How to upgrade firmware and load Lightning^{TM} II servo parameters

1 Introduction

This Application Note describes how to use SMC Firmware Loader to upgrade firmware in theScanMaster Controller (SMC) and to load Lightning^{TM} II servo parameters onto the SMC.

The following sections are included in this

Keywords: ScanMaster Designer, SMC, Software Development Kit, SMC SDK, SMC Firmware Loader, upgrade firmware, Lightning^{TM} II servo parameters

2 Background information

SMC Firmware Loader is a tool for upgrading the firmware and loading Lightning II servo parameters on your SMC target(s). This tool comes bundled with the SMC SDK (Software Development Kit) and includes the latest SMC firmware files. Common reasons for updating firmware in the SMC include fixing bugs and adding features to the controller.

When the SMC is used to control a Lightning II scanning system with the advanced ScanPack controlalgorithm, the Lightning II servo parameters need to be loaded on the SMC.

3 Software prerequisites

In order for you to upgrade the firmware and load Lightning II servo parameters on your SMC target(s), SMC Firmware Loader must be installed on the computer that is used to manage the SMC.

NOTE: SMC Firmware Loader is bundled with SMC SDK (Software Development Kit); in order to install Firmware Loader, you must install SMC SDK.

You can download SMC SDK and the applicable manuals from our website.

NOTE: If you are installing SMC SDK on a Windows 7 computer, you must run the Installer as an administrator. You can do this by right-clicking the Installer program and selecting **Run as administrator** from the context menu in the folder that contains the installation package (see the following figure).
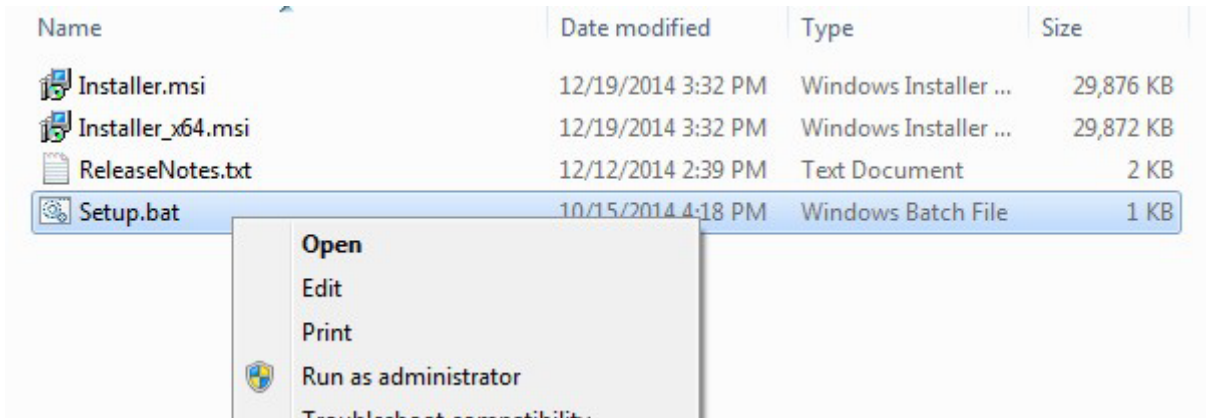
Figure 1 - The Run as administrator option

If you are installing SMC SDK on a Windows XP computer, you must be logged in to the computer as an administrator.

When SMC Firmware Loader runs for the first time, Windows will ask for firewall permission. Make sure that you select both of the check boxes in the following screen. Then left-click the **Allow access** button.

Note: All Cambridge Technology software requires the user to set firewall permission in order to access the software.
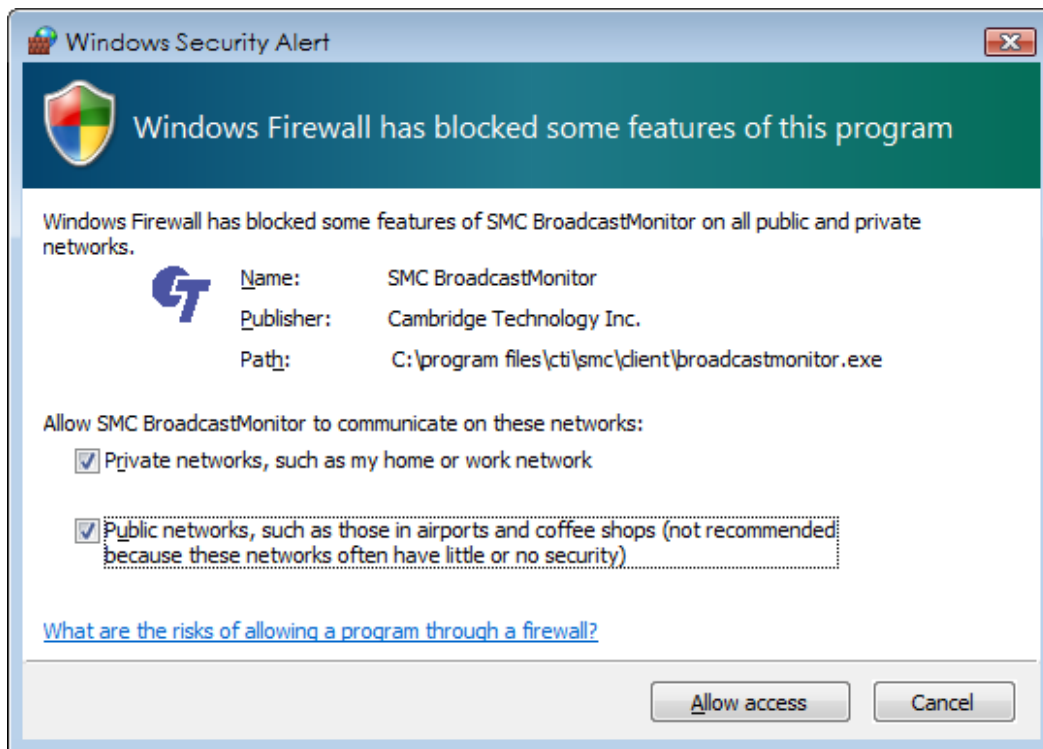
Figure 2 - Firewall option selection when running the Cambridge Technology software for the first time

3.1   Connect the SMC to the computer via Ethernet cable

You can use either of the following methods to connect the SMC to the PC via an Ethernet cable:

- **Direct** – The SMC is directly linked to the PC through an Ethernet cable. Both the PC and the SMC must have static IP addresses.

- **Network** – The SMC is connected to a network hub in an intranet, and the PC is connected to the same intranet. If the intranet has a DHCP server, both the PC and the SMC should be set to dynamic IP address; otherwise both can be set to **Static** IP address.

The default factory setting of the SMC board IP address is the static address 192.168.100.20.

Note: Please make sure to upgrade the Network Adaptor Driver in your computer to the latest version before doing the firmware upgrade.

3.2   Connect the Lightning II servo boards to the computer

If the user uses SMC Firmware Loader to load Lightning II servo parameters, he or she needs to connect Lightning II servo boards to the computer. The connection is via a USB cable that is connected to the USB port on the X servo board.
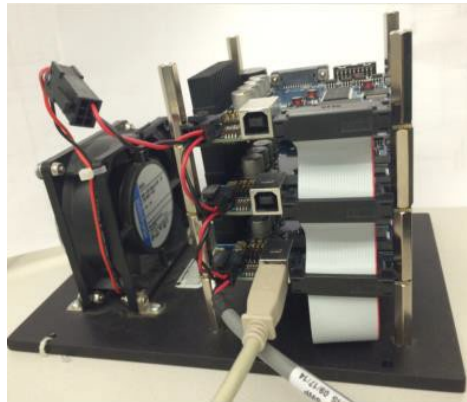
Figure 3 - Connect the X servo board to the computer via the USB port

If the Lightning II driver needs to be installed, it can be found in **C:\Program Files\CTI\SMC\ Lightning II Driver**. Choose the driver based on the system environment of the computer (i.e., 32-bit vs. 64-bit and Window 7 vs. Windows XP).

4   Upgrading firmware and loading Lightning^{TM} II servo parameters

This section describes how to use SMC Firmware Loader to upgrade the SMC firmware and load the Lightning II servo parameters on the SMC. The details of performing these tasks will vary depending on whether you are doing one or both of them. Refer to the following subsections for more information:

- "Upgrading the SMC firmware only" (below)
- "Loading the Lightning II servo parameters only" on page 11
- "Upgrading the SMC firmware and loading the Lightning II servo parameters" on page 14

4.1   Upgrading the SMC firmware only

Do the following to use SMC Firmware Loader to upgrade the firmware only:

1. Check that the SMC board is properly connected to the computer, and then power on the board.

2. Launch SMC Firmware Loader (either from the Windows start-up menu or from the folder **C:\Program Files\CTI\SMC\Server**). The following screen will be displayed while SMC Firmware Loader searches the Ethernet network for SMC targets.
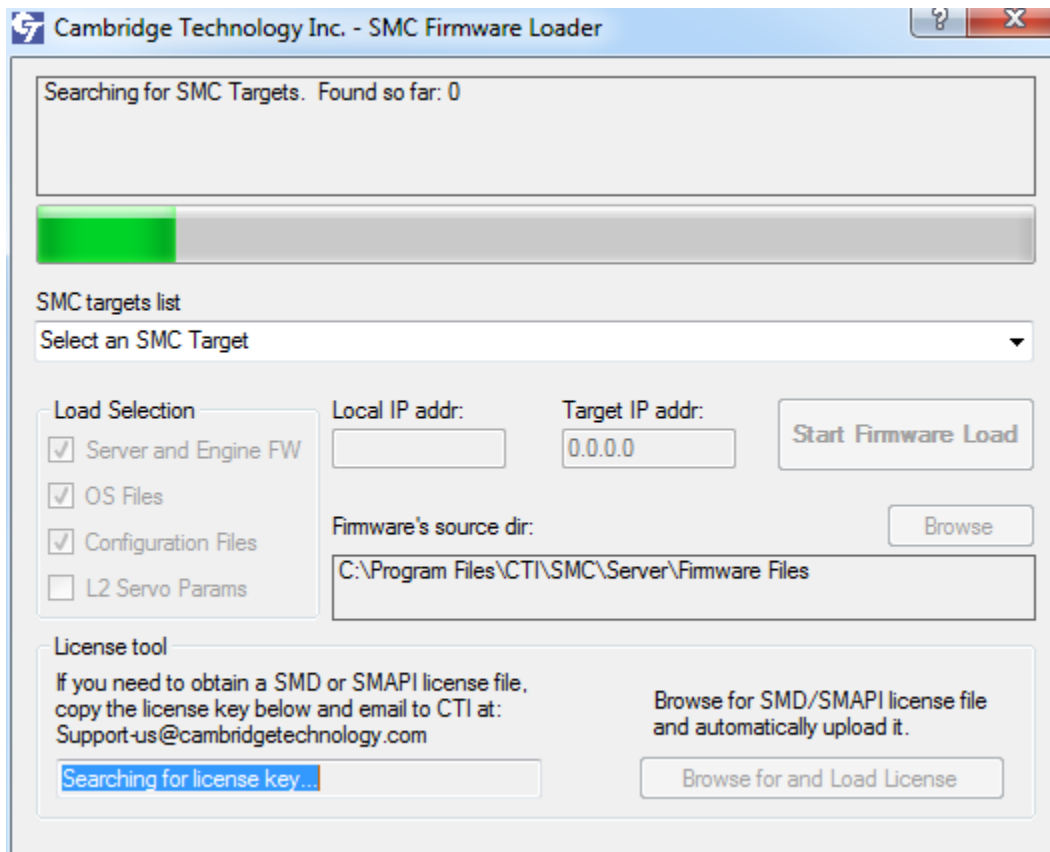
Figure 4 - SMC Firmware Loader searching for SMC targets

If one SMC is found, it is automatically selected in the **SMC targets list**. The message window will briefly display the **Server Version**, the **Marking Engine Version**, and the **ScanScript Engine Version** as shown in the following figure.
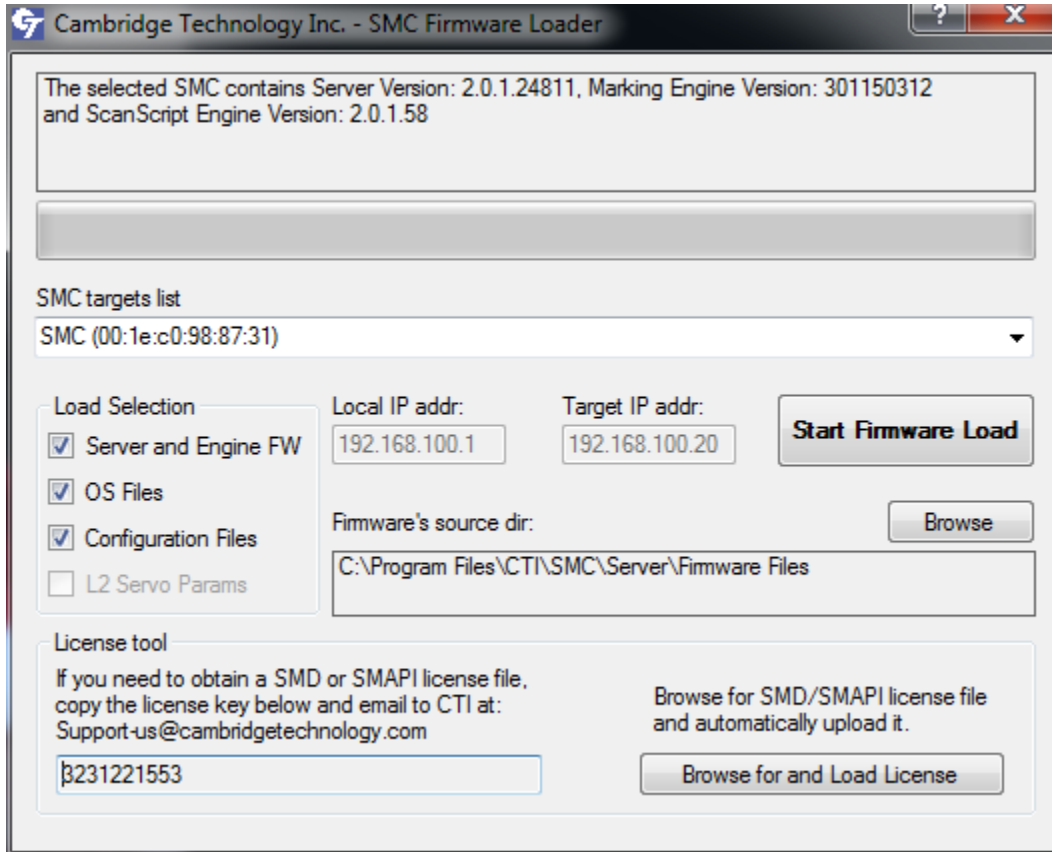

Figure 5 - SMC Firmware Loader finds the SMC target

If two or more SMCs are found, the user will be asked to select the correct one. If none are found, an error is reported in red and the user is asked to retry the search or manually enter the IP address of the target SMC.
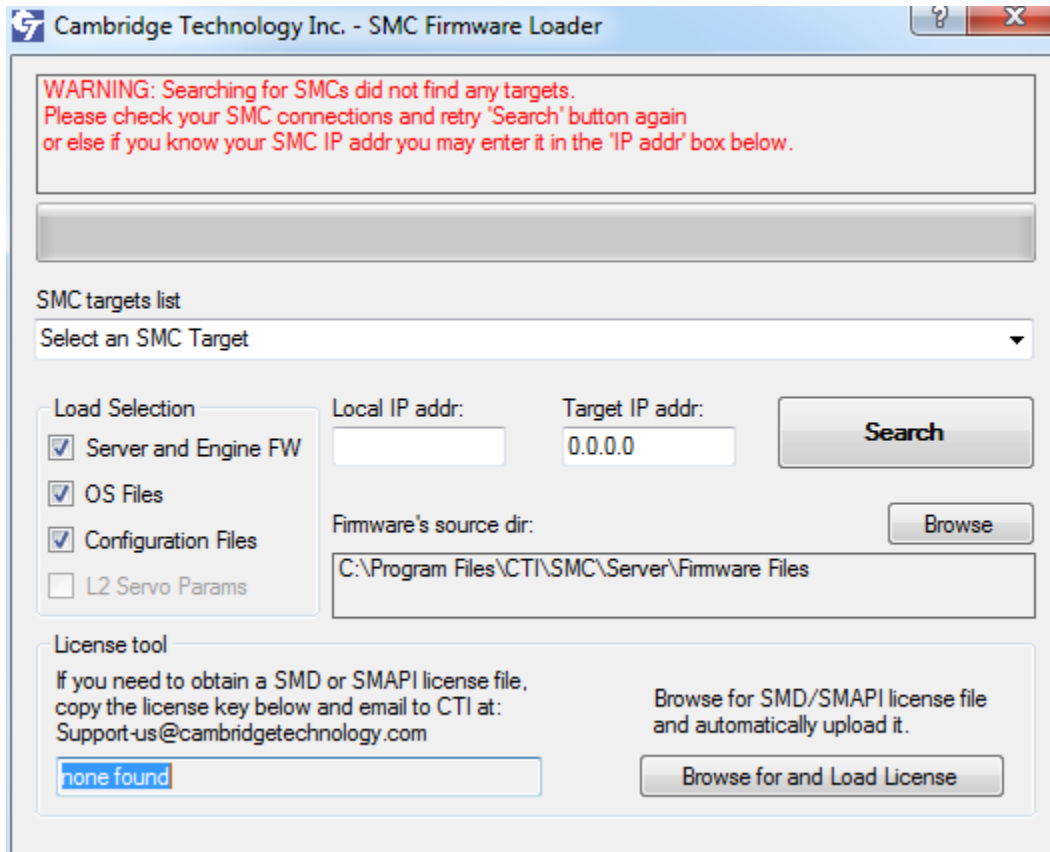
Figure 6 - SMC Firmware Loader did not find any SMC target

3. In the **Load Selection** area of the following screen, check all three active boxes: **Server and Engine FW**, **OS Files**, and **Configuration Files**.

4. Left-click the **Start Firmware Load** button in the following screen. This will start the firmware upgrade process.
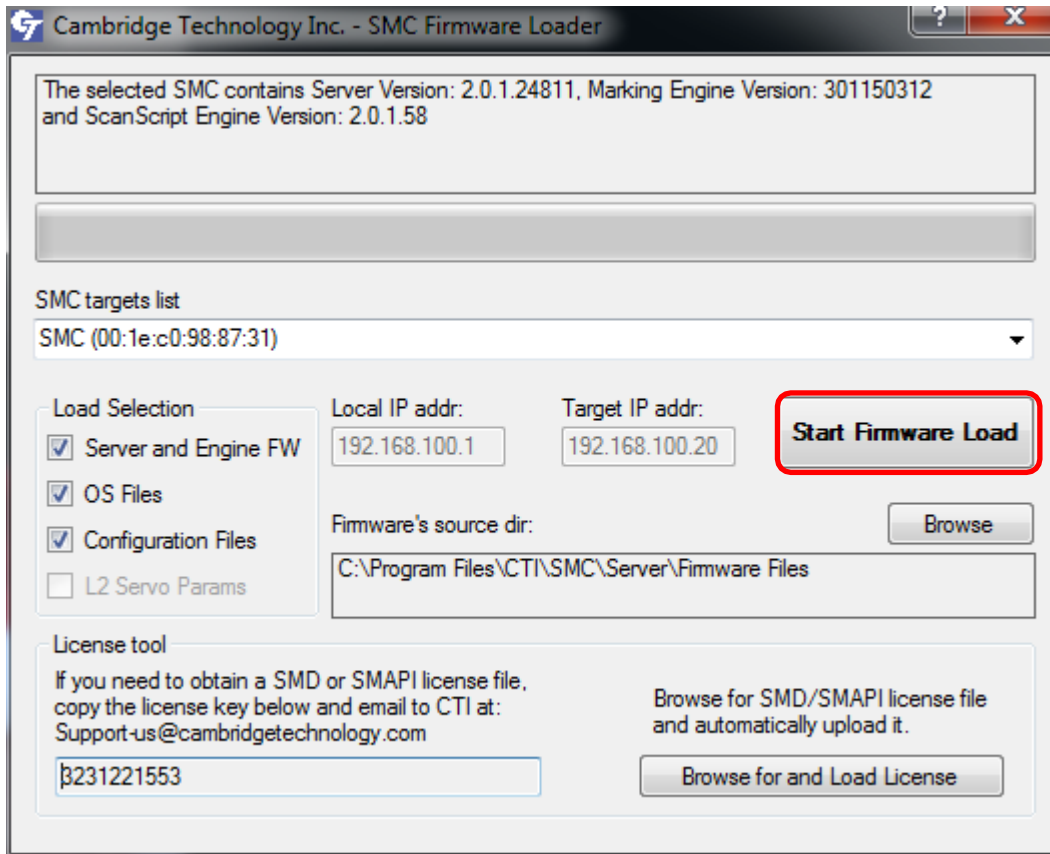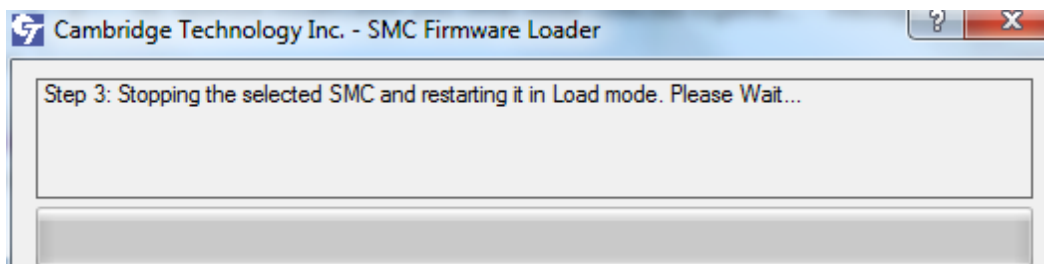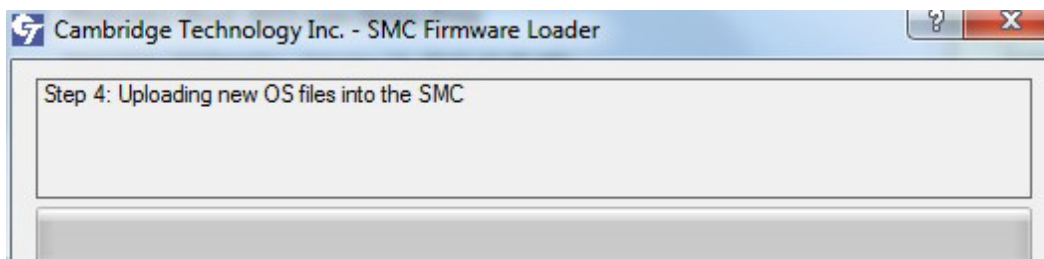

Figure 7 - Load Selection and Start Firmware Load

The following figures show the major steps in the firmware upgrade process. The details of each step are described in the message window of the applicable screen.
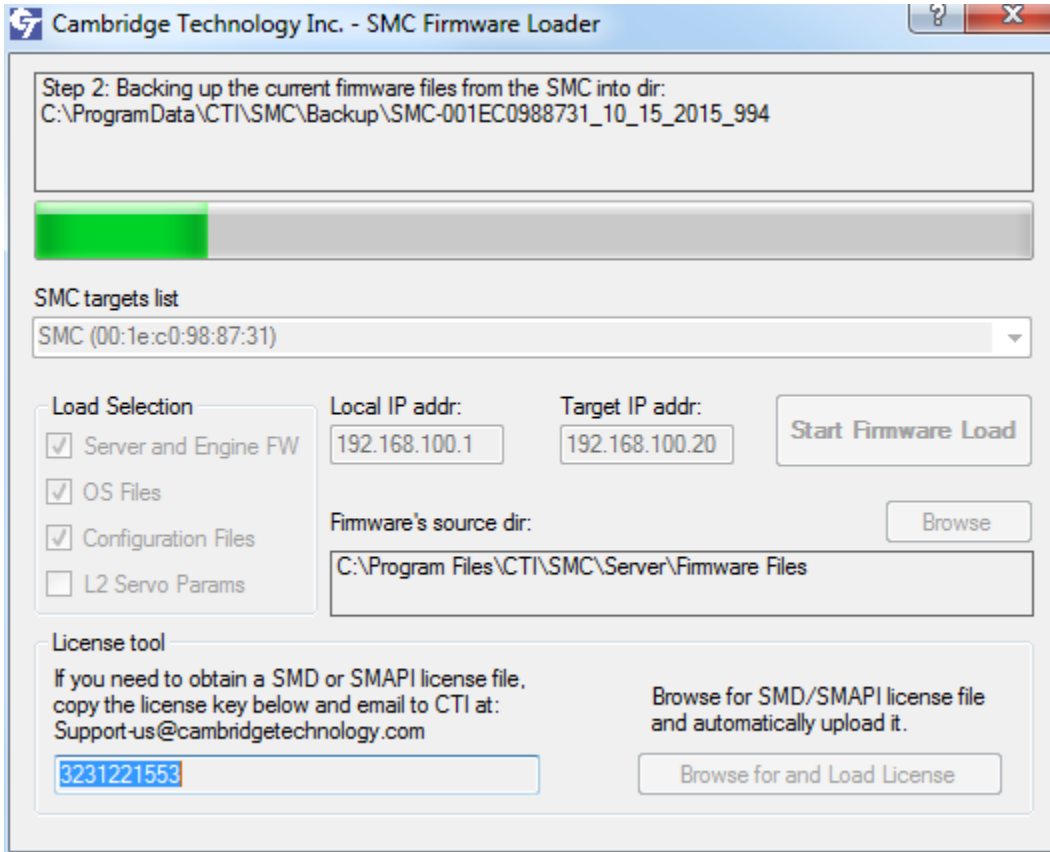
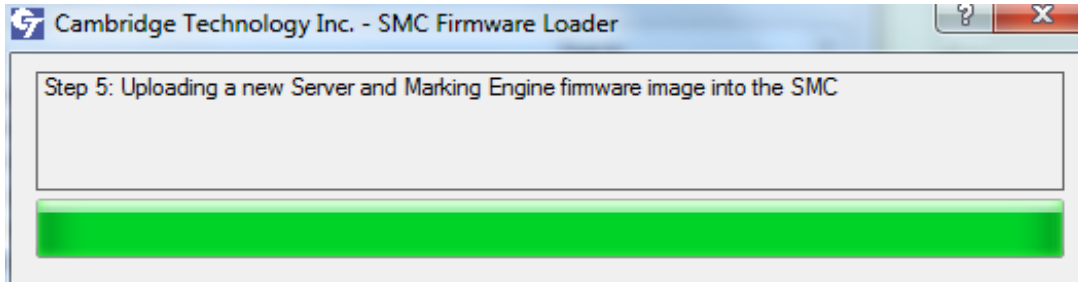**Figure 8 - Backing up the current firmware files from the SMC**

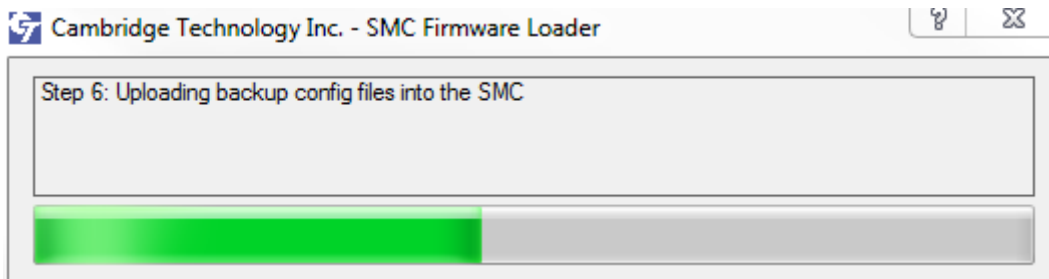**Figure 9 - Stopping the selected SMC and restarting it in Load mode**

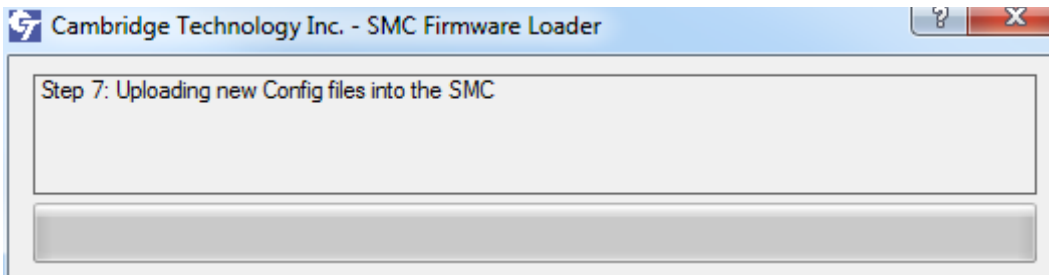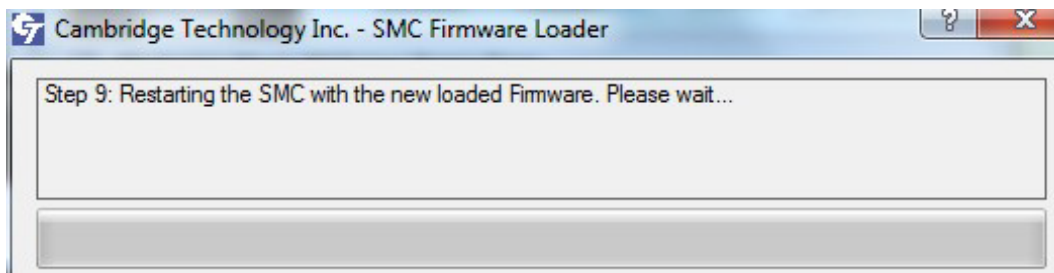**Figure 10 - Uploading the new OS files into the SMC**

Figure 11 - Uploading a new Server and Marking Engine firmware image into the SMC

**Figure 12 - Uploading the backup configuration files into the SMC**

Figure 13 - Uploading the new configuration files into the SMC

Figure 14 - Restarting the SMC with the new loaded firmware

You may notice that the screen for step 8 is missing from the above sequence. That is because step 8 is used for transferring Lightning II servo parameters into the SMC; it is not needed if you just want to upgrade the firmware.

The following screen will be displayed after the SMC has been restarted with the updated firmware.
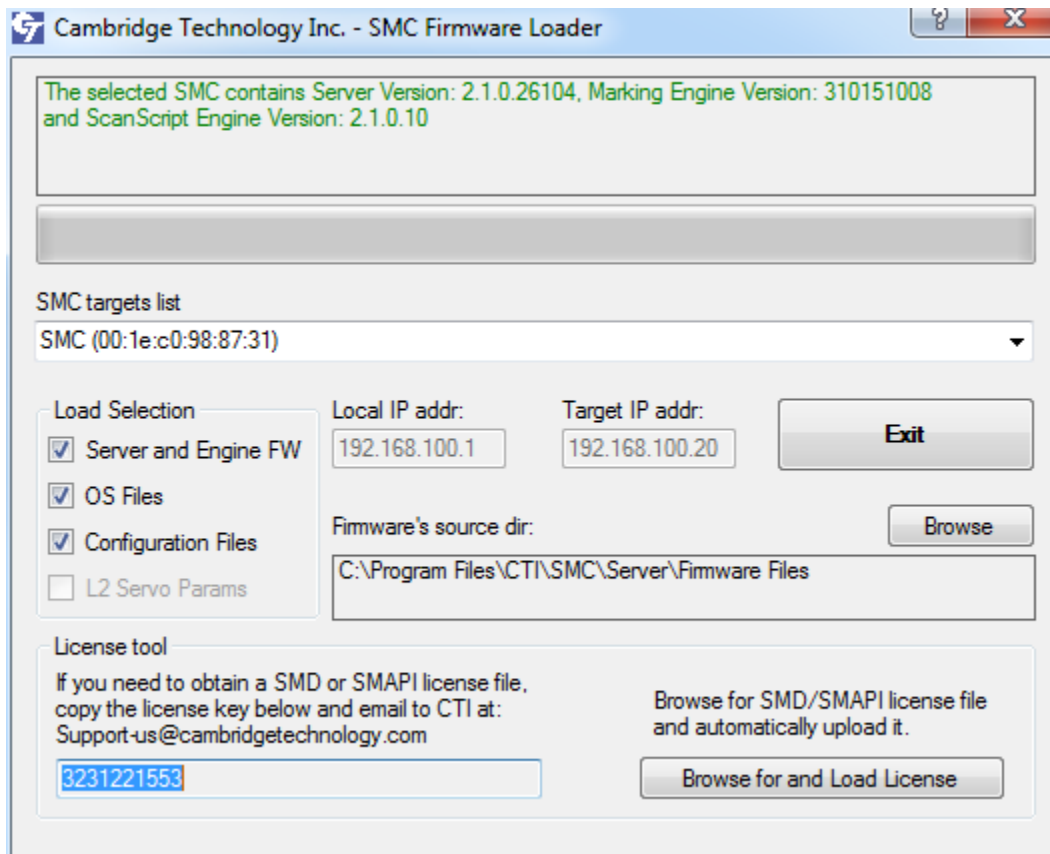
**Figure 15 - Updated firmware status screen**

5. Left-click the **Exit** button in the above screen. This completes the loading of the updated SMC firmware.

4.2   Loading the Lightning II servo parameters only

Do the following to use SMC Firmware Loader to load the Lightning II servo parameters only:

1. Check that the Lightning II servo boards are properly connected to the computer via the USB cable. Then power on the Lightning II servo boards.

2. Check that the SMC board is properly connected to the computer, and then power on the SMC board.

3. Launch SMC Firmware Loader (either from the Windows start-up menu or from the folder **C:\Program Files\CTI\SMC\Server**). SMC Firmware Loader will search the Ethernet network for the SMC.

   When an SMC is found, it appears in the **SMC targets list**. The message window will display the **Server Version**, the **Marking Engine Version**, and the **ScanScript Engine Version** as shown in the following figure.
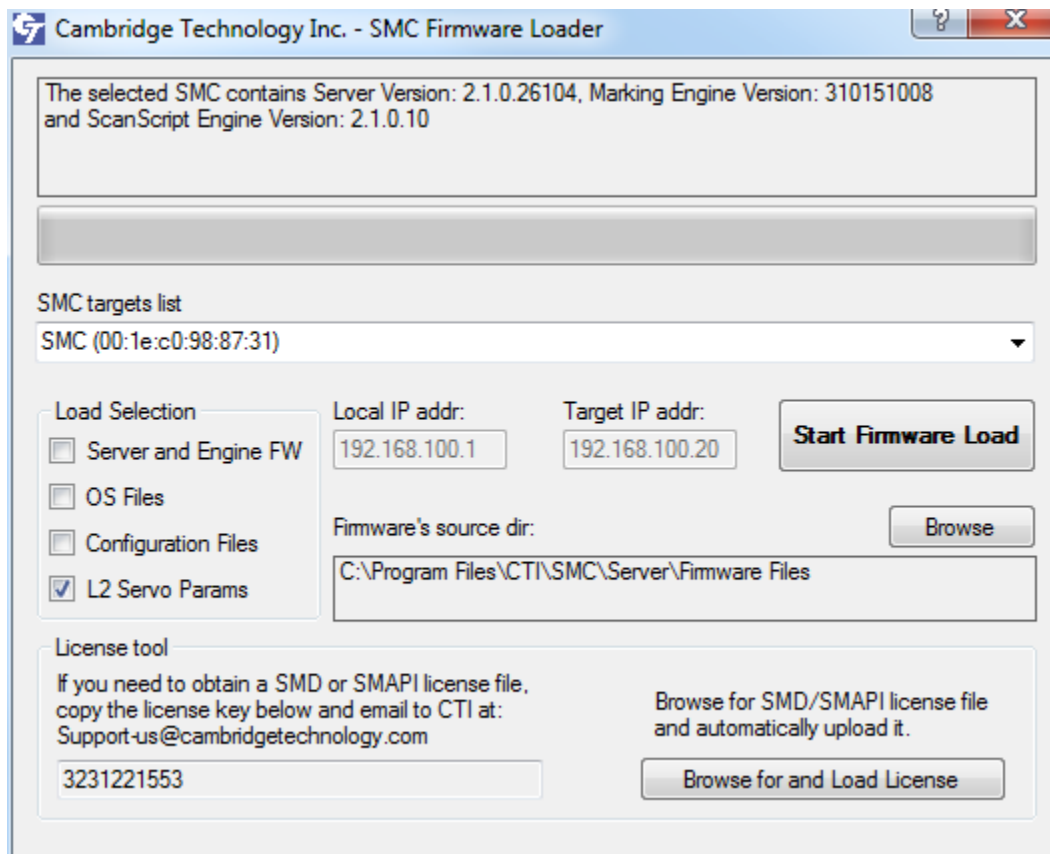
Figure 16 - "L2 Servo Params" and Start Firmware Load

4. In the **Load Selection** area of the above screen, select the **L2 Servo Params** check box.

   NOTE: Do not select any of the other check boxes in the **Load Selection** area; the goal of this procedure is only to load the Lightning II servo parameters.

5. Left-click the **Start Firmware Load** button in the above screen. This will start the process of loading Lightning II servo parameters into the SMC.

The major step in this process is "Step 8: Retrieving and uploading a new Lightning-2 Servo Parameter file into the SMC" as shown in the following figure.
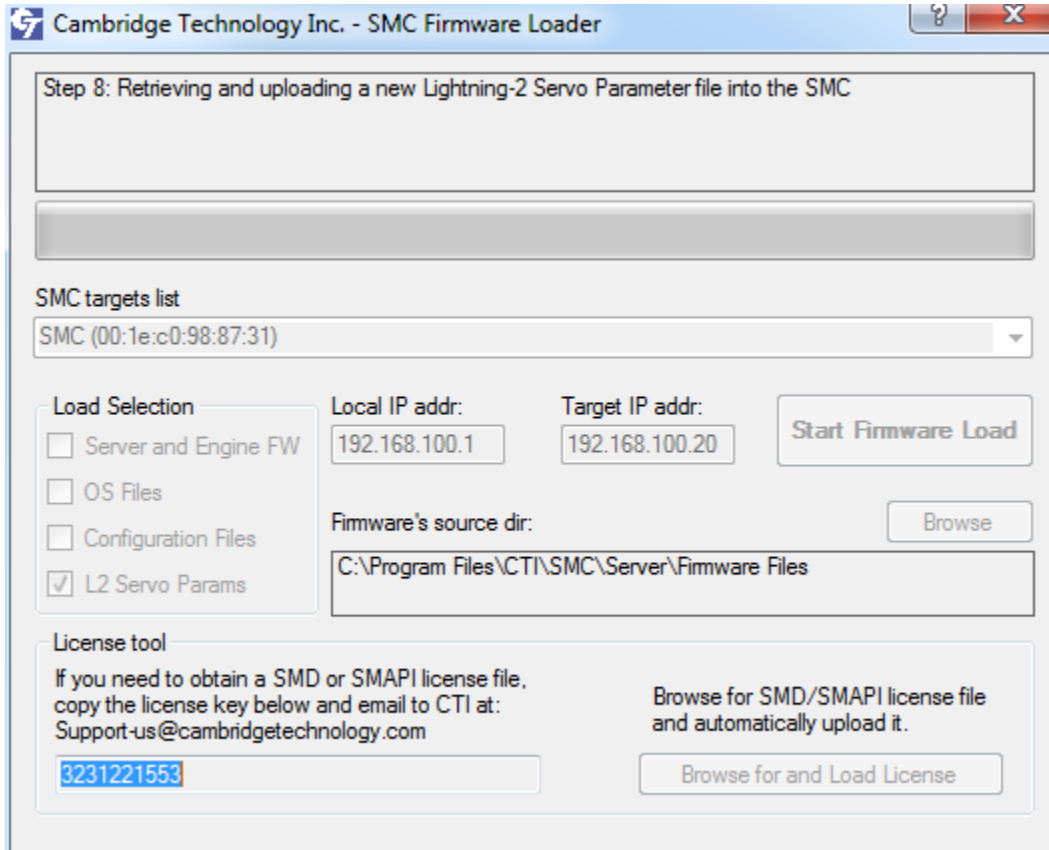
Figure 17 - Retrieving and uploading a new Lightning-2 Servo Parameter file into the SMC

A configuration file with the default name **ServoParams.xml** is automatically generated in the SMC, and the Control Configuration file has the default name **ServoParams.xml**. **PLEASE DO NOT CHANGE ANY SERVO PARAMETERS IN THE CONFIGURATION FILE.** Modifying these parameters will result in servo parameter mismatches between the SMC and the Lightning II scanning system. This means that the scanner control will not be optimized or even stable.

6. After the servo parameter upload is complete, the message window of the following screen will display the current SMC firmware version and a message saying "Check the Control Config file for the proper Servo Params file name entry." **IT IS RECOMMENDED THAT YOU NOT CHANGE THE SERVO PARAMS FILE NAME.**
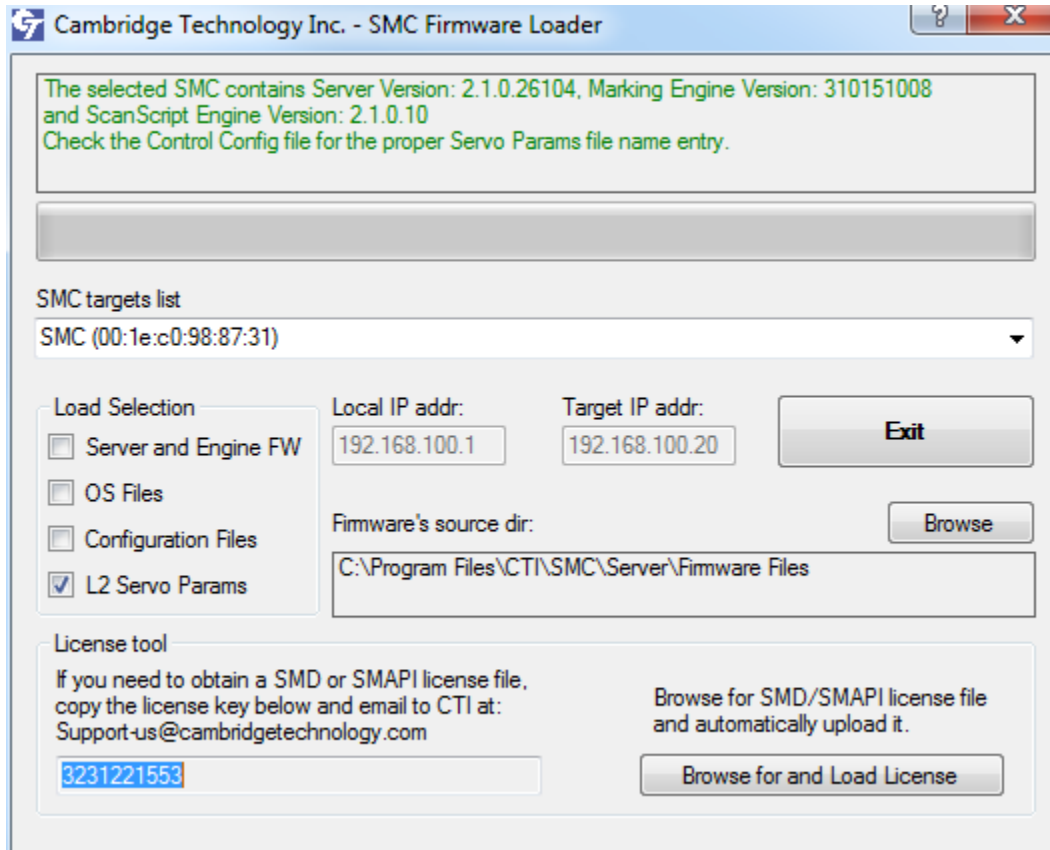
**Figure 18 - Lightning II servo upload completed**

7. Left-click the **Exit** button in the above screen to close SMC Firmware Loader. This concludes the Lightning II servo parameter upload process.

4.3   Upgrading the SMC firmware and loading the Lightning II servo parameters

Do the following to use SMC Firmware Loader to upgrade the firmware *and* load the Lightning II servo parameters:

1. Check that the Lightning II servo boards are properly connected to the computer via the USB cable. Then power on Lightning II servo boards.

2. Check that the SMC board is properly connected to the computer, and then power on the SMC board.

3. Launch SMC Firmware Loader (either from the Windows start-up menu or from the folder **C:\Program Files\CTI\SMC\Server**). SMC Firmware Loader will search the Ethernet network for the SMC.

    When an SMC is found, it appears in the **SMC targets list**. The message window will display the **Server Version**, the **Marking Engine Version**, and the **ScanScript Engine Version** as shown in the following figure.
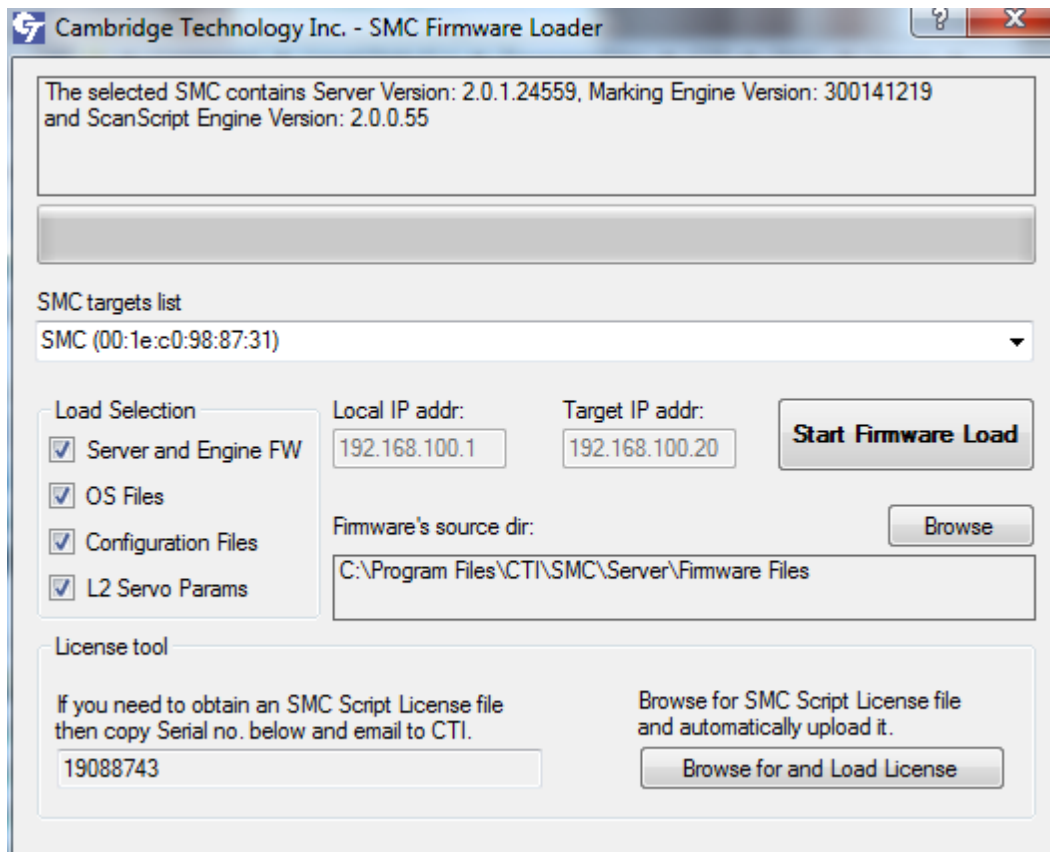

**Figure 19 - Check all four boxes and Start Firmware Load**

4. In the **Load Selection** area of the above screen, select all four check boxes: **Server and Engine FW**, **OS Files**, **Configuration Files**, and **L2 Servo Params**.

    Left-click the **Start Firmware Load** button in the above screen. This will start the process of firmware upgrade as well as the loading Lightning II servo parameters into the SMC.

The following figures show the major steps in the process of upgrading the firmware and loading the Lightning II servo parameters. The details of each step are described in the message window of the applicable screen.This process includes step 2 through step 9.
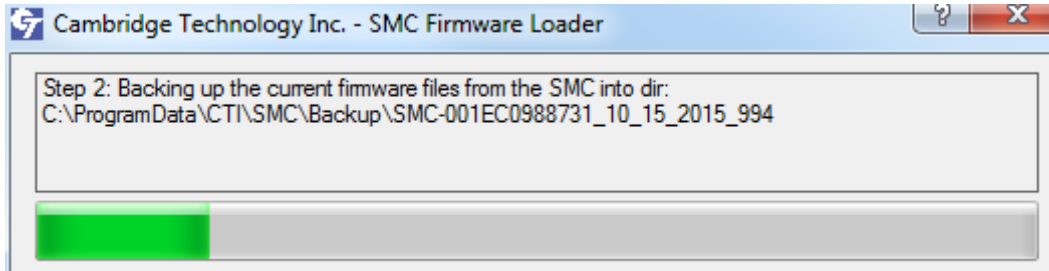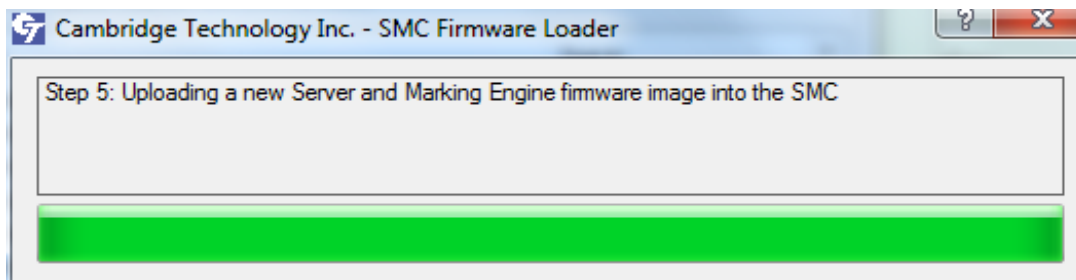

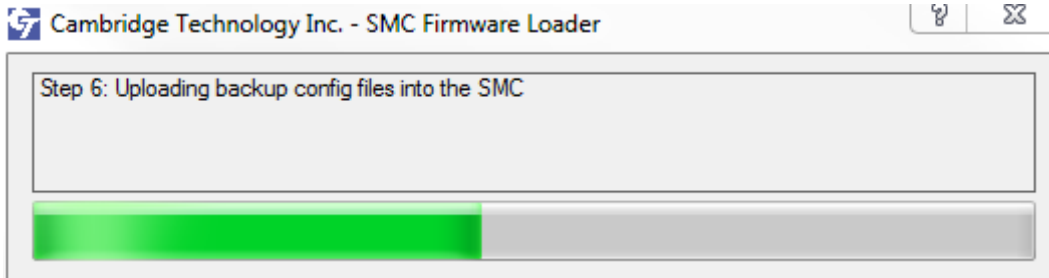**Figure 20 - Backing up the current firmware files from the SMC**
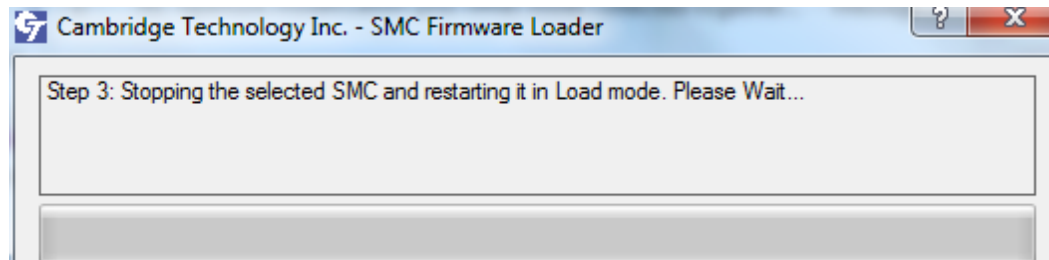
Figure 21 - Stopping the selected SMC and restarting it in Load mode
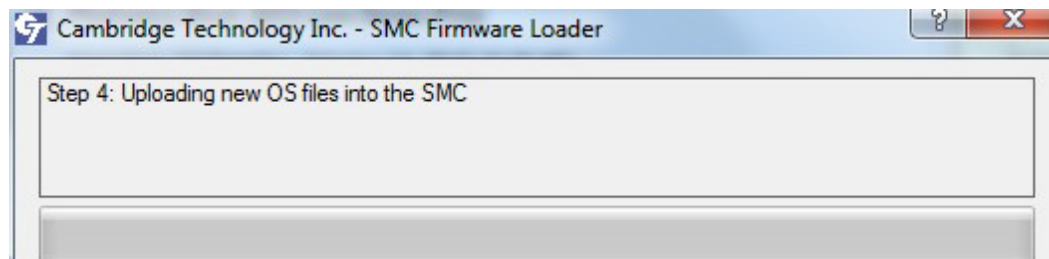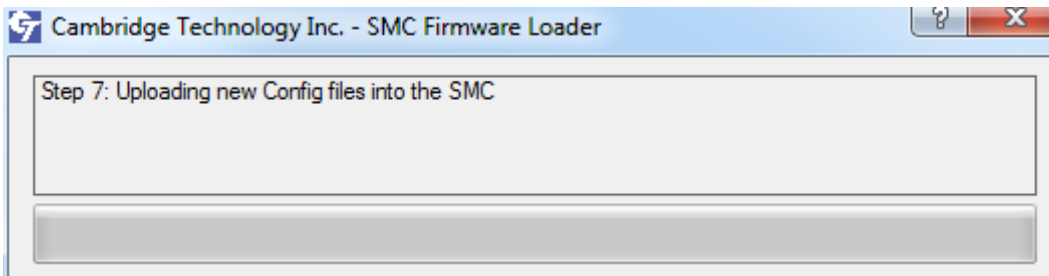

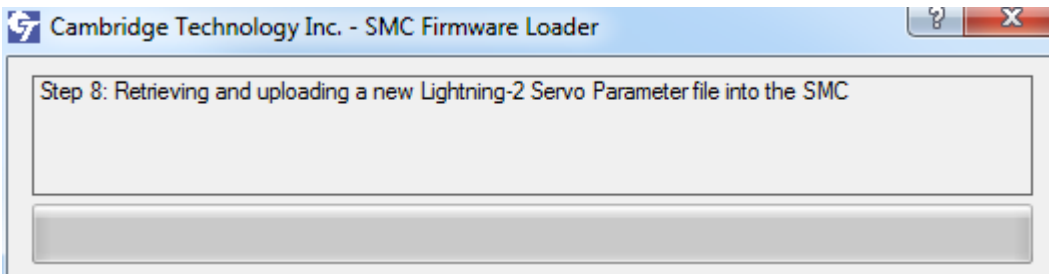**Figure 22 - Uploading the new OS files into the SMC**

Figure 23 - Uploading a new Server and Marking Engine firmware image into the SMC
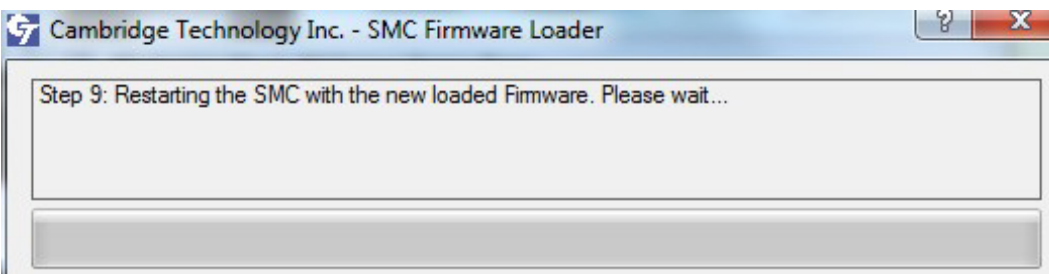
Figure 24 - Uploading the backup configuration files into the SMC

Figure 25 - Uploading the new configuration files into the SMC

Figure 26 - Retrieving and uploading a new Lightning II servo parameter file into the SMC


Figure 27 - Restarting the SMC with the new loaded firmware

A configuration file with the default name **ServoParams.xml** is automatically generated in the SMC, and the Control Configuration file has the default name **ServoParams.xml**. **PLEASE DO NOT CHANGE ANY SERVO PARAMETERS IN THE CONFIGURATION FILE.** Modifying these parameters will result in servo parameter mismatches between the SMC and the Lightning II scanning system. This means that the scanner control will be not optimized or even stable.

5. After the servo parameter upload is complete, the message window of the following screen will display the current SMC firmware version and a message saying "Check the Control Config file for the proper Servo Params file name entry." **IT IS RECOMMENDED THAT YOU NOT CHANGE THE SERVO PARAMS FILE NAME.**
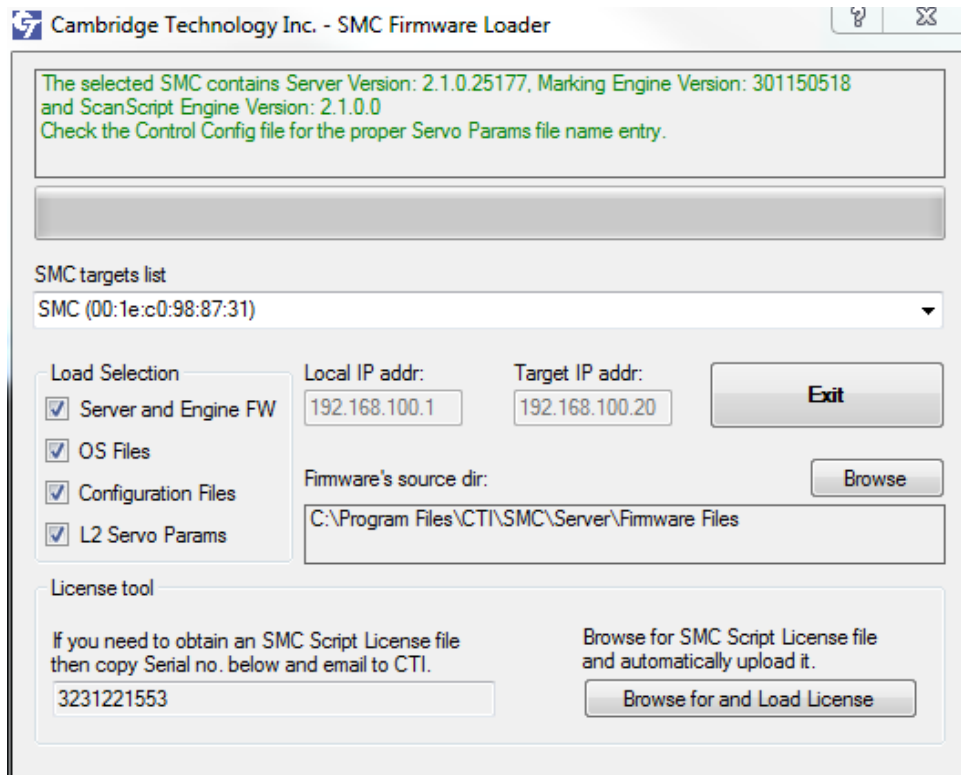
Figure 28 - Firmware upgrade and Lightning II servo parameter upload both completed

6. Left-click the **Exit** button in the above screen to close SMC Firmware Loader. This concludes the process of upgrading the SMC firmware and loading the Lightning II servo parameters.