Upgrading SD Radio Firmware

From time to time, GE MDS releases new firmware for its radio products. This firmware can be installed into previously shipped radios to take advantage of engineering improvements or new features.

Several methods are available for loading firmware files into the radio. TFTP is generally the fastest technique. It requires an Ethernet connection to a PC.

This publication describes how to update SD radios using TFTP file transfer. For a description of serial file downloads, consult publication 05-4891A01 instead.

NOTE: Only firmware specifically designed for this model of radio may be installed in the unit.

Firmware files are available free-of-charge online at:
http://www.gemds.com/app/support/downloads/

Firmware Upgrade via TFTP (LAN Port)

To install firmware by TFTP, you will need:

1. A valid firmware file.
   This is a file with a .mpk extension, available from the website mentioned above.

2. A terminal program such as HyperTerminal.
   This program communicates with the radio's COM1 management port.

3. A PC running a TFTP server program.
   A Windows-based TFTP server may be downloaded from the GE MDS website at: http://www.gemds.com/app/support/downloads/

4. The IP address of the PC running the TFTP server.
   To obtain your computer's address on a Windows PC, use the **RUN** function from the Start Menu and enter **cmd** to invoke the Windows Command Interpreter. At the prompt, enter **ipconfig** to determine the address.

5. The IP address of the radio.
   Knowledge of the radio's IP address is not essential for reprogramming but is required to independently confirm network connectivity. This optional step is delimited by [ ]s in the instructions that follow.

Connecting the Transceiver for Firmware Upgrade

There are several alternatives to connecting the transceiver for firmware upgrade. Figure 1 and Figure 2 show two variations.

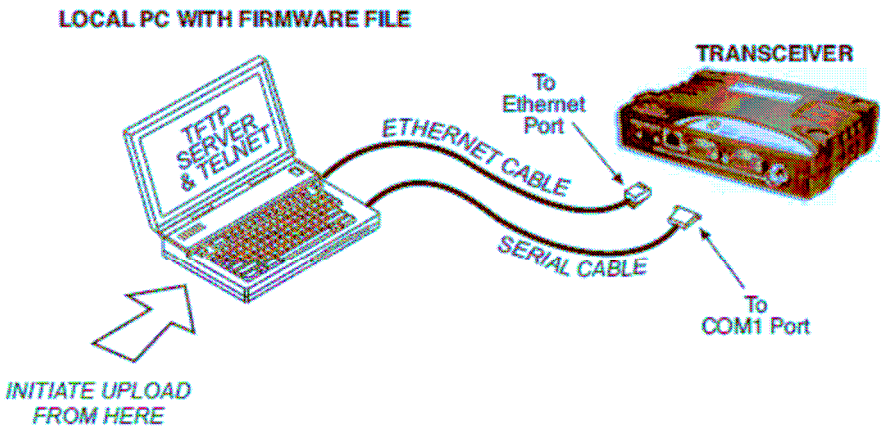

Figure 71. Firmware Upgrade Setup—Option 1
(TFTP Server and Firmware File Reside on Same CPU)

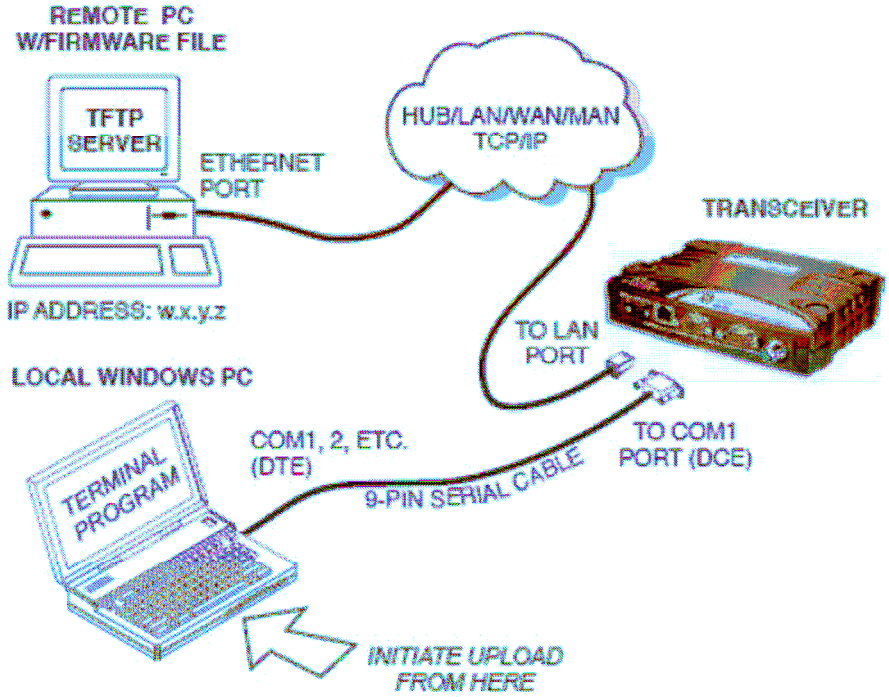

Figure 2. Firmware Upgrade Setup—Option 2
(TFTP Server and Firmware File Reside on Remote Server)

Initial Setup:

1. Connect an Ethernet cable between the radio's LAN port and the PC's (refer to Figure 1 or Figure 2, as applicable). Verify that the yellow LED on the radio's LAN port lights and stays lit. This verifies that the network is functioning.

2. Make sure the TFTP server program is running on the PC. If using the GE MDS TFTP Server refer to the figure below to assist in configuration. Click the **Options** tab (A in Figure 3 below) and modify the **Outgoing Path** (B) using your browser to point to the folder where the reprogramming package (.mpk) is located. The path (C) will be displayed once the operation is completed. Leave the application running until reprogramming on the radio is complete.

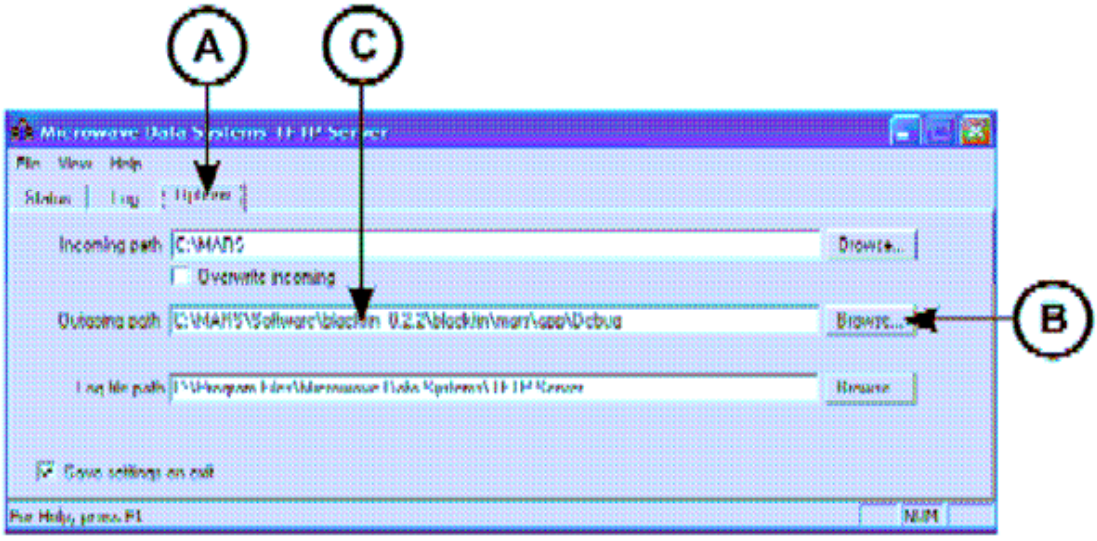

Figure 3. TFTP Server Screen

3. Remaining steps will vary based on the SD model purchased and the radio's operating mode.
   - For Models "ES" & "SS" the radio is typically configured through the menu interface.
   - For Model "MS" the radio must be configured through the SD command line.
   - Examples of each are shown below.

SD Menu Upgrade Procedure:

To load a new firmware file using the menu interface, use the following procedure.

1. Connect a PC running a Terminal Program such as HyperTerminal to the radio's COM1 port. Establish communication to the radio and login. (Additional details are provided in SD Series Reference Manual 05-4846A01)

2. Navigate to the networking configuration menu to verify the radio's IP address. Enter the **IP Configuration Menu**, from the **Main Menu>>Ethernet Configuration>>IP Configuration.** The menu shown in Figure 4 appears.

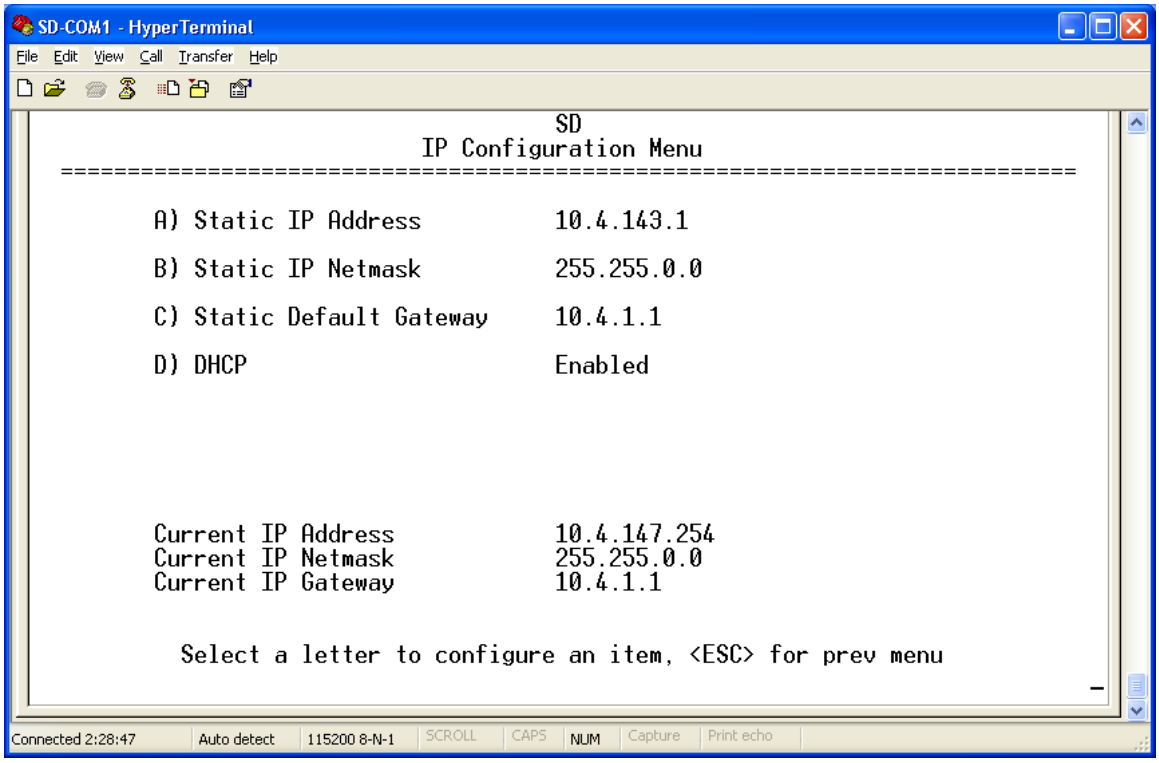

Figure 4. IP Configuration Menu

3. Set the IP Address, Netmask and Default Gateway as appropriate. Note the default gateway must be on the same subnet as the transceiver. Alternatively, if a DHCP server is available, enable DHCP and wait several seconds for the IP setting to be obtained from the server. The IP settings used are show at the bottom of the screen.

4. [To confirm connectivity, ping the radio's IP address from the PC using a Ping Utility and verify that the radio responds.]

5. Return to the Main Menu and navigate to the **TFTP Menu. Main Menu>>Maintenance/Tools>>Local Reprogram>>TFTP** shown in Figure 5.

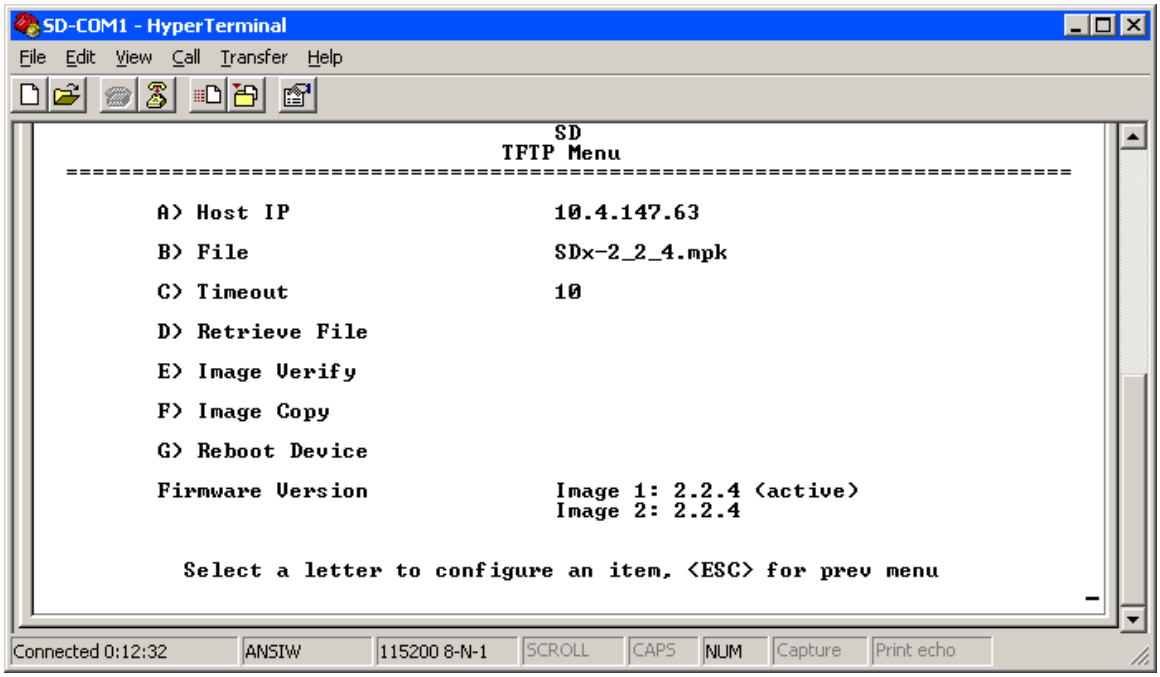

Figure 5. Reprogram Menu

6. On the TFTP Menu, verify that the radio has the right IP address for the TFTP server on the **Host IP** option. Set the path where the reprogramming file is located in the TFTP server on the **File** option.

7. Start reprogramming by selecting the **Retrieve File** option from the menu. A progress string indicates the reprogramming status. At this point, the radio is programming the inactive image.

8. As soon as reprogramming is complete, verify the package downloaded into flash using the **Image Verify** option. Make sure to select the *inactive* image when the choice is presented.

9. After verification is successfully completed, reboot to the inactive image using the **Reboot Device** option.

10. After reboot, verify the radio is running the new application by logging in and viewing the Firmware Version shown on the Starting Information Screen.

SD Command Line Upgrade Procedure:

To load a new firmware file using the X710 compatible command line interface, use the following procedure.

*NOTE: the commands **ifconfig**, **tftp**, and **boot** are extensions to the X710 compatible command set, intended to support new functionality provided in SD*

1. Connect a PC running a Terminal Program such as HyperTerminal to the radio's COM1 port. Establish communication to the radio by pressing the enter key several times until the "**>**" prompt appears.

2. Use the **ifconfig** command to configure the Ethernet port for communication. Set the IP Address, Netmask and Default Gateway as appropriate. Note the default gateway must be on the same subnet as the transceiver.

```
>ifconfig ip 10.4.143.1
>ifconfig net 255.255.0.0
>ifconfig gw 10.4.1.1
```

   Alternatively, if a DHCP server is available, enable DHCP and wait several seconds for the IP setting to be obtained from the server.

```
>ifconfig dhcp on
```

   The IP settings used can be verified by typing **ifconfig** followed by enter.

```
>ifconfig
Physical Address . . . . :
00:06:3d:03:7e:56
Link Status. . . . . . . : UP
DHCP Enabled . . . . . . : YES
Current IP Address . . . : 10.4.147.254
Current Subnet Mask. . . : 255.255.0.0
Current Default Gateway. : 10.4.1.1
Static IP Address. . . . : 10.4.143.1
Static SubnetMask. . . . : 255.255.0.0
Static Default Gateway.. : 10.4.1.1
>
```

3. [To confirm connectivity, ping the radio's IP address from the PC using a Ping Utility and verify that the radio responds.]

4. Use the **tftp** command to configure the IP host and file to program

```
>tftp host 10.4.147.63
>tftp file SDx-2_2_4.mpk
```

5. Start reprogramming by entering the **tftp get** command. This will cause the radio to reprogram the *inactive* image. A series of progress messages will display every few seconds indicating the reprogramming status.

```
>tftp get
TFTP reprogramming started
 Initializing....
 Initializing....
 Pkg [%14], Image App [%15]
 Pkg [%29], Image App [%31]
 Pkg [%44], Image App [%47]
 Pkg [%59], Image App [%63]
 Pkg [%74], Image App [%79]
 Reprogramming Complete

>
```

6. As soon as reprogramming is complete, reboot to the inactive image using the **boot other** command. Make sure to enter "y" within 5 seconds or the operation will be aborted and you will be returned to the ">" prompt.

```
>boot other
Rebooting to image 2.
Are you sure? (y|n)
```

7. After entering "y" the message "Rebooting..." will be displayed.

8. After reboot, hit enter several times to establish baud. Verify the radio is running the new application by entering the **srev** command.

```
>srev
06-3251A02
2.2.4  15Jan2009
>
```

Error Messages During File Transfers

It is possible to encounter errors during a file transfer. In most cases errors can be quickly corrected by referring to Table 1.

Error Message	Likely Cause/Corrective Action
Invalid file type	Indicates that the file is not a valid firmware file. Locate proper file and reload.
File not found	Invalid or non-existent filename on TFTP server
Invalid file path	Invalid or non-existent file path to TFTP server.
Timeout	TFTP transfer time expired. Increase the timeout value.
Bad CRC	Cyclic Redundancy Check reporting a corrupted file. Attempt to re-load or use a different file.
Version string mismatch	Invalid file detected. Attempted to re-load, or use a different file.

Table 1. Common Errors During TFTP Transfer

NOTE: If a firmware installation fails, the radio is left with the original active image intact, the inactive image will not properly verify and is unusable. Reprogramming should be attempted again.