

---

# TABLE OF CONTENTS

---

|  |    |
|--|----|
| 1.0 GENERAL.....   | 1  |
| 1.1 Introduction .....                                     | 1  |
| 1.2 Applications .....                                     | 2  |
| Point-to-Multipoint, Multiple Address Systems (MAS) .....  | 2  |
| Point-to-Point System .....                                | 3  |
| Continuously Keyed versus Switched Carrier Operation ..... | 3  |
| Single Frequency (Simplex) Operation .....                 | 3  |
| 1.3 Model Number Codes .....                               | 3  |
| 1.4 Accessories .....                                      | 4  |
| 2.0 GLOSSARY OF TERMS.....                                 | 6  |
| 3.0 INSTALLATION .....                                     | 9  |
| 3.1 Installation Steps .....                               | 9  |
| 3.2 Transceiver Mounting .....                             | 11 |
| 3.3 Antennas and Feedlines .....                           | 11 |
| Feedlines .....  | 12 |
| 3.4 Power Connection .....                                 | 13 |
| 3.5 Data Interface Connections .....                       | 13 |
| 3.6 Using the Radio's Sleep Mode .....                     | 13 |
| System Example.....  | 13 |
| 4.0 OPERATION.....   | 15 |
| 4.1 LED Indicators .....                                   | 16 |
| 4.2 RSSI Measurement .....                                 | 16 |
| 5.0 TRANSCEIVER PROGRAMMING .....                          | 17 |
| 5.1 Hand-Held Terminal Connection & Startup .....          | 17 |
| 5.2 Hand-Held Terminal Setup .....                         | 18 |
| 5.3 Keyboard Commands .....                                | 19 |
| Entering Commands.....                                     | 19 |
| Error Messages .....                                       | 19 |
| 5.4 Detailed Command Descriptions .....                    | 22 |
| AMASK [0000 0000–FFFF FFFF] .....                          | 22 |
| ASENSE [HI/LO].....  | 23 |
| BAUD [xxxxx abc].....                                      | 23 |
| BUFF [ON, OFF].....  | 24 |
| CKEY [ON–OFF] .....  | 24 |
| CTS [0–255] .....  | 24 |
| DATAKEY [ON, OFF] .....                                    | 24 |
| DEVICE [DCE, CTS KEY] .....                                | 25 |
| DKEY .....   | 25 |
| DLINK [ON/OFF/xxxx] .....                                  | 25 |

|  |           |
|--|-----------|
| DMGAP [xx].....                                      | 25        |
| DTYPE [NODE/ROOT].....                               | 26        |
| DUMP .....   | 26        |
| HREV.....  | 26        |
| INIT.....  | 26        |
| INIT [4710/9710].....                                | 26        |
| INIT [4720/9720].....                                | 27        |
| KEY .....  | 27        |
| MODEL.....   | 27        |
| MODEM [xxxx, NONE] .....                             | 27        |
| OWM [XXX...] .....                                   | 27        |
| OWN [XXX...] .....                                   | 27        |
| PTT [0-255].....                                     | 27        |
| PWR [20-37].....                                     | 27        |
| RSSI .....   | 28        |
| RTU [ON/OFF/0-80].....                               | 28        |
| RX [xxx.xxxx] .....                                  | 28        |
| RXTOT [NONE, 1-255] .....                            | 28        |
| SCD [0-255].....                                     | 29        |
| SER .....  | 29        |
| SHOW [DC, PORT, PWR].....                            | 29        |
| SNR .....  | 29        |
| SREV .....   | 29        |
| STAT .....   | 29        |
| TEMP.....  | 30        |
| TOT [1-255, ON, OFF].....                            | 30        |
| TX [xxx.xxxx] .....                                  | 30        |
| UNIT [10000...65000] .....                           | 30        |
| <b>6.0 TROUBLESHOOTING .....</b>                     | <b>30</b> |
| 6.1 LED Indicators .....                             | 31        |
| 6.2 Event Codes .....                                | 31        |
| Checking for Alarms—STAT command.....                | 31        |
| Major Alarms vs. Minor Alarms.....                   | 32        |
| Event Code Definitions .....                         | 32        |
| <b>7.0 TECHNICAL REFERENCE .....</b>                 | <b>33</b> |
| 7.1 MDS 4710/9710 Transceiver Specifications .....   | 33        |
| 7.2 Helical Filter Adjustment .....                  | 36        |
| 7.3 Performing Network-Wide Remote Diagnostics ..... | 37        |
| 7.4 Upgrading the Radio's Software .....             | 38        |
| 7.5 dBm-Watts-Volts Conversion Chart .....           | 40        |

## Copyright Notice

This Installation and Operation Guide and all software described herein are protected by **copyright: 2000 Microwave Data Systems Inc.** All rights reserved.

Microwave Data Systems Inc. reserves its right to correct any errors and omissions in this publication.

## Antenna Installation Warning

1. All antenna installation and servicing is to be performed by **qualified technical personnel** only. When servicing the antenna, or working at distances closer than those listed below, *ensure the transmitter has been disabled*.
2. Typically, the antenna connected to the transmitter is a directional (high gain) antenna, fixed-mounted on the side or top of a building, or on a tower. Depending upon the application and the gain of the antenna, the total composite power could exceed 20 to 50 watts EIRP. The antenna location should be such that only qualified technical personnel can access it, and that under normal operating conditions no other person can touch the antenna or approach within **5.3 meters** of the antenna.

**Antenna Gain vs. Recommended Safety Distance  
(MDS 4710 Series)**

|                            | Antenna Gain (MDS 4710 Series) |            |             |            |
|----------------------------|--------------------------------|------------|-------------|------------|
|                            | 0–5 dBi                        | 5–10 dBi   | 10–20 dBi   | 20–30 dBi  |
| Minimum RF Safety Distance | 0.29 meter                     | 0.53 meter | 1.68 meters | 5.3 meters |

**Antenna Gain vs. Recommended Safety Distance  
(MDS 9710 Series)**

|                            | Antenna Gain (MDS 9710 Series) |            |             |             |
|----------------------------|--------------------------------|------------|-------------|-------------|
|                            | 0–5 dBi                        | 5–10 dBi   | 10–20 dBi   | 20–30 dBi   |
| Minimum RF Safety Distance | 0.27 meter                     | 0.37 meter | 1.16 meters | 3.69 meters |

## ISO 9001 Registration

Microwave Data Systems' adheres to this internationally accepted quality system standard.

## MDS Quality Policy Statement

We, the employees of Microwave Data Systems Inc., are committed to understanding and exceeding our customer's needs and expectations.

- We appreciate our customer's patronage. They are our business.
- We promise to serve them and anticipate their needs.
- We are committed to providing solutions that are cost effective, innovative and reliable, with consistently high levels of quality.
- We are committed to the continuous improvement of all of our systems and processes, to improve product quality and increase customer satisfaction.

## FM/UL/CSA Notice

This product is available for use in Class I, Division 2, Groups A, B, C & D Hazardous Locations. Such locations are defined in Article 500 of the National Fire Protection Association (NFPA) publication NFPA 70, otherwise known as the National Electrical Code.

The transceiver has been recognized for use in these hazardous locations by three independent agencies —Underwriters Laboratories (UL), Factory Mutual Research Corporation (FMRC) and the Canadian Standards Association (CSA). The UL certification for the transceiver is as a Recognized Component for use in these hazardous locations, in accordance with UL Standard 1604. The FMRC Approval is in accordance with FMRC Standard 3611. The CSA Certification is in accordance with CSA STD C22.2 No. 213-M1987.

### FM/UL/CSA Conditions of Approval:

The transceiver is not acceptable as a stand-alone unit for use in the hazardous locations described above. It must either be mounted within another piece of equipment which is certified for hazardous locations, or installed within guidelines, or conditions of approval, as set forth by the approving agencies. These conditions of approval are as follows:

3. The transceiver must be mounted within a separate enclosure which is suitable for the intended application.
4. The antenna feedline, DC power cable and interface cable must be routed through conduit in accordance with the National Electrical Code.
5. Installation, operation and maintenance of the transceiver should be in accordance with the transceiver's installation manual, and the National Electrical Code.
6. Tampering or replacement with non-factory components may adversely affect the safe use of the transceiver in hazardous locations, and may void the approval.

7. When installed in a Class I, Div. 2, Groups A, B, C or D hazardous location, observe the following:

**WARNING —EXPLOSION HAZARD—** Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Refer to Articles 500 through 502 of the National Electrical Code (NFPA 70) for further information on hazardous locations and approved Division 2 wiring methods.

## Revision Notice

While every reasonable effort has been made to ensure the accuracy of this manual, product improvements may result in minor differences between the manual and the product shipped to you. If you have additional questions or need an exact specification for a product, please contact our Customer Service Team using the information at the back of this guide. In addition, manual updates can often be found on the MDS Web site at [www.microwavedata.com](http://www.microwavedata.com).

## Distress Beacon Warning

In the U.S.A., the 406 to 406.1 MHz band is reserved for use by distress beacons. Since the MDS 4710A radio is capable of transmitting in this band, take precautions to prevent the radio from transmitting between 406 to 406.1 MHz. This notice applies *only* to MDS 4710A Transceivers used in the U.S.A.

