



# **EX-4.9 Series**

## **Digital Microwave Radio Module**

Part Number: 5xxxxxxx

Date: 2007-07-16



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Net-SNMP	(see <a href="#">Copyright Notices</a> on page 10)	<a href="http://www.sourceforge.net">www.sourceforge.net</a>

## **About this Document**

This manual provides a description of the Exalt EX-4.9 Series Digital Microwave Radio Module.

### ***Revision History***

<b>Date</b>	<b>Products and Release code</b>
2007-07-16	EX-4.9 Series Radio Module Guide

## General Compliance and Safety

The usage of radio transmission devices is subject to specific regulatory requirements governed by regional legislation. In most cases, the specific device must be authorized for use in a given country and must be installed and adjusted in accordance with specific radio-frequency settings and in a manner that has been authorized specific to the device itself in accordance with the specific location of the device. Some users may be completely or partially restricted from use of the device. Please consult local governmental agency/agencies for regulatory requirements before use, or contact Exalt or your Exalt authorized dealer for assistance.


Do not modify this device in any way without the express written consent of Exalt. Modification voids the manufacturer warranty, and may also be illegal in accordance to government regulations. In addition, there are no user-serviceable parts or assemblies inside the product housing. There may also be voltages, signals, and mechanisms within the device that could be harmful to human safety.


The mounting of the system and associated peripherals and connections (inclusive of antenna mast, antenna, cabling, egress, lightning protection devices, grounding, power, and so on) may be subject to regional requirements for health and human safety. A qualified professional installer and an electrician may be required by law.


**Exalt cannot warranty the device or be found liable for any unauthorized use or installation of the device.**

### Safety Icons

The following icons denote specific types of information.

 **Note** This symbol means take note. Notes contain helpful suggestions or references to materials not contained in the manual.

 **Caution** This symbol means be careful. There is a risk of equipment damage, loss of data, or injury to persons. To reduce the risk, follow the instructions. This is a general warning, caution, or risk of danger.

 **Warning** This warning symbol means there is a risk of electric shock. This situation could cause bodily injury. To reduce the risk, before working on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

## **Safety Notices**

1. Review this entire guide for important installation instructions **BEFORE** attempting to install this product.
2. The end-product is intended to be installed, used, and maintained by experienced telecommunications personnel only.
3. Do not move or alter the marking labels.

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## Introduction

Exalt Communications, Inc. thanks you for your purchase. Our goal is to build the highest quality, highest reliability digital microwave radio products. This commitment to quality and reliability extends to our employees and partners alike. We appreciate any comments on how we can improve our products, as well as your sales and Customer Care experience.

Customer Care Hotline (USA):	(408) 871-9890
Toll-Free Customer Care Hotline (USA):	(877) EXALT-01 (392-5801)
Direct-Dial Telephone (USA):	(408) 871-1804
Website:	www.exaltcom.com
Sales e-mail:	sales@exaltcom.com
Customer Care e-mail:	support@exaltcom.com
Mailing Address:	Exalt Communications, Inc. 580 Division St. Campbell, CA 95008 USA

## **Related Documentation and Software**

This manual makes reference to other documentation and software files that may be necessary. Any document or software mentioned in this manual can be found at:

<http://www.exaltcom.com/support/downloads.htm>

The Quick Start Guide provides any necessary username and password information to gain access to these documents.

## **The Exalt EX-4.9 Series of Digital Microwave Radio Module**

The Exalt EX-4.9 Series of Digital Microwave Radios are the most advanced carrier-class point-to-point terrestrial radio communications devices operating in the 4940 to 4990 MHz frequency bands, respectively.

The EX-4.9 Series radios connect voice and/or digital data from one location to another, obviating the need for copper or fiber connectivity, or enhancing existing connectivity by providing a redundancy solution, a primary solution, and/or additional capacity.

The EX-4.9 Series Digital Microwave Radio Module is installed in Exalt's EX-4.9 Series products. Please refer to the Installation and Management Guide for your end-product for detailed information on installation, set-up, troubleshooting, and maintenance.

There are no user serviceable parts inside the end-product including the EX-4.9 Series Module, opening the end-product voids all warranties.



Generally, the EX-4.9 Series products require a clear line-of-sight and proper path clearance to achieve a high-performance, reliable connection. Perform professional path engineering and site planning BEFORE installing this equipment.

**Note: It is the professional installer's responsibility to ensure that the radio system is implemented in a legal fashion. Exalt is not liable for any unsafe or illegal installations.**

### Radio A/B Configuration

Use the Exalt GUI to configure the radio terminals for Radio A and Radio B orientation. Since many other parameters also need to be set, and the Exalt GUI is needed for these configurations, this is the best way to completely configure the radio terminals.

Radios arrive from manufacture in default configuration, orientated as Radio B and configured as shown in Table 1.

Table 1 Factory Default Settings

Parameter	EX-4.9
Frequency	4965 MHz
Transmit Power	+4 dBm
Bandwidth	10 MHz
Mode	Mode 1
Link Distance	<10 miles
TDD Frame Size	2ms
Link Security Key	000000000000
Administration Password	password
User Password	password
IP Address	10.0.0.1
IP Mask	255.0.0.0
IP Gateway	0.0.0.0
Ethernet Interfaces	Enabled, 100/Full
AUX port NMS Access	In-Band
T1/E1 Settings (-16 models)	All Enabled, T1, B8ZS, AIS
T1/E1 Settings (std. models)	Disabled

## **Installation**

Each Exalt Digital Microwave Radio Module is installed in an EX-4.9 Series product. There are no user-serviceable parts, Installation and Management need to be as described in the Installation and Management Guide applicable to the end-product.

## EX- 4.9 System Specifications

Frequency Band	4940 to 4990 MHz
Tunable Range	4945 to 4985 MHz
Output Power (at full power, Mode 1)	+24 dBm (20 MHz BW) +22 dBm (10 MHz BW)
Output Power (at minimum power)	+4 dBm
Selectable Channel Bandwidths	10 MHz, 20 MHz*

Receiver Threshold (BER= $10^{-6}$ )

dBm	Mode 1	Mode 2
10 MHz	-86	-78
20 MHz	-83	-75

Maximum RSL	Mode 1: -25dBm error-free; 0dBm no damage
Non-overlapping channels	10 MHz: 5; 20 MHz, 2
Regulatory Compliance	FCC Part 90; IC RSS-111
Contains FCC ID	TTM-104P90M
IC ID	6254A-104P90I/R

Emission Designator(s)

10 MHz	8M72D7D
20 MHz	19M0W7D

\* Mode 2 for 20 MHz BW is enabled through firmware options.

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## **Appendix A - Regulatory Compliance**

### **General Regulatory Notices**

#### ***Antennas***

Table 2 lists antennas recommended for use with the EX-4.9 Series radios. In some countries, antennas exceeding a certain level of gain may be unlawful.

Table 2 lists antennas supported by the EX-4.9 family of Digital Microwave Radios.

Table 2 EX-4.9 supported antennas

Manufacturer	Model #	Description	Mid-band Gain dBi (mid-band)
Andrew	PL4-44	4' dish	33
Andrew	PL6-44	6' dish	36.6
Andrew	PL8-44	8' dish	39.3
Andrew	PL10-44	10' dish	41
Andrew	PL12-44	12' dish	42.6
Andrew	PL15-44	15' dish	44.5
Gabriel	EPD1-49	1' panel	21.9
Gabriel	EPD249N	2' panel	23
Gabriel	QFD2-49-N	2' dish	27.7
Gabriel	QFD2.5-49-N	2.5' dish	29.7
Gabriel	QFD6-49-N	6' dish	33.7
Gabriel	QFD4-49-N	4' dish	33.7
Gabriel	RFB15-44	15' dish	44.5
Mars	MA-WA49-1X	1' panel	21
MaxRad	MPRW49027	2' dish	28
MaxRad	MPRW49029	2.5' dish	30
MaxRad	MPRW49031	3' dish	32
MTI	MT-465005	1' panel	21
MTI	MT-466004	1.5' panel	25
MTI	MT-466003	2' panel	27
Mwave	GS2-54-N	2' grid dish	25

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Mwave	RP2-54-N	2' dish	26.7
Radiall/Larsen	R380.500.222	1' panel	18.8
RadioWaves	SP1-4.7NS	1' dish	24.6
RadioWaves	SP2-4.7	2' dish	26.6
RadioWaves	SP3-4.7NS	3' dish	30
RadioWaves	SP4-4.7NS	4' dish	32.6
RadioWaves	SP6-4.7NS	6' dish	35.6
RadioWaves	SP8-4.7NS	8' dish	39

## Region 1 Specifics

Region 1 is designated for USA and Canada installations.

**Note:** The professional installer is responsible to ensure that RF output power is properly adjusted to not exceed the regulatory limit.

### **Federal Communications Commission (FCC), United States**

The device is allowed to be used provided it does not cause interference to other devices. It is not guaranteed to provide protection against interference from other electronic and radio devices.

The system has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded cables and I/O cords must be used for this equipment to comply with the relevant FCC regulations.

Changes or modifications not expressly approved in writing by Exalt may void the user's authority to operate this equipment.

### **This device must be professionally installed.**

To comply with regulations, the output power of this device may need to be adjusted in accordance to the associated transmission system.

The antenna associated with the EX-4.9 family shall be mounted in a location that is at least 10'/3m away from humans that may be subject to long-term or continuous exposure.

## United States Compliance

The EX-4.9 product families operate under FCC Rule Parts 90 as a licensed device. They may only be used as a point-to-point transmission device for fixed or temporary-fixed (non-mobile) installations. The devices are subject to the following restrictions:

- Do not use external amplifiers to boost the power or overcome transmission system losses, unless the specific amplifier/cable/antenna combination has expressly been authorized by the FCC. The output power must never exceed +50 dBm.
- Cross-border transmissions are expressly prohibited, except with written permission from both the FCC and the governing body of the neighboring country (Cofetel for Mexico; Industry Canada for Canada).
  - Use only parabolic dish antennas or directional flat-panel antennas. No other types of antennas (omni-directional, yagi, and so on) are authorized. Parabolic dishes of either grid or solid type are allowed. Maximum mid-band gain of each type of antenna certified are:
    - EX-4.9 models:
      - Parabolic dish: 26dBi (larger gains are allowed, with Tx power reduction)
      - Directional flat panel: 26 dBi (larger gains are allowed, with Tx power reduction)
      -

### **Industry Canada (IC), Canada**

This device complies with RSS-210 of Industry Canada. Operation is subject to the following two conditions:

4. this device may not cause interference, and
5. this device must accept any interference, including interference that may cause undesired operation of the device.

#### **Antennas Supported in Canada**

The EX-4.9 family has been designed to operate with the antennas listed in Table 2 which have a maximum gain of 37.9 dBi. Antennas not included in the list or having a gain greater than 37.9 dBi are prohibited for use with this device. The required antenna impedance is 50 Ohms.

The antenna associated with the EX-4.9 family shall be mounted in a location that is at least 10'/3m away from humans that may be subject to long-term or continuous exposure.

### **Canada Compliance**

EX-4.9 models operate under RSS-210 of Industry Canada regulations. Operation is subject to the following conditions, unless express permission is granted by Industry Canada to operate in a different manner:

- External amplifiers cannot be used to boost the power or to overcome transmission system losses, unless the specific amplifier/cable/antenna combination is expressly authorized by Industry Canada.

- Cross-border transmissions are expressly prohibited, except with written permission from both Industry Canada and the governing body of the neighboring country (FCC for USA)
- Only parabolic dish antennas or directional flat-panel antennas may be used. No other types of antennas (omni-directional, yagi, and so on) are authorized. Parabolic dishes of either grid or solid type are allowed. Maximum gain of each type of antenna allowed is:
  - EX-4.9 models:
    - Parabolic dish: 37.9 dBi (6'/1.8m diameter)
    - Directional flat panel: 28 dBi (~2'/61cm square)

## **EX-4.9 EIRP for the US and Canada**

### **4940-4990 MHz Band**

For the EX-4.9r model, within the 4940–4990 MHz band, the maximum EIRP allowed is +50dBm. The maximum output power of the radio shall never exceed +24dBm.

For the EX-4.9r models, the transmit power must be reduced from maximum (+20dBm for 40 MHz BW, +24dBm for 20MHz BW, +22dBm for 10MHz) by 1 dB for every 1dB that the antenna gain exceeds 26dBi (including transmission system losses).

- The professional installer is responsible to ensure that RF output power is properly adjusted so that it does not exceed the regulatory limit of these conditions.

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