



MOTOROLA
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Motorola Wireless Networking Solutions Catalog



With more than 75 years of knowledge and experience, the name Motorola stands for the ultimate in wireless communications expertise. Highly regarded for its outstanding warranties, support and service, Motorola offers customer peace of mind.

Motorola Wireless Networking Solutions can offer Enterprise, Education, Healthcare, Security or Wireless Internet Service Provider organizations these benefits:

COST EFFECTIVE SOLUTION

Motorola Wireless Networking Solutions offer high-speed connectivity at a cost that is substantially less than wire lines – especially in difficult to reach areas that are cost-prohibitive to wire. Plus, you can reduce monthly recurring costs and delay/disruption of installing cable or T1 lines.

SECURE TRANSMISSIONS

Meet latest certifications for secure wireless transmissions

Wireless LAN:

- Wired Equivalent Protocol (WEP)
- IEEE 802.1x authentication compliant
- Wi-Fi Protected Access (WPA)
- Meets HIPAA requirements to protect privacy and security of patient data

Wireless WAN:

- Data Encryption Standard (DES)
- IEEE 802.3 compliant

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PRODUCTIVITY

Enable your staff or students to quickly access critical information (voice, video, data), as well as perform real time transaction processing.

CUSTOMER PEACE OF MIND

No one knows more about wireless communications than Motorola, and a successful wireless network installation requires the kind of expertise that is unique to our dealer network who have the technical "know how" to create wireless solutions customers can count on.



FLEXIBLE AND SECURE ACCESS SERVICES FOR CAMPUS ENVIRONMENTS, ENTERPRISES, AND HEALTHCARE ORGANIZATIONS

Motorola Wireless Networking Solutions can provide immediate, wireless data connectivity throughout university, business, or healthcare organizations. Its multi-standard wireless architecture allows easy migration of new wireless standards, deployed and managed as a single network. With no ongoing monthly charges and almost instantaneous installations, Motorola's new wireless products offer cost-effective solutions for virtually any size organization. Other benefits include:

- Low-cost deployment, simple set-up, and ease of maintenance.
- Support for advanced security, such as video surveillance of walkways for student protection, hall monitoring, and overall student protection on university campuses and in K-12 learning environments.
- Improved productivity with mobile network, Internet, and email inside buildings or around a campus.
- Hospital-wide transmission of bandwidth-intensive medical data and image files.
- Sharing of data and graphics across all locations.
- Internet access for employees and visitors without sacrificing network integrity.

Campus Environment (multiple buildings):

- SCHOOLS
- MEDICAL CENTER WITH MULTIPLE DOCTOR OFFICES
- CORPORATE HEADQUARTERS
- OFFICE PARK



Wireless LAN Products

Motorola WiAP-100

SINGLE-RADIO ENTERPRISE-CLASS ACCESS POINT AT A SMALL BUSINESS PRICE

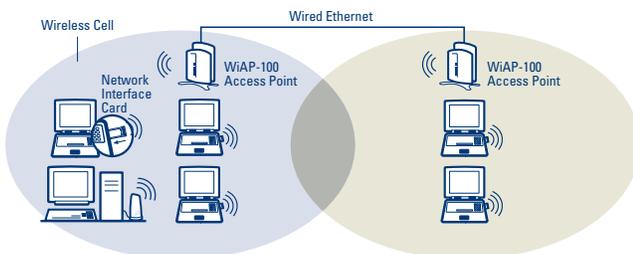
The Motorola WiAP-100 Access Point is a feature-rich Wi-Fi compliant Access Point solution that provides all the features and functionality of a high-end solution without the high-end price tag. The WiAP-100 Access Point is a single radio access point that provides highly secure 802.1x-based WLAN security with auto key management, using an efficient encryption key rotation scheme — available in 802.11g. For small and medium businesses, the WiAP-100 offers Radius-based access control, and all the performance, security and management features of enterprise-class solutions. The broad set of management options includes management via a web browser, delivering the flexibility and freedom of anytime, anywhere remote management.

Highly scalable and equipped with advanced processing power to support additional features in the future, the WiAP-100 Access Point offers the best protection for your investment.



APPLICATIONS

- Small and medium businesses or government offices
- K-12 educational institutions and non-profit organizations that require maximum mobility on a limited budget



Motorola WiAP-100 Specifications

PART NUMBER

RDH4291A

ADDITIONAL FEATURES

- 802.11g bridge
- EAP-TLS, EAP-MD5, EAP-TTLS
- Access control table and RADIUS Access Control implementation
- Telnet/CLI (embedded in the box)
- HTTP server for web-based management
- Remote link test
- Load balancing (.11b only)
- Spanning tree protocol
- Multicast/broadcast storm filtering
- ICMP (ping)
- AP density setting for capacity optimization (incl. Ultra High Density) (.11b only)
- Packet forwarding to specified MAC address
- Radius session time out
- Syslog
- 802.11a 2X mode (when allowed in region)
- 802.1x support (auto key management, user-based authentication)
- Auto key rotation
- SNMPv2c
- Extended MIBs and traps
- TFTP kernel and configuration upload
- Support for Wireless Network Manager
- Wireless Distribution System (.11b only)
- Link Integrity
- Static MAC filtering
- Protocol filtering
- DHCP support (client and server)
- Remote link test (.11b only)
- Automatic Channel Selection
- Blocking of intra-cell traffic
- Radius accounting start/stop
- Radius authentication attributes (per RFC 2865)

HARDWARE SPECIFICATION

PROCESSOR	Motorola 8241 – 166MHz
MEMORY	16 MB SDRAM 8 MB Flash

MECHANICAL SPECIFICATION

metal processing unit	mechanical lock	plastic cover, including wall mount facility
reset/reload switch	foot for table or ceiling mount	

INTERFACE

ETHERNET INTERFACE	10/100 base-T Ethernet (RJ-45)
WIRELESS INTERFACE	1 internal mPCI slot for radio NIC
RS-232	9 pin D-Shell female (unit configuration)
EXTERNAL ANTENNA CONNECTOR (for 802.11b and g units)	proprietary

PHYSICAL SPECIFICATIONS

DIMENSIONS UNIT (H X W X L)	215 mm x 175 mm x 40 mm	(8.46 in. x 6.89 in. x 1.57 in.)
WEIGHT (W/O BASE)	0.68 kg (1.5 lb.)	

ENVIRONMENTAL SPECIFICATIONS

OPERATING	0°C - 55°C	
	max 95% rel. humidity (non-condensing)	740 – 1050 hPa barometric pressure
STORAGE	-20°C - 75°C	max 95% rel. humidity (non-condensing)

POWER SUPPLY

WALL UNIT	autosensing 100/240 VAC; 50/60 Hz
OUTPUT 12V DC 1.5A	Active Ethernet (PoE) (802.3af)

RADIO

EMBEDDED MPCPI MODULE	802.11b or 802.11g
ANTENNA	embedded omni directional antenna set; external antenna connectors of WiAP-100

COMPLIANCE

US	FCC, UL, CE, Wi-Fi
CANADA	Industry Canada (IC)
Plenum rated (UL 2043) without plastic cover	

RELATED PRODUCTS

Works with ORiNOCO 802.11 a/b/g Network Interface Cards (NIC) and ORiNOCO 802.11 b/g Network Interface Cards (NIC) also available through Motorola.

Wireless LAN Products

Motorola WiAP-220

BROADBAND WIRELESS NETWORKING FOR ENTERPRISES AND PUBLIC HOTSPOTS

The Motorola WiAP-220 Access Point is an all-in-one wireless access point and access gateway, specifically designed for public hotspot providers and enterprises. It enables enterprises to offer corporate visitors immediate wireless network access regardless of their existing network or ISP settings. Dynamic address translation (DAT™) automatically maps local PC settings, saving visitors from having to temporarily change the settings on their PCs.

For public hotspots, the Motorola WiAP-220 Access Point delivers seamless connectivity, high security, flexibility and standards-based authentication and billing systems support. Eliminating the need to purchase separate gateways and access points, it significantly cuts hardware and installation costs for both venue owners and service providers. The Motorola WiAP-220 authenticates users based on various methods and allows for seamless roaming between hotspots. Standards-based Radius Authentication, Authorization and Accounting (AAA) attributes easily tie into billing systems, allow on-the-spot customer acquisition, and support varied service offerings, such as pay-per-use or fixed fee subscriptions. Offering various levels of security, the Motorola WiAP-220 has all the capabilities you need to help prevent eavesdropping between stations and to allow subscribers to set up secure Virtual Private Network (VPN) connections.

APPLICATIONS

- Carriers and Wireless Service Providers: expand customer base, extend network reach, penetrate new markets, increase Average Revenue Per User (ARPU)
- Public venues (restaurants, hotels, chain stores, etc.): increase revenues, capitalize on unique selling proposition of diversified WLAN services
- Enterprises: enable visitors to wirelessly connect to their own VPN and the Internet



Motorola WiAP-220 Specifications

PART NUMBER

RDH4292A

WIRELESS

802.11a support	50 users per radio	
802.11b support	250 users per radio	
Interference robustness	Monitoring Wi-Fi station status	
Fragmentation	Power Management support	Auto Channel Selection
Link test responder	Wireless Distribution System	AP list in Client Manager
Remote link test	Cell density settings (Ultra high, High, Medium, Low)	

NETWORKING

DHCP Client & Server	Access Control table	VLAN (2 user segments)
802.1d bridging	Network Protocol filtering	ICMP Echo response

CONFIGURATION

Remote Administration	TFTP	SNMP IP Access List
Secure Administration	SNMP v1 & V2c	Syslog
Telnet CLI	SNMP Traps	
MIB-II, Bridge MIB, Ethernet MIB, ORiNOCO MIB, 802.11 MIB, Nomadix MIB		

SECURITY

WEP	Transparent connectivity	E-mail redirection
WEP Plus – Weak key avoidance	Dynamic Address Translation	DNS redirection
Intracell traffic blocking	Transparent HTTP Proxy	Microsoft Netmeeting Support
Closed system	PPTP Support	Microsoft Netmeeting Support
VPN Passthrough for IP Sec and PPTP	IP Sec Shared Key Authentication	SMTP redirect

AUTHENTICATION AND BILLING

Authentication based on universal access method, Smart Client (iPass, GRIC, Boingo)		
HTTPS and SSL Support	Dynamic Billing Selection	Radius AAA Client
AAA Passthrough Port	XML Support	Radius Portal Redirect
Cookie Placement	Billing Records “Mirroring”	Automatic User Tracking, Billing and Security
Credit Card Billing	Authorized subscribers (Trusted users)	Specify Radius by host name using DNS

LOCAL SERVICE PRESENTATION

Information and Control Console (ICC)	Home Page Redirection	Selective Access Control (Walled Garden)
IP Upsell	URL Filtering	Connection Screen and Partner Image
Flexible Screen Size and JAVA Detect	Internal Web Server (IWS)	External Web server (EWS)

COMPLIANCE

US	FCC, UL, CE, Wi-Fi
CANADA	Industry Canada (IC)
Plenum rated (UL 2043) without plastic cover	

RELATED PRODUCTS

Works with ORiNOCO 802.11 a/b/g Network Interface Cards (NIC) and ORiNOCO 802.11 b/g Network Interface Cards (NIC) also available through Motorola.

Wireless LAN Products

ORiNOCO® Network Interface Cards

SIMPLE, CONVENIENT AND SECURE WIRELESS LAN CONNECTIVITY FOR EVERY NETWORK

ORiNOCO Network Interface Cards (NICs) deliver the utmost in mobile convenience and performance, so that you can move easily between 802.11 networks at work, home, and in public spaces. Fully compliant with all 802.11 standards, the NICs deliver proven high performance for a broad range of applications and host computer systems. The NICs provide throughput five times higher than 802.11b, which speeds network response times and supports bandwidth-intensive applications. Just plug the NIC into the Cardbus slot of your notebook computer and you have everything you need for maximum wireless productivity in an enterprise, public building or at home.

AVAILABLE IN 2 VERSIONS:

The 802.11 b/g NIC gives you the flexibility to connect to any 802.11b or 802.11g wireless network. The 802.11 a/b/g ComboCard protects your network investment by allowing you to deploy and simultaneously support new higher speed 802.11a and 802.11g infrastructure within legacy 802.11b networks.

The ORiNOCO NIC provides multiple security levels, with encryption up to 152-bit WEP and 802.1x authentication for enterprise-class security. Available in b/g and a/b/g, the NICs include an easy-to-use utility for quick, simple connection. Both versions are shipped hardware-ready for upgrade to Wi-Fi Protected Access (WPA) security.

APPLICATIONS

- Small/medium business, enterprises: improve productivity with mobile network, Internet, and email inside buildings, around campus
- Education: flexible, immediate, mobile faculty and student connectivity in dorms, classrooms, offices
- Quick network build-out for new employees
- Healthcare: hospital-wide transmission of bandwidth-intensive medical data and image files



ORiNOCO Network Interface Card Specifications

	ORiNOCO 802.11a/b/g ComboCard	ORiNOCO 802.11b/g ComboCard		
PART NUMBER	RDH4294A	RDH4295A		
INTERFACE				
	CardBus Card (32-bit) Type II PC Card			
RADIO CHARACTERISTICS				
FREQUENCY	2400-2484; 5150-5250; 5250-5350; 5725-5850 MHz	2400-2484 MHz		
MODULATION TECHNIQUES	802.11a			
	802.11g Orthogonal Frequency Division Modulation (64 QAM, 16 QAM, QPSK, BPSK)	802.11g Orthogonal Frequency Division Modulation (64 QAM, 16 QAM, QPSK, BPSK)		
	802.11b Direct Sequence Spread Spectrum (CCK, DQPSK, DBPSK)	802.11b Direct Sequence Spread Spectrum (CCK, DQPSK, DBPSK)		
MEDIA ACCESS PROTOCOL	CSMA/CA (Collision Avoidance) with ACK			
MAXIMUM OUTPUT POWER	802.11a			
	802.11g: 60 mW EIRP	802.11g: 60 mW EIRP		
	802.11b: 85 mW EIRP	802.11b: 85 mW EIRP		
DATA SPEEDS (Automatic fallback for extended range)	802.11a			
	802.11g modes: 54, 48, 36, 24, 18, 12, 9, 6 Mbps	802.11g modes: 54, 48, 36, 24, 18, 12, 9, 6 Mbps		
	802.11b mode: 11, 5.5, 2, 1 Mbps	802.11b mode: 11, 5.5, 2, 1 Mbps		
	2X mode: 108, 96, 72, 48, 36, 24, 18, 12 Mbps			
POWER CONSUMPTION	802.11a: Tx – 520 mA, Rx – 310 mA			
	802.11b, 802.11g: Tx – 600 mA, Rx – 330 mA	802.11b, 802.11g: Tx – 600 mA, Rx – 330 mA		
PHYSICAL SPECIFICATIONS				
DIMENSIONS	121.75 mm X 54 mm X 5 mm (PC Card)			
WEIGHT	55 grams			
ENVIRONMENTAL SPECIFICATIONS				
	Temperature (Ambient)	Humidity	Temperature (Ambient)	Humidity
Operating	0 to 55° C	90% (non-condensing)	0 to 55° C	90% (non-condensing)
Storage	-10 to 75° C	95% (non-condensing)	-10 to 75° C	95% (non-condensing)
PC CARD SPECIFICATIONS				
TYPE II CARDBUS	32-bit interface			
POWER SUPPLY VOLTAGE	3.3 VDC from host (+/-0.2V)			
LEDS				
2 LEDS	Power & Network Activity			
OPERATING SYSTEMS				
	Windows 98 SE, 2000, Me, XP			
SECURITY				
802.1X SUPPORT	EAP – TLS, TTLS, MD5, PEAP, LEAP			
	GOLD 152/128/64-bit WEP for 802.11a 128/64-bit WEP for 802.11b/g	SILVER 128/64-bit WEP for 802.11b/g		
PACKAGE CONTENTS				
	• CardBus Card			
	• Getting Started Guide			
	• CD-ROM with drivers, installation and configuration utility.			
RELATED PRODUCTS				
	Work with Motorola WiAP-100 and WiAP-220 Access Points also available through Motorola.			

Wireless WAN Products

Motorola Canopy™ Wireless Broadband System

(Can be configured for either Point-to-Point or Point-to-Multipoint)

A Canopy™ System is based on a wireless broadband technology that provides for high-speed Internet access and was designed to provide cost-effective, “last-mile” high speed data access for customers who previously were underserved or lived in locations where infrastructure is non-existent. The Canopy system uses Point-to-Point and Point-to-Multipoint networks that can span distances ranging from two to 10 miles in a multipoint configuration, to as many as 35 miles in a Point-to-Point configuration.* The basic building blocks of a Canopy system are:

- Access Point (AP) easily interfaces with your existing Local Area Network (LAN).
- Backhaul Unit (BH) provides Internet “feed” from a remote location.
- Subscriber Module (SM), the Internet access receiver, is small and easy to install — there’s no obtrusive equipment.

The Access Point and Subscriber Modules are compact and are designed to be mounted outdoors, so there is no need to run overhead and in-ground wire or microwave. And there’s no additional software for you to install, further limiting exposure to error.

The Canopy solution also delivers outstanding performance using a modulation scheme that improves the quality of data delivery and mitigates interference from other systems. Motorola’s Canopy platform offers security with over-the-air encryption that scrambles data bits and helps prevent interception, so data delivery with the Canopy solution is very reliable.

- Point-to-point configuration** up to 10-35 miles at 6-14 Mbps
- Point-to-multipoint configuration** up to 2-10 miles at 4 Mbps

*Motorola Canopy™ Wireless Broadband System 5.7 GHz backhaul with reflector kit

** At time of order product will be configured to user specifications



Motorola Canopy™ Wireless Broadband System Specifications

	CANOPY ACCESS POINT	CANOPY SUBSCRIBER MODULE	CANOPY BACKHAUL MODULE
PART NUMBER	HK1023A 5.2 GHz HK1025A 5.7 GHz	HK1022A 5.2 GHz HK1024A 5.7 GHz HK1028A with reflector kit, 5.7 GHz	HK1035A 5.2 GHz HK1026A 10 Mbps, with reflector kit, 5.7 GHz HK1036A 20 Mbps, with reflector kit, 5.7 GHz
Operating Frequency Range U-NII Mid band	5.2 GHz Access Point: 5.25 to 5.35 GHz; 5.7 GHz Access Point: 5.725 to 5.825 GHz	5.2 GHz Subscriber Module: 5.25 to 5.35 GHz; 5.7 GHz Subscriber Module: 5.725 to 5.825 GHz	5.2 GHz Backhaul Module: 5.25 to 5.35 GHz; 5.7 GHz Backhaul Module: 5.725 to 5.825 GHz
Access Method	TDD/TDMA	TDD/TDMA	TDD/TDMA
Signaling Rate	10 Mbps	10 Mbps	10 Mbps/ 20 Mbps(5.7 GHz only)
Modulation Type	High Index BFSK (Optimized for interference rejection)	High Index BFSK (Optimized for interference rejection)	High Index BFSK (Optimized for interference rejection)
Carrier to Interference	3dB 10 ⁻⁴ BER @ -65 dBm	3dB 10 ⁻⁴ BER @ -65 dBm	3dB 10 ⁻⁴ BER @ -65 dBm
Receiver Sensitivity	-83dBm 10 ⁻⁴ BER	-83dBm 10 ⁻⁴ BER	-83dBm 10 ⁻⁴ BER
Operating Range	Up to 2 miles with integrated antenna in the 5.2 GHz band. Up to 10 miles with passive reflector in the 5.7 GHz band.	Up to 2 miles with integrated antenna in the 5.2 GHz band. Up to 10 miles with passive reflector in the 5.7 GHz band.	Up to 2 miles with integrated antenna in the 5.2 GHz band. Up to 35 miles with passive reflector in the 5.7 GHz band.
Transmitter Power	Meets FCC UNII ERP limit	Meets FCC UNII ERP limit	Meets FCC UNII ERP limit
DC Power	24 VDC @ 0.3 Amp (active state)	24 VDC @ 0.3 Amp (active state)	24 VDC @ 0.3 Amp (active state)
Interface	10/100 Base T, half/full duplex Rate auto negotiated (802.3 compliant)	10/100 Base T, half/full duplex Rate auto negotiated (802.3 compliant)	10/100 Base T, half/full duplex Rate auto negotiated (802.3 compliant)
Protocols Supported by CANOPY		Switched Layer 2 Transport with support for all common Ethernet protocols including IPV6, NetBIOS, DHCP, IPX, etc.	Switched Layer 2 Transport with support for all common Ethernet protocols including IPV6, NetBIOS, DHCP, IPX, etc.
Protocols Used by CANOPY	IPV4, UDP, TCP, ICMP, Telnet, HTTP, FTP, SNMP	IPV4, UDP, TCP, ICMP, Telnet, HTTP, FTP, SNMP	IPV4, UDP, TCP, ICMP, Telnet, HTTP, FTP, SNMP
Software Upgrade Path	Remotely downloaded into FLASH via RF link	Remotely downloaded into FLASH via RF link	Remotely downloaded into FLASH via RF link
Network Management	HTTP, TELNET, FTP, SNMP	HTTP, TELNET, FTP, SNMP	HTTP, TELNET, FTP, SNMP
Wind	190 km/hr (118 miles/hr)	190 km/hr (118 miles/hr)	190 km/hr (118 miles/hr)
Operating Temperature	-40°C to +55°C (-40°F to +131°F)	-40°C to +55°C (-40°F to +131°F)	-40°C to +55°C (-40°F to +131°F)
Weight	1 lb. (.45kg)	1 lb. (.45kg)	1 lb. (.45kg). Weight with Passive Reflector (5.7 GHz only) 6.5 lbs. (3kg)
Dimensions	11.75" H x 3.4" W x 3.4"D (29.9 cm H x 8.6 cm W x 8.6 cm D)	11.75" H x 3.4" W x 3.4"D (29.9 cm H x 8.6 cm W x 8.6 cm D)	11.75" H x 3.4" W x 3.4"D (29.9 cm H x 8.6 cm W x 8.6 cm D)

Wireless WAN Products

Motorola Canopy™ Wireless Broadband System Specifications

Canopy Cluster Management Module	
PART NUMBER	HK1029A
Limits or Conditions	
Max length any one radio can be from Cluster Management Module	328 cable feet (100 Meters)
Max length from Cluster Management Module to GPS antenna	100 cable feet (30.5 Meters)
Dimensions	17.00" H x 12.88" W x 6.50" D (43.18 cm H x 32.72 cm W x 16.51 cm D)
Weight	25.0 lbs. (11.3 kg)
Operating Temperature Overall	-40°F to +131°F (-40°C to +55°C) Meets CE IP44 according to EN60529:2000
AC Power	
Limits or Conditions	
AC input voltage	100 V – 240 V ~, 0.7 A – 0.35 A. Note: Applying 230 V to a unit, which set to 115V, may damage the unit
AC frequency	50Hz to 60Hz
AC input power	Nominal 66 watts, max 92 watts with 8 modules connected to the CMM at max cable length
24 VDC Power Supply	
Limits or Conditions	
Input Voltage	17 to 32 VDC, measured at CMM
Input Power	Nominal 60 watts. Maximum 84 watts with 8 modules connected to the CMM at maximum cable length. 9 A in rush upon startup.
Use Note	If using a typical "24V +/-5%" power supply, ensure that CMM is within 400 cable feet (120M) of the power supply. Minimum 12 AWG copper wire.
12 VDC Power Supply	
Limits or Conditions	
Input Voltage	11.5 to 32 VDC, measured at CMM
Use Note	If using a 12 V power source (typically an automobile battery in a test or emergency situation), use 12 AWG (4mm ²) wire between the power supply and the CMM, ensure that the CMM is within 10 cable feet (3m) of the power supply, and ensure the modules are within 20 cable feet (6 m) of the CMM.
Cable Specifications	
Limits or Conditions	
Ethernet, GPS sync, and GPS coax Cables	The use of cables that conform to the operational temperature of the product, as well as being UV light protected, is mandatory.

Motorola Canopy™ Wireless Broadband System Accessories*

	PART NUMBER
Reflector Hardware Kit	RDN9720A
Universal Mounting Bracket	RDN9721A
110 VAC Single XCVR Power Supply	RDN9722A
220 VAC Single XCVR Power Supply	RDN9723A
Ethernet Surge Suppressor	RDH4208A
CAT5 Cable Tester	RDN9811A
8-Port Ethernet & Power Surge Suppressor (NEMA enclosure)	RRDN4115A
8-Port GPS Surge Suppressor (NEMA Enclosure)	RRDN4114A
Audio Alignment Headset	RLN5635A

* Not required for all configurations. See your Motorola representative to determine the solution that's right for your organization.

CANOPY SURGE SUPPRESSOR	
Dimensions	H 5.2" x W 5.0" x D 1.7" H (H 132 mm x W 127 mm x D 43.2 mm)
Space between mounting holes	4.25" (108 mm)
Size of knockouts	.75" (19 mm)
Weight	.4 lbs (180 g)
Operating Temperature	-40°C to +55°C (-40°F to 131°F)
Internal Connectors	RJ45
Capacity	1500J peak pulse energy dissipation with 10/10000 us waveform



Wireless WAN Products

Motorola Wireless Ethernet Bridges MODELS WiB-20 AND WiB-60

THE FASTEST, EASIEST WAY TO BUILDING-TO-BUILDING CONNECTIVITY

Offering ease-of-installation, the Motorola Wireless Ethernet Bridges (models WiB-60 and WiB-20) are faster, easier, and more cost-effective alternatives to leased lines and 802.11b bridges — providing toll-quality outdoor connectivity between buildings at distances of up to six miles.

At 18 Mbps, Motorola Wireless Ethernet Bridges provide data connectivity at nearly four times the actual throughput of comparably priced 802.11b bridging solutions. The Motorola WiB-60 can be set for an aggregate throughput of 54 Mbps for even higher speed!

At the same time, Motorola Wireless Ethernet Bridges are wireless and license-free, so you can get connected without delay.

FASTER RETURN ON INVESTMENT THAN LEASED LINES

Motorola Wireless Ethernet Bridges greatly reduce the installation costs and recurring fees associated with standard T1 lines. As a leased-line replacement for a single T1, it pays for itself in about a year. Payback period can further be reduced to less than 2 months when replacing multiple leased lines.

PRODUCT HIGHLIGHTS

Fast and Easy to Deploy

- Streamlined design minimizes deployment costs
- Kit includes all cables and hardware for out-of-the-box installation
- Audible tone for aiding antenna alignment

Rapid Return on Investment

- Rapid, easy deployment enables quick service activation at reduced costs
- High-capacity connection enables fast network traffic to deliver new service offerings

Point-to-Point Configuration

- Up to 3 miles at 54 Mbps (WiB-60)
- Up to 6 miles at 18 Mbps (WiB-20 or WiB-60)



Motorola Wireless Ethernet Bridge Specifications

	WiB-60			WiB-20
PART NUMBER	RDH4290A			RDH4289A
SYSTEM				
Frequency	5.725-5.825 GHz			
Data Speed (Aggregate Throughput)	(user selectable)			
	54 Mbps (27 Mbps each direction)	36 Mbps (18 Mbps each direction)	18 Mbps (9 Mbps each direction)	18 Mbps (9 Mbps each direction)
Threshold	-77dBm	-81 dBm	-89 dBm	-89 dBm
System Gain	133 dB	137 dB	145 dB	145 dB
Maximum Distance (Line of Sight)	up to 5 Km (3 miles)	up to 6 Km (4 miles)	up to 10 Km (6 miles)	Up to 10 Km (6 miles)
Maximum Output Power	+36 dBm			
Transmit Output Power	+16 dBm max; +15 dBm typical			
Antenna	Integrated LHCP; 20dBi, 10° azimuth by 10° elevation			
Maximum Receive Level	-20 dBm error free			
Latency	2.5 msec typical, 5 msec maximum			
Access Protocol	Time Division Duplex			
Modulation Technique	16 QAM - QPSK, with equalization and FEC			QPSK with equalization and FEC
Security Key	16 Character Security ID (Alphanumeric), authentication and PN transmission scrambling			
INTERFACE				
Ethernet Interface	10/100 base-T Ethernet (RJ-45) via AC power adapter			
MANAGEMENT				
Local, Remote Access	Java-based GUI for discovery, status, and configuration Software Upgradeable Over-the-air reprogramming			
Security	2-level password access			
ENVIRONMENTAL SPECIFICATIONS				
Operational Temperature	-33° to 55° C			
Storage Temperature	-55° to 85° C			
Humidity	5-100% condensing			
Altitude	up to 10,000 ft			
Wind Loading	115 mph			
POWER SUPPLY				
AC Power	Adapter included, 110 VAC or 220 VAC, 450 mA Output; 28 V DC, 0.6 Amp			
DC Power (to unit)	+18 to +28 V DC			
Power connector	Power over Ethernet (CAT5; RJ-45)			
PHYSICAL SPECIFICATIONS				
Dimensions (H X W X L)	26.5 x 26.5 x 14.4 cm (10.5" x 10.5" x 7")			
Mounting (Installation) Pole Mount	3.08 – 6.98 cm (1.5-2.75") O.D. [hardware included for 4.4 cm (1.75") O.D.]			
Weight	4.5 kg (10 lbs)			
COMPLIANCE				
US	UL, CE			FCC Part 15.247 ISM;
Canada	FCC Part 15.407 U-NII, 15.247 ISM			FCC Part 15.247 ISM;
Data Interface	IC RSS 210			
	IEEE 802.3			

PACKAGE CONTENTS

2 Motorola Wireless Ethernet Bridge Radio Units
 2 sets mounting hardware
 2 power adapters
 2 sets 50 meter CAT5 cable
 2 sets user documentation & utilities on CD-Rom

Works with Motorola WiAP-100 and WiAP-220 Access Points also available through Motorola.

Video Servers and Routers

Vanguard® RemoteVU Guardian provides the features of a video surveillance tool and the intelligence of a network access device all in one. It enables your organization to connect analog security cameras to a wireless LAN or WAN to receive and store real-time critical visual information. This wireless solution allows you to connect remote sites which were previously too expensive to network with wires or impossible to reach without running miles of cable underground. And because RemoteVU Guardian allows security professionals to monitor from a central location, they can cover more locations without increasing patrols, coverage hours or the budget required for both. Critical remote sites, such as parking lots and off-campus locations which have previously been impossible to secure without a physical presence are now instantly connected.

Utilizing the Vanguard® 340 series or Vanguard® 6400 series of routers along with RemoteVU Guardian, you can integrate and manage multiple surveillance technologies including video, voice, and data applications. If your organization is looking for a video solution and also wants to converge voice, data or both on the same network, then this wireless solution can save your business thousands of dollars.

The Vanguard 6400 series router is ideal for medium-size enterprise branch offices. With its ability to support multi-service access, flexible LAN and WAN connectivity, a variety of security options and high performance processors, the Vanguard 6400 series offers enterprise customers a complete networking solution while allowing for future growth of their network without any large investments or major upgrades. Plus, the Vanguard 6400 Series is the best value in the industry to reduce branch networking costs for: integrated packet Voice over IP, Voice over Frame Relay, Fax, Digital Video, LAN routing, and legacy data support.

The Vanguard 340 series router is a next generation IP/VPN platform targeted at small/medium enterprise customers. With its modular and flexible architecture, the Vanguard 340 series router provides a cost-effective ebusiness platform for enterprise customers to integrate data/voice/video/fax traffic over one network, thus reducing their overall Wide Area Networking (WAN) costs.



Vanguard 340 Series Specifications

PART NUMBER **RRDN4205A** Vanguard 340 Worldwide Base Unit, 16 MB SDRAM, 1-10/100BaseT, 1-Serial port

RRDN4162A Vanguard 342 Worldwide Base Unit, 32 MB SDRAM, 2-10/100BaseT, 1-Serial port

HARDWARE SPECIFICATIONS	POWER SUPPLY
Compact desktop design with 2 expansion slots	100-240 VAC, 60/50Hz, 1.1A-0.6A amps, 50-Watts external
1 10/100BaseT auto-sensing ethernet port	ENVIRONMENTAL
1 universal serial port, software selectable user interface for V.24, V.35, V.36, V.11, supports synchronous speeds up to 2.048 Mbps (E1) or asynchronous speeds up to 115.2Kbps	Storage Temperature: -40 to 158 °F (-40 °to 70 °C)
1 RS-232 management port with easy-to-use menu	Operating Temperature: 32 °to 104 °F (0 °to 40 °C)
860T PowerPC RISC processor	Relative Humidity: 5% to 90%, non-condensing
16MB S-DRAM (Upgradeable to 32MB)	REGULATORY COMPLIANCE
4MB of non-volatile flash,upgradable to 8MB with alternate flash bank	<u>Safety Certifications:</u> UL1950 3rd Edition, CAN/CSA C22.2 No. 950-95, EN60950 Amendment 11, IEC60950 2nd Edition Amendment 4
Rear removable/loadable motherboard	<u>EMC Certifications:</u> FCC Part 15 Class A, CISPR 22 Class A, AS/NZS 3548 Class A, EN55022:1997 Class A, EN50082-1 (EN55024)
High MTBF external power supply	<u>Telecom Certifications:</u> FCC Part 68, Industry Canada CS-03, CTR-2, CTR-4, CTR-12, CTR-13, JATE, TS-014, TS-016, TS0-38
Auxiliary cooling fan	
Optional data compression and encryption SIMM	
PHYSICAL DIMENSIONS	
Height: 2.6in (6.6cm)	
Width: 7.7in (19.6cm)	
Depth: 12.3in (31.3cm)	
Weight: 7.05lbs unloaded, 7.65lbs fully loaded	

Vanguard 6400 Series Specifications

PART NUMBER	RRDN4206A Vanguard 6435 Base Unit, 32 MB SDRAM, 4 MB Flash
	RRDN4207A Vanguard 6435 Base Unit, -48VDC Power, 32 MB SDRAM, 4 MB Flash
	RRDN4208A Vanguard 6455 Base Unit, 32 MB SDRAM, 32 MB SDRAM, 4 MB Flash
	RRDN4209A Vanguard 6455 Base Unit, -48VDC Power, 32 MB SDRAM, 4 MB Flash

HARDWARE SPECIFICATIONS VANGUARD 6400 PLATFORM BASE SYSTEM

Vanguard 6435

Compact, desktop, 3 expansion slots, 2 slots can be used for Enhanced Daughter Cards for high bandwidth applications

Vanguard 6455

Desktop, or rack-mount (optional 19" rack-mount hardware kit), 5 expansion slots, 2 slots can be used for Enhanced Daughter Cards for high bandwidth applications, rear loadable motherboard, rear loadable option cards

1 RS232 Management Port with easy-to-use menu system

1 RS232 port (300 bps to 115Kbps)

2 High Speed Serial Ports (up to 2.048Mbps)

V.35, V.36, V.24 and V.11 DB25 interfaces

Ethernet LAN motherboard port with 10BaseT support

High MTBF power supply

Auxiliary cooling fan

860 PowerPC RISC-processor and three 68302 processors

4MB of non-volatile onboard Flash

16 or 32MB of SDRAM SIMM

Platform Options

56Kbps DSU

Serial daughter card (V.36, V.35, V.11, V.24)

FT1/FE1 CSU/DSU daughter card

ISDN BRI Data — (2B+D), S/T & U interfaces

ISDN BRI Digital voice

Dual or Quad port FXS analog voice

Dual port E&M analog voice

Single port FXS/FXO analog voice

Quad FXO analog voice

V.34 modem card

10/100BaseT auto-sensing Enhanced Daughter Card

DS1/E1 ATM Enhanced Daughter Card

Flash expansion with upgradeable alternate bank of 8MB

Encryption SIMM

Data compression SIMM

6455 High Performance Interface Options

1 port Token Ring

4 port serial option card with high performance serial data interfaces (V.36, V.35, V.11, V.24)

T1/E1 Channelized Data/Voice over IP Convergence Card (up to 48 T1 and 60 E1 digital voice channels)

Physical Environment

Operating temperature: 32° to 104°F (0° to 40°C)

Storage temperature: -40 to 158°F (-40° to 70°C)

Relative humidity: 5% to 90% (non-condensing)

Power Requirements

90 to 264Vac

47 to 63Hz

Dimensions

6435/55 Height: 1.75in (4.43cm)

6455 Width: 17.5in (44.3cm)

6435 Width: 12.5in (31.8cm)

6435/55 Depth: 15.5in (39.2cm)

Regulatory Compliance

Safety Certifications: UL1950 3rd Edition, CAN/CSA C22.2 No.950-95, EN60950 Amendment 11, IEC60950 2nd Edition Amendment 4

EMC Certifications: FCC Part 15 Class A, CISPR 22 Class A, AS/NZS 3548 Class A, EN55022:1997 Class A, EN50082-1 (EN55024)

Telecom Certifications: FCC Part 68, Industry Canada CS-03, CTR-2, CTR-4, CTR-12, CTR-13, JATE, TS-014, TS-016, TS0-38

Vanguard Remote VU Guardian Specifications

PART NUMBER	RRDN4081A RemoteVU Guardian, 80 GB Hard Drive, 8 Port
	RRDN4455A RemoteVU Guardian, 137 GB Hard Drive, 8 Port
	RRDN4454A RemoteVU Guardian, 80 GB Hard Drive, 4 Port

FEATURES	BENEFITS
Complete Web-Based Interface <i>(Works best with Microsoft Internet Explorer 5.0)</i>	<ul style="list-style-type: none"> All RemoteVU Guardian software is web browser-based and does not require proprietary PC software.
H.263 Compression	<ul style="list-style-type: none"> You can use any browser to start viewing your remote sites from anywhere in the world. This allows you to cross multiple platforms and protect your investment. Standards based, designed for low bit rate transmission.
Built-in FTP server	<ul style="list-style-type: none"> Use any FTP program to upload new software or download stored video from any location. Proprietary PC software is not required to download stored video.
Built-in Web Server	<ul style="list-style-type: none"> Creates flexibility and simplicity in operation while providing true multiple platform support.
Built-in 80GB Hard Drive	<ul style="list-style-type: none"> Local storage and remote access decreases costs associated with VCR tape maintenance.
8 Alarm Contacts	<ul style="list-style-type: none"> Connect motion detectors and access controls to trigger video.
1 Analog Connector	<ul style="list-style-type: none"> Use your existing Multiplexer(s) and Analog video monitors at your central site, or use the connector as a daisy chain to connect to another RemoteVU Guardian unit.
Full Motion Video at 128K	<ul style="list-style-type: none"> Achieve real-time streaming video at full motion with minimal bandwidth.
IP Unicast and Multicast Support	<ul style="list-style-type: none"> Set each camera for IP Multicast or IP Unicast individually.
Time and Date Stamp Stored Video	<ul style="list-style-type: none"> Search the hard-drive by time/date stamp to quickly find video for the specific time period you desire.
Built for Video Platform	<ul style="list-style-type: none"> RemoteVU Guardian is less likely to pick up viruses and other anomalies that typically affect PC's.
10/100 Mb Ethernet Port	<ul style="list-style-type: none"> Utilize full 100Mb LAN when available.

REMOTE VU GUARDIAN STORAGE CAPABILITY TABLE

One Camera @ Bandwidth (Kbps)	4 Kbps	8 Kbps	16 Kbps	32 Kbps	64 Kbps	128 Kbps
Comparison @ Variable Frame Rate and Frame Size Based on Bandwidth Speed, Daily Storage Requirements (Mbps)	43 Mbps	86 Mbps	172 Mbps	346 Mbps	691 Mbps	1382 Mbps
Months of Local storage capacity with Built-in 80GB hard drive	60 Mo	30 Mo	15 Mo	7.7 Mo	4 Mo	2 Mo
QCIF Resolution in Frames Per Second (FPS)	1-3 FPS	2-5 FPS	4-7 FPS	8-10 FPS	10-15 FPS	20-30 FPS
CIF Resolution in Frames Per Second (FPS)	1-3 FPS	2-4 FPS	3-5 FPS	8-10 FPS	10-12 FPS	12-15 FPS

Size

Height: 1.75" (4.43 cm)

Width: 12.5" (31.8 cm)

Depth: 15.5" (39.2 cm)

Environment

Operating Temperature: -5C to 40C

Terms and Conditions

DEFINITIONS

"Motorola" shall mean the Radio Products and Services Division of the Commercial, Government and Industrial Solutions Sector of Motorola, Inc. "Customer" shall mean the customer who purchases Products from Motorola. "Products" shall collectively mean the Replacement Parts, Batteries, Accessories, Test & Site Equipment, and Software ordered by the Customer from the Motorola Radio Products and Services Division's then current Price and Availability List ("Price and Availability List").

CONFIRMING ORDERS

If Customer chooses to send in a confirming order, the confirming order should be clearly marked "confirming". Motorola is not responsible for duplicate shipments sent out if the reason for the duplicate shipment was that a confirming order was not marked "confirming". If a confirming order differs in any way from the original order, the original order takes precedence.

PRICING AND TAXES

The prices are located in the Price and Availability List and are subject to change without notice. Orders will be charged at prices in effect the day an order is entered. Special Pricing may be available, call your local account manager to determine applicability. Programs, promotions, quoted or contract prices supersede the prices in the then current Price and Availability List, provided the quotation or the contract is current at the time the order is placed.

Customers will be invoiced upon shipment. The prices set forth are exclusive of any amount for Federal, State and/or Local excise, sales, use, property, retailer's occupation or similar taxes. If any such excluded tax is determined to be applicable or if Motorola is required to pay any such tax, the prices set forth in the then current Price and Availability List shall be increased by the amount of such tax and any interest or penalty incurred, and Customer shall pay to Motorola the full amount of any such increase no later than ten (10) days after receipt of an invoice therefor, unless otherwise noted on the invoice.

SHIPPING, DELIVERY, TITLE AND SECURITY

Shipping and handling charges shall be paid by the Customer. Customer agrees to pay such amount quoted without regard to the actual charges applicable at the time of shipment. Motorola will ship only to Customer's facility or the facility of one of Customer's affiliates. Motorola will not drop ship to third parties at the request of a Customer. Unless otherwise directed by the Customer, all shipments will be routed via United Parcel Service or common carrier depending on weight and size.

Emergency shipments will be routed by air or by the fastest method with consideration given to weight and size limitations and will be subject to an additional shipping fee. Shipments outside of the U.S. will be routed by air. Unless otherwise agreed to by Motorola, all deliveries are F.O.B. Factory shipping facility(ies) or F.O.B. destinations for state and local government entities and title and risk of loss to Products sold shall pass to Customer at the F.O.B. point. Shipping or delivery dates are best estimates only.

Motorola reserves the right to make deliveries in installments and these terms and conditions shall be severable as to such installments. Delivery delay or default of any installment shall not relieve Customer of its obligation to accept and pay for remaining deliveries. Claims for shipment shortages shall be deemed waived unless presented to Motorola in writing within forty-five (45) days of delivery of each shipment.

Customer hereby grants to Motorola as security for all of Customer's obligations to Motorola, of any kind whatsoever, now or hereafter arising from this agreement or any other agreement with Motorola, a first priority security interest in all Products held in inventory or used as equipment by Customer, together with all contract rights, accounts, chattel paper and general intangibles relating thereto and all proceeds resulting therefrom.

Upon request, Customer agrees to cooperate in whatever manner necessary to assist Motorola in perfection of said security interest. Furthermore, Customer hereby irrevocably appoints Motorola as its attorney-in-fact to take any action and to execute any instrument which Motorola may deem necessary or advisable to accomplish the foregoing. Such power of attorney is coupled with an interest. Motorola has no obligation for payments of any applicable foreign import duties.

PAYMENT

The Customer shall make net payment to Motorola in accordance with the terms stated herein by mail to Motorola at P.O. Box 93042, Chicago, Illinois 60673-3042 or at such other place as Motorola may designate in writing or as reflected on an invoice.

Payment shall be made in ten (10) days after the date of invoice for each product, accessory, or other charge, unless otherwise agreed to in writing. Service charges at the maximum rate permitted by applicable law may be invoiced on accounts more than thirty (30) days past due and shall be due and payable upon receipt of invoice. All payments

made by Customer to Motorola in connection with this agreement or any other agreement with Motorola shall be applied by Motorola, in its sole discretion, to such obligations or liabilities (whether arising under this agreement or any other agreement with Motorola) as Motorola shall direct.

PATENT, COPYRIGHT AND TRADEMARKS

A. INDEMNIFICATION

Motorola agrees to defend, at its expense, any suits against Customer based upon a claim that any Motorola manufactured Products furnished hereunder directly infringe a U.S. patent or copyright and to pay costs and damages finally awarded in any such suit, provided that Motorola is notified promptly in writing of the suit and at Motorola's request and at its expense is given control of said suit and all requested assistance for defense of same, including all appeals thereof.

If the use or sale of any such Product(s) furnished hereunder is enjoined as a result of such suit, Motorola, at its option and at no expense to Customer, shall obtain for Customer the right to use or sell such Product(s) or shall substitute an equivalent Product reasonably acceptable to Customer and extend this indemnity thereto or shall accept the return of such Product(s) and reimburse Customer the purchase price therefor, less a reasonable charge for reasonable wear and tear.

This indemnity does not extend to any suit based upon any infringement or alleged infringement of any patent or copyright by the combination of any such Product(s) furnished hereunder and other elements not furnished by Motorola nor does it extend to any such Product(s) of Customer's design or formula, nor does it extend to any Product(s) that are modified, changed or altered. The foregoing states the entire liability of Motorola for patent or copyright infringement.

IN NO EVENT SHALL MOTOROLA BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM INFRINGEMENT OR ALLEGED INFRINGEMENT OF PATENTS OR COPYRIGHTS.

B. COPYRIGHTS AND MASK WORKS

Laws in the United States and other countries preserve for Motorola certain exclusive rights, in the Motorola Software, mask works and other works of authorship furnished hereunder including without limitation the exclusive rights to prepare works derived from same, reproduce same in copies and distribute copies of same.

C. LOGOS AND TRADEMARKS

1) The Products shipped under the terms and conditions hereof will carry Motorola's logo or such other logo as expressly agreed to by Motorola.

2) In order that Motorola may protect and preserve its trademarks, trade names, corporate slogans, corporate logo, goodwill and Product designations, Customer, without the express written consent of Motorola, shall have no right to use any such marks, names, slogans or designations of Motorola in the sale, lease or advertising of any Products or on any Product, Product container, component part, business forms, sales, advertising and promotional materials or other business supplies or materials, whether in writing, orally or otherwise.

D. LICENSE DISCLAIMER

Except for the right to use the Motorola Software and Product for the purposes provided herein which arises by operation of law and except as expressly provided herein, nothing contained herein, or otherwise shall be deemed to grant to Customer either directly or by implication, estoppel or otherwise, any license or right under any patents, copyrights, trademarks or trade secrets of Motorola or any third party.

EXCUSABLE DELAY

In addition to other limitations on liability set forth herein, Motorola shall not be liable for any delay or failure to perform due to any cause beyond its control. Causes include, but are not limited to, strikes, acts of God, acts of the Customer, interruptions of transportation or inability to obtain necessary labor, materials or facilities, default of any supplier, or delays in FCC frequency authorization or license grant. In the event Motorola is unable to wholly or partially perform because of any cause beyond its control, Motorola may terminate any order without any liability to Customer.

LIMITATIONS

A. LIMITATION OF LIABILITY. EXCEPT FOR PERSONAL INJURY AND EXCEPT AS PROVIDED FOR IN THE SECTION "PATENT, COPYRIGHT AND TRADEMARKS", MOTOROLA'S TOTAL LIABILITY ARISING OUT OF OR RELATED TO PURCHASE OF PRODUCTS, WHETHER FOR BREACH OF CONTRACT, WARRANTY, MOTOROLA'S NEGLIGENCE, STRICT LIABILITY IN

TORT OR OTHERWISE, IS LIMITED TO THE PRICE OF THE PARTICULAR PRODUCTS SOLD HEREUNDER WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED. CUSTOMER'S SOLE REMEDY IS TO REQUEST MOTOROLA AT MOTOROLA'S OPTION TO EITHER REFUND THE PURCHASE PRICE OR REPAIR OR REPLACE PRODUCTS THAT ARE NOT AS WARRANTED. IN NO EVENT, WHETHER FOR BREACH OF CONTRACT, WARRANTY, MOTOROLA'S NEGLIGENCE, STRICT LIABILITY IN TORT, OR OTHERWISE, WILL MOTOROLA BE LIABLE FOR INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, FRUSTRATION OF ECONOMIC OR BUSINESS EXPECTATIONS, LOSS OF PROFITS, LOSS OF DATA, COST OF CAPITAL, COST OF SUBSTITUTE PRODUCT(S), FACILITIES OR SERVICES, DOWNTIME COST OR ANY CLAIM AGAINST CUSTOMER BY ANY OTHER PARTY.

B. INSURANCE. IT IS FURTHER UNDERSTOOD THAT MOTOROLA IS NOT AN INSURER AND THAT CUSTOMER WILL OBTAIN ALL INSURANCE, IF ANY, THAT IS DESIRED AND THAT MOTOROLA DOES NOT REPRESENT OR WARRANT THAT MOTOROLA PRODUCTS WILL AVERT OR PREVENT OCCURRENCES, OR THE CONSEQUENCES THEREFROM, WHICH ARE MONITORED, DETECTED OR CONTROLLED WITH USE OF THE PRODUCTS.

C. TIME TO SUE. EXCEPT FOR MONEY DUE UPON AN OPEN ACCOUNT, NO ACTION SHALL BE BROUGHT FOR ANY BREACH OF A CONTRACT TO PURCHASE PRODUCTS MORE THAN TWO (2) YEARS AFTER THE ACCRUAL OF SUCH CAUSE OF ACTION EXCEPT WHERE A SHORTER LIMITATION PERIOD IS PROVIDED BY APPLICABLE LAW.

D. NO REPRESENTATIONS. THE ISSUANCE OF INFORMATION, ADVICE, APPROVALS, INSTRUCTIONS OR COST PROJECTIONS BY MOTOROLA'S SALES PERSONNEL OR OTHER REPRESENTATIVES SHALL BE DEEMED EXPRESSIONS OF PERSONAL OPINION ONLY AND SHALL NOT AFFECT MOTOROLA'S AND CUSTOMER'S RIGHTS AND OBLIGATIONS HEREUNDER, UNLESS AN OFFICER OF MOTOROLA, INC. AGREES TO A CHANGE IN WRITING.

E. WARRANTIES. IN ANOTHER SECTION OF THE PRICE AND AVAILABILITY LIST, MOTOROLA HAS PROVIDED CUSTOMER WITH ITS PRODUCT WARRANTY AND, IF APPLICABLE, ITS SOFTWARE LICENSE, WHICH WARRANTY AND LICENSE, TO THE EXTENT APPLICABLE, ARE INCORPORATED INTO AND MADE A PART OF THESE TERMS AND CONDITIONS. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED WHICH ARE SPECIFICALLY EXCLUDED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CUSTOMER HEREBY ACKNOWLEDGES RECEIPT OF SUCH WARRANTIES AND LICENSE.

PRODUCT COMPATIBILITY

Motorola agrees that the Product will perform in accordance with the specifications stated in Motorola's catalogue sheets. This does not extend to the performance of the Product as a part of a larger system generally nor specifically to the Product in combination with products, elements or components not supplied by Motorola.

SALES TO GOVERNMENTAL ENTITIES

A. Third Party Sales. In the event that Customer elects to provide Products or services to a Governmental entity, or to a prime contractor selling to a Governmental entity, Customer does so solely at its own option and risk and agrees not to obligate Motorola as a subcontractor or otherwise to such Governmental entity. Customer remains solely and exclusively responsible for compliance with all laws governing such sales to such an entity. Further, Motorola makes no representations, certifications, or warranties whatsoever with respect to the ability of its goods, services, or prices to satisfy any such laws. The term "Governmental entity" as used above includes any U.S. Federal, State, or Local Government agency or instrumentality as well as any Foreign (non U.S.) Government agency or instrumentality.

B. Sales to Governments. In the event that Customer is a state or local government agency in the United States or instrumentality, a foreign (non U.S.) government agency or instrumentality, or a contractor to such an entity, Customer agrees to promptly advise Motorola of any special government terms or conditions of sale and/or of any state and/or local law, regulation or ordinance that may be applicable to this sale. Customer's offer is conditioned upon such notice and upon Motorola's acceptance, in writing, of any such special requirements.

ACCESS TO RECORDS AND FACILITIES

Motorola reserves the right to control access to its facilities and records along with those of its subcontractors and suppliers. Such control must include the right to deny access to those facilities and records deemed to be confidential or proprietary.

EXPORT CONTROL PROVISION

Customer must comply with all applicable export and reexport laws and regulations of Customer's country and the U.S.A. The exporting and reexporting of Products from the U.S.A. is subject to the U.S. Department of State Munitions Control Regulations. Certain of Motorola's communications products are controlled products and require special licensing. Specifically, but without limitation, Customer agrees that it will not resell or reexport any Motorola parts or associated software or technical data in any form without obtaining appropriate export or reexport licenses from the United States Government or other

applicable licensing body. If, at the time or times of Motorola's performance hereunder, a validated export license is required to lawfully export any parts or associated technical data or software, then the issuance of such license to Motorola constitutes a condition precedent to Motorola's obligations hereunder.

GENERAL

A) Customer acknowledges that it has read and understands the terms and conditions herein and agrees to be bound by them, that it is the complete and conclusive statement of the parties and understanding between the parties relating to the subject matter hereof and all understanding and agreements, oral and written, heretofore made between Motorola and Customer, are merged in this agreement which alone fully and completely expresses their agreement.

(B) No modification of or additions to these terms and conditions shall be binding upon Motorola unless such modification is in writing and signed by an officer of Motorola.

(C) If any term or provision of these terms and conditions is held by a court or other tribunal to be invalid, void, unenforceable, then that term or provision shall be inoperative and insofar as it is in conflict with law, but the remaining terms and provisions shall nevertheless continue in full force and effect and the rights and obligations of the parties shall be construed and enforced as if these terms and conditions did not contain the particular term or provision held to be invalid, void or unenforceable.

(D) Section and paragraph headings used herein are for convenience only and are not to be deemed or construed to be part of these terms and conditions.

(E) The failure of Motorola to insist, in any one or more instances, upon the performance of any of the terms, covenant or conditions of these terms and conditions, or to exercise any right herein, shall not be construed as a waiver or relinquishment of the future performance of any such term, covenant or condition or the future exercise of such right, but the obligation of the Customer with respect to such future performance will continue in full force and effect.

(F) THESE TERMS AND CONDITIONS AND THE RIGHTS AND DUTIES OF THE PARTIES WILL BE GOVERNED AND INTERPRETED IN ACCORDANCE WITH THE LAWS OF THE STATE OF ILLINOIS.

Warranty Information

This warranty applies within the fifty (50) United States, the District of Columbia and Canada.

LIMITED WARRANTY FOR Radio Products and Services Division ("RPSD") PRODUCTS LISTED IN THE PRICE AND AVAILABILITY LIST

I. WHAT THIS WARRANTY COVERS AND FOR HOW LONG:

RPSD PRODUCTS OTHER THAN BATTERIES:

The Radio Products and Services Division of Motorola, Inc. or, if applicable, Motorola Canada Limited ("Motorola") warrants the Motorola, Inc. manufactured radio communications product, including original equipment crystal devices and channel elements ("Product"), against material defects in material and workmanship under normal use and service for a period of One (1) Year from the date of shipment. Motorola, at its option, will at no charge either repair the Product (with new or reconditioned parts), replace it with the same or equivalent Product (using new or reconditioned Product), or refund the purchase price of the Product during the warranty period provided purchaser notifies Motorola according to the terms of this warranty. Repaired or replaced Product is warranted for the balance of the original applicable warranty period. All replaced parts of the Product shall become the property of Motorola.

This express limited warranty is extended by Motorola to the original end user purchaser purchasing the Product for purposes of leasing or for commercial, industrial, or governmental use only, and is not assignable or transferable to any other party. This is the complete warranty for the Product manufactured by Motorola. Motorola assumes no obligations or liability for additions or modifications to this warranty unless made in writing and signed by an officer of Motorola. Unless made in a separate written agreement between Motorola and the original end user purchaser, Motorola does not warrant the installation, maintenance or service of the Product.

Motorola cannot be responsible in any way for any ancillary equipment not furnished by Motorola which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. Because each system which may use the Product is unique, Motorola disclaims liability for range, coverage, or operation of the system as a whole under this warranty. "Non Motorola manufactured items such as Site Equipment sold by Motorola carry the Original Equipment Manufacturer's warranty."

II. GENERAL PROVISIONS:

This warranty sets forth the full extent of Motorola's responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at Motorola's option, is the exclusive remedy. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER EXPRESS WARRANTIES. MOTOROLA DISCLAIMS ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOST PROFITS OR SAVINGS OR OTHER INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH PRODUCT, TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

III. HOW TO GET WARRANTY SERVICE:

Purchaser must notify Motorola's representative or call RPSD at 1-800-422-4210 within the applicable warranty period for information regarding warranty service.

IV. WHAT THIS WARRANTY DOES NOT COVER:

- A) Defects or damage resulting from use of the Product in other than its normal and customary manner.
- B) Defects or damage from misuse, accident, water, or neglect.
- C) Defects or damage from improper testing, operation, maintenance, installation, alteration, modification, or adjustment.
- D) Breakage or damage to antennas unless caused directly by defects in material workmanship.
- E) A Product subjected to unauthorized Product modifications, disassemblies or repairs (including, without limitation, the addition to the Product of non-Motorola supplied equipment) which adversely affect performance of the Product or interfere with Motorola's normal warranty inspection and testing of the Product to verify any warranty claim.
- F) Product which has had the serial number removed or made illegible.
- G) Freight costs to the repair depot.
- H) A Product which, due to illegal or unauthorized alteration of the software/firmware in

the Product, does not function in accordance with Motorola's published specifications or with the FCC type acceptance labeling in effect for the Product at the time the Product was initially distributed from Motorola.

I) Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.

J) That the software in the Product will meet the purchaser's requirements or that the operation of the software will be uninterrupted or error-free.

K) Normal and customary wear and tear.

L) Non-Motorola manufactured equipment unless bearing a Motorola Part Number in the form of an alpha numeric number (i.e., TDE6030B).

M) Processing of date data from, into, and between the year 2000 and the year 2001.

V. GOVERNING LAW

In the case of a Product sold in the United States and Canada, this Warranty is governed by the laws of the State of Illinois and the Province of Ontario, respectively.

VI. PATENT AND SOFTWARE PROVISIONS:

Motorola will defend, at its own expense, any suit brought against the end user purchaser to the extent that it is based on a claim that the Product or its parts infringe a United States patent, and Motorola will pay those costs and damages finally awarded against the end user purchaser in any such suit which are attributable to any such claim, but such defense and payments are conditioned on the following:

A) that Motorola will be notified promptly in writing by such purchaser of any notice of such claim;

B) that Motorola will have sole control of the defense of such suit and all negotiations for its settlement or compromise; and

C) should the Product or its parts become, or in Motorola's opinion be likely to become, the subject of a claim of infringement of a United States patent, that such purchaser will permit Motorola, at its option and expense, either to procure for such purchaser the right to continue using the Product or its parts or to replace or modify the same so that it becomes non-infringing or to grant such purchaser a credit for the Product or its parts as depreciated and accept its return. The depreciation will be an equal amount per year over the lifetime of the Product or its parts as established by Motorola.

Motorola will have no liability with respect to any claim of patent infringement which is based upon the combination of the Product or its parts furnished hereunder with software, apparatus or devices not furnished by Motorola, nor will Motorola have any liability for the use of ancillary equipment or software not furnished by Motorola which is attached to or used in connection with the Product. The foregoing states the entire liability of Motorola with respect to infringement of patents by the Product or any its parts thereof.

Laws in the United States and other countries preserve for Motorola certain exclusive rights for copyrighted Motorola software such as the exclusive rights to reproduce in copies and distribute copies of such Motorola software. Motorola software may be used in only the Product in which the software was originally embodied and such software in such Product may not be replaced, copied, distributed, modified in any way, or used to produce any derivative thereof. No other use including, without limitation, alteration, modification, reproduction, distribution, or reverse engineering of such Motorola software or exercise of rights in such Motorola software is permitted. No license is granted by implication, estoppel or otherwise under Motorola patent rights or copyrights.

TO OBTAIN WARRANTY SERVICE:

Replacement Parts/Kits/Accessories

To obtain warranty service on replacement parts/kits or test equipment, the item must be delivered, transportation prepaid to:

Motorola
Radio Products and Services Division
Attn: Warranty Dept
2222 Galvin Drive
Elgin, Illinois 60123

Each shipment of returned items must include a Motorola Warranty Replacement Form, with each item being returned listed by quantity, type, frequency of code, defect code, radio model number and serial number (when returning items removed from a Motorola radio) sales or factory order number. Items returned with no manufacturer's date code will be assumed to be out of warranty and subject to charges for repair or replacement.

In the event that Motorola in its discretion elects to replace an item, and a replacement is ordered prior to the return of the defective product, credit for the defective product will be issued against the replacement order provided that the defective units covered by this warranty are returned within forty-five (45) days of the replacement order date and the replacement factory order number is properly provided.

After 45 days, Motorola's sole obligation is limited to replacement of the defective unit covered by this warranty with a unit that meets original factory specifications, and credit cannot be issued.

For a RETURN AUTHORIZATION – PLEASE CALL 1-800-323-6967.

Transportation charges for the return of the product to Purchaser shall be prepaid by Motorola. This warranty is void, as determined in the reasonable judgement of Motorola, if:

- (a) The product has not been operated in accordance with the procedures described in the operating instruction;
- (b) The seals on non-user serviceable components or modules are broken;
- (c) The product has been subject to misuse, abuse, damage, accident, negligence, repair or alteration.

Many items manufactured by third parties are warranted directly by the manufacturer. In such cases, customers may be put in direct contact with the manufacturer's service facility for warranty repair or replacement. In no event shall Motorola be liable for any special, incidental or consequential damages. In the event Motorola elects to repair a defective product by replacing a module or subassembly, Motorola, at its option, may replace such defective module or subassembly with a new or reconditioned replacement module or subassembly. Only the unexpired warranty of the warranty product will remain in force on the replacement module or subassembly.

EXCEPT AS SPECIFICALLY SET FORTH HEREIN, ALL WARRANTIES EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, ARE EXCLUDED.

MOTOROLA AUTHORIZED NETWORKING SOLUTIONS PROVIDER:

