



Monitored Hot Standby (MHS) for Exalt Digital Microwave Radios

Installation and Implementation Guide

Compatible with Exalt radio models:
EX-2.4i-16
EX-5i-16



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

For More Information

Refer to the I&M guide for the radio, which can also be downloaded from the Internet at:

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

user ID: **go_exalt**; password: **wexmaltux**

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5. Select the designator for the radio, **Primary** or **Secondary**, from the **MHS Designation** drop-down menu. At one end one radio must be **Primary**, and the other **Secondary**.
6. Select **Disable** in the **Lock On Local** drop-down menu.
7. (Optional) Select the desired time, **20 Seconds**, **10 Minutes**, **Infinity**, in the **Lock On Timeout** drop-down menu.

This is the amount of time that this radio will be force-connected if the Lock On Local parameter is set to **Enable**. Using Lock On Local allows for testing or equipment and cabling changes. The system reverts to its previous condition after the selected Lock On Local Timeout or when disabled.

8. Follow steps 3 through 7 to configure the partner radio.
9. Click the **Update** button to store the configuration settings.

The MHS solution is now connected and configured.

Configuration, status, and alarm information for the MHS solution displays on the MHS Status page, available under the **Monitor** link (Figure).

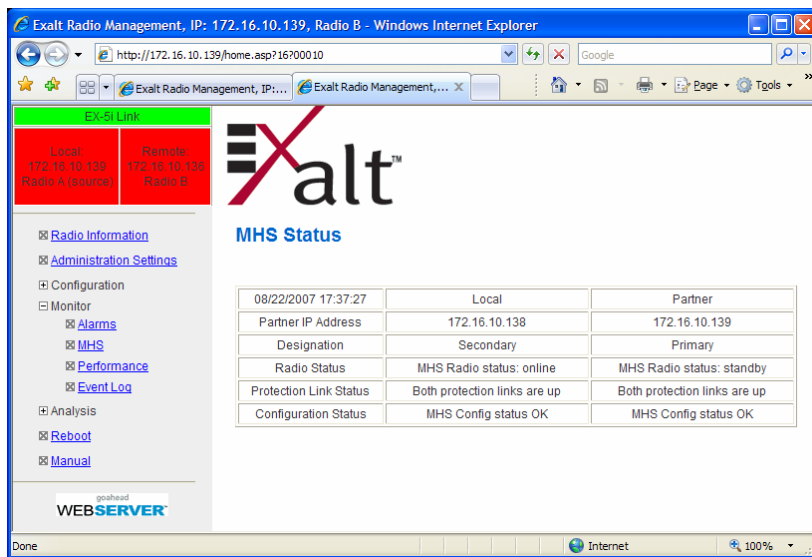


Figure 6 MHS Status page

Introduction

Note: Read this entire document before attempting to install Exalt digital microwave radios and the Exalt MHS solution.

This guide provides an overview of the Monitored Hot Standby (MHS) solution for the i-Series ‘-16’ model radios, installation instructions, and MHS implementation. The installer must have experience with networking and RF. Refer to the *i-Series Installation and Management Guide (I&M)* for detailed radio descriptions, Exalt graphical user interface (GUI) instructions, regulatory requirements, and troubleshooting information.

You are strongly encouraged to obtain a copy of the I&M guide for the associated radio. The I&M guide is embedded in the radio’s graphical user interface (GUI) and can be saved locally, as described in the *i-Series Quick Installation Guide (QSG)*. Exalt guides are available at:

<http://www.exaltcom.com/support/downloads.htm>;
user ID “go_exalt” and password “wexmaltux”.

Monitored Hot Standby (MHS)

The Exalt MHS solution provides redundancy assurance for i-Series ‘-16’ model radios. Full hardware redundancy and automatic radio protection with automatic switchover ensures high reliability and less downtime. With MHS, two radios – primary and secondary – are installed at the same end (local or remote) as backup in the event of failure of one radio or connected interfaces. A control panel – the MHS panel – is installed in the rack with the radios.

The MHS advantage

The Exalt MHS solution is designed for large, high-traffic environments that cannot afford downtime. It is also the perfect solution for remote installations, where physical access to the radio is difficult or limited. MHS allows time to resolve issues with minimal impact on data traffic.

Fault assurance

Once the MHS solution is connected, activated, and configured, the primary and secondary radios constantly monitor and communicate fault status. If the primary radio experiences a hard failure or traffic-affecting fault condition, the secondary radio immediately assumes all time division multiplex (TDM) T1/E1 and Ethernet traffic as well as maintaining management functionality.

The MHS solution ensures that in the event the following faults are detected on the primary radio, data traffic immediately switches to the secondary radio and is not affected:

- Radio power outage*

If the primary radio loses power, the secondary radio assumes control of data traffic.

- Loss of radio signal

If the primary radio does not detect a signal from the remote radio, the secondary radio assumes control of data traffic.

- Disconnected cable

If a cable for the primary radio is disconnected, the secondary radio assumes control of data traffic.

- Silent transmitter

If the remote radio detects that the primary (far-end) radio has become silent, the secondary (far-end) radio assumes control of data traffic. If the far-end radio is still not detected, the remote radio assumes there is an internal fault and triggers an alarm and, if MHS is implemented at both ends of the link, enables the secondary radio on the remote side.

Likewise to the above conditions, when the secondary radio is active, data traffic switches to the primary radio if any of these faults are detected. The system always selects the best radio under fault conditions, but only switches when a fault is detected on the active radio.

Shipping Contents

Review the labeling and contents of all boxes and the physical condition of the shipping container and contents. Ensure that items are not damaged, and that part numbers and serial numbers match the original equipment order and shipping information.

Each radio terminal box contains the following:

- Radio terminal
- AC adapter with power cord
- Accessory kit
- Quick start guide
- Product registration card

The MHS kit contains the following:

- MHS control panel; integral cable harness for POWER and ALARM ports
- 4 T1/E1 y-cables
- 1 serial cable
- 1 LAN cable

* Note that power outages affect all radios on the circuit. Providing separate power circuits can limit this possibility, however outages may affect the main circuit.

Implementation

This section presents the software configuration procedures for MHS.



Note: Ensure that both the primary and secondary radios at one side of the link are both configured as Radio A or both configured as Radio B, as described in the i-Series QSG. Use the Exalt browser-based GUI for configuration.

Radios on one side of the link are configured as Radio A, and Radio B at the opposite side of the link. All system configurations must match on all radios of the link, including T1/E1 configurations.

Using the GUI to configure the MHS solution

A browser is required to access the GUI. Microsoft Internet Explorer 5.0 or greater is recommended. Netscape, Mozilla, and Firefox are supported. Use the procedure in the i-Series I&M guide to access the Exalt GUI. Use the following procedure to configure the MHS solution within the Exalt GUI.

The GUI settings for MHS configuration must be performed on all radios that are connected for MHS. For a link protected on both sides, all four radios must be configured.

1. Click the **Configuration** link to expand the subtopics.
2. Click the **MHS** link to display the MHS Configuration page.

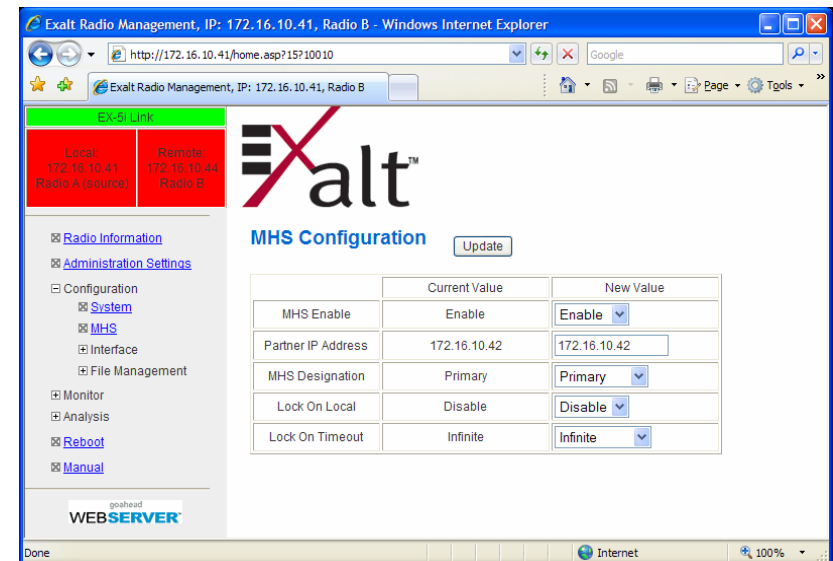


Figure 5 MHS Configuration page

3. Select **Enable** in the **MHS Enable** drop-down menu.
4. Enter the IP address of the partner radio (the MHS radio at the same end as the radio you are managing) in the **Partner IP Address** field.

For both wires, connect to either unused terminals or to the terminals used by the DC power system or AC adaptor. Ensure that all terminals are properly tightened and all wires secure.

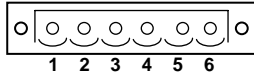


Figure 4 DC power connector

Note: When using the 48V DC adaptor or an external 48V DC power source, you must clip the small black wire on the underside of the MHS control panel, as shown in Figure 1.

3. Connect the radios to power as described in the *i-Series Quick Installation Guide*.
4. If using the AC/DC adapters, plug the adaptor's AC power cable into the AC power source.
5. Wait for both the primary and secondary radio to completely boot up.
6. Verify that the primary radio is linked with the radio at the opposite side of the link.

Connect to your environment

After powering the entire MHS configuration, use customer-provided cables to connect from the LAN switch or router to the MAIN ETHERNET connectors and customer T1/E1 services to the y-cable female connectors.

- 1 sync cable
- 2 RF port coaxial cables
- Installation and Implementation Guide (this document)

Additional T1/E1 cable kits are available in sets of four. The i-Series radios allow up to 16 T1/E1 connections, enabled through software license keys.

Installation

It is strongly advised to configure the radio system prior to physical installation. Pre-configuration minimizes total installation time and aids with troubleshooting that may be required during the commissioning process.

Install the link using the primary radio, and then replace the primary radio with the secondary radio to ensure identical configuration and performance. The IP addresses of the radios must be different and in the same subnet.

Note: Refer to the QSG that came with the radios for radio installation and configuration instructions.

This section describes installing the MHS solution.

Configure the MHS panel for 48Volt DC power (if necessary)

The MHS panel is pre-configured for 24VDC operation. If using 48VDC, such as with the radio's AC adapters, the MHS panel must be modified prior to mounting.

If using 48VDC power, clip the black wire on the underside of the panel, as shown below.

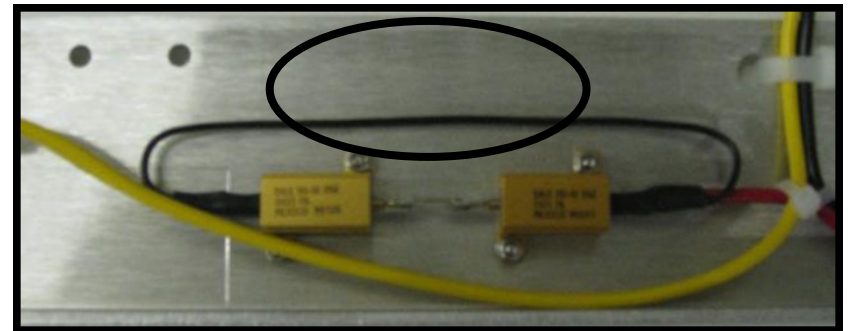


Figure 1 When using 48V DC adaptors, clip this wire

Rack mount the pre-configured radios and MHS control panel

i-Series '-16' model radios are 1.5U. The MHS control panel is 1U. The total MHS solution takes up 4U with an extra 0.5U above and below the equipment, for a total of 5U. Mounting the components as follows allows adequate ventilation for all components.

1. Mount the MHS control panel in the rack with a minimum of 2U above and below.
2. Mount the primary radio directly below the MHS control panel, using 1.5U below the MHS control panel.
3. Mount the secondary radio directly above the MHS control panel, leaving 0.5U above the radio for ventilation.



Figure 2 Rack mount example

Make connections

1. Connect the T1/E1 cables to the first four T1/E1 connectors on both radios.

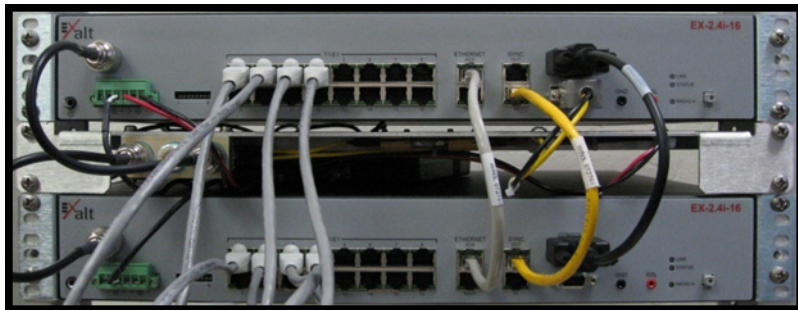


Figure 3 Connectors

Your T1/E1 connections are made between your equipment or wiring panels and the female connector of each y-cable.

Additional T1/E1 connections are available through MHS expansion kits provided are in packs of four (that is, four T1/E1 connections are

available per kit). Up to 16 connections can be made on the i-Series '-16' model radios.

2. Connect the serial cable to the CONSOLE connector on each radio. This is the primary management control cable.

Note: In an MHS configuration, the CONSOLE port is unavailable for normal use on both radios.

3. Connect the gray CAT5 cable to the AUX ETHERNET connector on each radio. This is the secondary management control cable.

Note: In an MHS configuration, the AUX ETHERNET port is unavailable for normal use on both radios. Local LAN connections should be made to the MAIN ETHERNET port on the both radios.

4. Connect the yellow CAT5 from the SYNC OUT connector of the primary radio to the SYNC IN connector of the secondary radio.

Note: The SYNC IN connector on the primary radio can be used as an optional GPS sync input or to receive sync from another collocated radio. The SYNC OUT connector on the secondary radio can be used to connect to other sync recipients in your environment.

5. Connect the 9-pin connector from the MHS Panel to the ALARMS port on the secondary radio. This is the MHS switch control cable.

Note: The ALARMS port of the secondary radio is used for MHS switch control and cannot be used for typical alarm management. The ALARMS port of the primary radio functions normally.

6. Remove the antenna coaxial connector caps on the MHS control panel.
7. Connect the RF cable to the ANTENNA port on the primary radio to the left-hand N-type RF connector on the MHS control panel.
8. Connect the RF cable to the ANTENNA port on the secondary radio to the right-hand N-type RF connector on the MHS control panel.
9. Connect the antenna cable to the middle N-type RF connector on the MHS control panel.

Connect to power

1. Ensure power is not applied to the secondary radio.
2. Connect the red/black wire set from the MHS control panel to the DC power connector on the secondary radio:

Insert the red wire into position #3 or 4 (For both wires, connect to either unused terminals or to the terminals used by the DC power system or AC adaptor. Ensure that all terminals are properly tightened and all wires secure.

- a. Figure).
- b. Insert the black wire into position #1 or 6.