



# ***Integration Guide*** ***CRM4200/4250***

## ***Cellular Radio Module***

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

800-767-2831

**Cellular Modem Module****CRM4200/4250****Document Changes:**

<b>Date</b>	<b>Document Revision</b>	<b>Details</b>
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## 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 must 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 1.1310

47CFR Part 2.1091

Federal Communications Commission (FCC) Primary website:

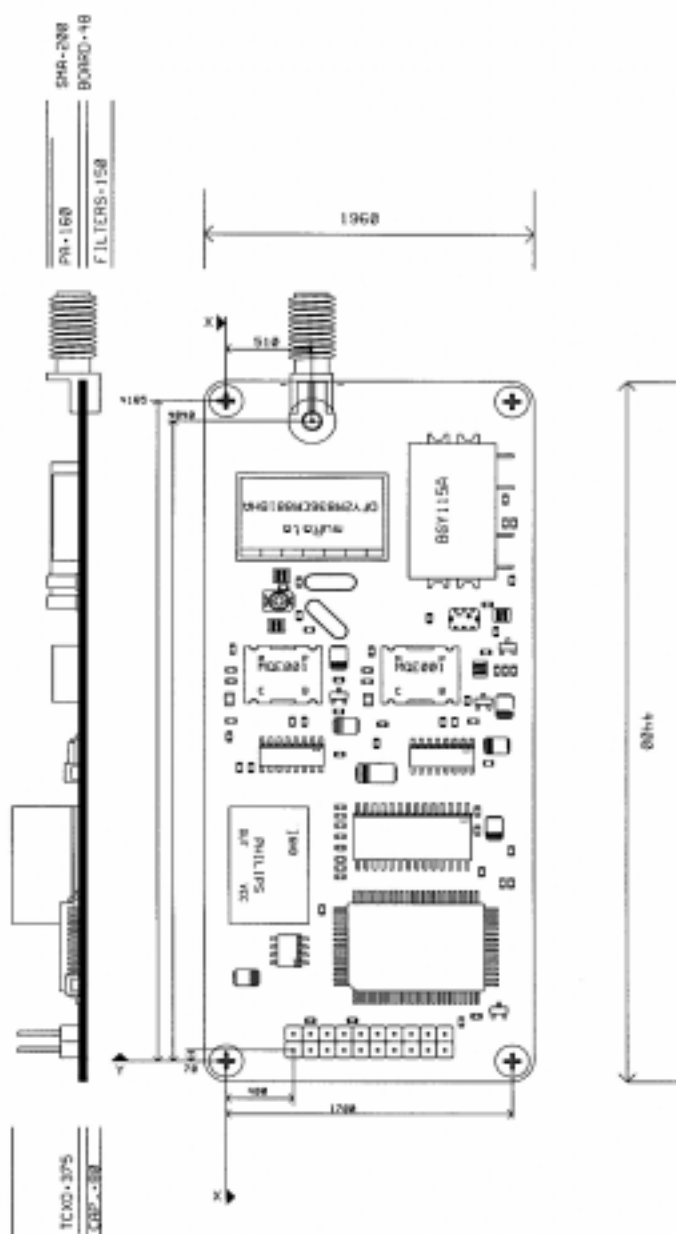
[www.fcc.gov](http://www.fcc.gov)

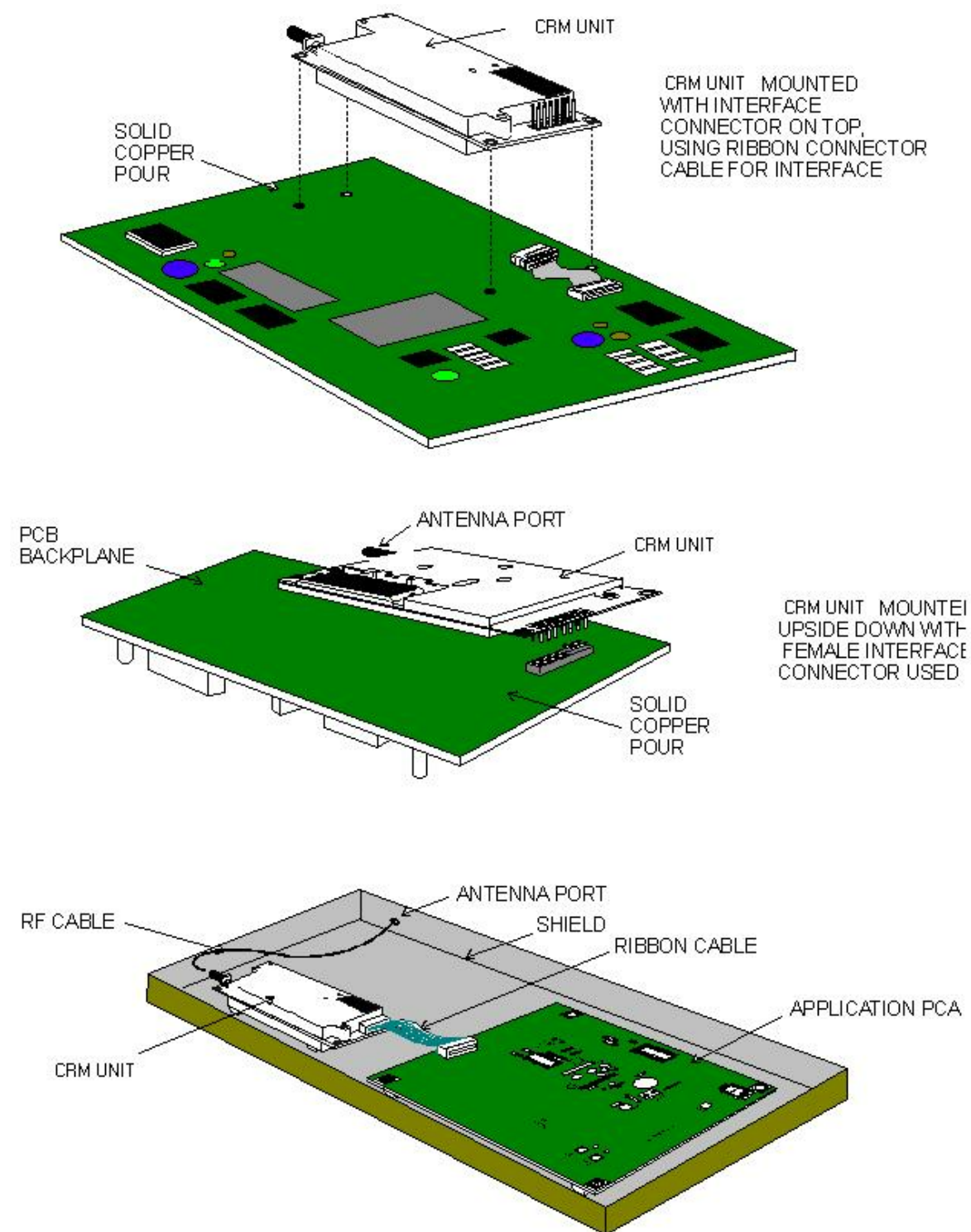
Federal Communications Commission Office of Engineering and Technology web site:

[www.fcc.gov/oet/rfsafety](http://www.fcc.gov/oet/rfsafety)

# INTEGRATION

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 CRM4200/4250.



**Cellular Modem Module****CRM4200/4250****Mounting Considerations**

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**ANTENNA SPECIFICATION**

Standard Communication has provided a Centurion (Model: EXE-821-SM) 2.5 dBi gain antenna with the kit. Only use this antenna with the module. (Please refer to statement below)

\* Centurion Antenna: Model: EXE-821-SM 2.5dBi gain

**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 above, 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 with a different antenna(s) is the responsibility of the OEM end-product manufacturer and will required a new MPE measurement.**

## **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.

# 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 <a href="http://www.allentele.com">www.allentele.com</a>	Mobile portable & base antennas	800-664-5274
Astron Antenna Co. <a href="http://www.astronantennas.com">www.astronantennas.com</a>	Fixed, "DISC", "Hemi" antennas	703-450-5517
Centurion International <a href="http://www.centurion.com">www.centurion.com</a>	Fixed and portable antennas and batteries.	800-228-4563
MAXRAD <a href="http://www.maxrad.com/wirelessdata">www.maxrad.com/wirelessdata</a>	Fixed and Mobile antennas	800-323-9122
TX/RX Systems Inc. <a href="http://www.txrx.com">www.txrx.com</a>	Base antennas / Fixed antennas	716-549-4700

## Batteries

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

## Cables

Company	Products offered	Telephone #
Richardson Electronics <a href="http://www.rfpower.net">www.rfpower.net</a>	RF connectors and cable assy's	800-737-6937



**Cellular Modem Module****CRM4200/4250****Coatings (RF shielding)**

Company	Products offered	Telephone #
Chomerics <a href="http://www.chomerics.com">www.chomerics.com</a>	EMI, RF Shielding gaskets, covers & spray	781-935-4850

**Connectors**

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

**Cores (ferrite)**

Company	Products offered	Telephone #
Digi-Key Corporation <a href="http://www.digikey.com">www.digikey.com</a>	Ferrite core products	800-344-4539
Ferronics Incorporated <a href="http://www.ferronics.com">www.ferronics.com</a>	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 <a href="http://www.serpac.com">www.serpac.com</a>	Plastic enclosures w/EMI	626-331-0517

**Cellular Modem Module****CRM4200/4250****Generators (see Service Monitors)****Power Converters (DC-DC)**

<b>Company</b>	<b>Products offered</b>	<b>Telephone #</b>
Allied Electronics, Inc. <a href="http://www.allied.avnet.com">www.allied.avnet.com</a>	Multi-source DC-DC converters	800-433-5700

**Power Supplies**

<b>Company</b>	<b>Products offered</b>	<b>Telephone #</b>
AstroDyne	Power Supplies	508-823-8080
Astron	Power Supplies	949-458-7277
Maxim Integrated Products <a href="http://www.maxin-ic.com">www.maxin-ic.com</a>	Power Supplies IC's	800-998-8800
Watkins-Johnson Co. <a href="http://www.wj.com">www.wj.com</a>	Power Supplies & Assy's	800-951-4401

**Service Monitors (Cellular test sets)**

<b>Company</b>	<b>Products offered</b>	<b>Telephone #</b>
Hewlett Packard <a href="http://www.hp.com">www.hp.com</a>	HP8920A, 8920B	800-452-4844
Grayson Wireless / Allen Telecom <a href="http://www.allentele.com">www.allentele.com</a>	Cellscope (over the air monitoring)	216-349-8400

**Solar Panels**

<b>Company</b>	<b>Products offered</b>	<b>Telephone #</b>
Sunwize Technologies, Inc. <a href="http://www.sunwize.com">www.sunwize.com</a>	Solar panels, system components	800-817-6527

**Miscellaneous**

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**CRM4200/4250**

<b>Company</b>	<b>Products offered</b>	<b>Telephone #</b>
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 <a href="http://www.rafhdwe.com">http://www.rafhdwe.com</a>	Stand-offs, chassis fasteners	203-888-2133