

TDFM-9000 SERIES SOFTWARE UPGRADE PROCEDURE

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INTRODUCTION:

From time to time it may be necessary to update the operational software for the TDFM-9000 series of radios. This document describes the procedure to load new software into the TDFM-9000 series radios. There are several pieces of Software (SW) that need to be loaded when upgrading. All TDFM-9000 series are field upgradeable and only requires a PC, Programming cable and terminal software to load the SW.

This document is broken down into 5 sections:

- SECTION 1 Describes installing the USB driver and Terminal set up.
- SECTION 2 Describes the procedure for putting the radio into Bootload Mode and updating the Bootloader SW and Front Panel SW and ASU-9000 SW.
- SECTION 3 Contains the procedure for upgrading TDFM-9000 radios.
- SECTION 4 Contains the procedure for upgrading TDFM-9300 radios.
- SECTION 5 Contains the procedure for upgrading TDFM-9200 radios.

NOTE: These procedures will reset the Configuration Menu settings and Maintenance Menu settings to factory defaults for the target radio. It is highly recommended that all the custom settings in the Configuration Menu and Maintenance Menus be recorded prior to this upgrade procedure. After the upgrades are complete, the settings should be restored to the previous settings before putting the radio back into service.

EQUIPMENT REQUIRED:

- 1) PC with Windows XP, Windows 7, or Windows 10.
- 2) PC-9000 programming cable 127499
- 3) Terminal program such as Tera Term or similar.
- 4) 28 V power supply.
- 5) TIL Upgrade SW

SECTION 1- DRIVER INSTALLATION & TERMINAL SET UP

SETTING UP THE USB TO SERIAL DRIVER ON THE PC:

The TDFM-9000 series radios have a built in USB to serial adaptor. When the radio is connected to a PC in Bootload Mode, it will create a Virtual Serial Port. The Virtual serial port may require a driver to be installed in some Windows operating systems. The driver can be downloaded here:

<http://www.ftdichip.com/Drivers/VCP.htm>

Load the latest version for Windows Desktop: 2.12.36.4 WHQL Certified or newer.

Run the driver installer.

Determining the serial port:

- 1) Power up the radio and invoke the bootloader mode by holding the 7, 2, 3 & 0 keys and pushing the knob. Hold the keys until the Bootloader screen comes up on the display.
- 2) Connect the programming cable PC-9000 to the radio and a USB port on the computer.
- 3) The PC will detect new hardware and finish installing the USB to serial driver.
- 4) Navigate the PC to the Device manager.

Determining the Com Port for Windows XP:

On windows XP, Open my computer in explorer. Then right click and select Properties.

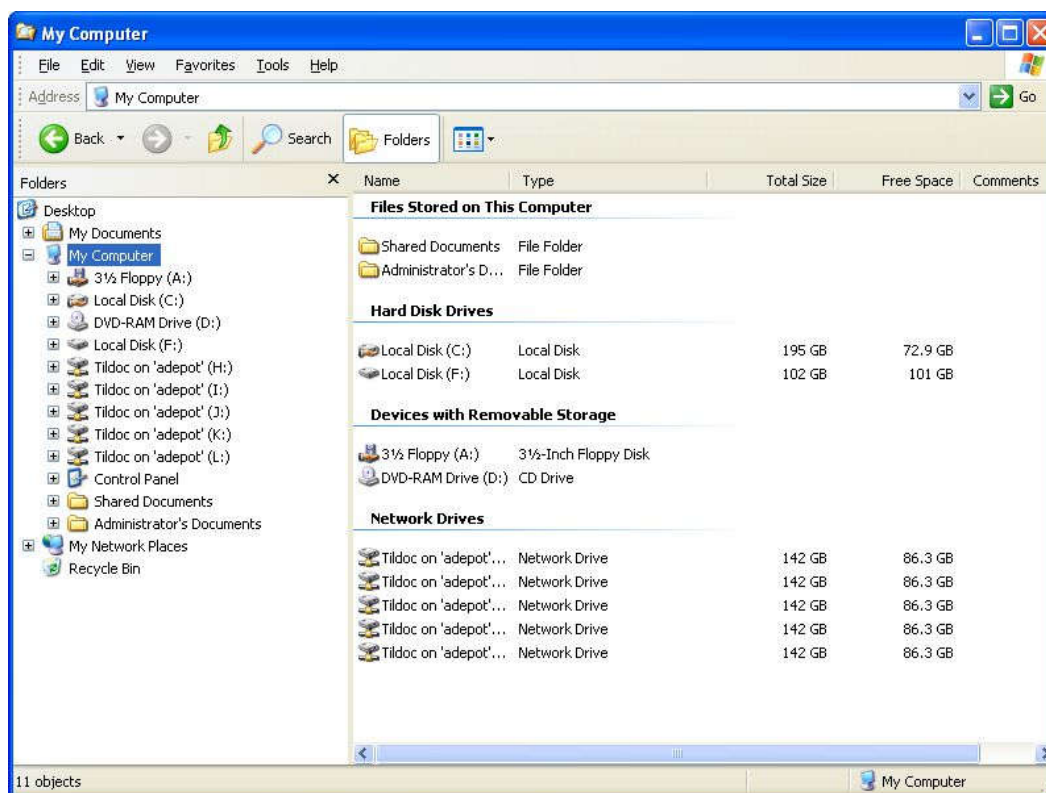


FIGURE 1: My Computer in Explorer (Win XP)

Click on the Hardware Tab:

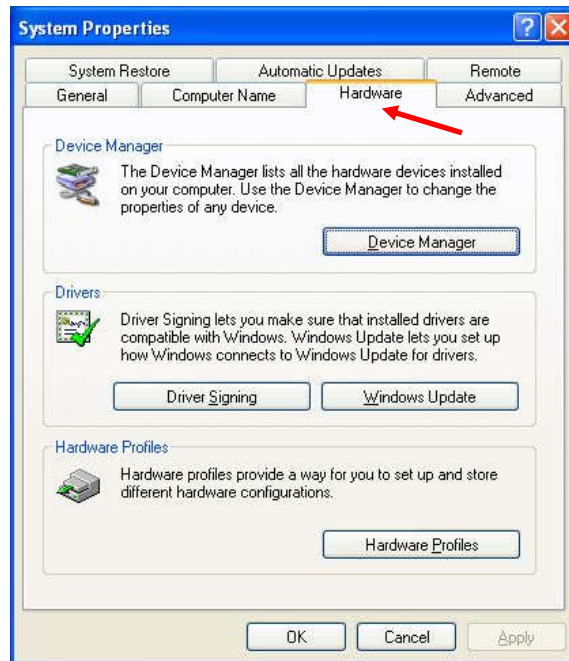


FIGURE 2: System Properties Tile (Win XP)

Then select Device Manager, and click on the “Ports (COM & LPT)”. There should be a USB to Serial Port listed. Mark it down, as it is needed for the next step.

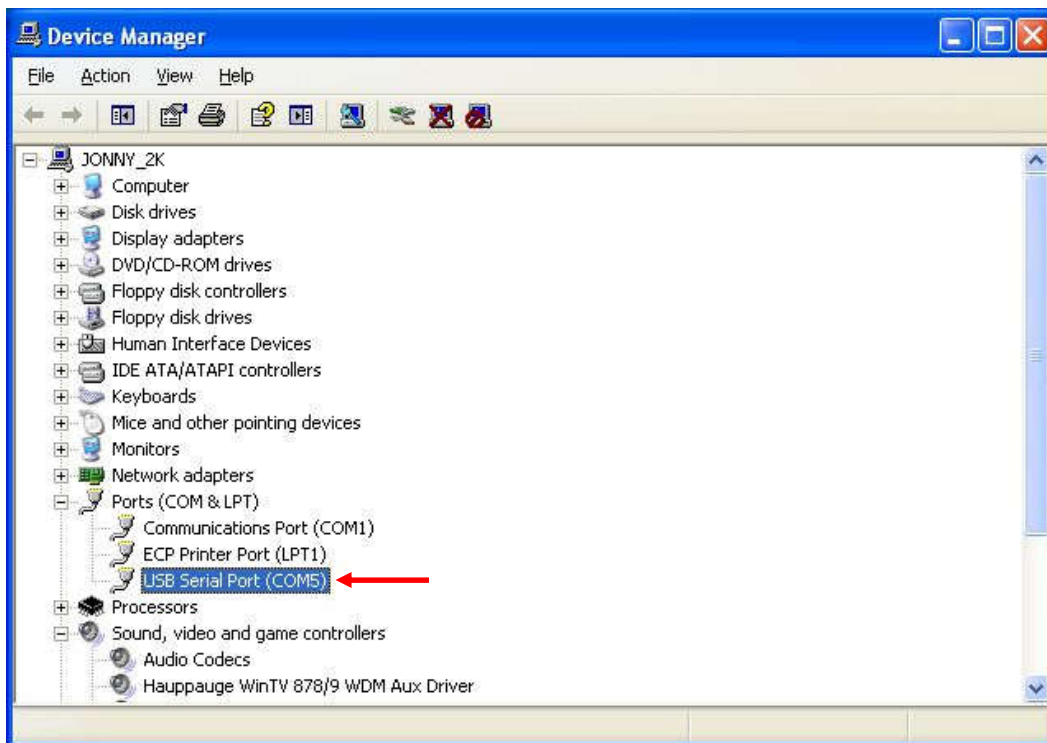


FIGURE 3: USB to Serial Port “COM 5” listed in device Manager (Win XP)

Determining the Com Port for Windows 7:

On Win 7, click on the Start Button, select Control Panel. Then Select "Hardware and Sound". Under Devices and Printers, click on Device Manager.

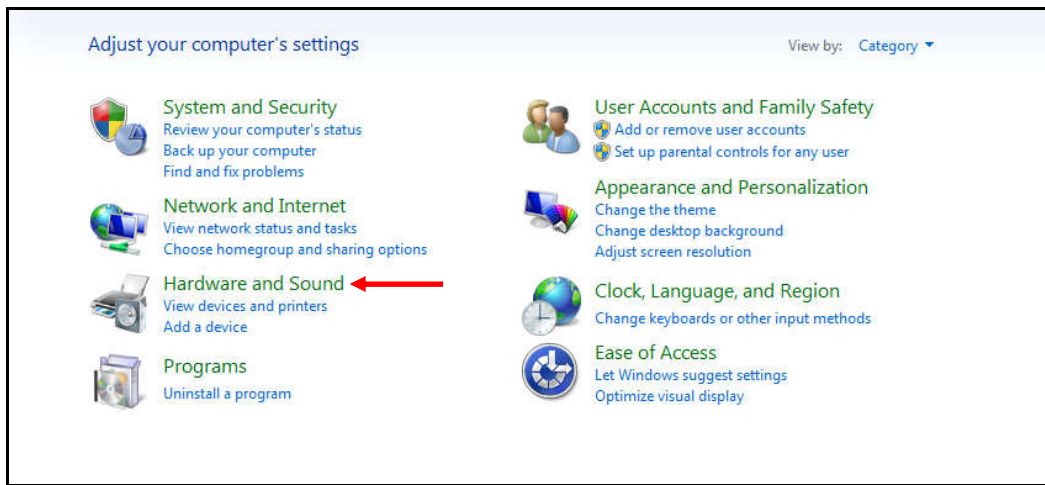


FIGURE 4: Control Panel (Win 7)

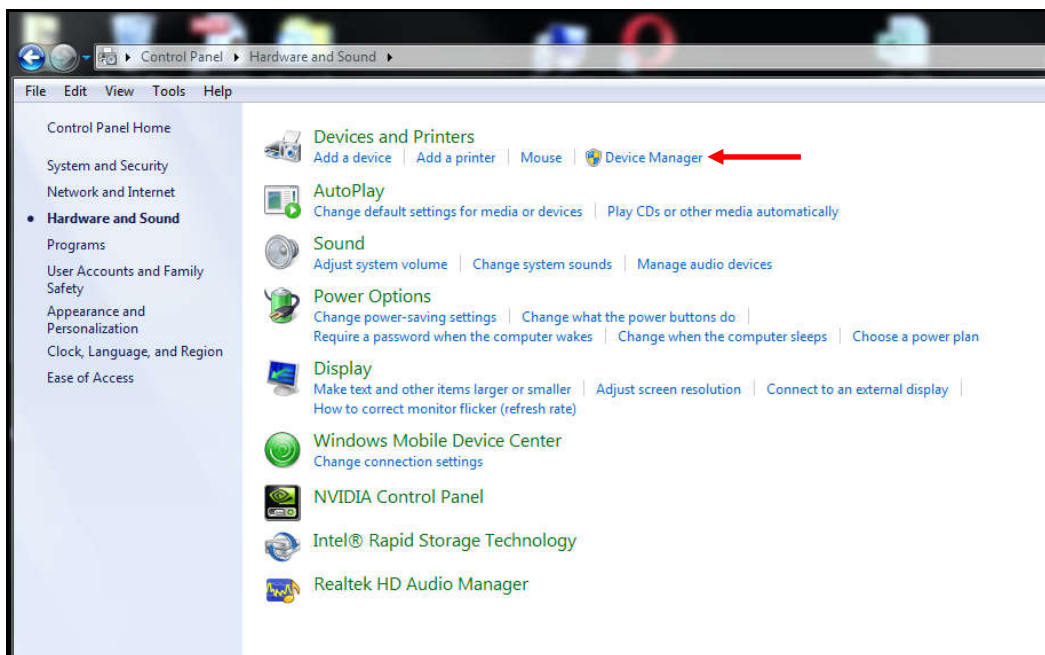


FIGURE 5: Hardware and Sound Screen (Win 7)

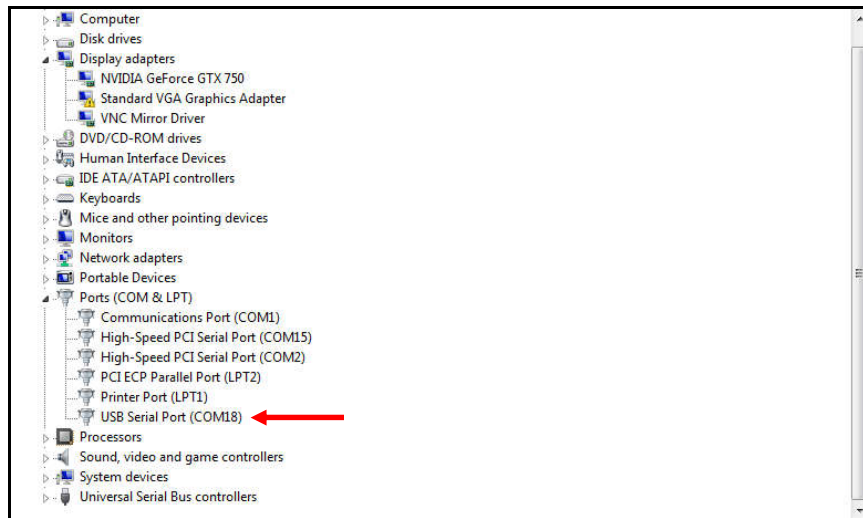


FIGURE 6: Device Manager Screen (Win 7).

In Device Manager, click on Ports (COM & LPT). Look for a USB Serial Port. Mark it down. This will be the Virtual Serial Port the radio will use with the Terminal program.

Determining the Com Port for Windows 10:

On Win 10, click on the Start Button, type in the box below “Device Manager”. The Device Manager Button should come up on the upper left hand filter results.

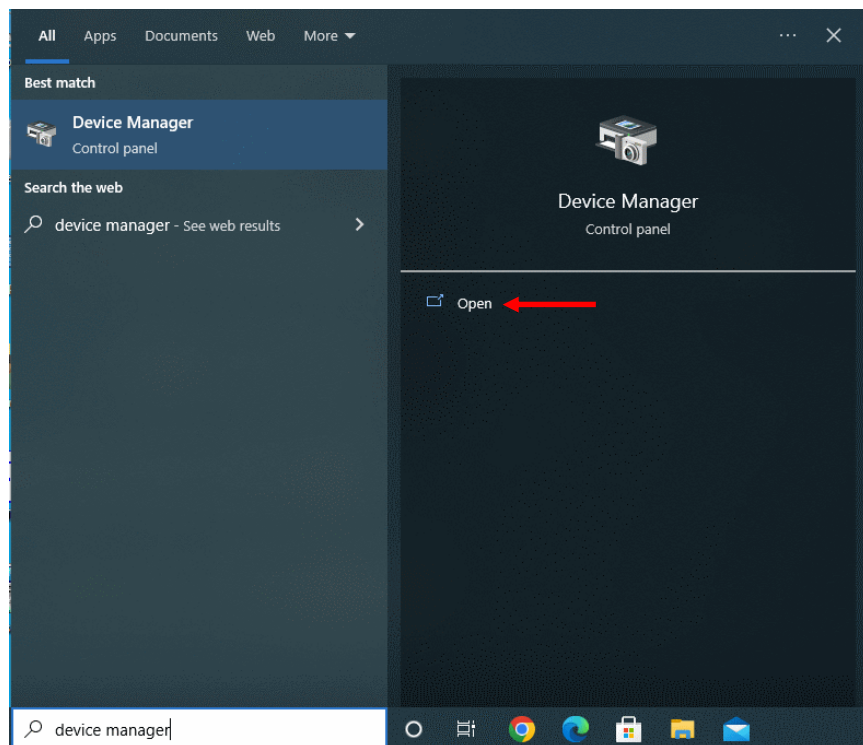


FIGURE 7: Locating the Device Manager (Win 10)

Click on the Device Manager in the filter window. It will take you to the Device manager screen.

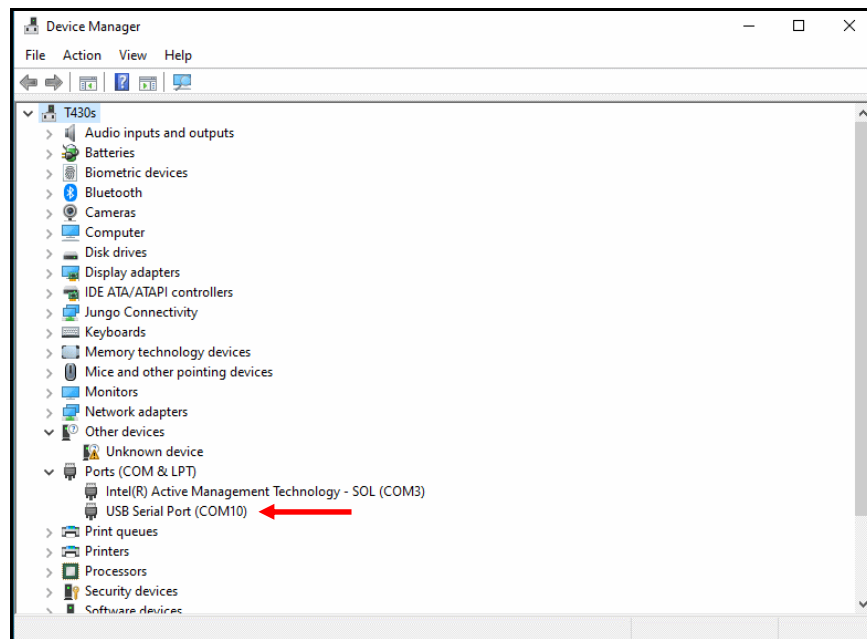


FIGURE 8: The Device Manager Screen (Win 10)

In Device Manager, click on Ports (COM & LPT). Look for a USB Serial Port. Mark it down. This will be the Virtual Serial Port the radio will use with the Terminal program.

INSTALLING TERA TERM:

NOTE: Bootloading the TDFM-9000 series radios requires a terminal program with Y-modem.

Technisonic recommends using Tera Term V4.75 to V4.79. Newer versions have issues with the Y-modem and will not load the SW properly. You may choose to use another Terminal program that supports the Y-modem function.

You can download Tera Term V4.75 here:

<http://en.sourceforge.jp/projects/ttssh2/downloads/56762/teraterm-4.75.exe/>

Install the terminal program. The first time you run Tera Term a new connection box will pop up.

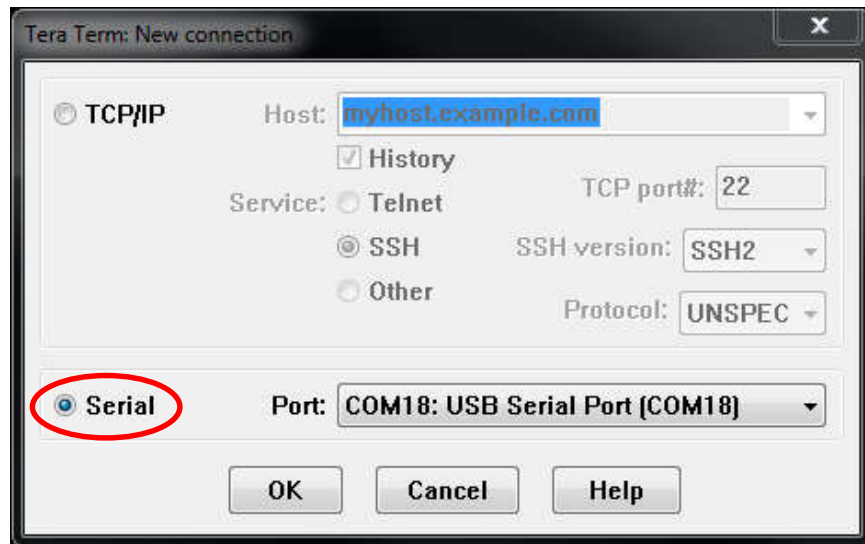


FIGURE 9: New Connection Window

Select "Serial" and in the pull down box, select the USB to Serial port as determined in the previous section. Click on OK. The Main window will be displayed.

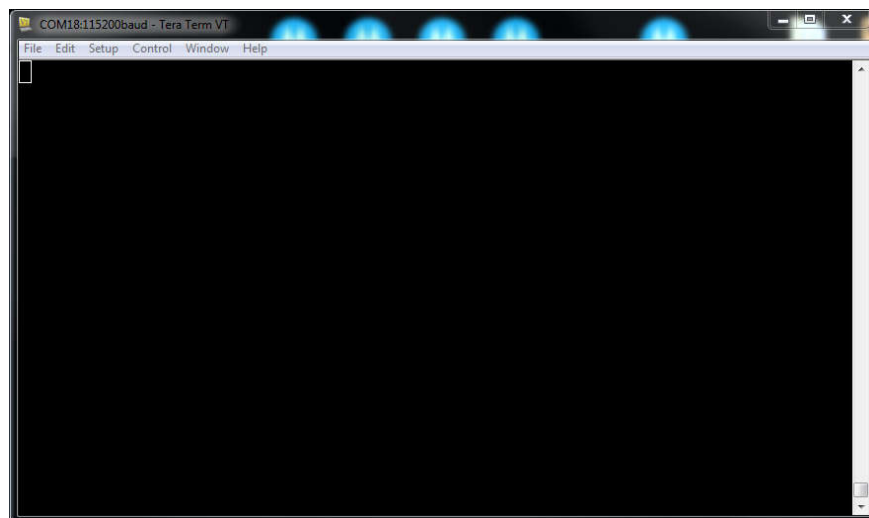


FIGURE 10: Main Tera Term Screen

Select SETUP> SERIAL PORT from the top menus. Select the serial port as determined above, and set the Baud Rate and other parameters as shown below:

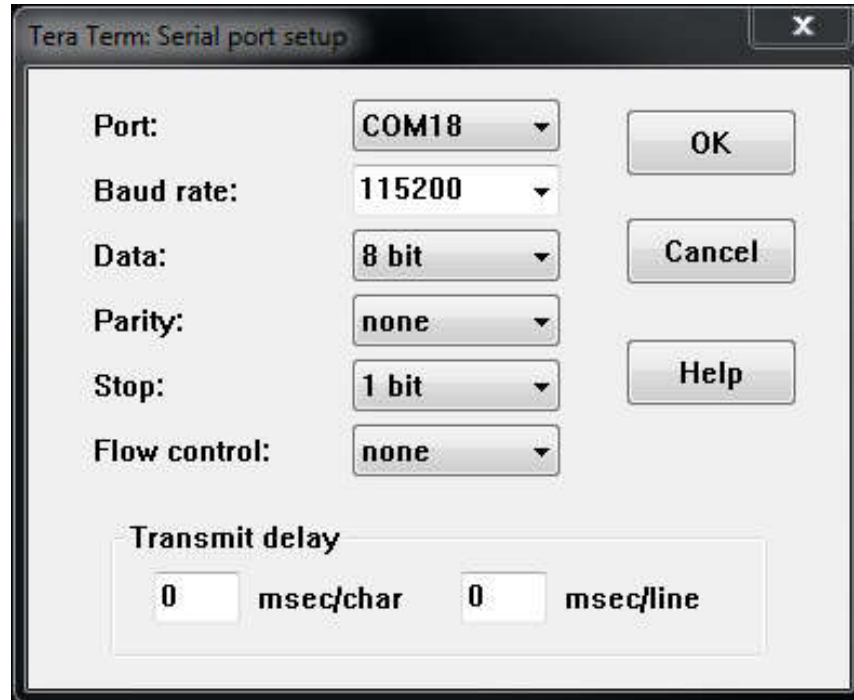


FIGURE 11: Port Setup

Click ok. Select SETUP>SAVE SETUP. Save the "TERATERM.INI" file. Then close Tera Term.

The next time Tera term is started it will open with these settings.

NOTE: The seral port only exists as long as the TDFM radio is connected to the PC and is in the Bootload mode. Tera Term will not find the serial port if the radio is not already connected and in the Bootload mode.

SECTION 2: INITIAL SW UPDATE PROCEDURE

NOTE: These procedures will reset the Configuration Menu settings and Maintenance Menu settings to factory defaults for the target radio. It is highly recommended that all the custom settings in the Configuration Menu and Maintenance Menus be recorded prior to this upgrade procedure. After the upgrades are complete, the settings should be restored to the previous settings before putting the radio back into service.

RECORDING THE RADIO SETUPS:

To access the Configuration Menu, Press the FUNC key and then the NEXT soft key. Press the Second Side Button. Record all the first page value settings. Press the NEXT soft key to step to the next page. Record all the settings on all pages. Press HOME to exit to normal mode.

To access the Maintenance menu, Press the FUNC key, and then the Next soft key. Press the Second Side Button to reach the Configuration Menu. Press the MODE key to access the first page of the Maintenance Menu. Record all settings. Press NEXT soft key to step to the next page. Record all settings on all pages. Press HOME to exit to normal mode.

PUTTING THE RADIO INTO BOOTLOAD MODE:

The TDFM-9000 series radio unit must be put into Bootload mode to update the software.

Power up the radio by pressing the knob, and before the TIL Logo disappears, press and hold down the #7, 2, 3 & 0 keys together until the display shows the Bootloader screen. See below.

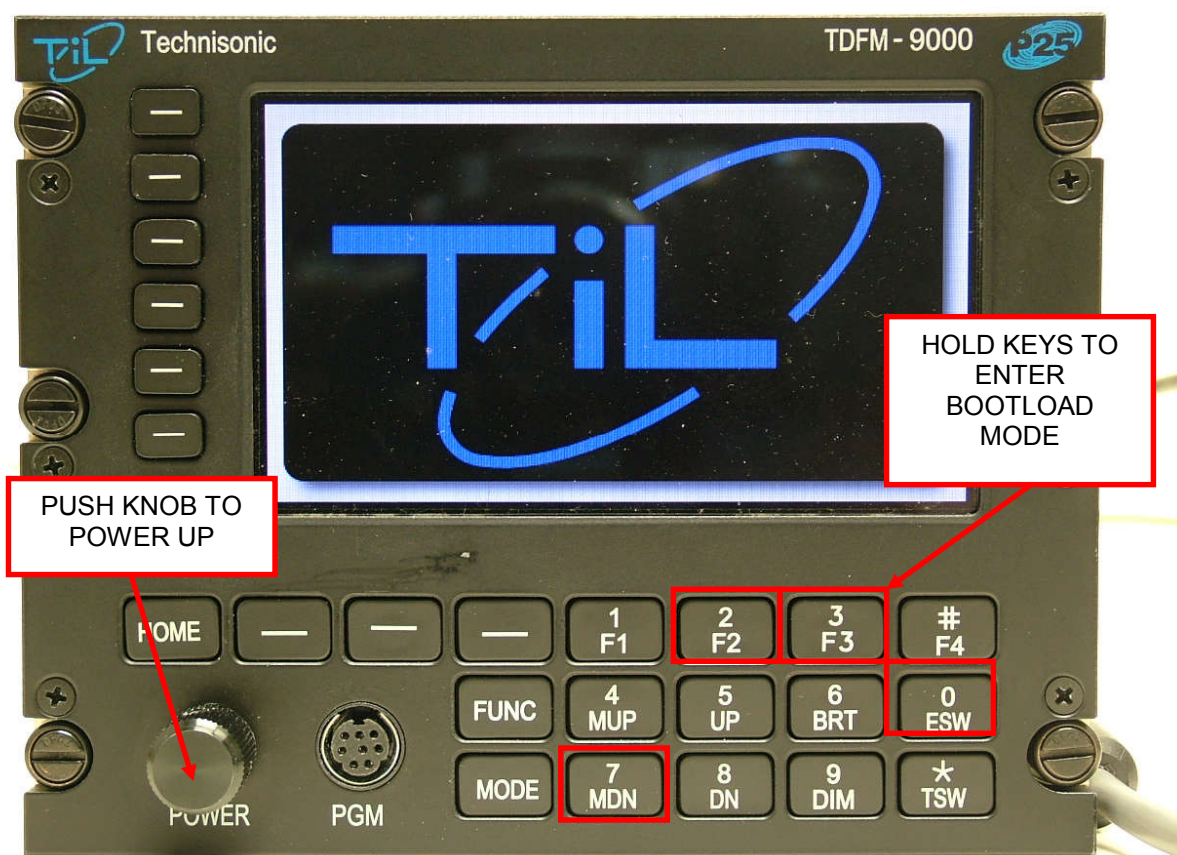


FIGURE 12: Invoking the Bootloader Mode



FIGURE 13: The Bootloader Screen

CONNECTING THE RADIO TO THE PC:

Connect the radio to the PC with the PC-9000 programming cable (P/N 127499).

Plug the 8 pin Mini-Din connector into the PGM port on the TDFM-9000 and the other end into a USB port on the PC. Wait for the USB cable to enumerate. See Figure 14 below:

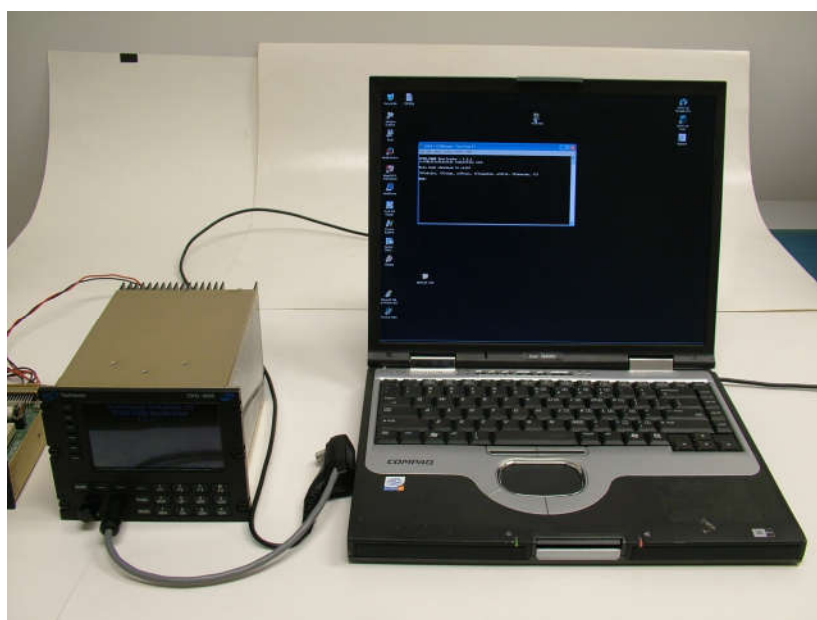
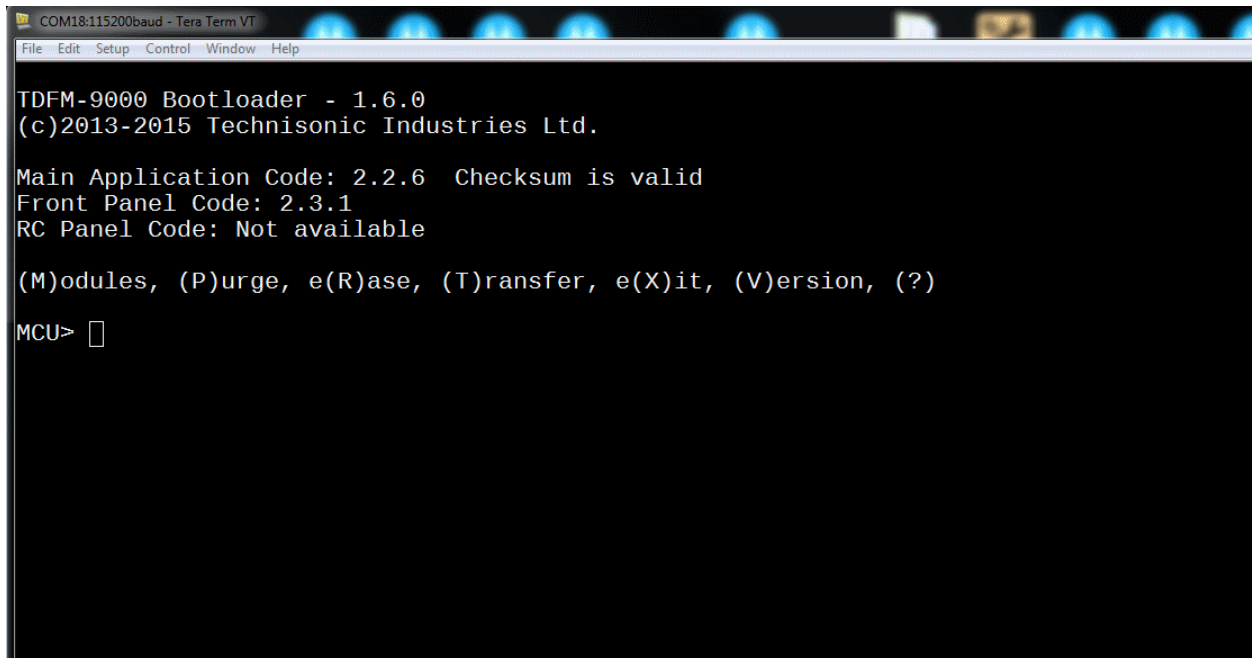


FIGURE 14: Typical Hook Up To PC

Start Tera Term with the radio connected to the PC. The terminal program should recognize the radio serial port. If it doesn't, set the serial port as determined above from the computer's Device Manager. Press <ENTER> on the terminal screen to confirm connection and to bring up the Bootloading Menu.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.6.0
(c)2013-2015 Technisonic Industries Ltd.

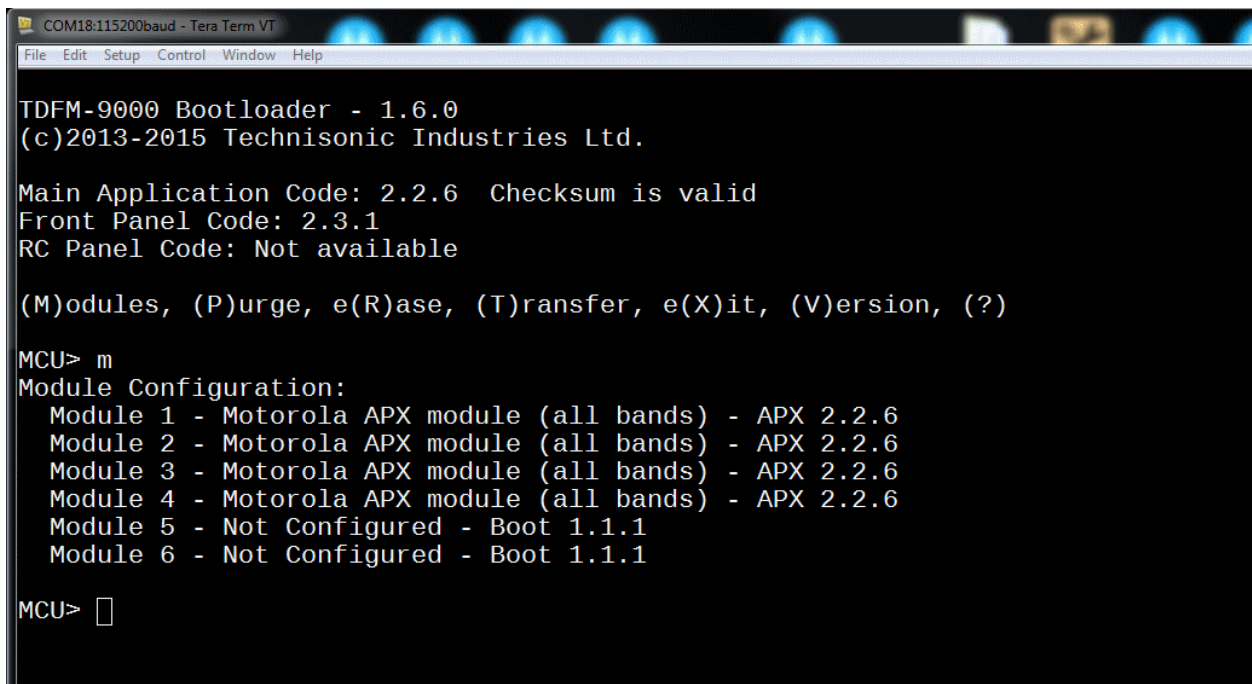
Main Application Code: 2.2.6 Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> 
```

FIGURE 15: Bootloader Menu

Type “m” and <ENTER> to display the current software versions installed in the TDFM-9000.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.6.0
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.2.6 Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.2.6
Module 2 - Motorola APX module (all bands) - APX 2.2.6
Module 3 - Motorola APX module (all bands) - APX 2.2.6
Module 4 - Motorola APX module (all bands) - APX 2.2.6
Module 5 - Not Configured - Boot 1.1.1
Module 6 - Not Configured - Boot 1.1.1

MCU> 
```

FIGURE 16: Interface Software Installed In the Radio

UPDATING THE BOOTLOADER SW:

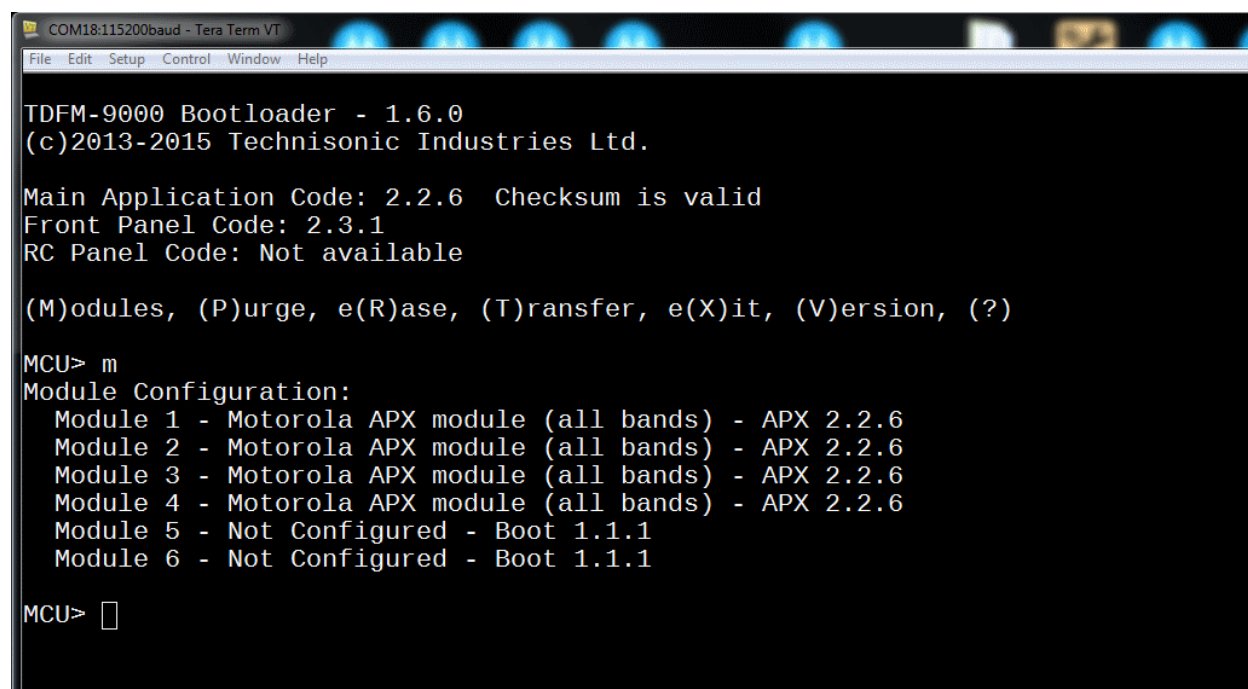
There may be several pieces of software that need to be uploaded to the radio. Bootloader SW, Main SW, Interface SW, Analog Module SW and for radios with MOD 9, the Front Panel SW can also be updated. The Bootloader SW manages and facilitates the ability to field load the operating SW for the 9000s.

Check the bootloader SW version after confirming connection to the terminal. The Bootloader Version is listed at the top of the page. If the version reported is at V1.7.2, then it is up to date and updating the bootloader SW can be skipped. Proceed to Sections 3, 4 or 5 for update procedures for the TDFM-9000, 9300 or 9200 radios.

If the bootloader SW reported is anything below V1.7.2, then the bootloader must be updated.

Type m <ENTER> to display the Bootloader Table. This displays how many RF modules are installed and the Interface SW version.

NOTE: Record the table configuration of modules, as it will be needed to reset the table after the Bootloader SW is updated.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.6.0
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.2.6 Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

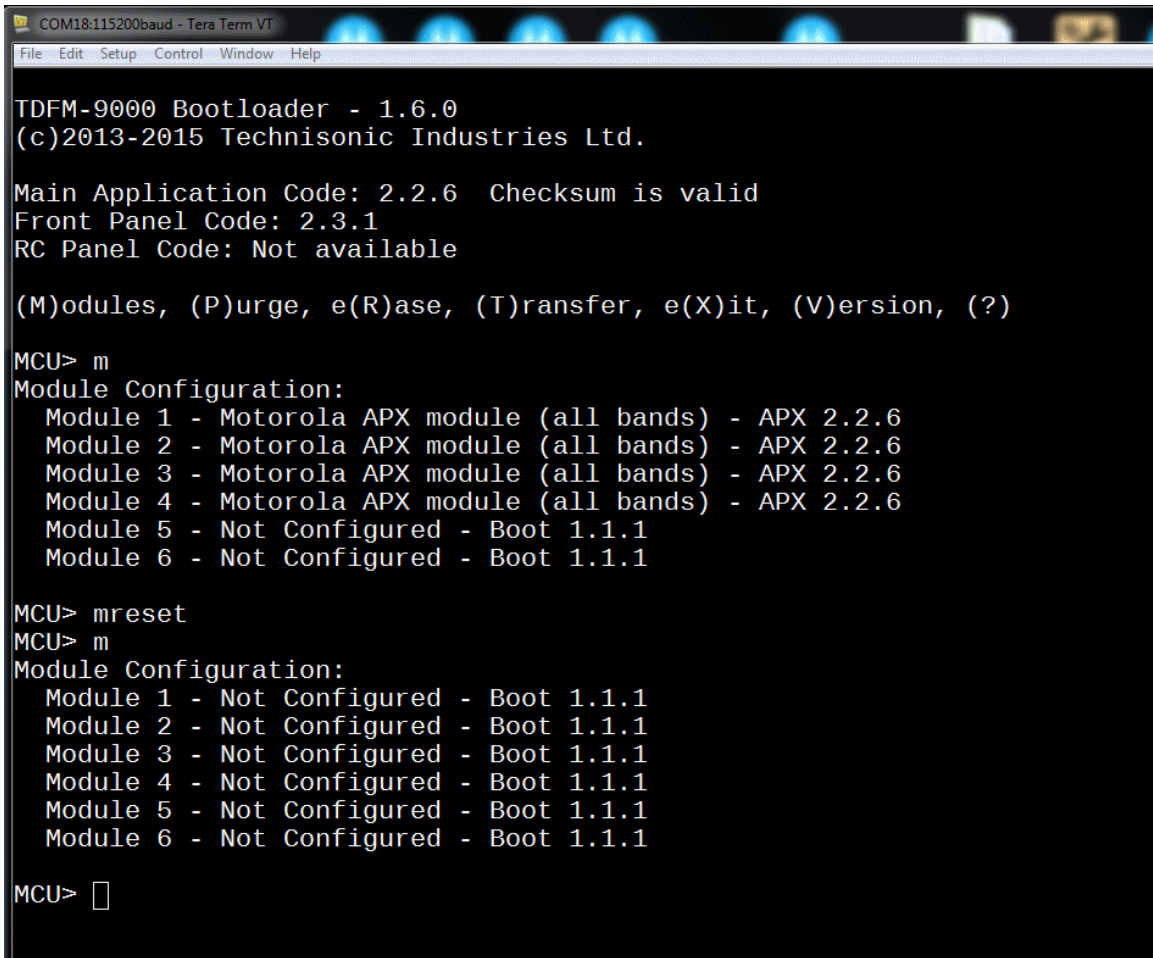
MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.2.6
  Module 2 - Motorola APX module (all bands) - APX 2.2.6
  Module 3 - Motorola APX module (all bands) - APX 2.2.6
  Module 4 - Motorola APX module (all bands) - APX 2.2.6
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1

MCU> 
```

FIGURE 17: The Bootloader Table Setup with 4 modules shown.

Type m reset <ENTER> this will clear the Bootloader Table.

Type m <ENTER> to confirm the table is cleared.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.6.0
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.2.6 Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.2.6
  Module 2 - Motorola APX module (all bands) - APX 2.2.6
  Module 3 - Motorola APX module (all bands) - APX 2.2.6
  Module 4 - Motorola APX module (all bands) - APX 2.2.6
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1

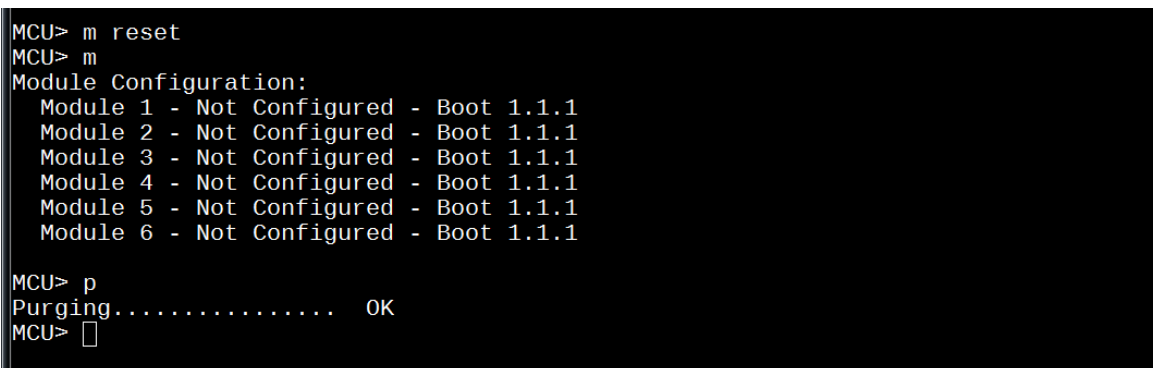
MCU> mreset
MCU> m
Module Configuration:
  Module 1 - Not Configured - Boot 1.1.1
  Module 2 - Not Configured - Boot 1.1.1
  Module 3 - Not Configured - Boot 1.1.1
  Module 4 - Not Configured - Boot 1.1.1
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1

MCU> 
```

FIGURE 18: The Bootloader Table Cleared.

The main memory needs to be erased before uploading the new Bootloader SW.

Type p <ENTER> to purge the main memory.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.6.0
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.2.6 Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> m reset
MCU> m
Module Configuration:
  Module 1 - Not Configured - Boot 1.1.1
  Module 2 - Not Configured - Boot 1.1.1
  Module 3 - Not Configured - Boot 1.1.1
  Module 4 - Not Configured - Boot 1.1.1
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1

MCU> p
Purging..... OK
MCU> 
```

FIGURE 19: Purging the main memory

To upload the Bootloader software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the location of the Bootloader SW File on the PC and select the file. The file should have a name “9000_MCU_BootUpdate_1.7.2.s19” or similar. On the Terminal window a transfer screen will come up with a progress bar. On the radio the display will show a progress bar on the bottom of the screen as the data is transferred. See Figures 20 and 21.

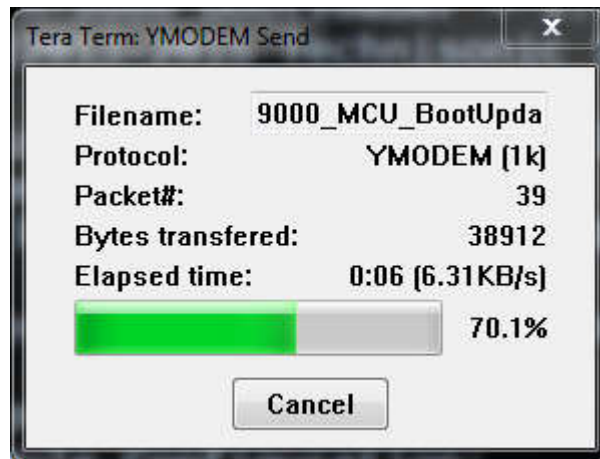


FIGURE 20: Progress Window on PC.



FIGURE 21: Progress Bar on the radio.

Once the Bootloader file has been loaded, remove the programming cable from the radio and power cycle the radio. After power up, the radio will erase the old bootloader and install the new one. This will take a few more seconds than normal to boot into the new Bootloader. The Bootloader screen should come up as per Figure 22.



FIGURE 22: The Updated Bootloader Screen.

Reconnect the programming cable and close the terminal. Open a new instance of Tera Term and re-establish connection to the radio.

At this point, the Bootloader Table must be defined before the new Main and JM 60 interface SW can be installed. New JM 60 SW must be installed in all the interface micros as part of the initialization process.

The Bootloader Table must be configured to have all 6 modules as APX.

Type `m <ENTER>` to display the current configuration of the Table. It should show all the modules as "Not Configured - Boot 1.1.1". To set all modules as APX, type in the following commands on the terminal:

`m1 apx<ENTER>`

`m2 apx<ENTER>`

`m3 apx<ENTER>`

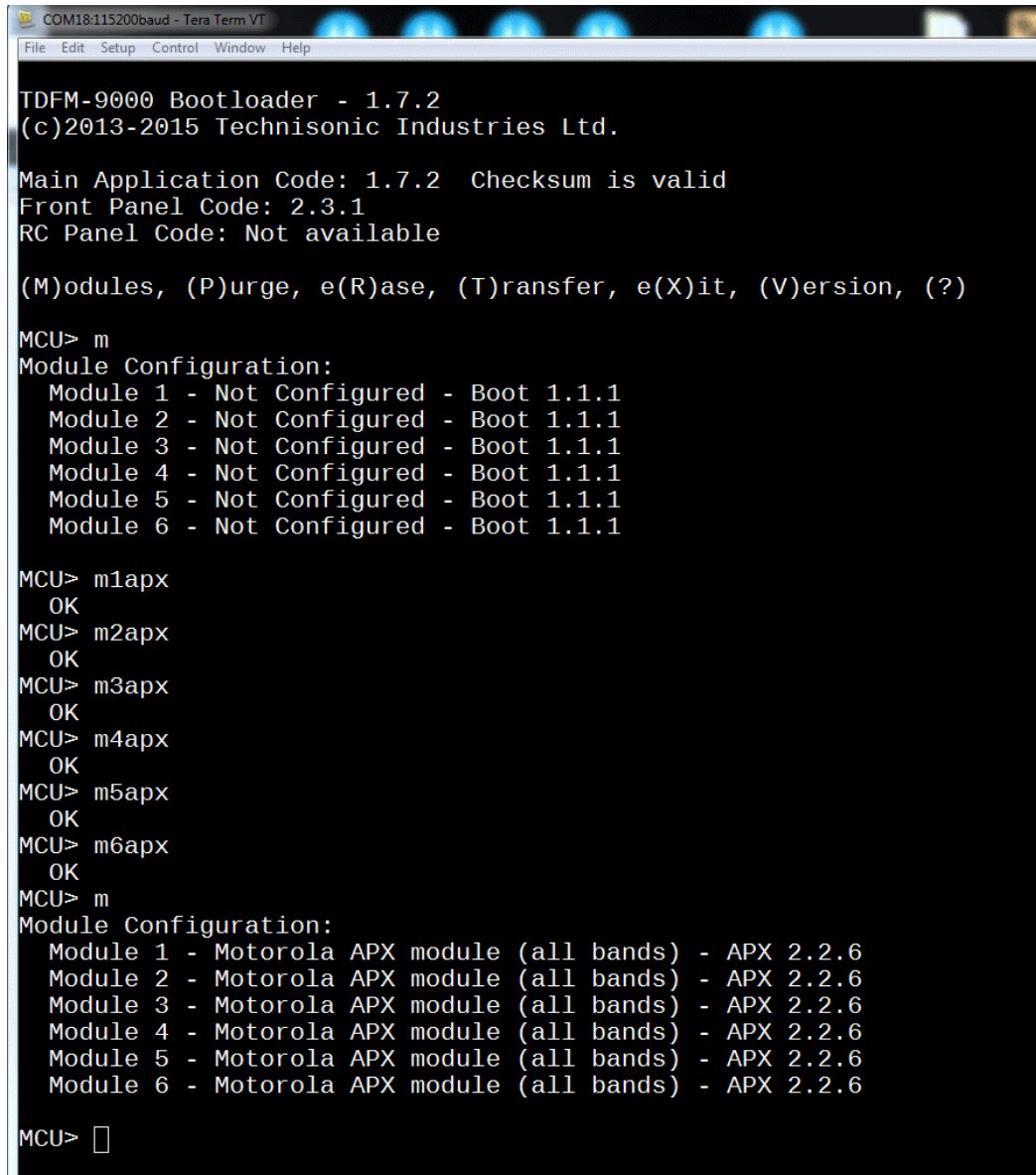
`m4 apx<ENTER>`

`m5 apx<ENTER>`

`m6 apx<ENTER>`

These commands tell the Bootloader what module types are installed in all the positions so it knows where to send the Main and JM 60 interface SW in the radio.

Type m <ENTER> to display the current configuration of the table. It should show the previous module types and the JM 60 SW versions.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 1.7.2 Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> m
Module Configuration:
  Module 1 - Not Configured - Boot 1.1.1
  Module 2 - Not Configured - Boot 1.1.1
  Module 3 - Not Configured - Boot 1.1.1
  Module 4 - Not Configured - Boot 1.1.1
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1

MCU> m1apx
OK
MCU> m2apx
OK
MCU> m3apx
OK
MCU> m4apx
OK
MCU> m5apx
OK
MCU> m6apx
OK
MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.2.6
  Module 2 - Motorola APX module (all bands) - APX 2.2.6
  Module 3 - Motorola APX module (all bands) - APX 2.2.6
  Module 4 - Motorola APX module (all bands) - APX 2.2.6
  Module 5 - Motorola APX module (all bands) - APX 2.2.6
  Module 6 - Motorola APX module (all bands) - APX 2.2.6

MCU> 
```

FIGURE 23: Preloading the Bootloader Table.

The latest JM 60 interface SW should be loaded to ensure that all the interface micros have the same SW, even if it is not used on some modules.

To upload the JM 60 interface software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the location of the JM60 SW File on the PC and select the file. The JM 60 file should have a name of “11S152XX...s19” or similar. On the Terminal window a transfer screen will come up with a progress bar. The radio display will show a progress bar on the bottom of the screen as the data is transferred.

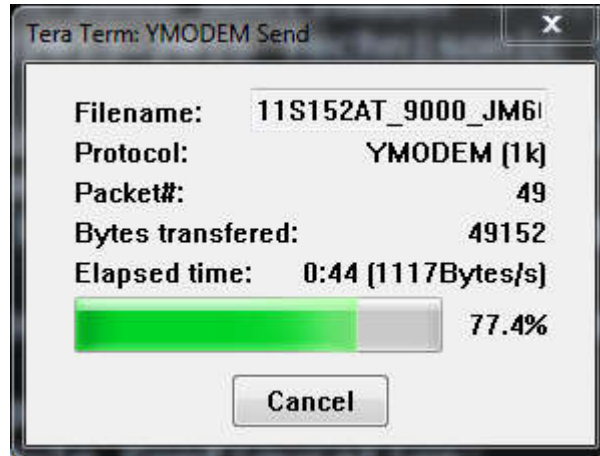


FIGURE 24: JM 60 SW Progress.

```
MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
  APX Dbg 2.6.0 - OK

MCU>
MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - Motorola APX module (all bands) - APX 2.6.0
  Module 4 - Motorola APX module (all bands) - APX 2.6.0
  Module 5 - Motorola APX module (all bands) - APX 2.6.0
  Module 6 - Motorola APX module (all bands) - APX 2.6.0

MCU> □
```

FIGURE 25: All Modules Loaded With the New JM 60 SW.

The Bootloader Table can now be reconfigured back to the radio’s setup after the initialization. As above, the radio originally only had 4 APX modules so positions 5 & 6 need to be deactivated.

Type m5 reset <ENTER> to deactivate module #5.

Type m6 reset <ENTER> to deactivate module #6.

This should leave modules 1 to 4 configured for APX modules.

Type m <ENTER> to verify the modules are configured correctly.

```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help
m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - Motorola APX module (all bands) - APX 2.6.0
Module 4 - Motorola APX module (all bands) - APX 2.6.0
Module 5 - Motorola APX module (all bands) - APX 2.6.0
Module 6 - Motorola APX module (all bands) - APX 2.6.0

MCU> m5 reset
OK
MCU> m6 reset
OK
MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - Motorola APX module (all bands) - APX 2.6.0
Module 4 - Motorola APX module (all bands) - APX 2.6.0
Module 5 - Not Configured - Boot 1.1.1
Module 6 - Not Configured - Boot 1.1.1
```

FIGURE 26: Bootloader Table Configured to Radio's Original Configuration.

At this point the radio is ready to have the Main and other SW installed. Proceed to Section 3 instructions for TDFM-9000, Section 4 for TDFM-9300 or Section 5 for TDFM-9200.

UPDATATING THE FRONT PANEL SW:

TDFM-9000 radios & RC-9000s equipped with "MOD 9" have hardware front panels that can be field updated via the bootloader. Older radios that do not have "MOD 9" hardware are not field upgradable. This procedure describes how to update the "MOD9" front panels on the TDFM-9000s and RC-9000s. The procedure is similar to updating Main or JM 60 SW.

Determine that the radio (or RC) has MOD 9 hardware by checking the Modification Record Label. If #9 is blacked out then the unit has the newer upgradable front panel hardware. The record label is located on the left side of the TDFM-9000/9200/9300 radios and on the back of the RC-9000s.

Power up the radio and/or RC-9000. The front panels will indicate the SW version under the TIL LOGO. If the SW Version is lower than V3.1.0, then it will need to be updated. Current Front panel SW is V 3.2.0.

If the Radio or RC unit displays V2.3.1 SW, they cannot be updated. These units do not have MOD 9 hardware.

Power up the radio and put it into Bootload mode. Establish connection to the terminal program as described above. Press <ENTER>.



FIGURE 27: Front Panel Splash Screen with Old SW V3.0.1

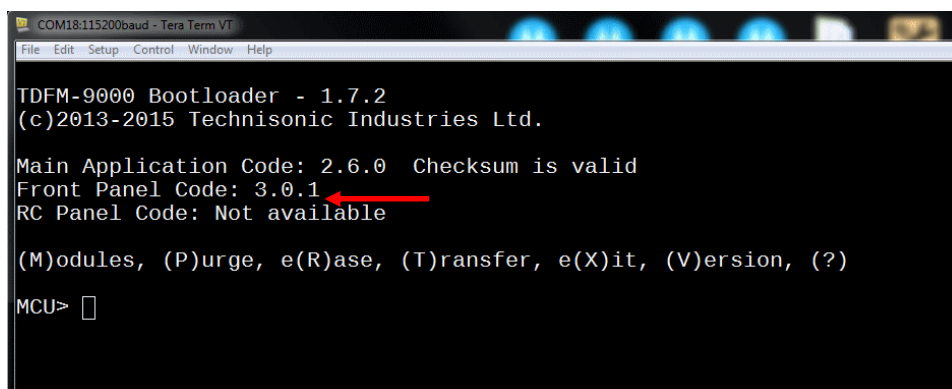
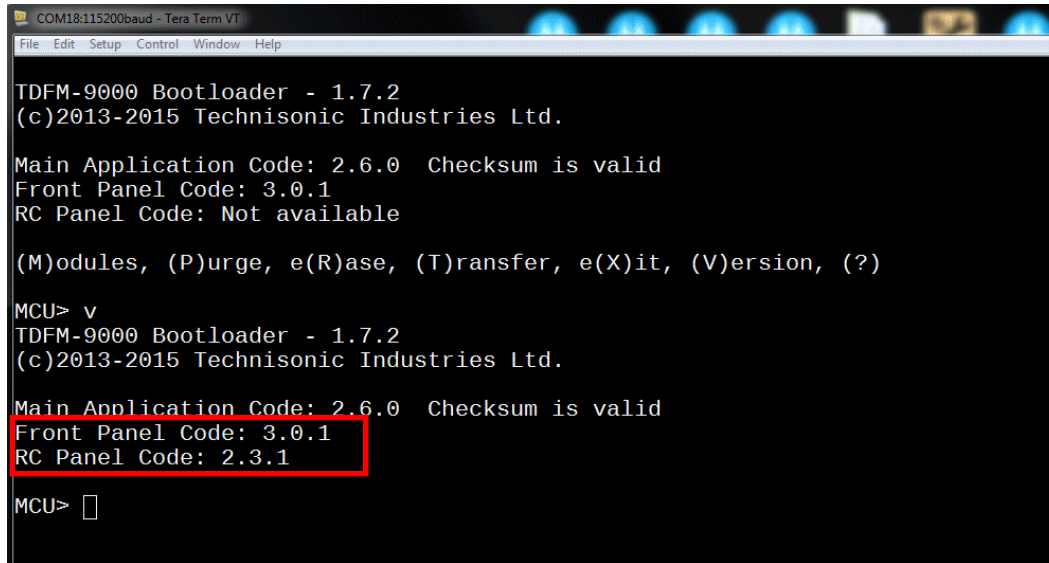


FIGURE 28: Bootloader Code Shows FP SW Version (V3.01)

If you connect an RC unit, let it boot up and put the radio in to Bootload mode.
Type v<ENTER> to display the Front Panel SW version of both the Radio and the RC front panels.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.6.0 Checksum is valid
Front Panel Code: 3.0.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> v
TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.6.0 Checksum is valid
Front Panel Code: 3.0.1
RC Panel Code: 2.3.1

MCU> 
```

FIGURE 29: Determining the SW Versions of the Radio and RC Front Panels.

To upload the Front Panel software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the front panel software on the PC and select the file. The Front panel SW file should have a name of “16S191B_LCD-FPanel_3.1.0.s19” or similar. On the Terminal window a transfer screen will come up with a progress bar. On the radio the display will show a progress bar on the bottom of the screen as the data is transferred.

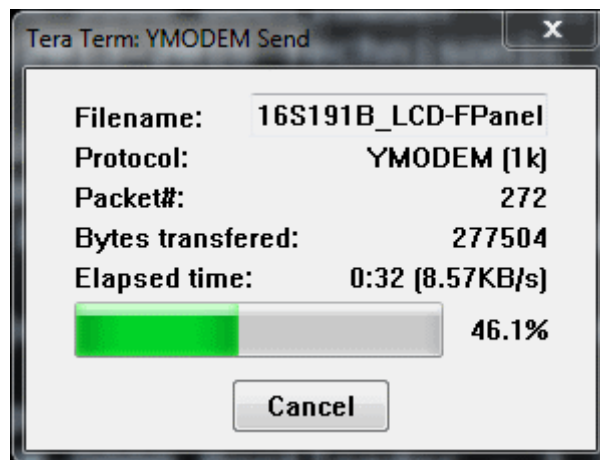


FIGURE 30: Front Panel SW Progress.



FIGURE 31: Progress Bar on the Radio/RC.

The Radio will display a “Done” message when the upload is complete. The Terminal program will show the upload was completed ok.

```
COM18115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.6.0 Checksum is valid
Front Panel Code: 3.0.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> v
TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.6.0 Checksum is valid
Front Panel Code: 3.0.1
RC Panel Code: 2.3.1

MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  LCD-FPanel 3.1.0 - OK

MCU> 
```

FIGURE 32: Upload Ok

NOTE: If an RC is connected to the radio and the Front Panel SW is updated, it will update both the Front Panel and the RC SW at the same time. This is true only if both Panels are MOD 9 hardware. If one is the older type and the other is MOD 9, only the MOD 9 Front panel will be updated and the other will safely ignore the update.

Disconnect the programming cable, and power cycle the radio. Verify the Radio (and RC-9000) boots and displays the new Front Panel SW version.



FIGURE 33: Radio Splash Screen with new SW Displayed (V3.1.0)

UPDATATING THE ASU-9000 SW:

Updating the software for the ASU-9000 cannot be updated by its self. The ASU must be connected to a TDFM-9000 or 9300 radio with the Bootloader SW V 1.8.1 or higher.

- 1) Connect the ASU-9000 to the TDFM-9000 or 9300 radio with the harness diagram as shown in the ASU-9000 install manual.
- 2) Power up the ASU and then power up the radio into Bootload mode. Establish connection to the terminal program as described above. Press <ENTER>.

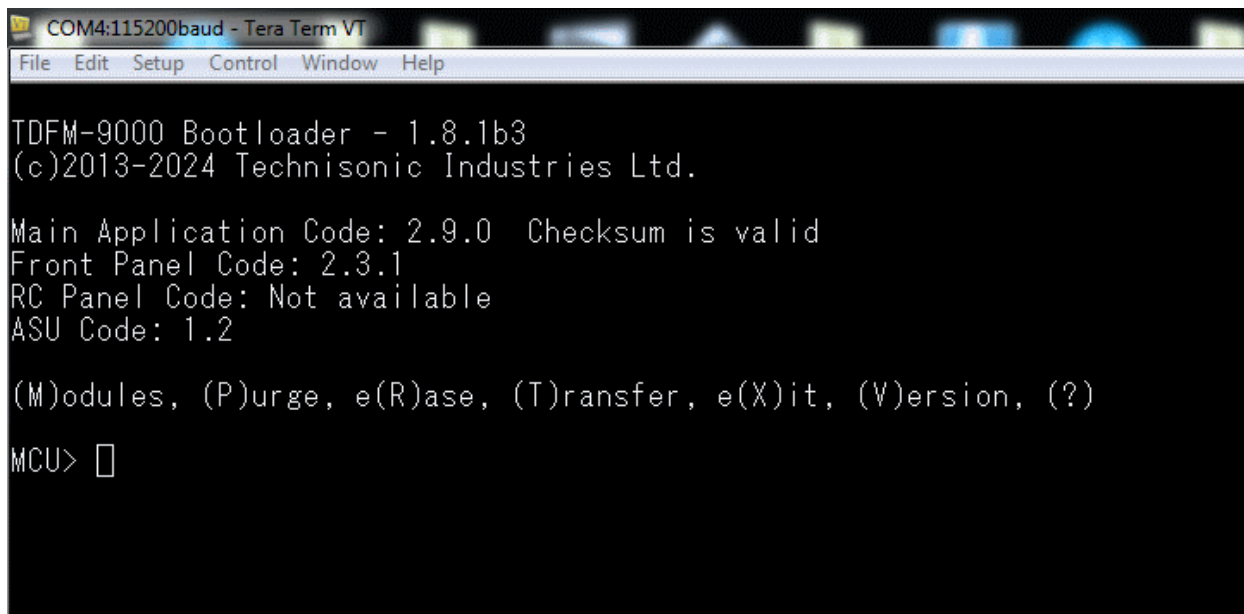


FIGURE 34: Bootloader Screen

- 3) To upload the ASU software press "t" on the terminal then click on FILE>TRANSFER>Y MODEM>SEND. Navigate to the ASU software on the PC and select the file. The ASU SW file should have a name of "22S208X_ASU-9000_Main_Y.Y.s19" or similar. On the Terminal window a transfer screen will come up with a progress bar.

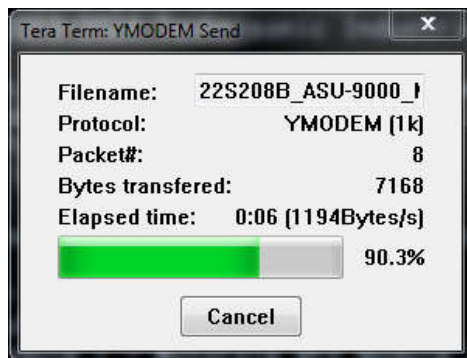
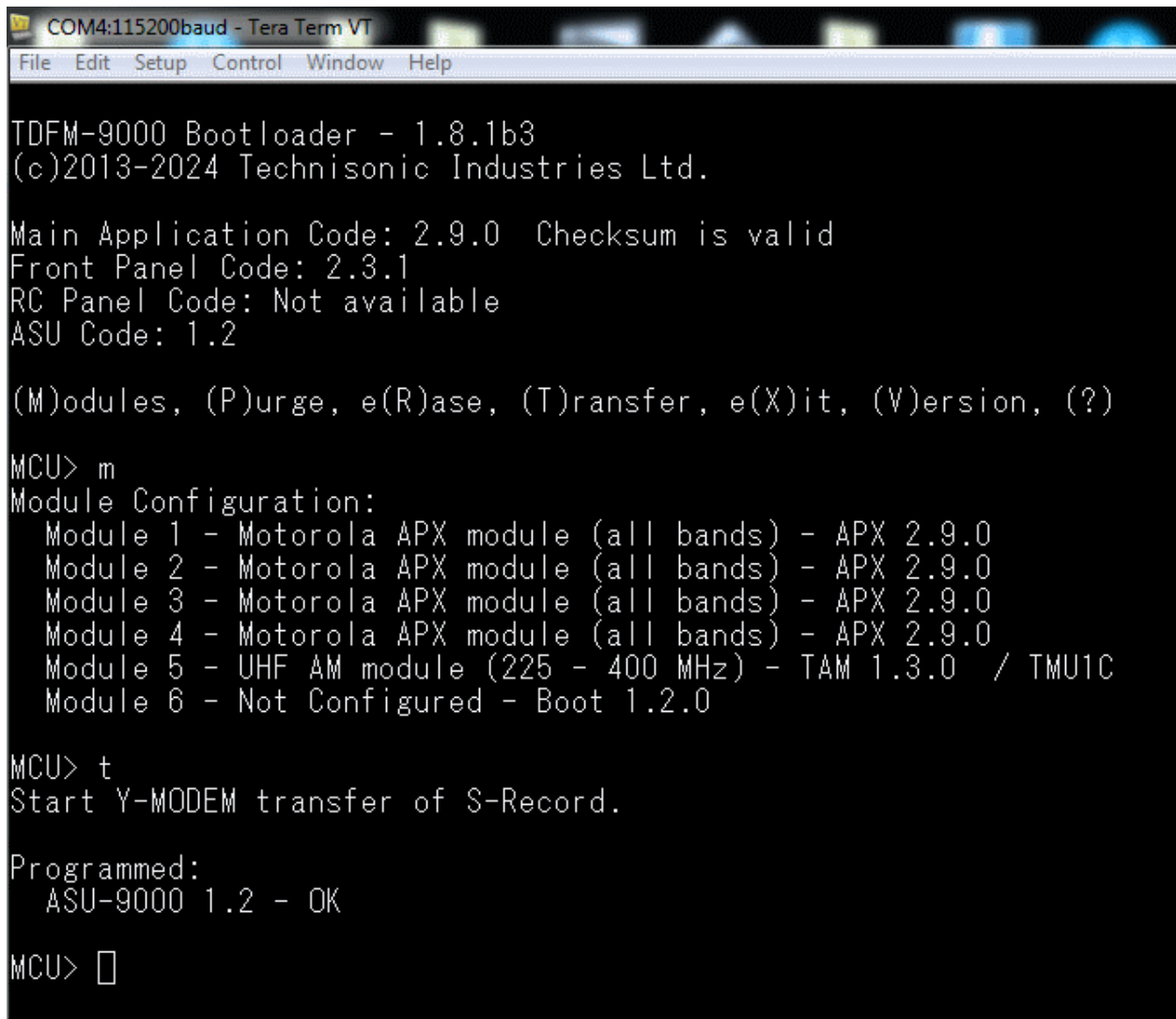


FIGURE 35: ASU SW Progress.

The Radio will display a "Done" message when the upload is complete. The Terminal program will show the upload was completed ok.



```
COM4:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.8.1b3
(c)2013-2024 Technisonic Industries Ltd.

Main Application Code: 2.9.0  Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available
ASU Code: 1.2

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.9.0
  Module 2 - Motorola APX module (all bands) - APX 2.9.0
  Module 3 - Motorola APX module (all bands) - APX 2.9.0
  Module 4 - Motorola APX module (all bands) - APX 2.9.0
  Module 5 - UHF AM module (225 - 400 MHz) - TAM 1.3.0 / TMU1C
  Module 6 - Not Configured - Boot 1.2.0

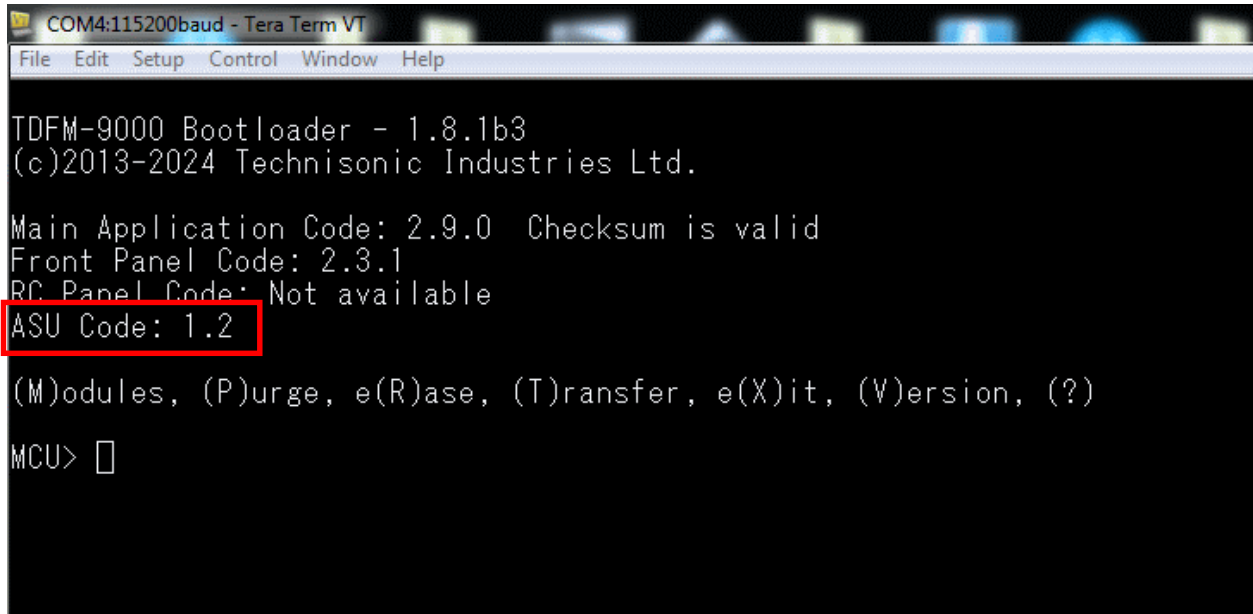
MCU> t
Start Y-MODEM transfer of S-Record.

Programmed:
  ASU-9000 1.2 - OK

MCU> □
```

FIGURE 36: Upload Complete

- 4) Verify the ASU code. Disconnect the cable to the PC and reconnect the terminal. Press ENTER to bring up the bootloader prompt. The terminal will display the ASU SW version installed.



```
COM4:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.8.1b3
(c)2013-2024 Technisonic Industries Ltd.

Main Application Code: 2.9.0 Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available
ASU Code: 1.2

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> 
```

FIGURE 37: Initial Bootloader Screen Shows the ASU SW Version

- 5) Disconnect the programming cable, and power cycle the radio. Verify the Radio boots. Set the radio to Forestry Mode in the Supervisor Menu.
- 6) Verify the radio keys the modules as selected while connected to the ASU-9000.

SECTION 3: TDFM-9000 RADIO SW UPDATE PROCEDURE

This section describes the SW update procedure for the TDFM-9000 radios only. Procedures for the TDFM-9300 and TDFM-9200 are described in Sections 4 & 5 respectively.

NOTE: This procedure will reset the Configuration Menu settings and Maintenance Menu settings to factory defaults for the target radio. It is highly recommended that all the custom settings in the Configuration Menu and Maintenance Menus be recorded prior to this upgrade procedure. After the upgrade is complete, the settings should be restored to the previous settings before putting the radio back into service.

TDFM-9000 radios only require two pieces of SW to be loaded. The Main software and the APX Module JM60 Interface software. The normal practice is to update the JM 60 Interface software first, purge the Main memory and then update Main software.

Obtaining The Latest Software:

Technisonic is always improving the products. Software may be revised from time to time.

Use the latest SW Version available. Visit the Technisonic website <https://til.ca/tdfm9000software/> to obtain the latest SW packages.

Table 1 below shows a list of all the software files that would be used for the TDFM-9000 radios. All files have a file name convention of: (Software P/N.S19); Eg: 11S151E.S19 would be a file for the Main software.

TDFM-9000 SERIES SOFTWARE TABLE		
SOFTWARE	SW Part Number	FILE NAME
MAIN SW	11S151	*11S151xx_9000_Main_Vy_y_y.s19
APX INTERFACE (JM 60)	11S152	*11S152xx_9000_JM60_APX_Vy_y_y.s19
FRONT PANEL SW (MOD 9)	16S191	*16S191x_LCD-FPanel_y.y.y.s19

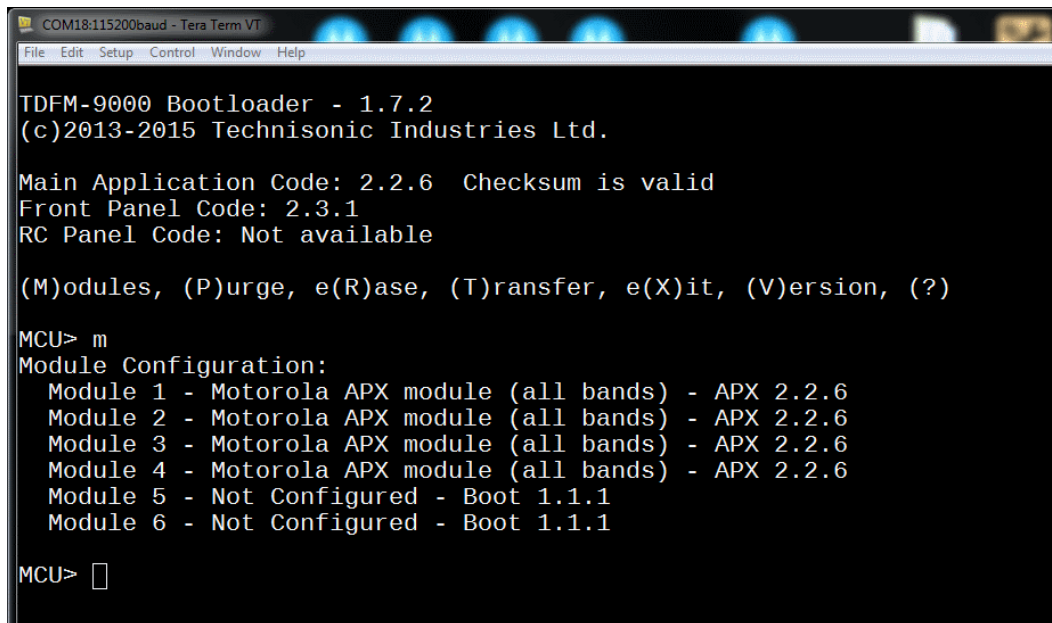
TABLE 1

NOTE: * x is the revision of the SW and yyy is the Version Number displayed of the SW.

MAIN AND JM60 SW UPDATE

Power up the radio and put it into Bootload mode. Establish connection to the terminal program as described in Section 2.

Type m <ENTER> at the prompt on the terminal. This will show the Bootloader Table configuration for the radio and shows the current version of the module Interface SW.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.2.6 Checksum is valid
Front Panel Code: 2.3.1
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.2.6
  Module 2 - Motorola APX module (all bands) - APX 2.2.6
  Module 3 - Motorola APX module (all bands) - APX 2.2.6
  Module 4 - Motorola APX module (all bands) - APX 2.2.6
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1

MCU> █
```

FIGURE 38: Bootloader Table Configuration (4 modules, Version 2.2.6)

To upgrade the Interface SW, it is necessary to update all the JM 60s to the same version. All the unused JM 60s must be enabled in the Bootloader Table. Type the following command to enable each unused JM 60:

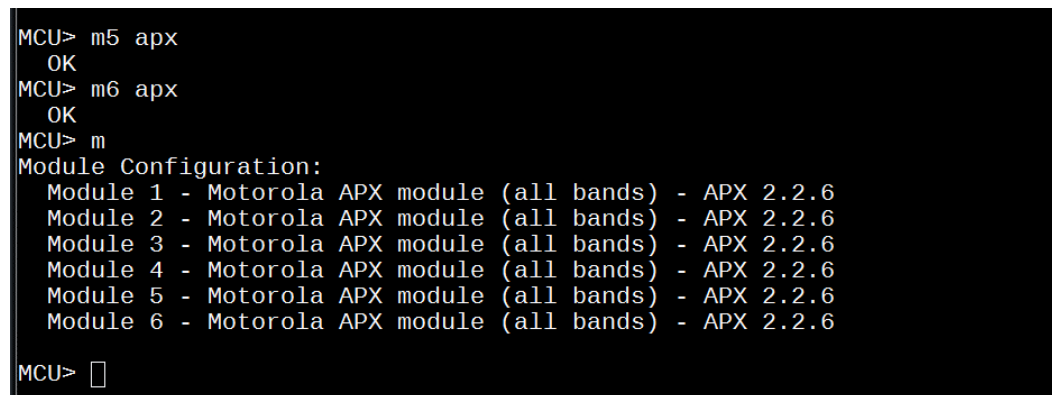
mX apx<ENTER>. Where "X" is the module slot number to be enabled. In this example modules # 5 and #6 need to be enabled.

Type in the following commands to enable modules 5 & 6:

M5 apx<ENTER>

m6 apx<ENTER>

Type m <ENTER> to verify all the JM 60s are enabled.



```
MCU> m5 apx
OK
MCU> m6 apx
OK
MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.2.6
  Module 2 - Motorola APX module (all bands) - APX 2.2.6
  Module 3 - Motorola APX module (all bands) - APX 2.2.6
  Module 4 - Motorola APX module (all bands) - APX 2.2.6
  Module 5 - Motorola APX module (all bands) - APX 2.2.6
  Module 6 - Motorola APX module (all bands) - APX 2.2.6

MCU> █
```

FIGURE 39: All JM 60s Enabled For Upgrade.

To upload the JM 60 Interface software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the interface software on the PC and select the file. Refer to Table 1 for the correct file name.

The JM 60 file should have a name of “11S152XX...s19” or similar. On the Terminal window a transfer screen will come up with a progress bar. On the radio the display will show a progress bar on the bottom of the screen as the data is transferred. See Figures 40 and 41.

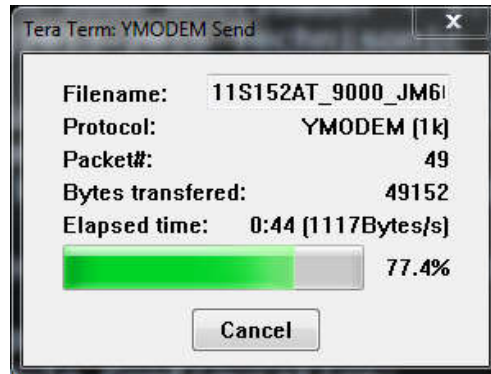


FIGURE 40: Terminal Progress Bar



FIGURE 41: JM 60 SW Radio Progress Bar

The radio will display “DONE” when the file has finished uploading.

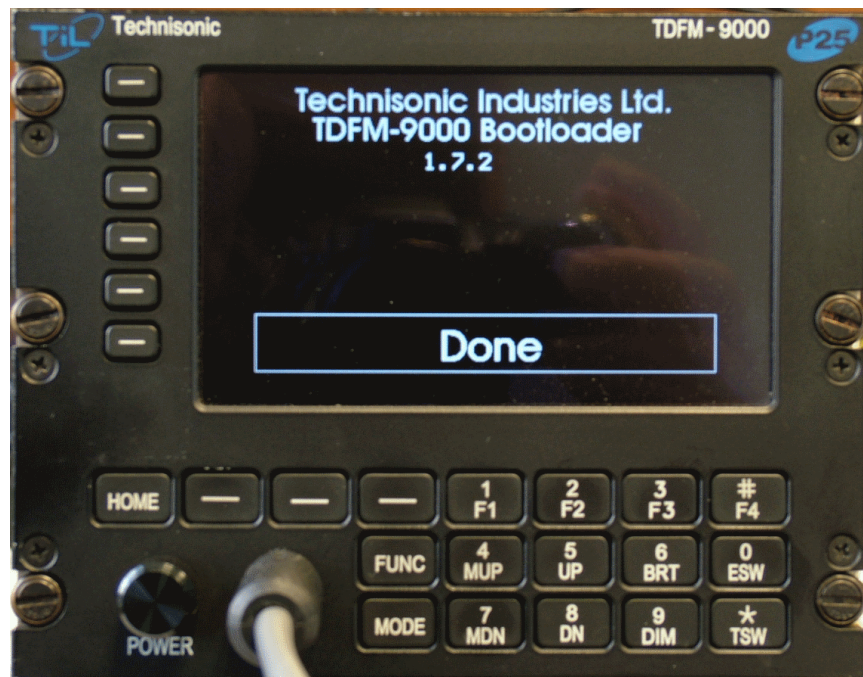


FIGURE 42: Upload Complete.

The Terminal will show the upload was ok.

```
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.2.6
Module 2 - Motorola APX module (all bands) - APX 2.2.6
Module 3 - Motorola APX module (all bands) - APX 2.2.6
Module 4 - Motorola APX module (all bands) - APX 2.2.6
Module 5 - Motorola APX module (all bands) - APX 2.2.6
Module 6 - Motorola APX module (all bands) - APX 2.2.6

MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  APX Dbg 2.6.0 - OK
MCU> 
```

FIGURE 43: Uploaded File Programmed Ok.

Type m <ENTER> to verify all the JM 60 s were updated.

```
MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  APX Dbg 2.6.0 - OK

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - Motorola APX module (all bands) - APX 2.6.0
  Module 4 - Motorola APX module (all bands) - APX 2.6.0
  Module 5 - Motorola APX module (all bands) - APX 2.6.0
  Module 6 - Motorola APX module (all bands) - APX 2.6.0

MCU> 
```

FIGURE 44: All JM 60s Updated

The Bootloader Table must be reconfigured to the TDFM-9000's actual setup before the Main SW can be uploaded. Use the following command at the terminal to deactivate or disable any unused module slots:

Type mX reset <ENTER> where "X" is the module slot number. In this example module slots # 5 & 6 need to be deactivated as there are no modules installed in those positions.

Type m5 reset <ENTER>

Type m6 reset <ENTER>

```
MCU> m5 reset
OK
MCU> m6 reset
OK
MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - Motorola APX module (all bands) - APX 2.6.0
  Module 4 - Motorola APX module (all bands) - APX 2.6.0
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1
```

FIGURE 45: Bootloader Table Reconfigured to the Radio's Actual Setup.

Type p <ENTER> to purge the Main memory before uploading the Main SW.

To upload the Main software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND. Navigate to the Main software on the PC and select the file. Refer to Table 1 for the correct file name. The Main SW file should have a name of “11S151XX...s19” or similar. The Terminal transfer screen will come up on the computer and a progress bar will show on the radio. See Figures 46 & 47.

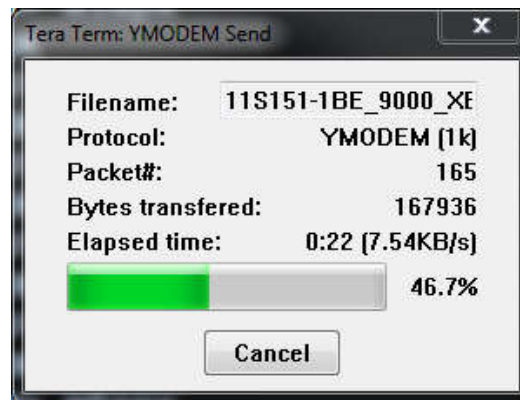


FIGURE 46: Terminal Progress Bar



FIGURE 47: Radio Progress Bar


```

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - Motorola APX module (all bands) - APX 2.6.0
  Module 4 - Motorola APX module (all bands) - APX 2.6.0
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1

MCU> p
Purging..... OK
MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  Main 2.6.0 - OK

MCU> 

```

FIGURE 48: Main SW Uploaded Ok.

Type m <ENTER> to review the JM 60 configuration.

Type v <ENTER> to display the current Main SW version and verify the checksum is valid.

```

MCU> p
Purging..... OK
MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  Main 2.6.0 - OK

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - Motorola APX module (all bands) - APX 2.6.0
  Module 4 - Motorola APX module (all bands) - APX 2.6.0
  Module 5 - Not Configured - Boot 1.1.1
  Module 6 - Not Configured - Boot 1.1.1

MCU> v
TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.6.0 Checksum is valid ←
Front Panel Code: 2.3.1
RC Panel Code: Not available

MCU> 

```

FIGURE 49: SW Update is Complete.

Disconnect the programming cable, and power cycle the radio. Verify the radio boots and detects all installed modules with the SW version installed.



FIGURE 50: Radio Booting with New SW

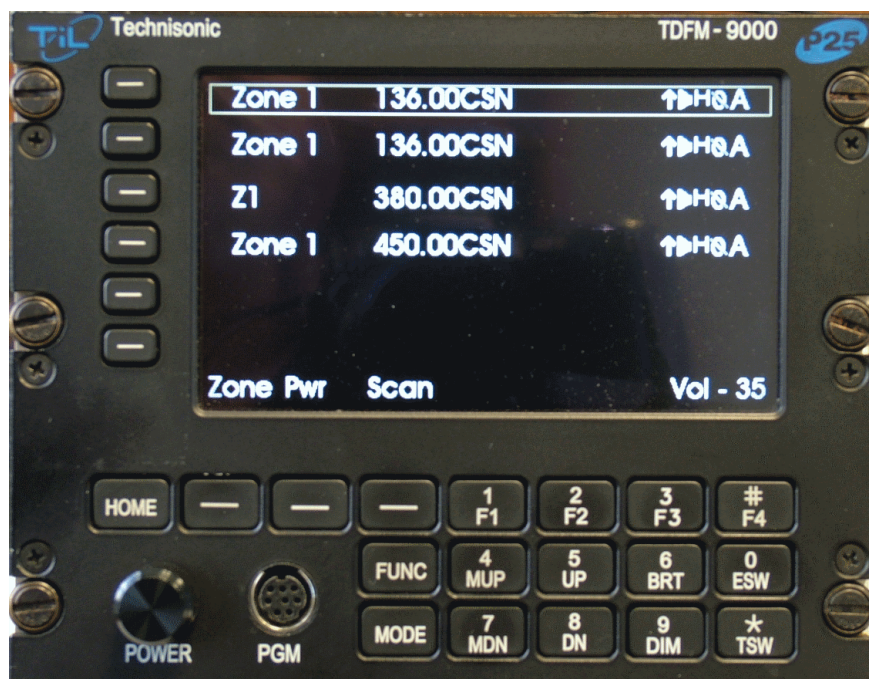


FIGURE 51: Radio Main Display

RESETTING CONFIGURATION SETTINGS

The Configuration Menus and the Maintenance Menus should be adjusted back to the previous settings as recorded once the radio has been updated successfully.

To access the Configuration Menu, Press the FUNC key and then the NEXT soft key. Press the Second Side Button. Adjust the Configuration Menus as they were prior to the update. Press the NEXT soft key to move through the rest of the pages. Press the HOME key to return to the normal screen when done.

To access the Maintenance Menu, Press the FUNC key, and then the Next soft key. Press the Second Side Button to reach the Configuration Menu. Press the MODE key to access the first page of the Maintenance Menu. Adjust the Maintenance Menu settings as they were prior to the SW update. Press the NEXT soft key to move through the rest of the pages. Press the HOME key to return to the normal screen when done.

RETUNING THE RADIO TO SERVICE

The radio can be returned to service by testing on the bench using the latest version of TIL Docs:

“136561 TDFM-9000 FINAL TEST PROCEDURE” &

“136562 TDFM-9000 TEST DATA SHEET”

Or, in the case of a simple SW upgrade, follow the procedure of:

“146611A TDFM-9000 SERIES QUICK FUNCTIONAL TEST”

These documents are supplied with the software package download from the TIL website.

Please note that TDFM-9000 series units are airworthiness approved on a non-hazard, non-interference basis and that the firmware is E-level which does not have to be controlled. Hence it is not mandatory to install the latest version of firmware.

SECTION 4: TDFM-9300 RADIO SW UPDATE PROCEDURE

This section describes the SW update procedure for the TDFM-9300 radios only. Procedures for the TDFM-9000 and TDFM-9200 are described in Sections 3 & 5 respectively.

NOTE: This procedure will reset the Configuration Menu settings and Maintenance Menu settings to factory defaults for the target radio. It is highly recommended that all the custom settings in the Configuration Menu and Maintenance Menus be recorded prior to this upgrade procedure. After the upgrade is complete, the settings should be restored to the previous settings before putting the radio back into service.

TDFM-9300 radios require several pieces of SW to be loaded. Most usual SW updates only require the Main and the JM 60 SW to be updated. All other SW in the 9300 will stay the same. In some cases loading all the SW would be required when updating the Bootloader or replacing the MCU board.

Obtaining The Latest Software:

Technisonic is always improving the products. Software may be revised from time to time. Use the latest SW Version available. Visit the Technisonic website <https://til.ca/tdfm9000software/> to obtain the latest SW packages.

Table 2 below shows a list of all the software files that would be used for the TDFM-9300 radios. All files have a file name convention of: (Software P/N.S19); e.g. 11S151E.S19 would be a file for the Main software.

TDFM-9300 SERIES SOFTWARE TABLE		
SOFTWARE	SW Part Number	*FILE NAME
MAIN SW	11S151	11S151xx_9000_Main_Vy_y.y.s19
APX INTERFACE (JM 60)	11S152	11S152xx_9000_JM60_APX_Vy_y.y.s19
ANALOG INTERFACE (TAM)	13S172	13S172x_TDFM-9300_Interface_TAM_y.y.y
ANALOG VHF LO (T1) !	07S119	07S119x_TDFM_9300_UpperMCU_VLO_TLUy
ANALOG VHFAM (T4) !	11S148	11S148x_TDFM_9300_UpperMCU_VAM_TAUy
ANALOG UHF AM (T5) !	13S169	13S169x_TDFM-9300_UpperMCU_UAM_TMUyy
MULTIBAND ANALOG (T6)!\$	24S210	24S210x_Multiband_T6_Vy.y.y.S19
FRONT PANEL SW (MOD 9)	16S191	16S191x_LCD-FPanel_y.y.y.s19

TABLE 2

NOTE: * x is the revision of the SW P/N and yyy is the Version Number displayed of the SW.
! Only one SW package can be loaded depending on the Analog Module installed for module # 5.
\$ For T6 modules, use TAM 1.3.0 or higher.

TDFM-9300 Variants

The TDFM-9300 has 4 variants, depending on which Analog Module is installed for Module #5.

The TDFM-9300 T1 has the VLO 30- 50 MHz FM module.

The TDFM-9300 T4 has the VAM 118 – 138 MHz AM module.

The TDFM-9300 T5 has the UAM 225 – 400 MHz AM module and

The TDFM-9300 T6 has the T6 30 - 400 MHz Multiband FM/AM Analog Module.

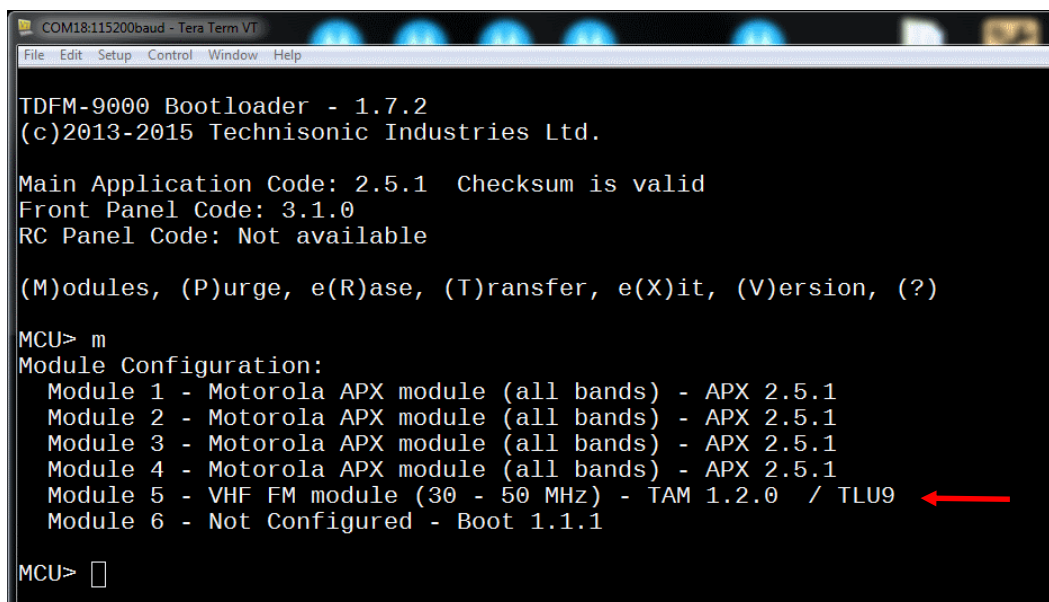
When updating all the SW in the 9300, determine which variant of 9300 you have and select the corresponding Analog SW for the installed module. Refer to the table above for the correct SW files. The 9300 variant (TX) is indicated by the last 2 digits of the radio's P/N and is located on the right hand side Main P/N Label.

TDFM-9300 SW UPDATE

Most SW updates for the TDFM-9300 only require the Main and JM 60 updates. The normal practice is to update the JM 60 Interface software first, Purge the Main memory and then update Main software.

Power up the radio and put it into Bootload mode. Establish connection to the terminal program as described in Section 2.

Type m <ENTER> at the prompt on the terminal. This will show the Bootloader Table configuration for the radio and shows the current SW version of the module Interface SW. Write down the setup of the Table as it will be needed later on.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.5.1 Checksum is valid
Front Panel Code: 3.1.0
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.5.1
  Module 2 - Motorola APX module (all bands) - APX 2.5.1
  Module 3 - Motorola APX module (all bands) - APX 2.5.1
  Module 4 - Motorola APX module (all bands) - APX 2.5.1
  Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU9
  Module 6 - Not Configured - Boot 1.1.1

MCU> 
```

FIGURE 52: Bootloader Table Configuration (4 modules + VLO)

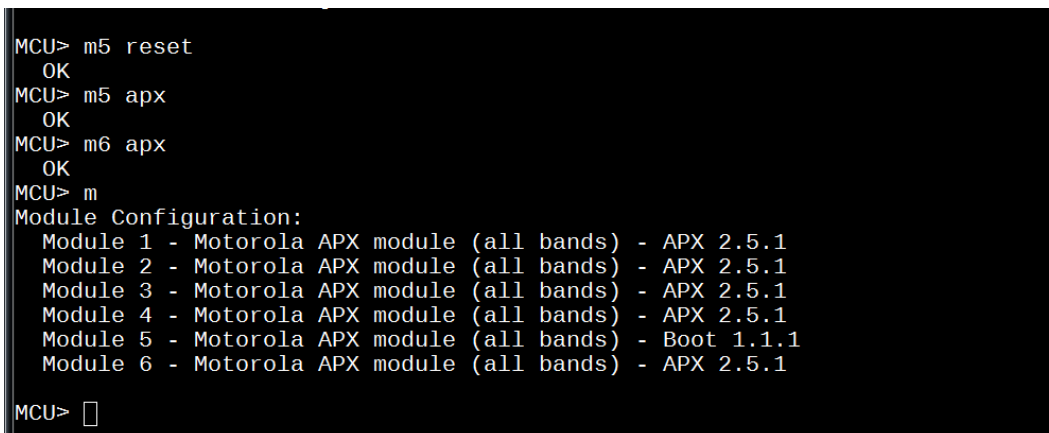
To upgrade the interface SW, it is necessary to update all the JM 60s to the same version. The analog module # 5 needs to be converted to APX and the # 6 unused JM 60 must be enabled in the Bootloader Table. Type the following commands to reconfigure the Table:

Type m5 reset <ENTER>. This will reset module # 5 in the Table.

Type m5 apx <ENTER>. This will reconfigure Module #5 for apx SW.

Type m6 apx <ENTER>. This will reconfigure Module #6 for apx SW.

Type m <ENTER> to verify all the JM 60s are enabled.



```
MCU> m5 reset
OK
MCU> m5 apx
OK
MCU> m6 apx
OK
MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.5.1
  Module 2 - Motorola APX module (all bands) - APX 2.5.1
  Module 3 - Motorola APX module (all bands) - APX 2.5.1
  Module 4 - Motorola APX module (all bands) - APX 2.5.1
  Module 5 - Motorola APX module (all bands) - Boot 1.1.1
  Module 6 - Motorola APX module (all bands) - APX 2.5.1

MCU> 
```

FIGURE 53: All JM 60 s Enabled For Upgrade.

To upload the APX JM 60 Interface software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the interface software on the PC and select the file. Refer to Table 2 for the correct file name. The JM 60 file should have a name of “11S152XX...s19” or similar. On the Terminal window a transfer screen will come up with a progress bar. On the radio the display will show a progress bar on the bottom of the screen as the data is transferred. See Figures 54 and 55.

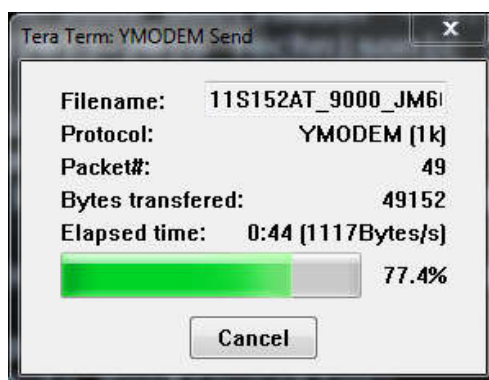


FIGURE 54: Terminal Progress Bar



FIGURE 55: JM 60 SW Radio Progress Bar

When the radio is done loading the file it will show a “Done” screen.



FIGURE 56: Upload Complete.

The Terminal will show the upload was ok.

```
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.5.1
Module 2 - Motorola APX module (all bands) - APX 2.5.1
Module 3 - Motorola APX module (all bands) - APX 2.5.1
Module 4 - Motorola APX module (all bands) - APX 2.5.1
Module 5 - Motorola APX module (all bands) - Boot 1.1.1
Module 6 - Motorola APX module (all bands) - APX 2.5.1

MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  APX Dbg 2.6.0 - OK
MCU> □
```

FIGURE 57: Uploaded File Programmed Ok.

Type m <ENTER> to verify all the JM 60 s were updated.

```
MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  APX Dbg 2.6.0 - OK

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - Motorola APX module (all bands) - APX 2.6.0
  Module 4 - Motorola APX module (all bands) - APX 2.6.0
  Module 5 - Motorola APX module (all bands) - APX 2.6.0
  Module 6 - Motorola APX module (all bands) - APX 2.6.0

MCU> □
```

FIGURE 58: All JM 60s Updated

The Bootloader Table must be reconfigured to the TDFM-9300's actual setup before the rest of the SW can be uploaded. This example has a T1 module. Use the following commands at the terminal to modify the Bootloader Table:

Type m6 reset <ENTER>. This will disable module # 6 as it is not used on TDFM-9300s.

Type m5 reset <ENTER>. This clears module # 5.

Module # 5 type must be specified based on the Analog Module installed. Enter only one of the following commands based on the Analog Module of the target radio:

Radios with the VLOW T1 module:

Type m5 vlo <ENTER>.

Radios with the T4 VHF AM:

Type m5 vam <ENTER>.

Radio with the T5 UHF AM:

Type m5 uam <ENTER>.

Or if the radio is equipped with the T6 Multiband module:

Type m5 t6 <ENTER>.

Type m<ENTER> to verify the bootloader configuration.

```
MCU> m6 reset
OK
MCU> m5 reset
OK
MCU> m5 vlo
OK
MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - Motorola APX module (all bands) - APX 2.6.0
  Module 4 - Motorola APX module (all bands) - APX 2.6.0
  Module 5 - VHF FM module (30 - 50 MHz) - Boot 1.1.1 / TLU9
  Module 6 - Not Configured - Boot 1.1.1

MCU> □
```

FIGURE 59: Reconfigured Table with the VLO T1 Module 5.

The Analog JM 60 SW for Module #5 must be reloaded since the Table was reset.
To upload the Analog JM 60 Interface software press “t” on the terminal then click on
FILE>TRANSFER>Y MODEM>SEND.

Navigate to the interface software on the PC and select the file. Refer to Table 2 for the correct file name.
The Analog JM 60 file should have a name of “13S172...TAM_y.y.s19” or similar.

```
MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  TAM 1.2.0 - OK

MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - Motorola APX module (all bands) - APX 2.6.0
Module 4 - Motorola APX module (all bands) - APX 2.6.0
Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU8
Module 6 - Not Configured - Boot 1.1.1

MCU>
```

FIGURE 60: Bootloader Table Reconfigured

If the Analog Module SW is to be updated, then it should be done at this point.

To upload the Analog Module software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the analog module software on the PC and select the file. Refer to Table 2 for the correct file name as per module installed.

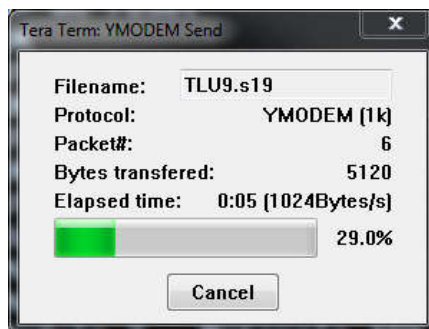


FIGURE 61: Updating the Analog Module SW

```
MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
  TLU9 - OK

MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - Motorola APX module (all bands) - APX 2.6.0
Module 4 - Motorola APX module (all bands) - APX 2.6.0
Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU9
Module 6 - Not Configured - Boot 1.1.1

MCU>
```

FIGURE 62: Bootloader Table Final Configuration

The Main Memory must be cleared and configurations preset to factory values before the Main SW can be installed.

Type p <ENTER> to purge the Main memory before uploading the Main SW.

To upload the Main software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND. Navigate to the Main software on the PC and select the file. Refer to Table 2 for the correct file name.

The Main SW file should have a name of “11S151XX...s19” or similar.

The Terminal transfer screen will come up the computer and a progress bar will show on the radio.



FIGURE 63: MAIN SW Radio Progress Bar

```
MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - Motorola APX module (all bands) - APX 2.6.0
Module 4 - Motorola APX module (all bands) - APX 2.6.0
Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU9
Module 6 - Not Configured - Boot 1.1.1

MCU> p
Purging..... OK
MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
Main 2.6.0 - OK
MCU> □
```

FIGURE 64: Main SW Uploaded Ok.

Type m <ENTER> to review the JM 60 configuration.
Type v <ENTER> to display the current Main SW version and verify the checksum is valid.

```
MCU> p
Purging..... OK
MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
  Main 2.6.0 - OK

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - Motorola APX module (all bands) - APX 2.6.0
  Module 4 - Motorola APX module (all bands) - APX 2.6.0
  Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU9
  Module 6 - Not Configured - Boot 1.1.1

MCU> v
TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.6.0 Checksum is valid
Front Panel Code: 3.1.0
RC Panel Code: Not available

MCU> 
```

FIGURE 65: SW Update is Complete.

Disconnect the programming cable, and power cycle the radio. Verify the radio boots and detects all installed modules with the SW version installed.



FIGURE 66: Radio Booting with New SW



FIGURE 67: Radio Main Display

RESETTING CONFIGURATION SETTINGS

The Configuration Menus and the Maintenance Menus should be adjusted back to the previous settings as recorded once the radio has been updated successfully.

To access the Configuration Menu, Press the FUNC key and then the NEXT soft key. Press the Second Side Button. Adjust the Configuration Menus as they were prior to the update. Press the NEXT soft key to move through the rest of the pages. Press the HOME key to return to the normal screen when done.

To access the Maintenance Menu, Press the FUNC key, and then the Next soft key. Press the Second Side Button to reach the Configuration Menu. Press the MODE key to access the first page of the Maintenance Menu. Adjust the Maintenance menu settings as they were prior to the SW update. Press the NEXT soft key to move through the rest of the pages. Press the HOME key to return to the normal screen when done.

RETUNING THE RADIO TO SERVICE

The radio can be returned to service by testing on the bench using the latest version of TIL Docs:

“136567 TDFM-9300 FINAL TEST PROCEDURE” &

“136568 TDFM-9300 FINAL TEST DATA SHEET”

Or, in the case of a simple SW upgrade, follow the procedure of:

“146611A TDFM-9000 SERIES QUICK FUNCTIONAL TEST”

These documents are supplied with the software package download from the TIL website.

Please note that TDFM-9300 series units are airworthiness approved on a non-hazard, non-interference basis and that the firmware is E-level which does not have to be controlled. Hence it is not mandatory to install the latest version of firmware.

SECTION 5: TDFM-9200 RADIO SW UPDATE PROCEDURE

This section describes the SW update procedure for the TDFM-9200 radios only. Procedures for the TDFM-9000 and TDFM-9300 are described in Sections 3 & 4 respectively.

NOTE: This procedure will reset the Configuration Menu settings and Maintenance Menu settings to factory defaults for the target radio. It is highly recommended that all the custom settings in the Configuration Menu and Maintenance Menus be recorded prior to this upgrade procedure. After the upgrade is complete, the settings should be restored to the previous settings before putting the radio back into service.

TDFM-9200 radios require several pieces of SW to be loaded. Most usual SW updates only require the Main and the JM 60 SW to be updated. All other SW in the 9200 will stay the same. In some cases loading all the SW would be required when updating the Bootloader or replacing the MCU board.

Obtaining The Latest Software:

Technisonic is always improving the products. Software may be revised from time to time. Use the latest SW Version available. Visit the Technisonic website <https://til.ca/tdfm9000software/> to obtain the latest SW packages.

Table 3 below shows a list of all the software files that would be used for the TDFM-9200 radios. All files have a file name convention of: (Software P/N.S19); Eg: 11S151E.S19 would be a file for the Main software.

TDFM-9200 SERIES SOFTWARE TABLE		
SOFTWARE	SW Part Number	*FILE NAME
MAIN SW	11S151	11S151xx_9000_Main_Vy_y.y.s19
APX INTERFACE (JM 60)	11S152	11S152xx_9000_JM60_APX_Vy_y.y.s19
ANALOG INTERFACE (TAM)	13S172	13S172x_TDFM-9300_Interface_TAM_y.y.y
ANALOG VHF LO (T1) !	07S119	07S119x_TDFM_9300_UpperMCU_VLO_TLUy
ANALOG VHFAM (T4) !	11S148	11S148x_TDFM_9300_UpperMCU_VAM_TAUy
ANALOG UHF AM (T5) !	13S169	13S169x_TDFM-9300_UpperMCU_UAM_TMUyy
MULTIBAND ANALOG (T6)!\$	24S210	24S210x_Multiband_T6_Vy.y.y.S19
FRONT PANEL SW (MOD 9)	16S191	16S191x_LCD-FPanel_y.y.y.s19

TABLE 3

NOTE: * x is the revision of the SW P/N and yyy is the Version Number displayed of the SW.
! Two SW packages must be loaded depending on the combination analog modules installed for #3 & # 5 slots.
\$ For T6 modules, use TAM 1.3.0 or higher.

TDFM-9200 Variants

The TDFM-9200 has 2 APX Modules and 2 Analog modules installed for Bands 3 & 5. Any combination of 2 modules listed below can be installed to create several variants.

TDFM-T1 VLO 30- 50 MHz FM module.
TDFM-T4 VAM 118 – 138 MHz AM module.
TDFM-T5 UAM 225 – 400 MHz AM module.
TDFM-T6 Multiband 30 - 400 MHz FM/AM Analog Module.

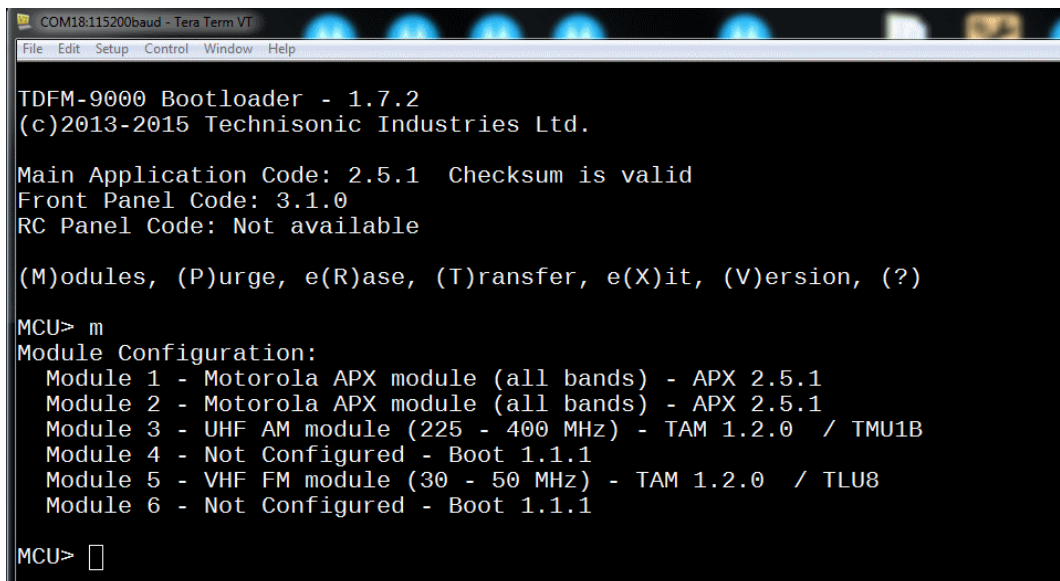
When updating all the SW in the 9200, determine which modules you have installed and select the corresponding Analog SW for the installed modules. Refer to the table above for the correct SW files. The 9200 variant combination (TX-TY) is indicated by the last 4 digits of the radio's P/N and is located on the right hand side Main P/N Label.

TDFM-9200 SW UPDATE

Most SW updates for the TDFM-9200 only require the Main and JM 60 updates. The normal practice is to update the JM 60 Interface software first, Purge the Main memory and then update Main software.

Power up the radio and put it into Bootload mode. Establish connection to the terminal program as described in Section 2.

Type m <ENTER> at the prompt on the terminal. This will show the Bootloader Table configuration for the radio and shows the current SW version of the module Interface SW. Write down the setup of the Table as it will be needed later on.



```
COM18:115200baud - Tera Term VT
File Edit Setup Control Window Help

TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.5.1 Checksum is valid
Front Panel Code: 3.1.0
RC Panel Code: Not available

(M)odules, (P)urge, e(R)ase, (T)ransfer, e(X)it, (V)ersion, (?)

MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.5.1
Module 2 - Motorola APX module (all bands) - APX 2.5.1
Module 3 - UHF AM module (225 - 400 MHz) - TAM 1.2.0 / TMU1B
Module 4 - Not Configured - Boot 1.1.1
Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU8
Module 6 - Not Configured - Boot 1.1.1

MCU> 
```

FIGURE 68: Bootloader Table Configuration (2 APX + UHF AM, VLO)

To upgrade the interface SW, it is necessary to update all the JM 60s to the same version. Analog modules #3 & 5 need to be converted to APX and the #4 & 6 unused JM 60s must be enabled in the Bootloader Table. Type the following commands to reconfigure the Table:

Type m3 reset <ENTER>. This will reset module # 3 in the Table.

Type m4 reset <ENTER>. This will reset module # 4 in the Table.

Type m5 reset <ENTER>. This will reset module # 5 in the Table.

Type m6 reset <ENTER>. This will reset module # 6 in the Table.

Type m3 apx <ENTER>. This will reconfigure Module #3 for apx SW.

Type m4 apx <ENTER>. This will reconfigure Module #4 for apx SW.

Type m5 apx <ENTER>. This will reconfigure Module #5 for apx SW.

Type m6 apx <ENTER>. This will reconfigure Module #6 for apx SW.

Type m <ENTER> to verify all the JM 60s are enabled.


```
MCU> m3 reset
OK
MCU> m4 reset
OK
MCU> m5 reset
OK
MCU> m6 reset
OK
MCU> m3 apx
OK
MCU> m4 apx
OK
MCU> m5 apx
OK
MCU> m6 apx
OK
MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.5.1
Module 2 - Motorola APX module (all bands) - APX 2.5.1
Module 3 - Motorola APX module (all bands) - Boot 1.1.1
Module 4 - Motorola APX module (all bands) - APX 2.5.1
Module 5 - Motorola APX module (all bands) - Boot 1.1.1
Module 6 - Motorola APX module (all bands) - APX 2.5.1
MCU> █
```

FIGURE 69: All JMJ 60s Enabled For Upgrade.

To upload the APX JM 60 Interface software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the interface software on the PC and select the file. Refer to Table 3 for the correct file name.

The JM 60 file should have a name of “11S152XX...s19” or similar. On the Terminal window a transfer screen will come up with a progress bar. On the radio the display will show a progress bar on the bottom of the screen as the data is transferred. See Figures 701 and 71.

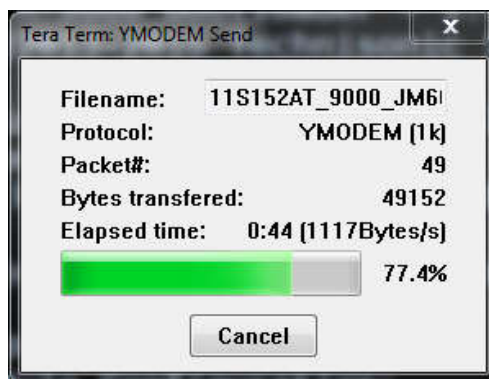


FIGURE 70: Terminal Progress Bar



FIGURE 71: JM 60 SW Radio Progress Bar

When the radio is done loading the file it will show a “Done” screen.



FIGURE 72: Upload Complete.

The Terminal will show the upload was ok.

```
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.5.1
Module 2 - Motorola APX module (all bands) - APX 2.5.1
Module 3 - Motorola APX module (all bands) - Boot 1.1.1
Module 4 - Motorola APX module (all bands) - APX 2.5.1
Module 5 - Motorola APX module (all bands) - Boot 1.1.1
Module 6 - Motorola APX module (all bands) - APX 2.5.1

MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
APX Dbg 2.6.0 - OK
```

FIGURE 73: Uploaded File Programmed Ok.

Type m <ENTER> to verify all the JM 60s were updated.

```
MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
APX Dbg 2.6.0 - OK

MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - Motorola APX module (all bands) - APX 2.6.0
Module 4 - Motorola APX module (all bands) - APX 2.6.0
Module 5 - Motorola APX module (all bands) - APX 2.6.0
Module 6 - Motorola APX module (all bands) - APX 2.6.0

MCU> □
```

FIGURE 74: All JM 60s Updated

The Bootloader Table must be reconfigured to the TDFM-9200's actual setup before the rest of the SW can be uploaded. Use the following commands at the terminal to modify the Bootloader Table:

Type m3 reset <ENTER>. This will clear module # 3.

Type m4 reset <ENTER>. This will clear module # 4 as it not used on the 9200.

Type m5 reset <ENTER>. This will clear module # 5.

Type m6 reset <ENTER>. This will clear module # 6 as it not used on the 9200.

Module # 3 type must be specified based on the Analog Module installed. Enter only one of the following commands to define Analog Module #3 of the target radio:

If Module #3 is VLOW T1 module:

Type m3 vlo <ENTER>.

If Module #3 is T4 VHF AM:

Type m3 vam <ENTER>.

If Module #3 is T5 UHF AM:

Type m3 uam <ENTER>.

Or If Module #3 is T6 Multiband:

Type m3 t6 <ENTER>.

Module # 5 type must also be specified based on the Analog Module installed. Enter only one of the following commands to define Analog Module #5 of the target radio:

If Module #5 is VLOW T1 module:

Type m5 vlo <ENTER>.

If Module #5 is T4 VHF AM:

Type m5 vam <ENTER>.

If Module #5 is T5 UHF AM:

Type m5 uam <ENTER>.

Or If Module #5 is T6 Multiband:

Type m5 t6 <ENTER>.

In this example, the radio has UHF AM on module 3 and VHF LOW on module # 5. So the following commands should be entered at the terminal:

Type m3 uam <ENTER>.

Type m5 vlo <ENTER>.

Type m<ENTER>. To verify the bootloader configuration.

```
MCU> m3 reset
OK
MCU> m4 reset
OK
MCU> m5 reset
OK
MCU> m6 reset
OK
MCU> m3 uam
OK
MCU> m5 vlo
OK
MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - UHF AM module (225 - 400 MHz) - Boot 1.1.1 / TMU1B
Module 4 - Not Configured - Boot 1.1.1
Module 5 - VHF FM module (30 - 50 MHz) - Boot 1.1.1 / TLU8
Module 6 - Not Configured - Boot 1.1.1
MCU> □
```

FIGURE 75: Reconfigured Table With The VLO T1 Module 5.

The Analog JM 60 SW for Modules #3 & 5 must be reloaded since the Table was reset. To upload the Analog JM 60 Interface software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the interface software on the PC and select the file. Refer to Table 3 for the correct file name. The Analog JM 60 file should have a name of “13S172...TAM_y.y.s19” or similar.



FIGURE 76: Analog JM 60 SW Radio Progress Bar

```
MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
  TAM 1.2.0 - OK

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - UHF AM module (225 - 400 MHz) - TAM 1.2.0 / TMU1B
  Module 4 - Not Configured - Boot 1.1.1
  Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU8
  Module 6 - Not Configured - Boot 1.1.1

MCU> 
```

FIGURE 77: Bootloader Table Reconfigured

If the Analog Module SW for either or both modules is to be updated, then it should be done at this point. To upload the Band 3 Analog Module software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the analog module software on the PC and select the file. Refer to Table 3 for the correct file name as per module 3 installed.

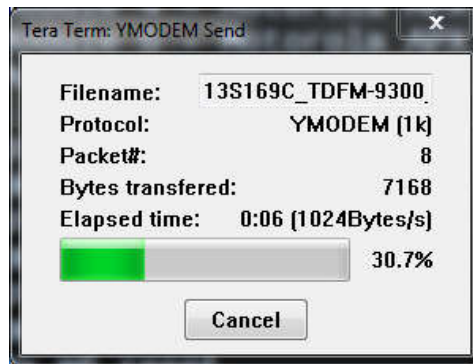


FIGURE 78: Band 3 SW Terminal Progress Bar



FIGURE 79: UHF AM SW Radio Progress Bar

Repeat the process above for the module SW for Band 5.

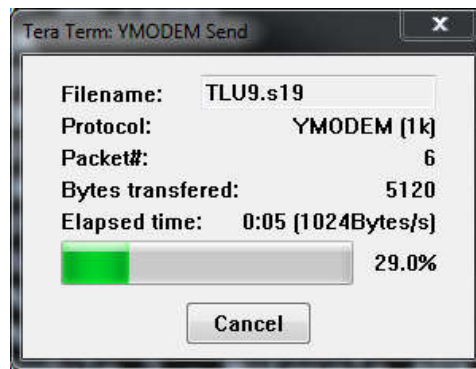


FIGURE 80: Band 5 SW Terminal Progress Bar



FIGURE 81: VLO SW Radio Progress Bar

```

MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
  TMU1C - OK

MCU> t
Start Y-MODEM transfer of S-Record.
CC
Programmed:
  TLU9 - OK

MCU> m
Module Configuration:
  Module 1 - Motorola APX module (all bands) - APX 2.6.0
  Module 2 - Motorola APX module (all bands) - APX 2.6.0
  Module 3 - UHF AM module (225 - 400 MHz) - TAM 1.2.0 / TMU1C
  Module 4 - Not Configured - Boot 1.1.1
  Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU9
  Module 6 - Not Configured - Boot 1.1.1

MCU>

```

FIGURE 82: Bootloader Table Final Configuration

The Main Memory must be cleared and configurations preset to factory values before the main SW can be installed.

Type p <ENTER> to purge the Main memory before uploading the Main SW.

To upload the Main software press “t” on the terminal then click on FILE>TRANSFER>Y MODEM>SEND.

Navigate to the Main software on the PC and select the file. Refer to Table 3 for the correct file name.

The Main SW file should have a name of “11S151XX...s19” or similar.

The Terminal transfer screen will come up the computer and a progress bar will show on the radio.



FIGURE 83: MAIN SW Radio Progress Bar

```

MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - UHF AM module (225 - 400 MHz) - TAM 1.2.0 / TMU1C
Module 4 - Not Configured - Boot 1.1.1
Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU9
Module 6 - Not Configured - Boot 1.1.1

MCU> p
Purging..... OK
MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
Main 2.6.0 - OK

MCU> 

```

FIGURE 84: Main SW Uploaded Ok.

Type m <ENTER> to review the JM 60 configuration.

Type v <ENTER> to display the current Main SW version and verify the checksum is valid.

```

MCU> p
Purging..... OK
MCU> t
Start Y-MODEM transfer of S-Record.
CCC
Programmed:
Main 2.6.0 - OK

MCU> m
Module Configuration:
Module 1 - Motorola APX module (all bands) - APX 2.6.0
Module 2 - Motorola APX module (all bands) - APX 2.6.0
Module 3 - UHF AM module (225 - 400 MHz) - TAM 1.2.0 / TMU1C
Module 4 - Not Configured - Boot 1.1.1
Module 5 - VHF FM module (30 - 50 MHz) - TAM 1.2.0 / TLU9
Module 6 - Not Configured - Boot 1.1.1

MCU> v
TDFM-9000 Bootloader - 1.7.2
(c)2013-2015 Technisonic Industries Ltd.

Main Application Code: 2.6.0 Checksum is valid ←
Front Panel Code: 3.1.0
RC Panel Code: Not available

MCU> 
MCU> 

```

FIGURE 85: SW Update is Complete.

Disconnect the programming cable, and power cycle the radio. Verify the radio boots and detects all installed modules with the SW version installed.



FIGURE 86: Radio Booting with New SW



FIGURE 87: Radio Main Display

RESETTING CONFIGURATION SETTINGS

The Configuration Menus and the Maintenance Menus should be adjusted back to the previous settings as recorded once the radio has been updated successfully.

To access the Configuration Menu, Press the FUNC key and then the NEXT soft key. Press the Second Side Button. Adjust the Configuration Menus as they were prior to the update. Press the NEXT soft key to move through the rest of the pages. Press the HOME key to return to the normal screen when done.

To access the Maintenance Menu, Press the FUNC key, and then the Next soft key. Press the Second Side Button to reach the Configuration Menu. Press the MODE key to access the first page of the Maintenance Menu. Adjust the Maintenance menu settings as they were prior to the SW update. Press the NEXT soft key to move through the rest of the pages. Press the HOME key to return to the normal screen when done.

RETUNING THE RADIO TO SERVICE

The radio can be returned to service by testing on the bench using the latest version of TIL Docs:

“136571 TDFM-9200 FINAL TEST PROCEDURE” &

“136572 TDFM-9200 FINAL TEST DATA SHEET”

Or, in the case of a simple SW upgrade, follow the procedure of:

“146611A TDFM-9000 SERIES QUICK FUNCTIONAL TEST”

These documents are supplied with the software package download from the TIL website.

Please note that TDFM-9200 series units are airworthiness approved on a non-hazard, non-interference basis and that the firmware is E-level which does not have to be controlled. Hence it is not mandatory to install the latest version of firmware.