LineAmp+Ethernet Firmware Upgrade Guide

Release date: Not released

Table of Contents

Purpose

This guide describes the steps to upgrade the firmware for the LineAmp+Ethernet (LAE) using physical connections from the LAE to a PC/laptop.
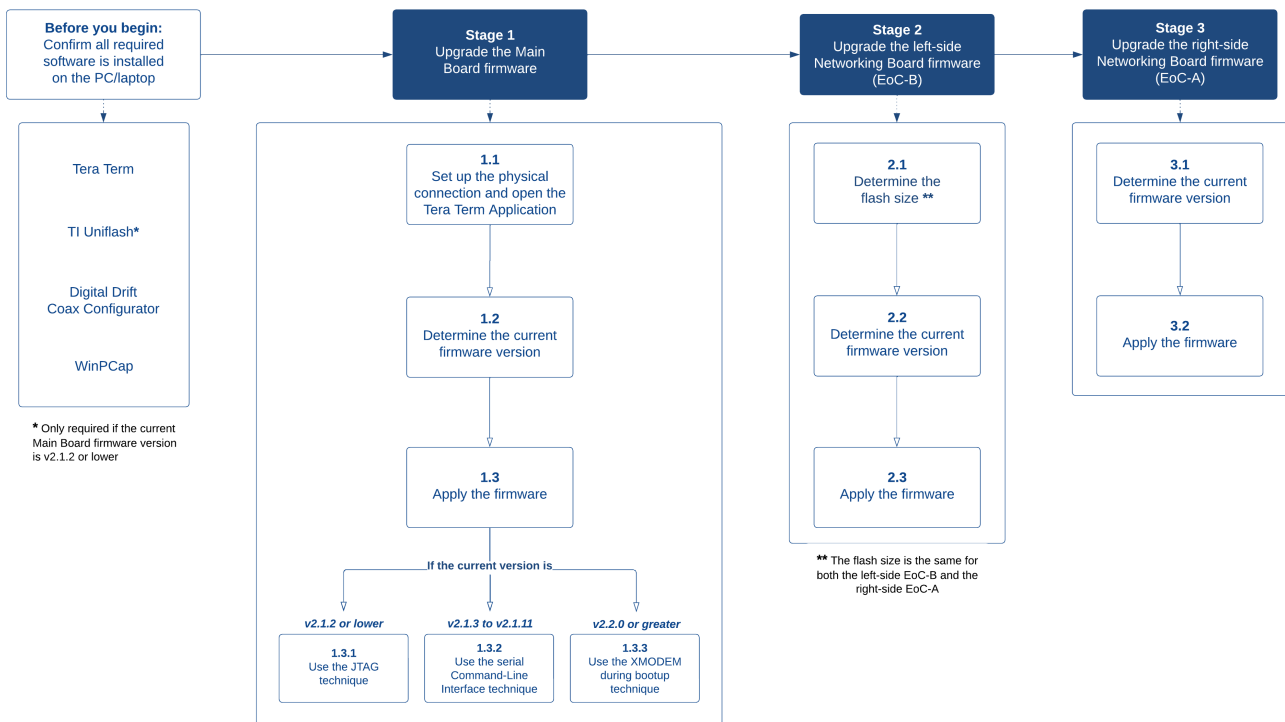
Scope

This guide applies to anyone responsible for upgrading the firmware for the LAE.

This guide does not include instructions for updating the firmware via Bluetooth, using the **Digital Drift Connect** mobile application.
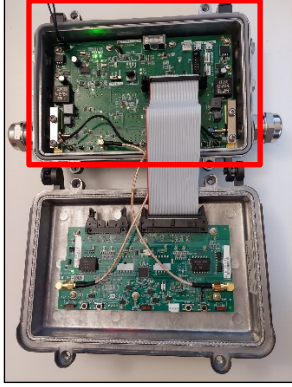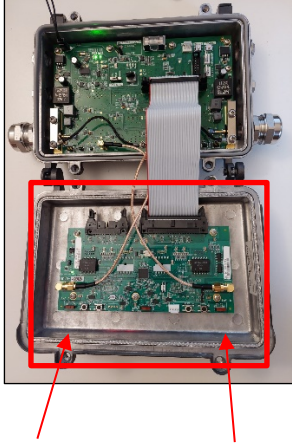
Flowchart: How to upgrade the firmware of the LAE

The flowchart illustrates the steps required to upgrade the firmware for all three processors in a LAE.

Before you begin:
Confirm all required software is installed on the PC/laptop

Tera Term

TI Uniflash*****

Digital Drift
Coax Configurator

WinPCap

* Only required if the current Main Board firmware version is v2.1.2 or lower

Stage 1
Upgrade the Main Board firmware

1.1
Set up the physical connection and open the Tera Term Application

1.2
Determine the current firmware version

1.3
Apply the firmware

If the current version is

v2.1.2 or lower

1.3.1
Use the JTAG technique

v2.1.3 to v2.1.11

1.3.2
Use the serial Command-Line Interface technique

v2.2.0 or greater

1.3.3
Use the XMODEM during bootup technique

Stage 2
Upgrade the left-side Networking Board firmware (EoC-B)

2.1
Determine the flash size ******

2.2
Determine the current firmware version

2.3
Apply the firmware

** The flash size is the same for both the left-side EoC-B and the right-side EoC-A

Stage 3
Upgrade the right-side Networking Board firmware (EoC-A)

3.1
Determine the current firmware version

3.2
Apply the firmware

Before you Begin: Parts Description

The following parts are required to upgrade the firmware.

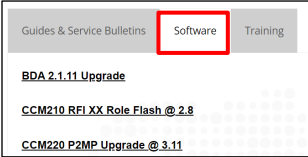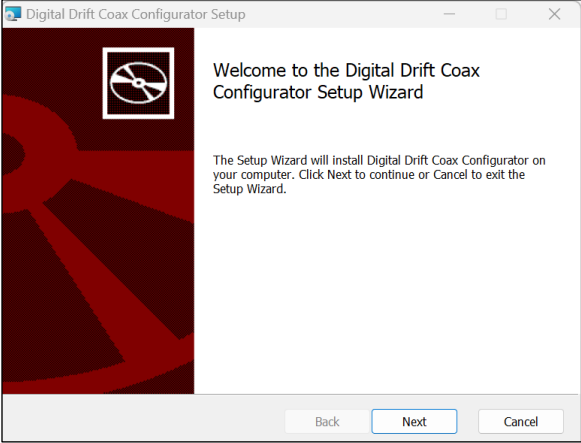| Part Description		Required in
1. LAE		Sections 1, 2 and 3 of this guide
2. LAE Main Board, located in the base. This circuit board is responsible for RF splitting/combining VHF signal amplification, narrowband VHF diagnostics and all power related functions. **Note**: The image is an example only and may vary, depending on the hardware variant.		Section 1 of this guide
3. LAE Networking Board, also known as the Ethernet board, located in the lid. This circuit board is responsible for the Ethernet over Coax (EoC) signal processing, and the Layer 2 Ethernet switching. **Notes**: ▪ The LAE Networking Board is made up of the 'left-side' (EoC-B) and 'right-side' (EoC-A). ▪ The image is an example only and may vary, depending on the hardware variant.	 Left-side (EoC-B) Right-side (EoC-A)	Sections 2 and 3 of this guide
4. A USB to TTL serial cable. Either: ▪ RFI DD-CONSOLE-USB ▪ FTDI TTL-232R-RPI		Section 1 of this guide

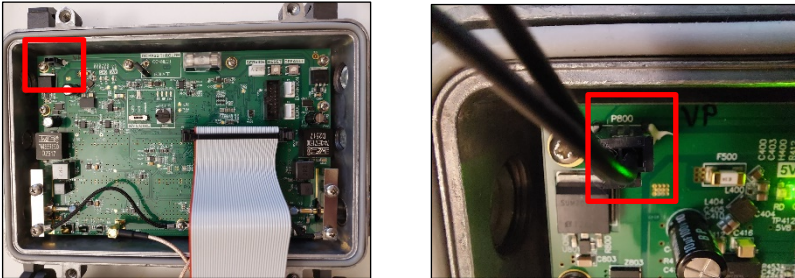| Part Description		Required in
5. TI JTAG programmer **Note**: Only required if the Main Board firmware is currently V2.1.2 or lower		Section 1 of this guide
6. Ethernet cable	 	Sections 2 and 3 of this guide

Before you Begin: Software Required

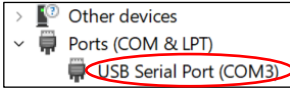The following software must be installed on the PC/laptop to perform the firmware upgrade.
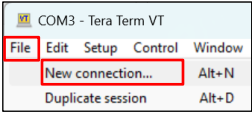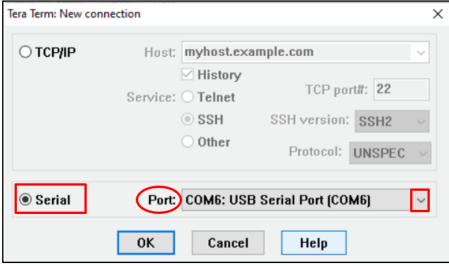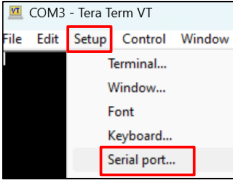
Software Name	Required in	Install Instructions
▪ **Tera Term**	Section 1: Upgrade the Main Board Firmware	Install **Tera Term**. To do this: a. Copy and paste the following link into an internet browser: https://ttssh2.osdn.jp/index.html.en b. Click **[Download]**. c. Click the latest **.exe file** from the **Download Package List**. d. Follow/accept the prompts to install Tera Term.
▪ **TI Uniflash** **Note:** Only required if the current firmware version is v2.1.2 or lower	Section 1.3.1 –Apply upgrade using the JTAG technique	Install **TI Uniflash** on the PC/laptop. To do this: a. Copy and paste the following link into an internet browser: https://www.ti.com/tool/UNIFLASH b. Click **Downloads**. c. Select **Download options**. d. Select the appropriate Installer. e. Open the file and follow/accept the prompts to install.

Software Name	Required in	Install Instructions
▪ **Digital Drift Coax Configurator**	▪ Section 2: Upgrade the 'Left-Side' Networking Board (EoC-B) ▪ Section 3: Upgrade the 'Right-Side' Networking Board (EoC-A)	Install **Digital Drift Coax Configurator**. To do this: a. Copy and paste the following link into an internet browser: https://products.rfi.com.au/en-au/digital-drift-industrial b. Scroll down to locate and click on the **Software** tab. c. Select **Digital Drift Coax Configurator**. d. Follow and accept the prompts to install the **Digital Drift Coax Configurator**.
▪ **WinPCap**	▪ Section 2: Upgrade the 'Left-Side' Networking Board (EoC-B) ▪ Section 3: Upgrade the 'Right-Side' Networking Board (EoC-A)	Install **WinPCap**. To do this: a. Copy and paste the following link into an internet browser: https://www.winpcap.org/install/bin/WinPcap_4_1_3.exe b. Follow and accept the prompts to install WinPCap.

1. Upgrade the Main Board Firmware

1.1 Set up the physical connection and open the Tera Term Application

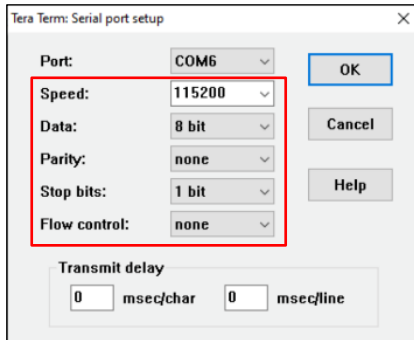| Step	Action
1.	Loosen the four screws of the LAE to open the enclosure.
2.	Power on the LAE, by either: ▪ Applying DC power to the P800 connector; or ▪ Drawing DC power from the coaxial backbone cable. **Note**: A green LED light displays on the Main Board when on.
3.	Connect the **USB to TTL serial cable** from the LAE **SERVICE** port to the **USB port** in the PC/laptop, as shown in the image below.

Step	Action
4.	Identify the **COM port** being used by the **USB to TTL serial cable** in the PC/laptop. To do this: a. In the **search** field of your PC/laptop, enter **Device Manager** and press **Enter**. **Result**: The **Device Manager** box displays. b. Click c. Take note of the **COM port** that displays for the **USB Serial Port** entry, as this information is required for a later step. Example:
5.	Open Tera Term in the PC/laptop and from the top menu bar, select **File** and select **New connection**. **Note**: See section <u>Before you Begin: Software Required</u> for instructions on how to install Tera Term. **Result**: The **Tera Term New connection** dialog box displays.
6.	Select **Serial** and select the correct serial COM port from the **Port** field drop-down box, identified in step 4 above.
7.	Click **OK**. **Result**: The **Tera Term New connection** dialog box closes.
8.	From the top menu bar, select **Setup** and select **Serial port**. **Result**: The **Tera Term: Serial port setup and connection** dialog box displays.

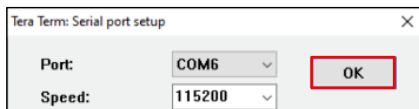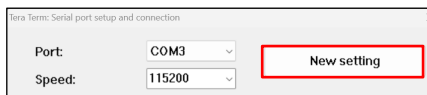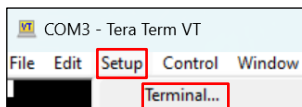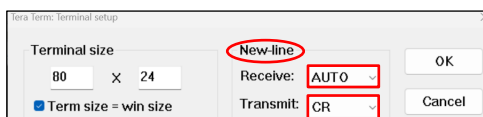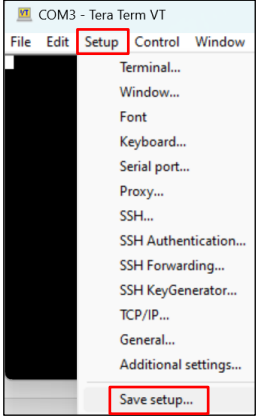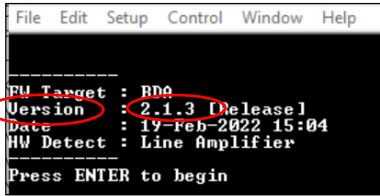| Step	Action
9.	Enter the following values in the corresponding fields: ▪ **Speed**: 115200 ▪ **Data**: 8 bit ▪ **Parity**: none ▪ **Stop bits**: 1 bit ▪ **Flow control**: none
10.	Click **OK**. **Note: New setting** may display instead of OK. In this case, click **New setting**. **Result**: The **Tera Term: Serial port setup and connection** dialog box closes.
11.	From the menu bar, select **Setup** and select **Terminal**. **Result**: The **Tera Term: Terminal setup** dialog box displays.
12.	In the **New-line** section, select the following settings: ▪ In the **Receive** field, select **AUTO** from the drop down. ▪ In the **Transmit** field, select **CR** from the drop down.
13.	Click **OK**. **Result**: The **Tera Term: Terminal setup** dialog box closes.

Step	Action
14.	Save the selected Tera Term configuration. To do this:

      a. From the top menu bar, select **Setup** and select **Save Setup**.

      Result: The **Tera Term: Save setup** dialog box displays.

      b. Click **Save** to over-write the default setup.

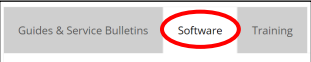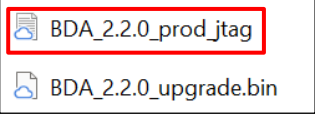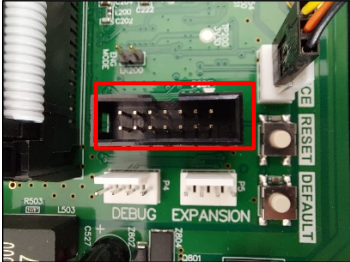   **Result**: The **Tera Term Save setup** dialog box closes.
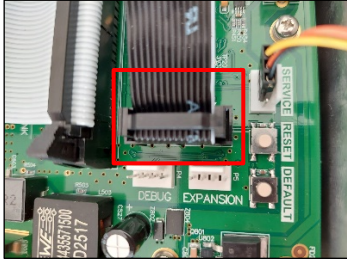
1.2 Determine the current firmware version

Step	Action
1.	Press the **RESET** button on the LAE's Main Board.

Result: The Tera Term bootup banner displays, stating the current firmware version for the Main Board.

Example:

1.3 Apply the upgrade

Step	Action
1.	Proceed as follows:

If the current firmware version is	Then go to
v2.1.2 or lower	Section 1.3.1: Apply an upgrade using the JTAG technique.
v2.1.3 to v2.1.11	Section 1.3.2: Apply an upgrade using the serial Command-Line Interface (CLI) technique.
v2.2.0 or greater	Section 1.3.3: Apply an upgrade using the XMODEM during bootup technique.

### 1.3.1   How to apply an upgrade to the Main Board using the JTAG technique

Step	Action
1.	Download the latest Main Board production flash image. To do this: a. Copy and paste the following link into an internet browser: https://products.rfi.com.au/en-au/digital-drift-industrial b. Scroll down to locate and click on, the **Software** tab. c. Select the latest LAE upgrade file. d. Follow the prompts to download and save the upgrade file. **Note**: The file will be named: BDA_*<version>*_ prod_jtag.txt **Example**: BDA_2.2.0_ prod_jtag.txt
2.	Open **TI UniFlash** on the PC/laptop. **Note**: See section <u>Before you Begin: Software Required</u> for instructions on how to install.
3.	Configure TI UniFlash. To do this: a. Connect the **TI JTAG programmer's USB port** to the **PC/laptop**. b. Connect the **TI JTAG programmer's 14-way connector** to the black rectangular boxed connector in the top right area of the Main Board. c. Ensure the Main Board is on. d. Start **TI Uniflash** on the PC/laptop. e. From the **Detected Devices** section, click **Detect.** **Note: Start** may display instead of **Detect**. In this case, click **Start.**

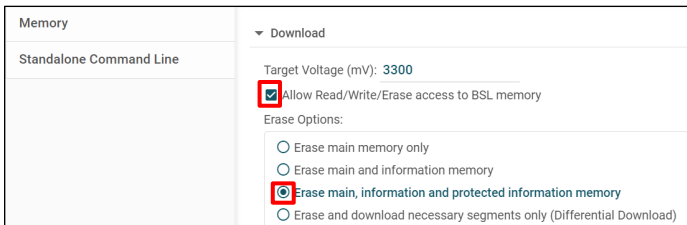| Step	Action
4.	Update the default settings. To do this:

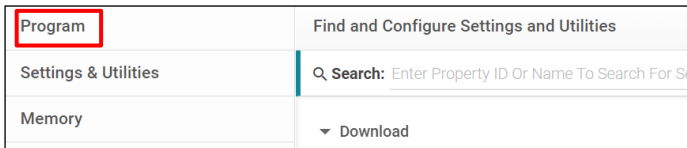a. Click the **Settings & Utilities** menu option.
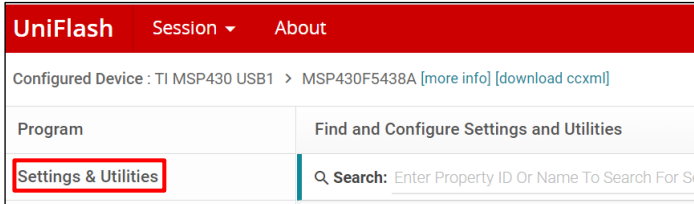
b. Click the following:

- **Allow Read/Write access to BSL memory**

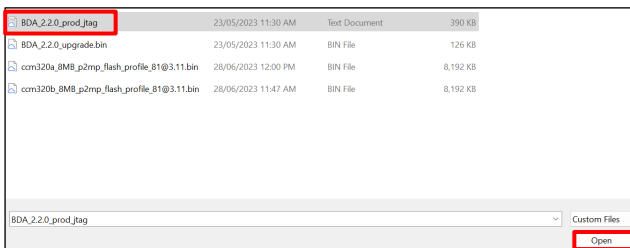- **Erase main, information and protected information memory**.

c. Click the **Program** menu option to return to the main programming screen.
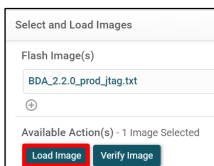

d. Click **Browse**

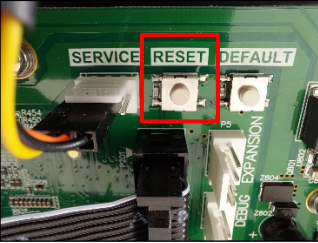e. Navigate to and select, the upgrade file (BDA_*<version>*_prod_jtag.txt) downloaded in step 1 and click **Open**.

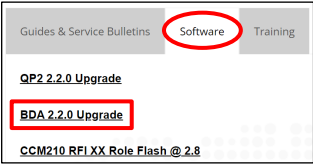

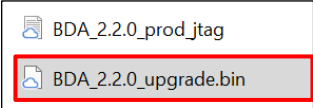f. Click **Load Image**.

Note: If a dialog box pops up with a warning about the version of firmware in the JTAG programmer, select the option to **upgrade the firmware** in the JTAG programmer to avoid this dialog box from popping up each time a JTAG file is programmed.

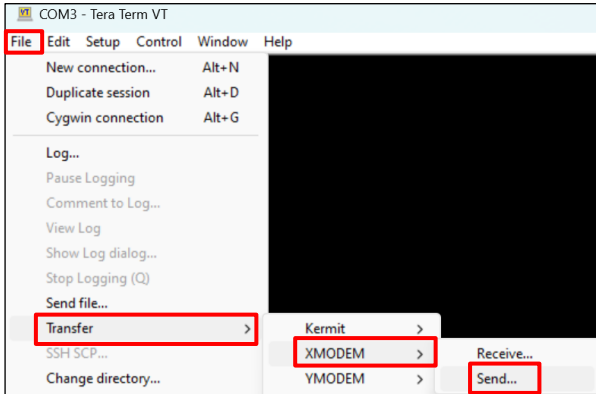| Step	Action
5.	Verify the upgrade was successfully programmed. To do this: a. Wait for the firmware to be completely and successfully uploaded. b. Remove the **JTAG programmer** from the device's **14-way black rectangular boxed connector**. c. Press the **RESET** button on the LAE's Main Board. **Result**: In the Tera Term session, the upgraded firmware version displays in the bootup banner.
6.	Disconnect the **USB to TTL serial cable** and **JTAG programmer** from the **LAE**.
7.	Go to section 2: to upgrade the networking board.

1.3.2 How to apply an upgrade the Main Board using the serial Command-Line Interface (CLI)

Step	Action
1.	Download the latest Main Board upgrade file. To do this: a. Copy and paste the following link into an internet browser: https://products.rfi.com.au/en-au/digital-drift-industrial b. Scroll down to locate and click on, the **Software** tab. Guides & Service Bulletins Software Training **BDA 2.1.11 Upgrade** c. Select the latest LAE upgrade file. Guides & Service Bulletins Software Training **QP2 2.2.0 Upgrade** **BDA 2.2.0 Upgrade** **CCM210 RFI XX Role Flash @ 2.8** d. Follow the prompts to download and save the upgrade file. **Note**: The file will be named: BDA_*<version>*_ upgrade.bin **Example**: BDA_2.2.0_upgrade.bin BDA_2.2.0_prod_jtag BDA_2.2.0_upgrade.bin
| 2. | Press **Enter**, type the command **fw upgrade partition erase** and press **Enter**.<br><br>```
FW Target : BDA
Version   : 2.1.3 [Release]
Date      : 19-Feb-2022 15:04
HW Detect : Line Amplifier

Press ENTER to begin

LINEAMP> fw upgrade partition erase
Erased in 58ms
```<br><br>**Note**: This command erases the temporary flash storage area used to hold firmware upgrades. |
| 3. | Type the command **fw upgrade file transfer** and press **Enter**.<br><br>```
FW Target : BDA
Version   : 2.1.3 [Release]
Date      : 19-Feb-2022 15:04
HW Detect : Line Amplifier

Press ENTER to begin

LINEAMP> fw upgrade partition erase
Erased in 58ms

LINEAMP> fw upgrade file transfer
``` |
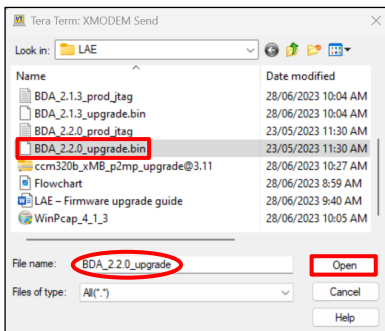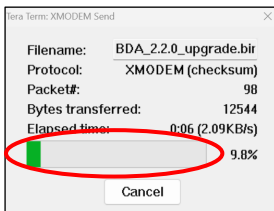
Step	Action
4.	a. Click **File**.
	b. Select **Transfer** from the drop-down menu.
	c. Select **XMODEM** from the drop-down menu.
	d. Select **Send…**

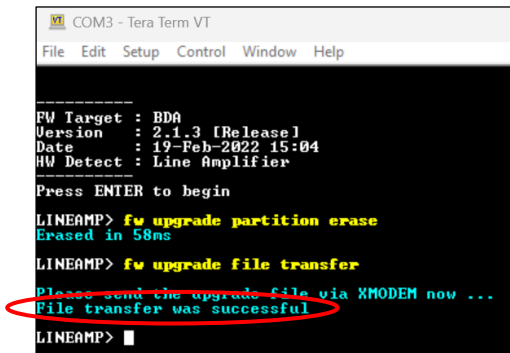e. Select the upgrade file downloaded/saved in step 1 and click **Open**.

Result: A green download bar displays, while the file transfers.

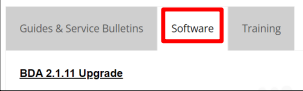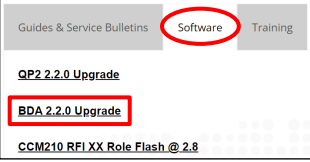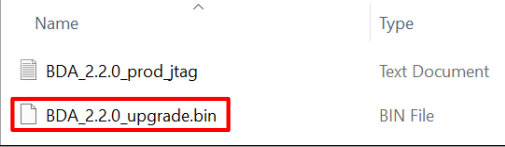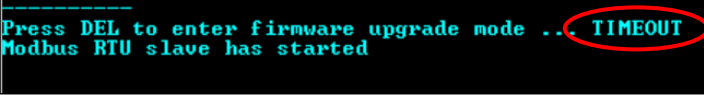f. Wait for the file to be transferred to the LAE.

Note: At the conclusion of the file transfer, the message **File transfer was successful** displays. If an error has been encountered, go back to step 2.

Step	Action
5.	Type the command **fw upgrade apply** and press **Enter.**

Important	Do not turn off the LAE or the Tera Term App until the upgrade is complete

Result: When the upgrade is complete, the Main Board restarts and the bootup banner displays the upgraded firmware version.

Example: New version 2.2.0 displays in bootup banner in the screenshot below.

6.	Disconnect the **USB to TTL serial cable** from the **LAE**.
7.	Go to section 2: to upgrade the networking board.

1.3.3 How to apply an upgrade to the Main Board using the XMODEM during bootup technique

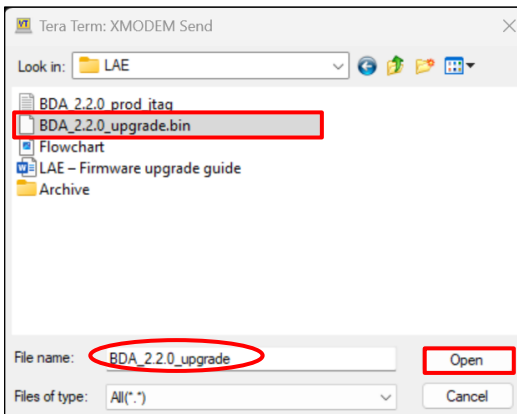| Step	Action
1.	Download the latest Main Board upgrade file. To do this: a. Copy and paste the following link into an internet browser: https://products.rfi.com.au/en-au/digital-drift-industrial b. Scroll down to locate and click on, the **Software** tab. c. Select the latest LAE upgrade file. d. Follow the prompts to download and save the upgrade file. **Note**: The file will be named: BDA_*<version>*_ upgrade.bin **Example**: BDA_2.2.0_upgrade.bin
2.	Press and release the **RESET** button on the Main Board. **Result**: The boot banner prints.
3.	Press the **DEL** key within 3 seconds of the prompt appearing to enter firmware upgrade mode. **Note**: If a **TIMEOUT** message displays in Tera Term: a. Press the **RESET** button on the Main Board again. b. Press the **DEL** key within 3 seconds of the prompt appearing.

Step	Action
4.	a. In Tera Term, perform the following:

- Click **File**.
- Select **Transfer** from the drop-down menu.
- Select **XMODEM** from the drop-down menu.
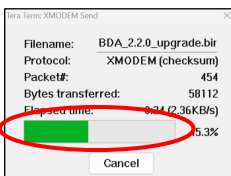- Select **Send…**

b.   Select the upgrade file downloaded/saved in step 1 and click **Open**.

Example:

Result: A green download bar displays, while the upgrade file transfers.

| 5. | Wait for the file to be transferred to the LAE.

Note: At the conclusion of the file transfer, the message **File transfer was successful** displays. If an error has been encountered, go back to step 2.

Result: If the file transfer was successful, the new firmware applies immediately, the Main Board restarts and the bootup banner displays the upgraded firmware version. |
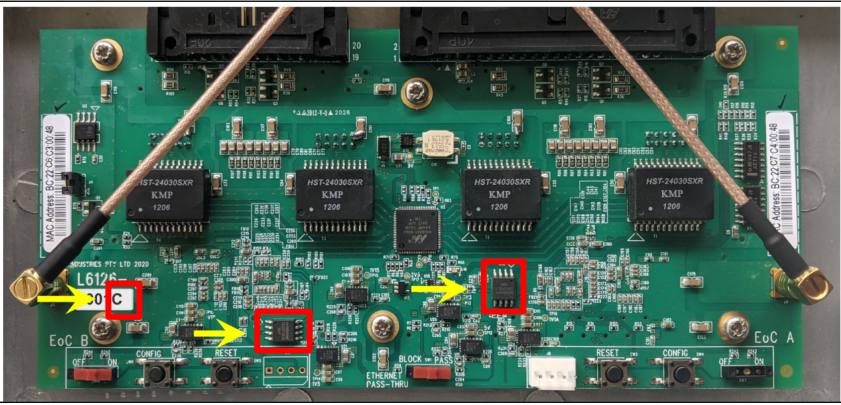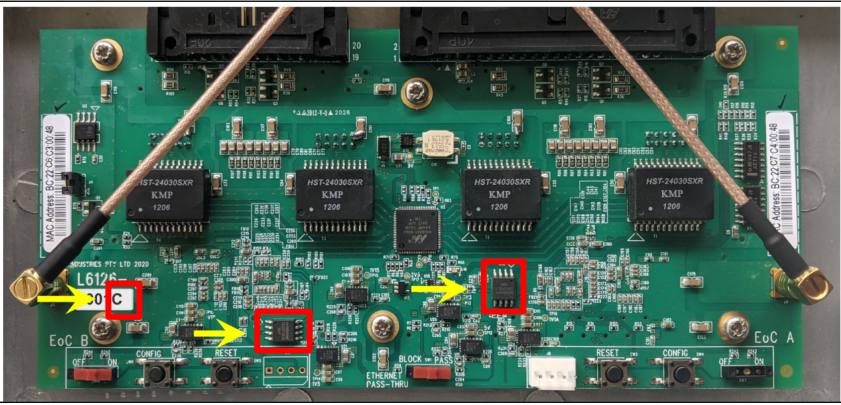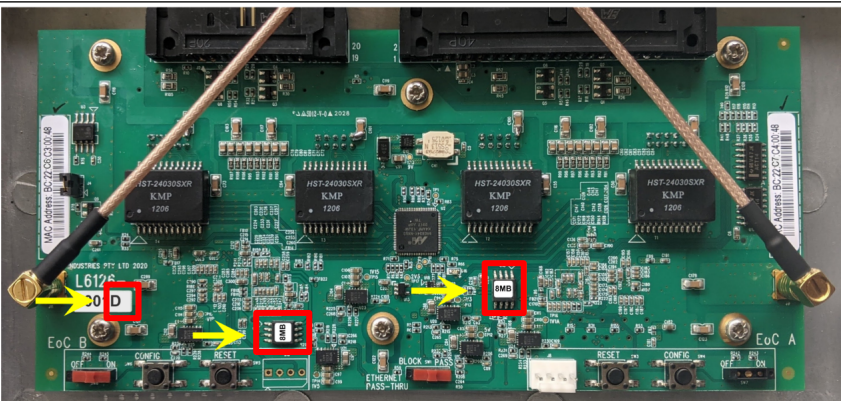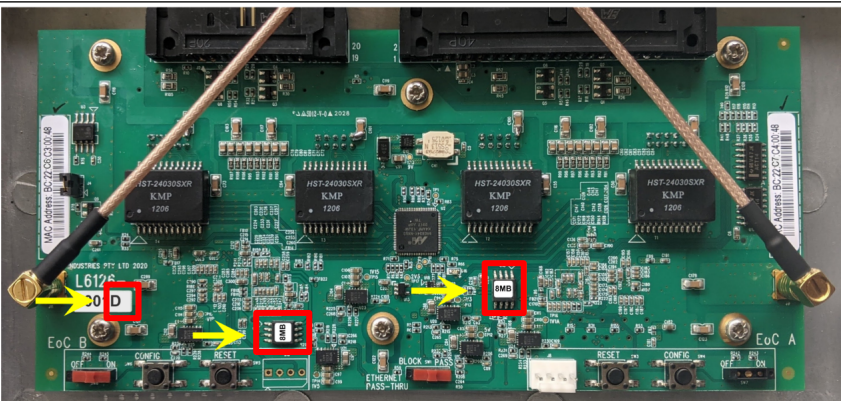
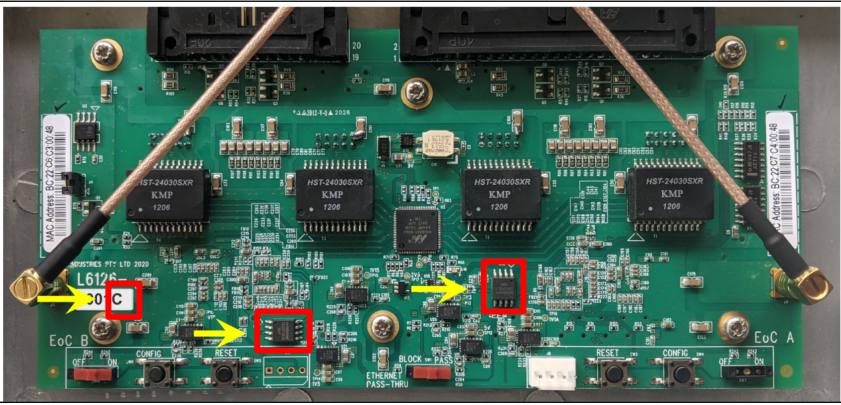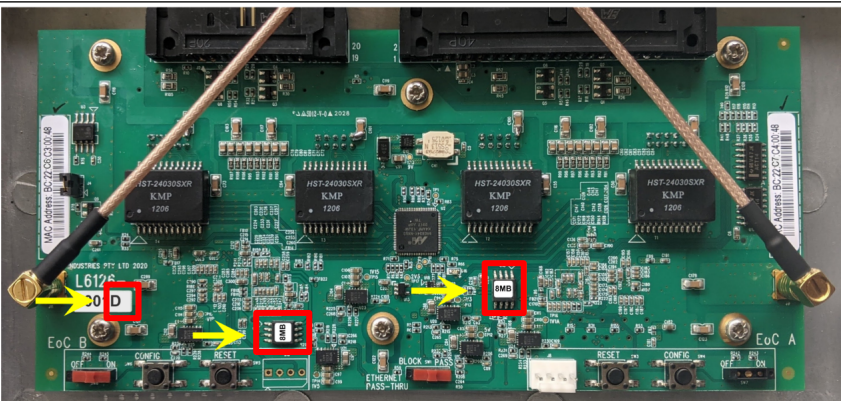| | **Important**   Do not turn off the LAE or the Tera Term App until the upgrade is complete |

| 6. | Disconnect the **USB to TTL serial cable** from the **LAE**. |

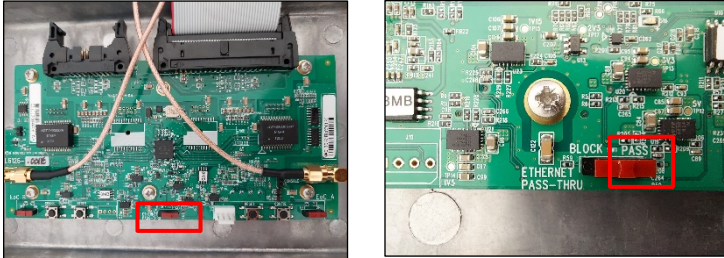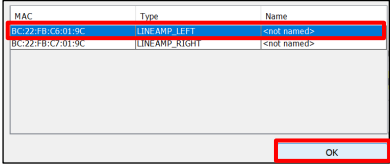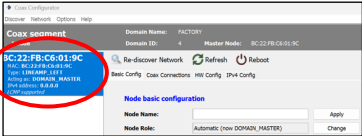| 7. | Go to section 2: to upgrade the networking board. |

2. Upgrade the 'Left-Side' Networking Board Firmware (EoC-B)
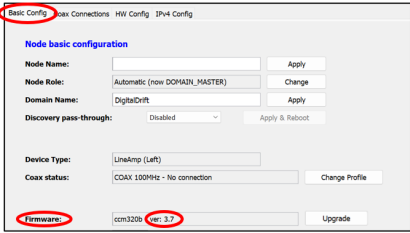
2.1 Determine the flash size

Step	Action
1.	Locate the networking board, in the lid of the LAE and visually check the following:
	Note: Knowing whether the hardware is 4MB or 8MB is required in this section and section 3.

If the hardware version is		Then the current
▪ Labelled as **C**; and ▪ The flash chips are unlabelled 		Hardware is 4MB
▪ Labelled as **D** or **E**; and ▪ The flash chips are labelled as **8MB** 		Hardware is 8MB

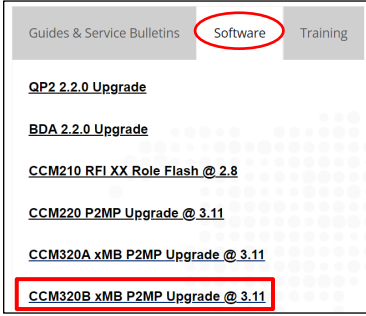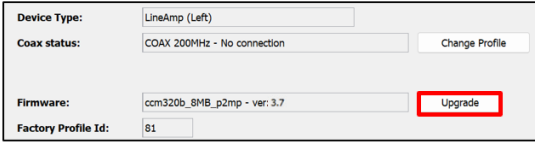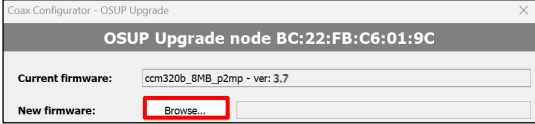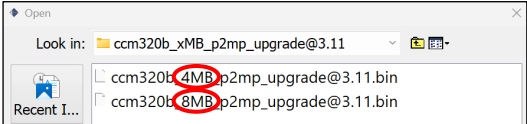| Step	Action
2.	Close the LAE.

2.2 Determine the current firmware version

Note: **WinPCap** must be installed on your PC/laptop to perform these steps. See section Before you Begin: Software Required for instructions on how to install.

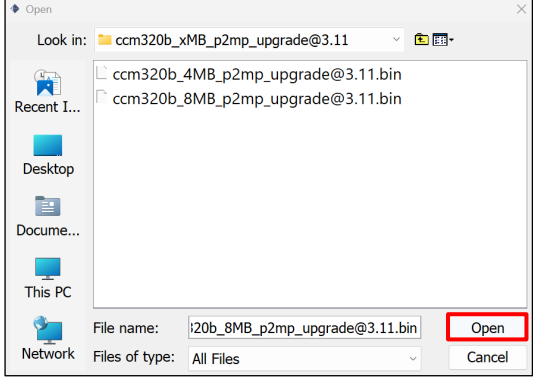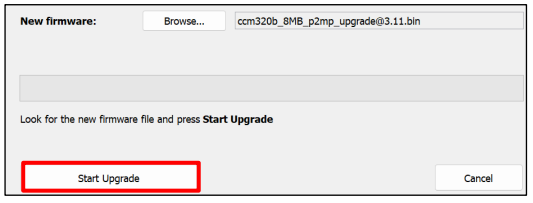| Step	Action
1.	Connect an **Ethernet cable** from the **LAE's left-side RJ45 port** to the **PC/laptop**. **Note**: This guide assumes the **ETHERNET PASS-THRU** switch on the networking board is in the **PASS** position. Example:
2.	Open the **Digital Drift Coax Configurator** application on the PC/laptop. **Notes**: ▪ See section **Before you Begin: Software Required** for instructions on how to install **Digital Drift Coax Configurator.** ▪ **WinPCap** is required to run Digital Drift Coax Configurator. See section Before you Begin: Software Required for instructions on how to install. **Result**: A dialog box displays, requesting which coax segment to connect to.
3.	Select the device with a MAC address starting with **BC:22:FB:C6:XX:XX** with type **LINEAMP_LEFT** and click **OK**. **Note**: This is the left-side EoC processor. **Result**: The **Digital Drift Coax Configurator** displays the unit information on the left hand side of the screen.

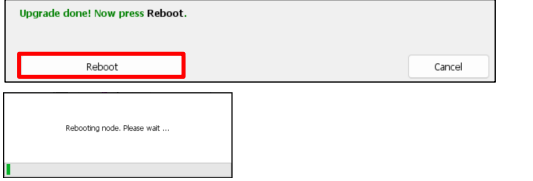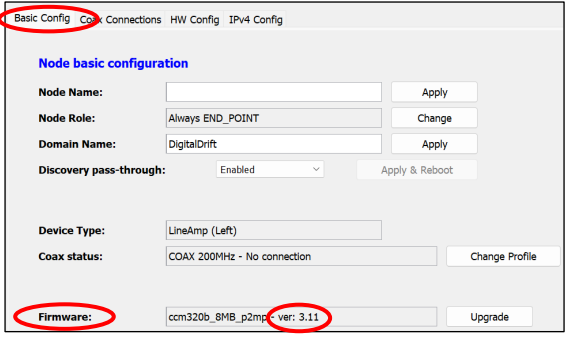| Step	Action
4.	Navigate to the **Basic Config** tab (if not already there) and note the current **Firmware version** that displays in the **Firmware** field. **Note**: In the example above, the **firmware version** is **3.7**.

2.3 Apply the Upgrade
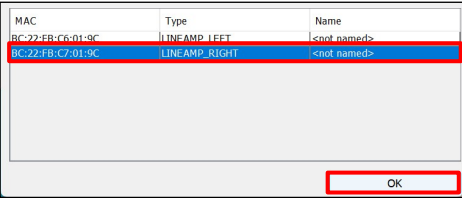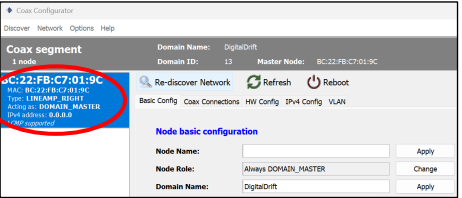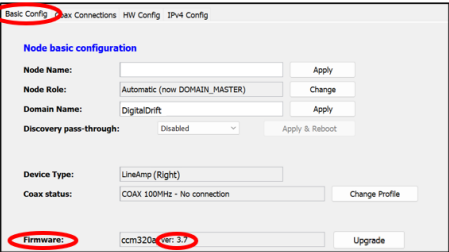
Step	Action
1.	Download the latest upgrade file. To do this: a. Copy and paste the following link into an internet browser: https://products.rfi.com.au/en-au/digital-drift-industrial b. Scroll down to locate, and click on the **Software** tab. c. Select the latest upgrade files for the **CCM320B** hardware platform. d. Follow the prompts to download and save the file. e. Unzip the downloaded archive, which extracts the 4MB and 8MB firmware upgrade files.
2.	Click **Upgrade** in Coax Configurator. **Result**: The **Coax Configurator – OSUP Upgrade** dialog box displays.
3.	From the **New firmware** field, click **Browse**.
4.	Navigate to the relevant upgrade file extracted in step 1 e. and select the upgrade file that matches the LAE EOC-B processor's flash size (i.e. 4MB or 8MB). **Note**: The file names are: ▪ CCM320b_4MB_p2mp_upgrade@<*version*>.bin ▪ CCM320b_8MB_p2mp_upgrade@<*version*>.bin

Step	Action
5.	Click **Open**.
6.	Click **Start Upgrade**. **Result:** If a compatible upgrade file was selected, the upgrade will commence.
7.	Wait for the percentage bar to reach 100% and an **Upgrade done!** message to display.
8.	Click **Reboot** and wait for the **Rebooting node. Please wait…** dialog box to close. **Result**: The new firmware version displays under the **Basic Config** tab, in the **Firmware** field. Example:
9.	Close **Digital Drift Coax Configurator** and disconnect the Ethernet cable.

3. Upgrade the 'Right-Side' Networking Board Firmware (EoC-A)

3.1 Determine the current firmware version

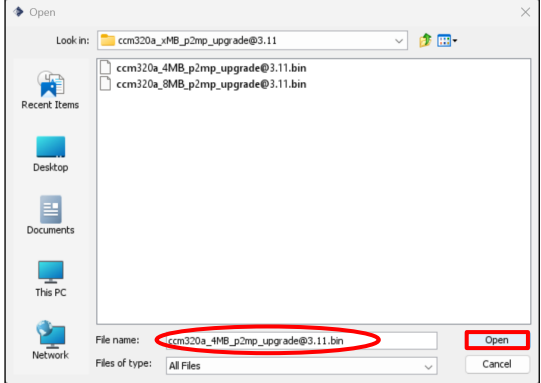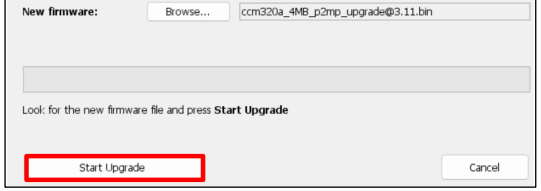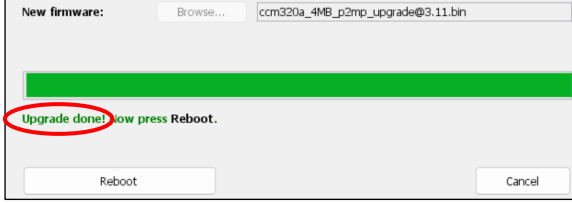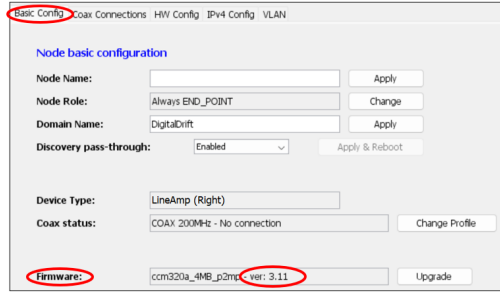| Step	Action
1.	Connect the **Ethernet cable** from the **LAE's right-side RJ45 port** to the **PC/laptop**. **Note**: The flash size determined in section 2.1 is the same for both the left-side EoC-B and right-side EoC-A.
2.	Open the **Digital Drift Coax Configurator** application on the PC/laptop. **Result**: A dialog box displays, requesting which coax segment to connect to.
3.	Select the device with a MAC address starting **BC:22:FB.C7:XX:XX** with type **LINEAMP_RIGHT** and click **OK**. **Note**: This is the right-side of the EoC processor. **Result**: The **Digital Drift Coax Configurator** displays the unit information on the left hand side of the screen.
4.	Navigate to the **Basic Config** tab (if not already there) and note the current **Firmware version** that displays in the **Firmware** field. **Note**: In the example above, the **firmware version** is **3.7**.

3.2 Apply the Upgrade

Step	Action
1.	Download the latest upgrade file. To do this:
	a. Copy and paste the following link into an internet browser:
	https://products.rfi.com.au/en-au/digital-drift-industrial
	b. Scroll down to locate, and click on the **Software** tab.
	c. Select the latest upgrade files for the **CCM320A** hardware platform.
	d. Follow the prompts to download and save the file.
	e. Unzip the downloaded archive, which extracts the 4MB and 8MB firmware upgrade files.
2.	Click **Upgrade** in Coax Configurator.
	Result: The **Coax Configurator – OSUP Upgrade** dialog box displays.
3.	From the **New firmware** field, click **Browse**.
4.	Navigate to the relevant upgrade file extracted step 1 e. and select the upgrade file that matches the LAE EOC-A processor's flash size (i.e. 4MB or 8MB).
	Note: The file names are:
	▪ CCM320a_4MB_p2mp_upgrade@*<version>*.bin
	▪ CCM320a_8MB_p2mp_upgrade@*<version>*.bin

Step	Action
5.	Click **Open**.
6.	Click **Start Upgrade**.
	Result: If a compatible upgrade file was selected, the upgrade will commence.
7.	Wait for the percentage bar to reach 100% and an **Upgrade done!** message to display.

Step	Action
8.	Click **Reboot** and wait for the **Rebooting node. Please wait…** dialog box to close.

Result: The new firmware version displays under the **Basic Config** tab, in the **Firmware** field.

Example:

9.	Close **Digital Drift Coax Configurator**.
10.	Disconnect the **Ethernet cable** from the **LAE**. **The firmware upgrade is complete.**