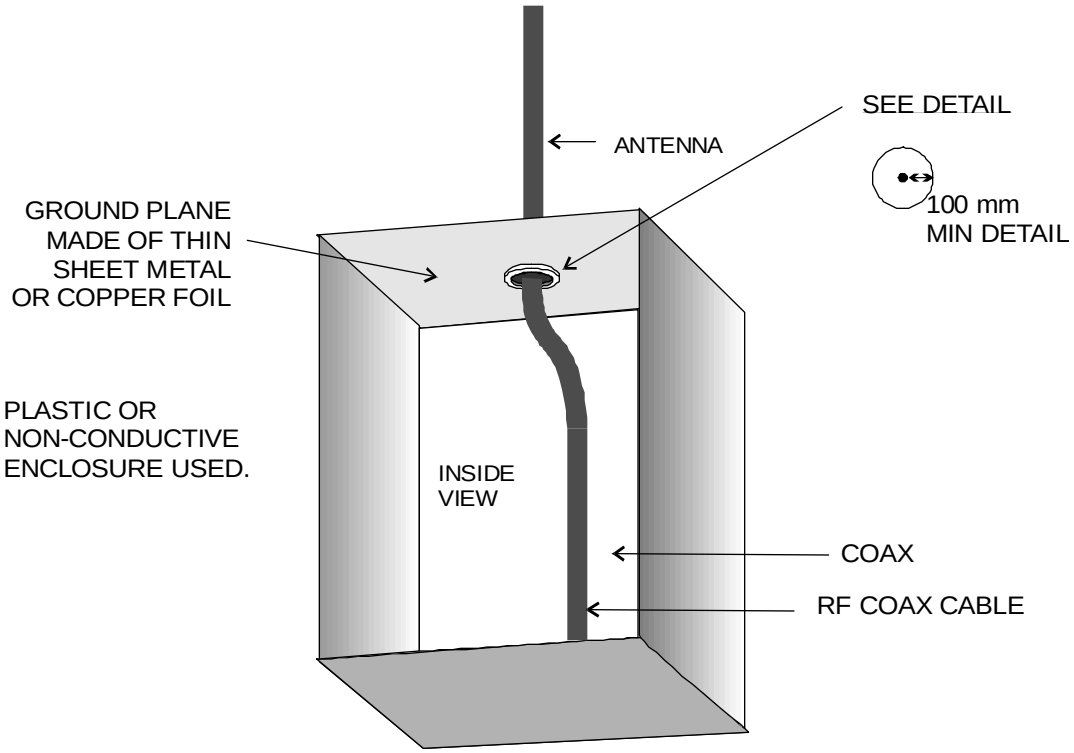


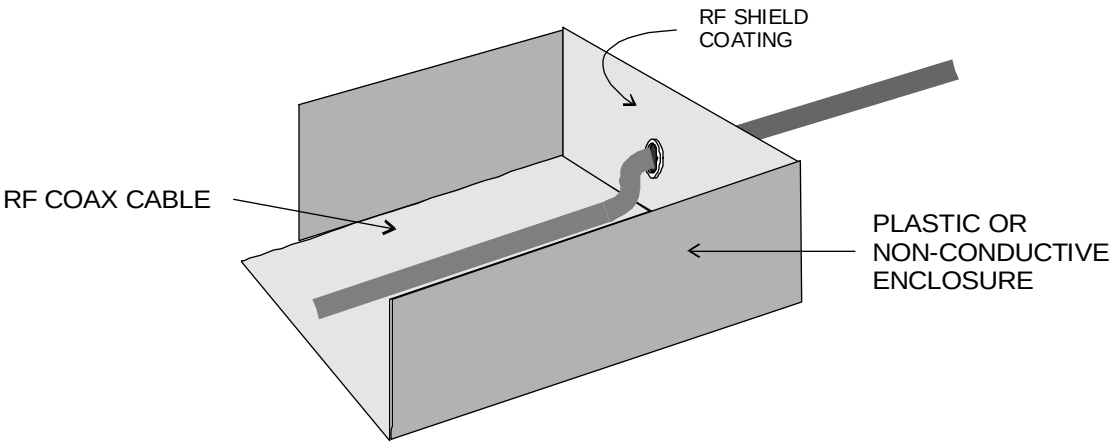
CMM UNIT MOUNTED
WITH INTERFACE
CONNECTOR ON TOP,
USING RIBBON CONNECTOR
CABLE FOR INTERFACE



CMM UNIT MOUNTED
UPSIDE DOWN WITH
FEMALE INTERFACE
CONNECTOR USED







ANTENNA PLACEMENT AND GROUND PLANE EXAMPLES

HARDWARE RESOURCES

The following are suggested hardware manufacturers providing various components of an application. The sources are kept as current as possible, but changes in the product line offered by the manufacturers occur often. Please contact them for their latest catalog to insure product availability.

Antennas

Company	Products offered	Telephone #
Ace Antenna Company	Fixed and portable antennas	818-718-1534
Antenna Specialist / Allen Telecom Group www.allentele.com	Mobile portable & base antennas	800-664-5274
Astron Antenna Co. www.astronantennas.com	Fixed, “DISC”, “Hemi” antennas	703-450-5517
Centurion International www.centurion.com	Fixed and portable antennas and batteries.	800-228-4563
MAXRAD www.maxrad.com/wirelessdata	Fixed and Mobile antennas	800-323-9122
TX/RX Systems Inc. www.txrx.com	Base antennas / Fixed antennas	716-549-4700

Batteries

Company	Products offered	Telephone #
Centurion International www.centurion.com	Fixed and portable antennas and batteries.	800-228-4563
Digi-Key Corporation www.digikey.com	Mounting hardware / connectors interface cables and components	800-344-4539

Cables

Company	Products offered	Telephone #
Richardson Electronics www.rfpowernet.com	RF connectors and cable assy’s	800-737-6937

Coatings (RF shielding)

Company	Products offered	Telephone #
Chomerics www.chomerics.com	EMI, RF Shielding gaskets, covers & spray	781-935-4850

Connectors

Company	Products offered	Telephone #
Digi-Key Corporation www.digikey.com	Mounting hardware / connectors interface cables and components	800-344-4539
Dynawave Incorporated www.dynawave.com	RF connectors (PCB mount + cable)	800-886-7786
Johnson Components www.johnsoncomp.com	RF connectors + hardware	800-247-8256
Richardson Electronics www.rfpowernet.com	RF connectors and cable assy's	800-737-6937
Samtec www.samtec.com	Headers (0.100") PCB inter-connection solutions.	800-726-8329

Cores (ferrite)

Company	Products offered	Telephone #
Digi-Key Corporation www.digikey.com	Ferrite core products	800-344-4539
Ferronics Incorporated www.ferronics.com	Ferrite beads	716-388-1020

Enclosures (shielded)

Company	Products offered	Telephone #
Compac Development Corp.	Shielded enclosures	516-585-3400
Leader Tech Inc.	Shielded enclosures	813-855-6921
Serpac Electronic Enclosures www.serpac.com	Plastic enclosures w/EMI	626-331-0517

Generators (see Service Monitors)

Power Convertors (DC-DC)

Company	Products offered	Telephone #
Allied Electronics, Inc. www.allied.avnet.com	Multi-source DC-DC converters	800-433-5700

Power Supplies

Company	Products offered	Telephone #
AstroDyne	Power Supplies	508-823-8080
Astron	Power Supplies	949-458-7277
Maxim Integrated Products www.maxin-ic.com	Power Supplies IC's	800-998-8800
Watkins-Johnson Co. www.wj.com	Power Supplies & Assy's	800-951-4401

Service Monitors (Cellular test sets)

Company	Products offered	Telephone #
Hewlett Packard www.hp.com	HP8920A, 8920B	800-452-4844
Grayson Wireless / Allen Telecom www.allentele.com	Cellscope (over the air monitoring)	216-349-8400

Solar Panels

Company	Products offered	Telephone #
Sunwize Technologies, Inc. www.sunwize.com	Solar panels, system components	800-817-6527

Miscellaneous

Company	Products offered	Telephone #
Black Box Corporation	Misc. Adapters, converters	800-321-0746
Global Engineering	EIA/TIA/IS-41.1-B, EIA/TIA-553	303-792-2181
Documents	Industry standards documents	
RAF Electronic Hardware http://www.rafhdwe.com	Stand-offs, chassis fasteners	203-888-2133