SYSTEMS ENGINEERING
HMI BACKUP AND RESTORE
REFERENCE

25. June 2024

With the Maple Systems HMI, the PLC program and setup parameters (including the timing channel setpoints) can be uploaded and **saved TO** the HMI. Once the upload is complete, this information can be **exported TO** an "expanded memory" file (.emi) on a USB thumb drive.

The PLC program and setup parameters (including the timing channel setpoints) can also be downloaded and **restored FROM** the HMI or from an "expanded memory" file (.emi) on a USB thubm drive. The restore process will essentially put the controller back to the previsous state in a short amount of time (generally witin a couple of minutes).

Additionally, the PLC program, setup parameters (including the timing channel setpoints) can be imported **FROM** an "expanded memory" file (.emi) on a USB thumb drive. This allows the data to be updated in the HMI without having to upload it from the controller.

There are NO restrictions on UPLOADING FROM the controller. This function can be performed at any time. The **ONLY restriction for DOWNLOADING TO the controller** is the **completion of an UPLOAD to 100%, otherwise the DOWNLOAD function will NOT be executed**.

UPLOADING is the process of **READING FROM** the controller. This is a two step process which involves first uploading the PLC program and then the setup data (including the timing channel setpoints).

When TO perform a PROGRAM and/or DATA UPLOAD FROM the controller to HMI:
1. Initial installation or replacement of HMI (PROGRAM and DATA upload)
2. After a PLC program update has been performed on the controller, external to the HMI (PROGRAM upload only)
3. As advised by Systems Engineering Technical Support

**When NOT TO perform a PROGRAM and/or DATA UPLOAD FROM the controller to HMI:**
1. PLC/PLS Rack/Module Replacement
2. Module FAULTED (program corrupt)

When the HMI is initially installed or replaced it is important to normalize the data between the controller and the HMI. This is the process of **UPLOADING** the PLC program and setup DATA **FROM the M4500**. The UPLOAD process can be done at anytime, including while the machine is in production. **Uploading the PROGRAM can take up to about 20 minutes to complete. This process should NOT be interrupted once started**. Uploading the DATA is completed in about 90 seconds or less, depending on the number of setup parameters and timing channel setpoints needed to upload. This process should NOT be interrupted once started.

NOTE: Anytime a setup parameter is changed through the HMI, the data is written to the M4500, as well as saved to non volitile memory in the HMI. Therefore it is only necessary to perform a DATA UPLOAD at the initial installation or replacement of the HMI.

DOWNLOADING is the process of **WRITING DATA TO** the controller. This is a two step process which involves **FIRST** downloading or restoring the **PLC PROGRAM** and then, **IF NECESSARY**, downloading and restoring the setup data (including timing channel setpoints).

WARNING: DOWNLOADING or restoring the PLC program or setup data to the controller should **ONLY** be done with the **MACHINE STOPPED!** This is especially true if the PLC program were to be restored as program execution is haulted and **ALL OUTPUTS are turned Off** during program download.

NOTE: If an S4516 or S4516-DF1 communications board is installed in the rack, a power cycle to the rack is required in order to properly reinitialize the board after downloading is complete.

When TO perform a PROGRAM and/or DATA DOWNLOAD TO the M4500 controller:
1. M4500 PLC/PLS Rack/Module Replacement (PROGRAM AND DATA download)
2. Unrecoverable module Fault – program corrupt (PROGRAM download)
3. As advised by Systems Engineering Technical Support

When NOT TO perform a PROGRAM and/or DATA DOWNLOAD TO the M4500 controller:
1. While machine is in production or running. Machine must be stopped for any type of download.
2. A **DATA DOWNLOAD** is **NOT** necessary if restoring a corrupted PLC program unless these values have also been corrrupted.

NOTE: Selecting the "SEA" icon in the upper left corner of any screen will display information about how to reach Systems Engineering Technical Support.
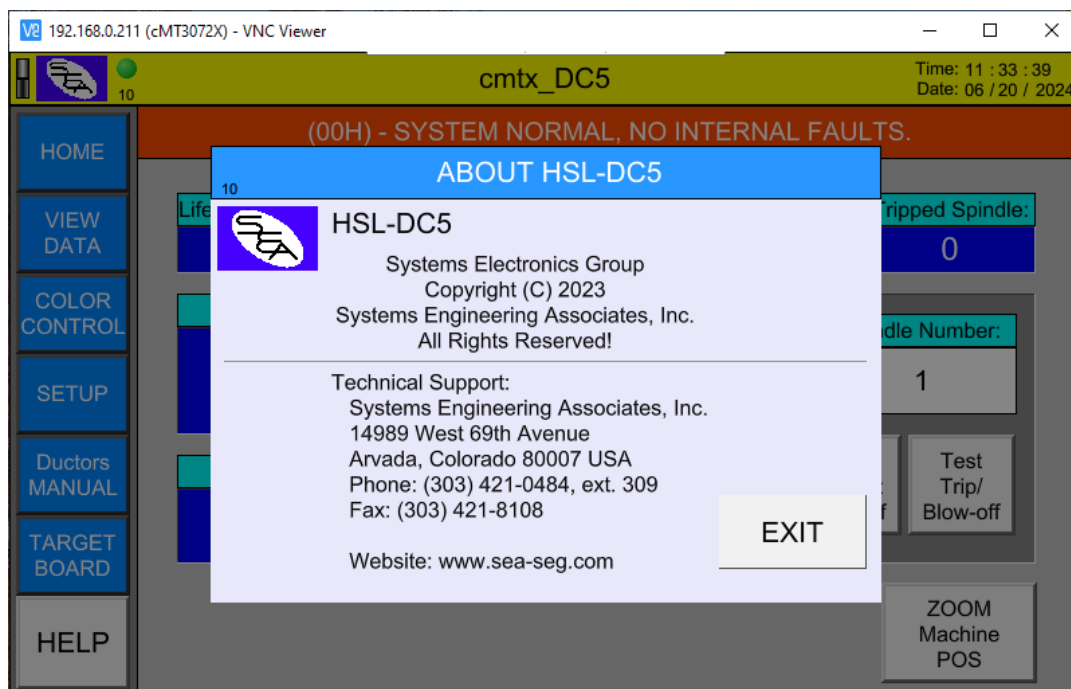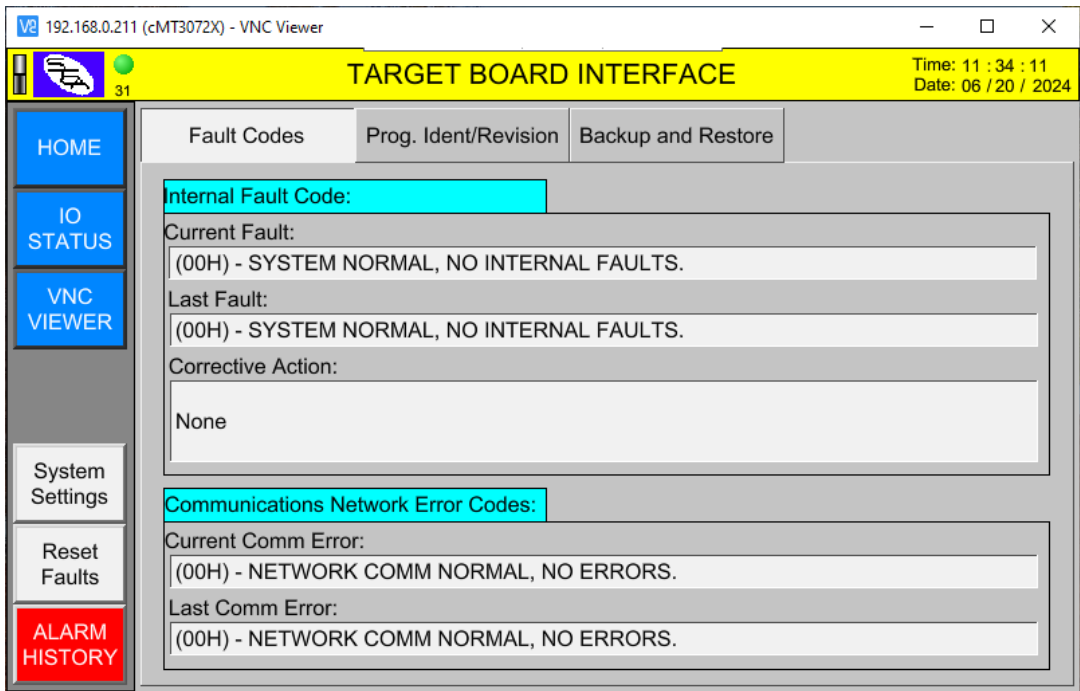
Perform the following to **UPLOAD FROM** the M4500 using the Maple Systems HMI display:
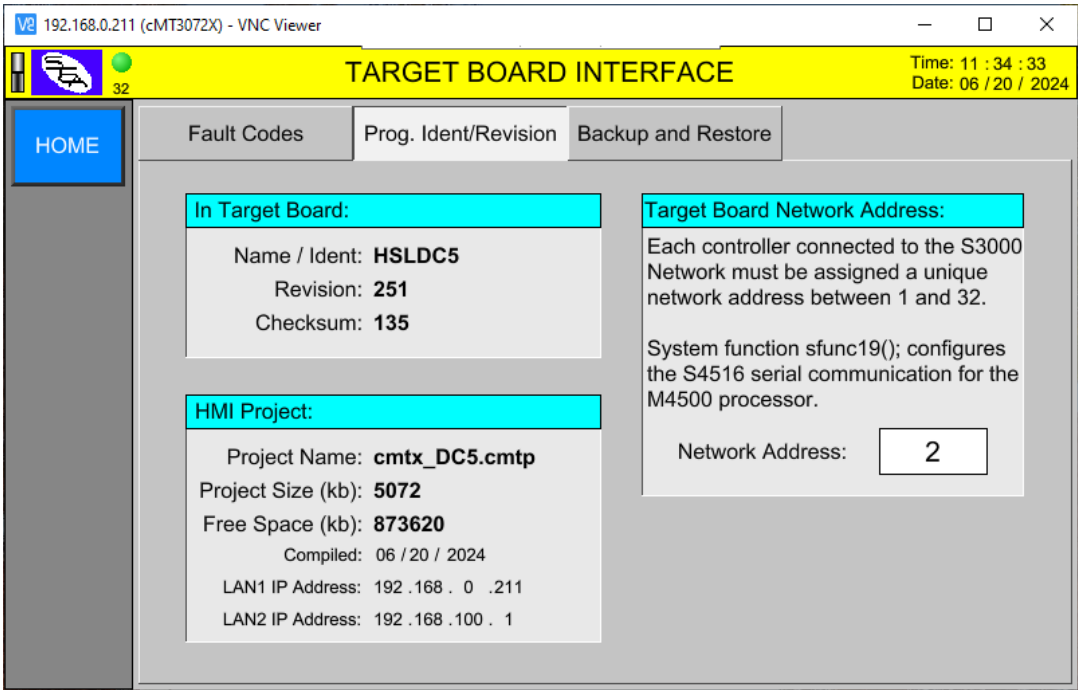
From the **HOME** screen, select **TARGET BOARD**:
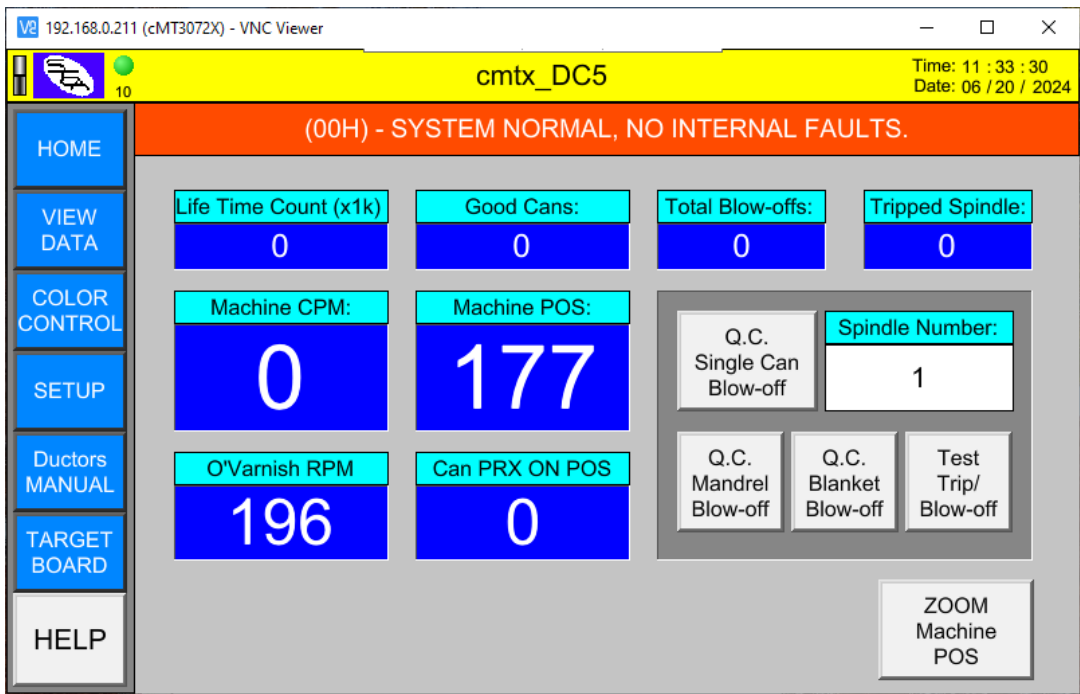
This will initialize to the "Fault Codes" TAB of the TARGET BOARD INTERFACE display. This will display information about the current fault status of the controller.

The "Prog Ident/Revision" TAB will show information about the current program loaded in the M4500 as well as the HMI project:
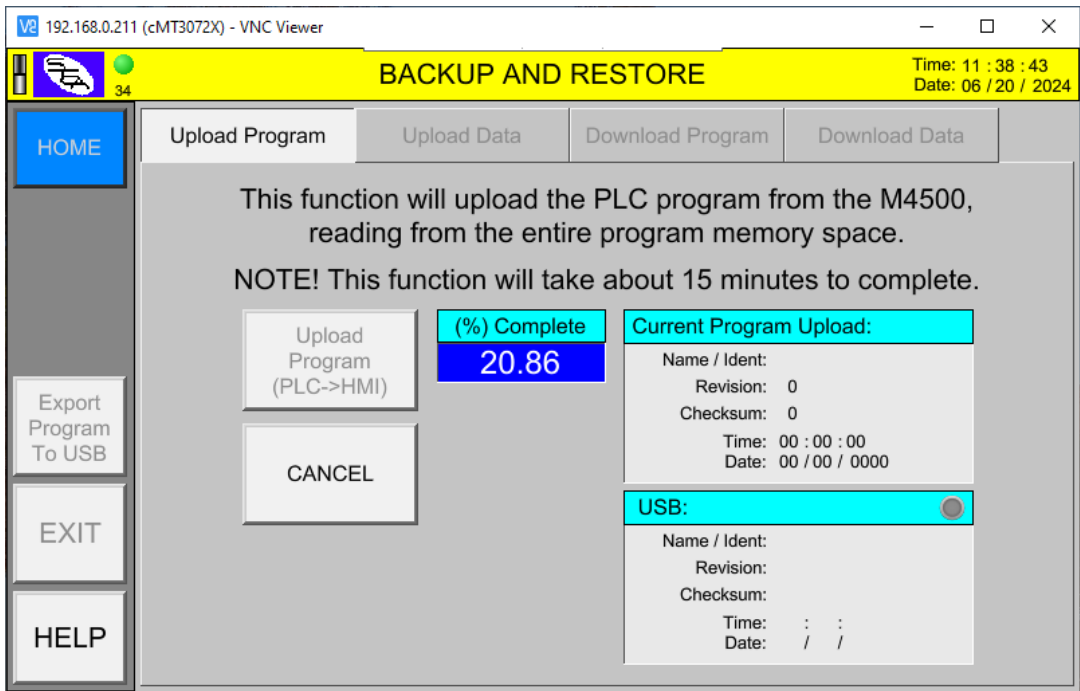

Select the "**Backup and Restore**" TAB and then select "**Upload Program (PLC->HMI)**" button:
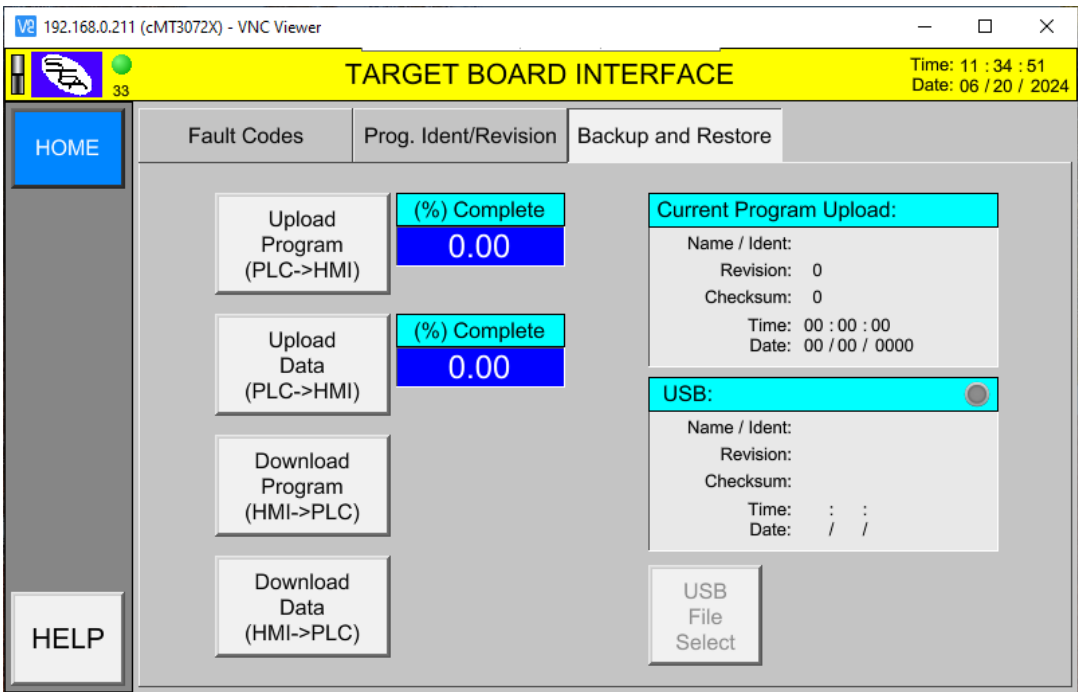
This will initialize to the "Upload Program" TAB. Select the "**Upload Program (PLC->HMI)**" button to initiate the UPLOAD process of reading the PLC program memory space from the M4500.
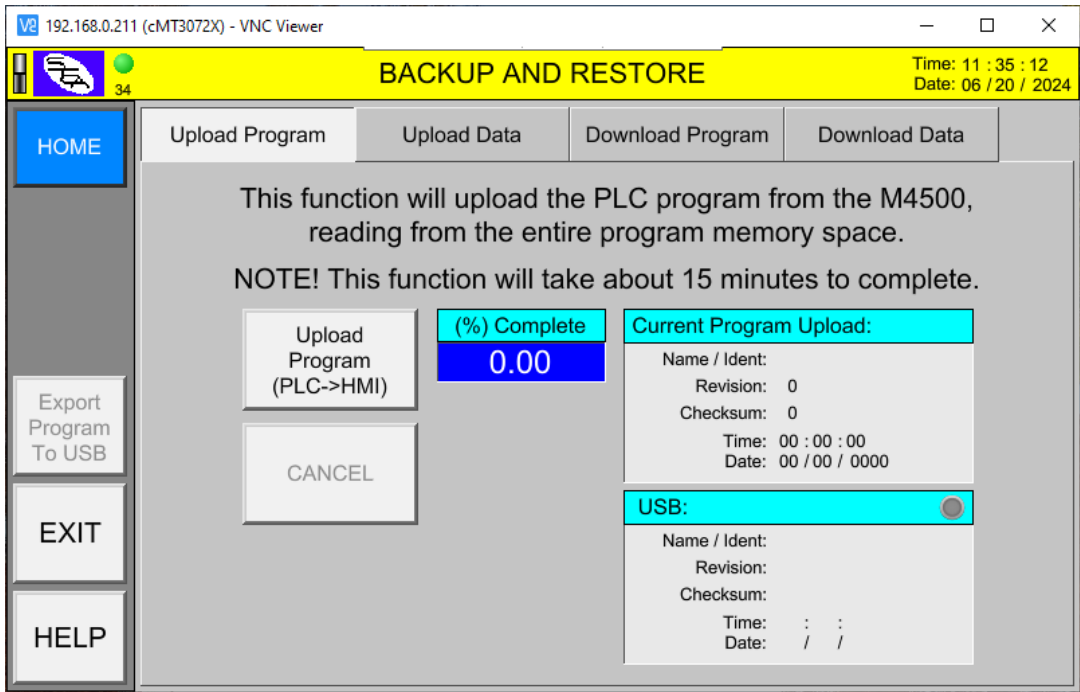
Note: The "**CANCEL**" button is used to **TERMINATE** the process at anytime.

Once the upload is at 100% Complete, the **Current Program Upload** will show the Name, Revision and Checksum of the current program uploaded, as well as a time and date stamp of when it was completed.
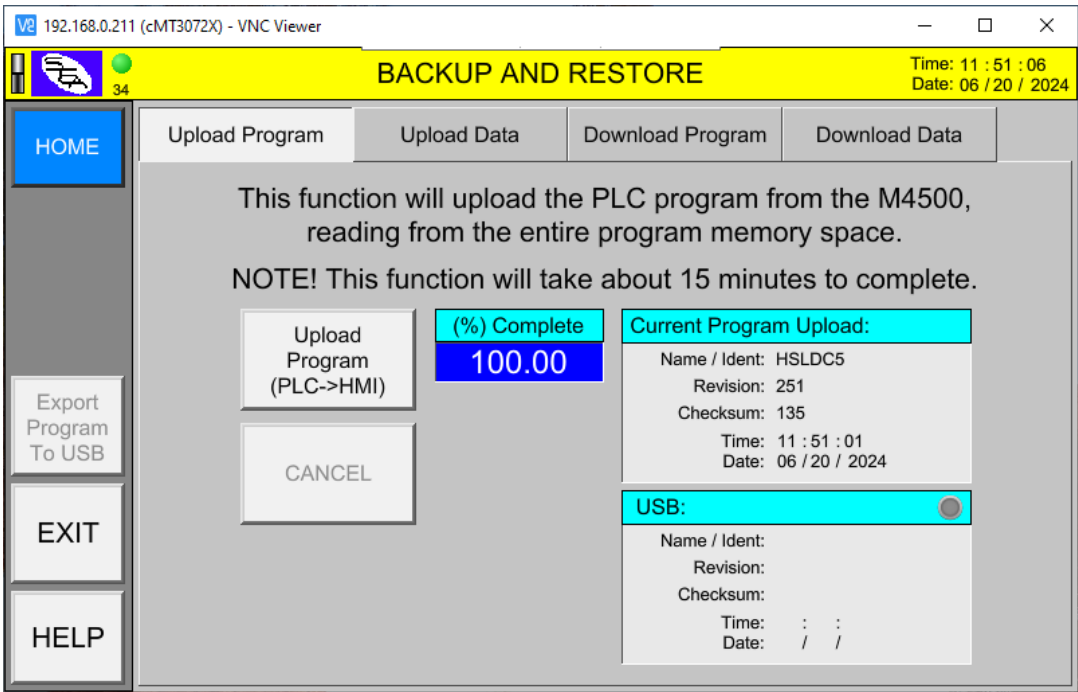
Next select the "**Upload Data**" TAB:
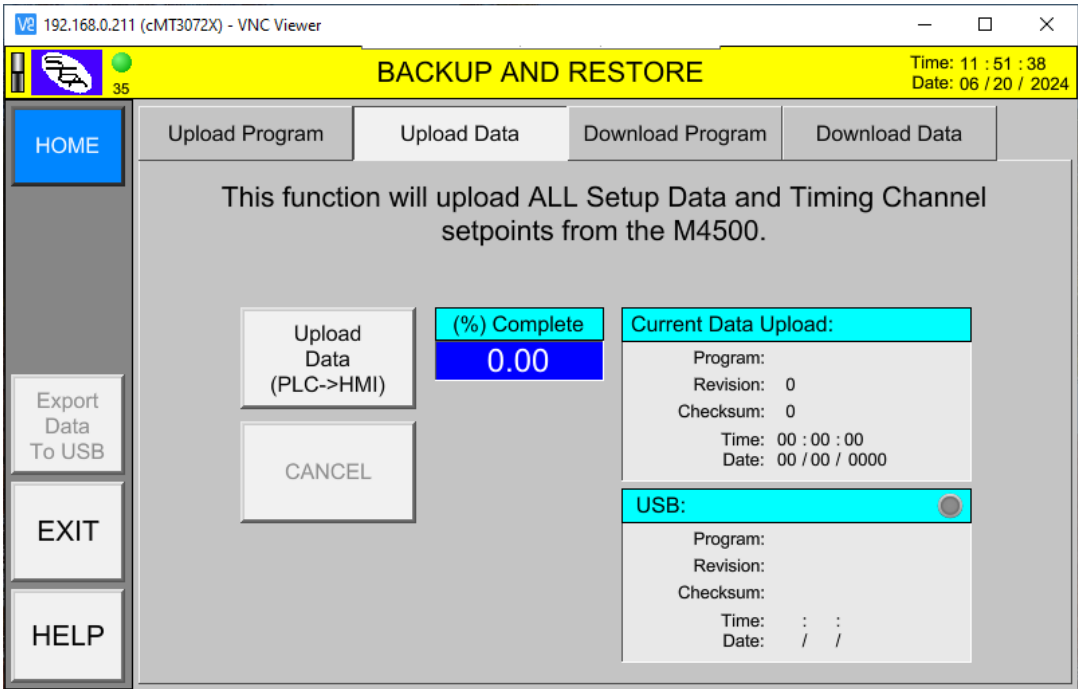
Selecting the "**Upload Data (PLC->HMI)**" button will initiate the UPLOAD process of reading the setup parameters and timing channel setpoints from the M4500.
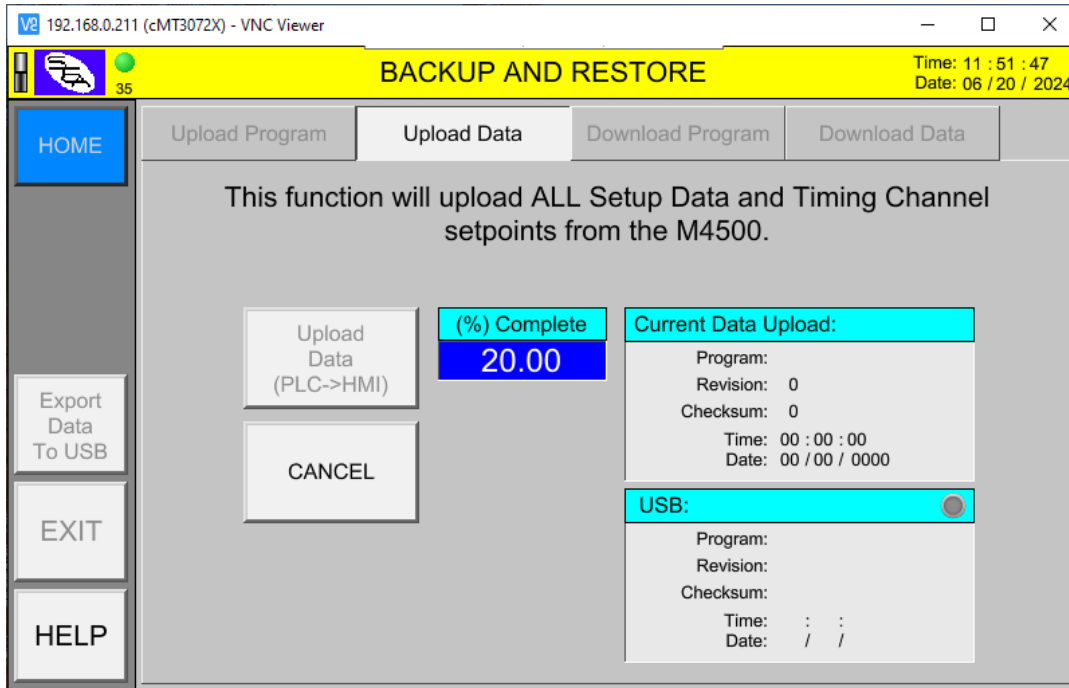
Note: The "**CANCEL**" button is used to **TERMINATE** the process at anytime.

Once upload is at 100% Complete, the user can:
- Use the "**HOME**" button to return to the HOME screen
- Select the "**EXIT**" button to return to "**Backup and Restore**"
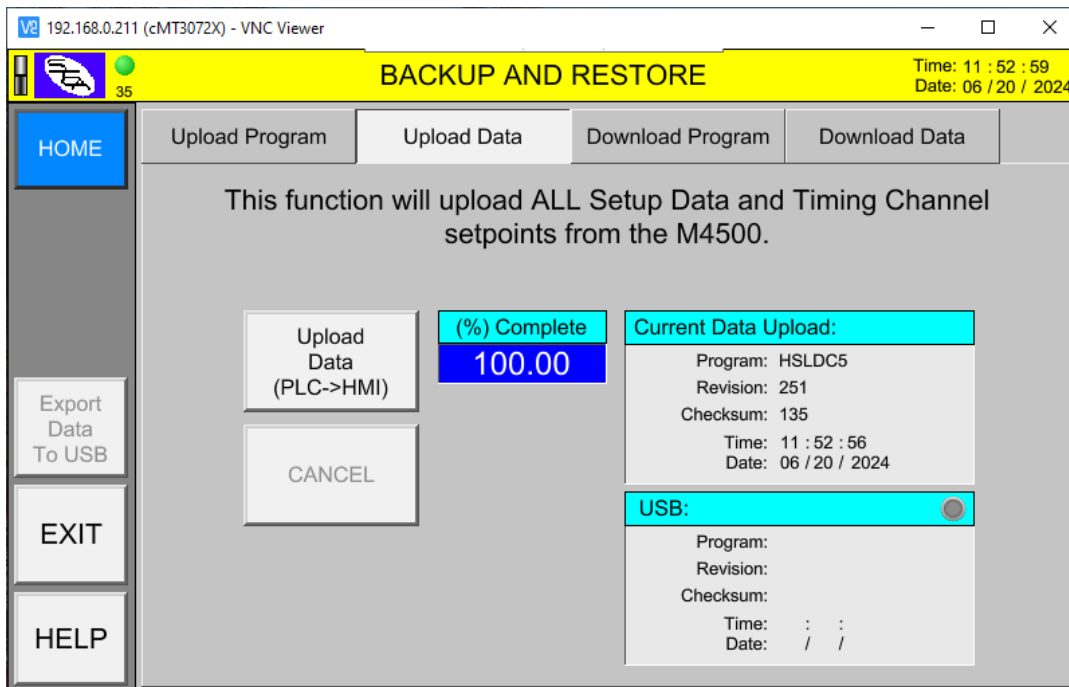
Exporting TO an "expanded memory" file (.emi) on a USB thumb drive: Once the PLC program and setup data have been uploaded to the HMI, the data can optionally be **exported TO** an "expanded memory" file (.emi). To perform this function, insert a USB thumb drive into the USB port (located next to the RS-232 serial communications port) on the back of the HMI.

When the drive is first inserted, a pop-up will be displayed regarding "External Device Detected". Select close or wait for the inactivity timer to expire.
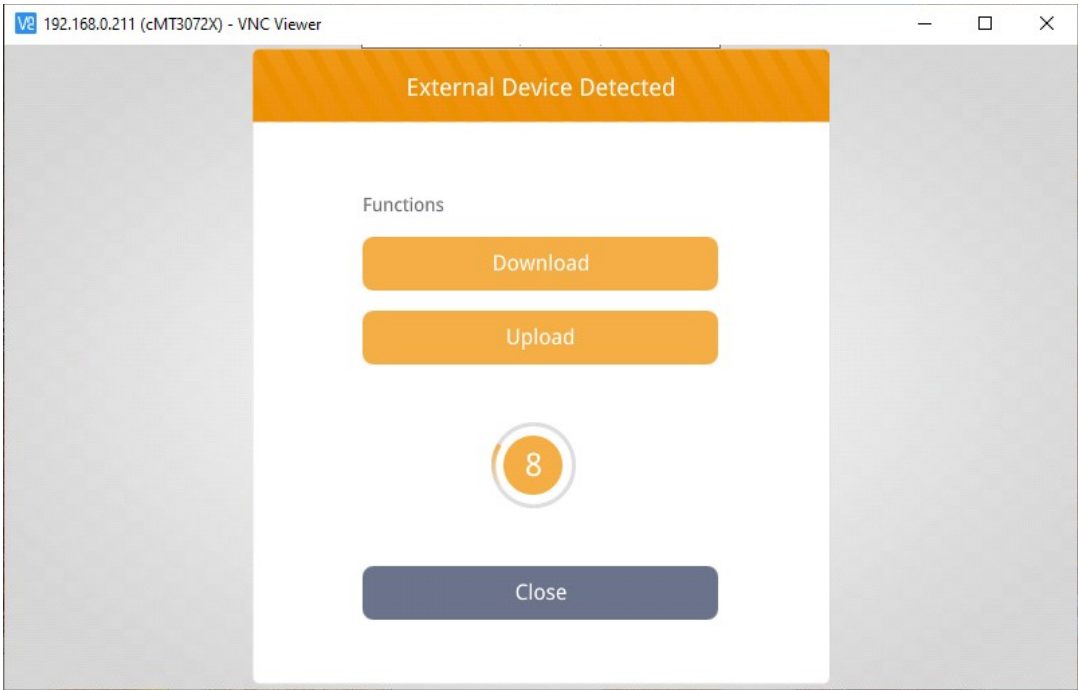
With the USB thumb drive inserted, the "**Export Program to USB**" button is now active (buttons are gray when NOT active).
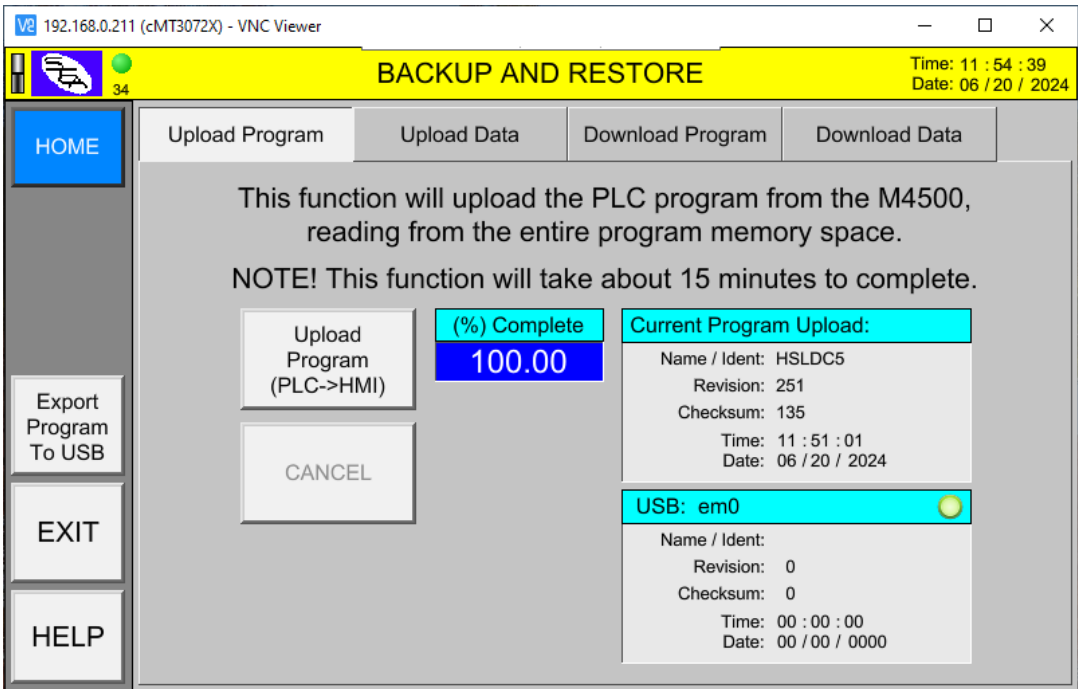
Selecting "**Export Program to USB**" will display file explorer popup. This allows the user to enter a file name to export the PLC program data or select an existing file.
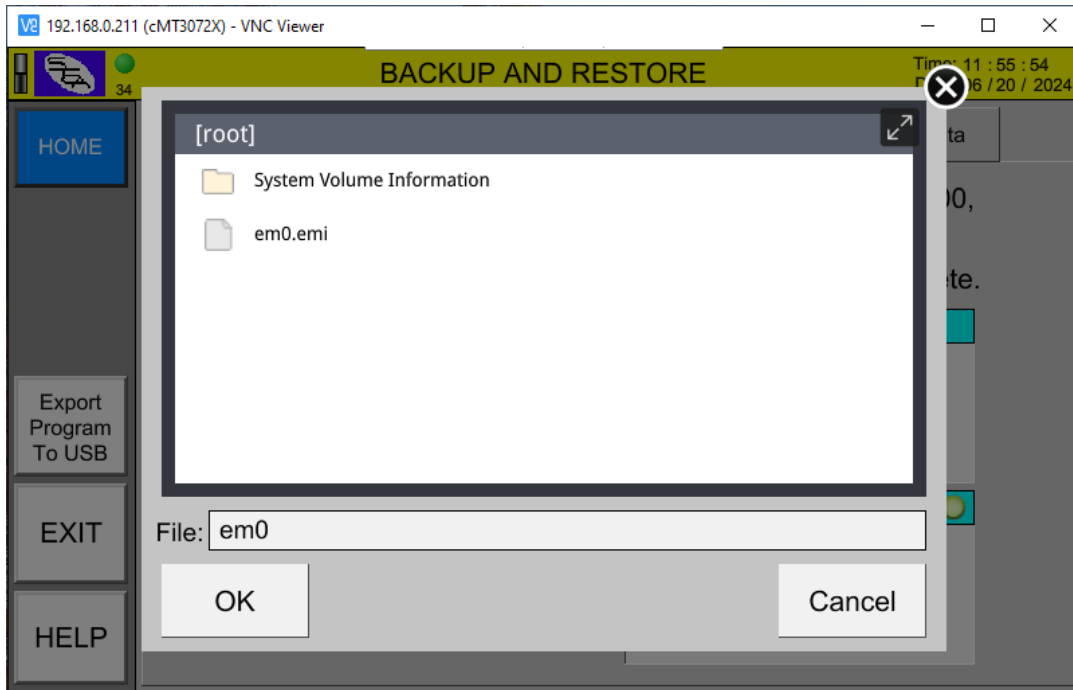
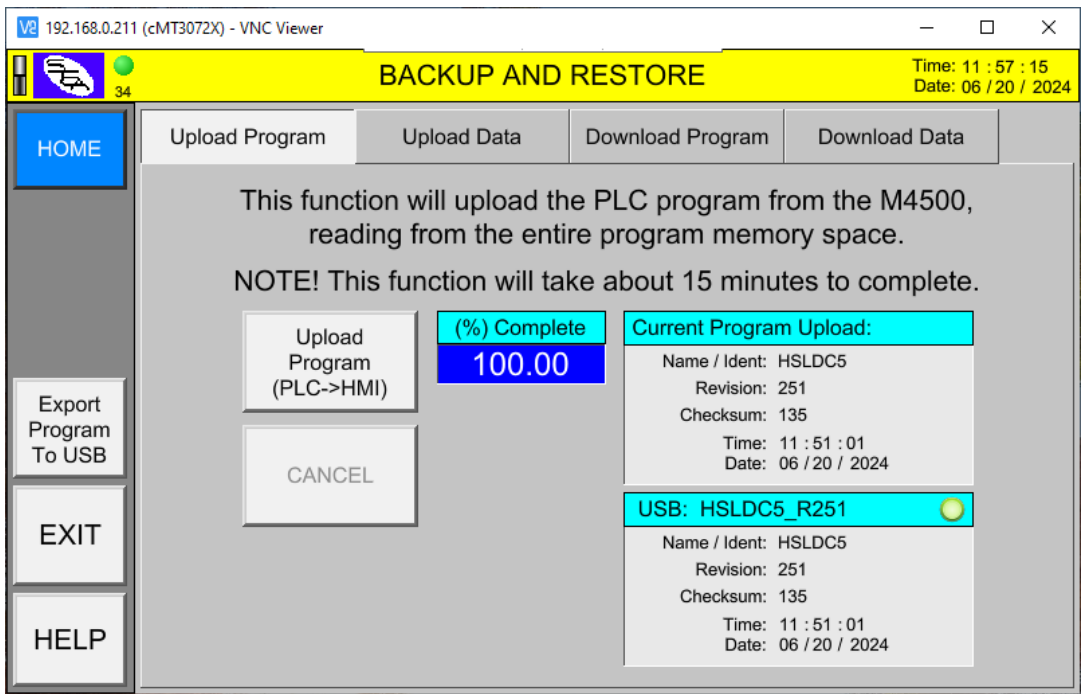Use the keyboard to enter a new file name and press return.
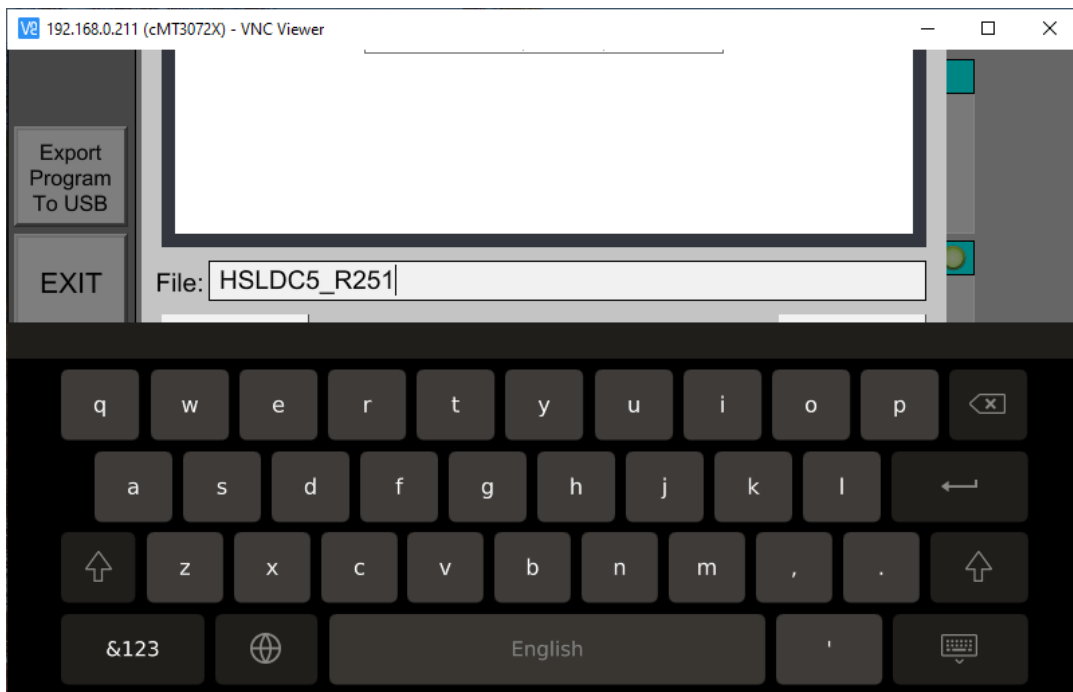
Select the "OK" button to initiate the export process. Selecting the "Cancel" button will abort the export process.
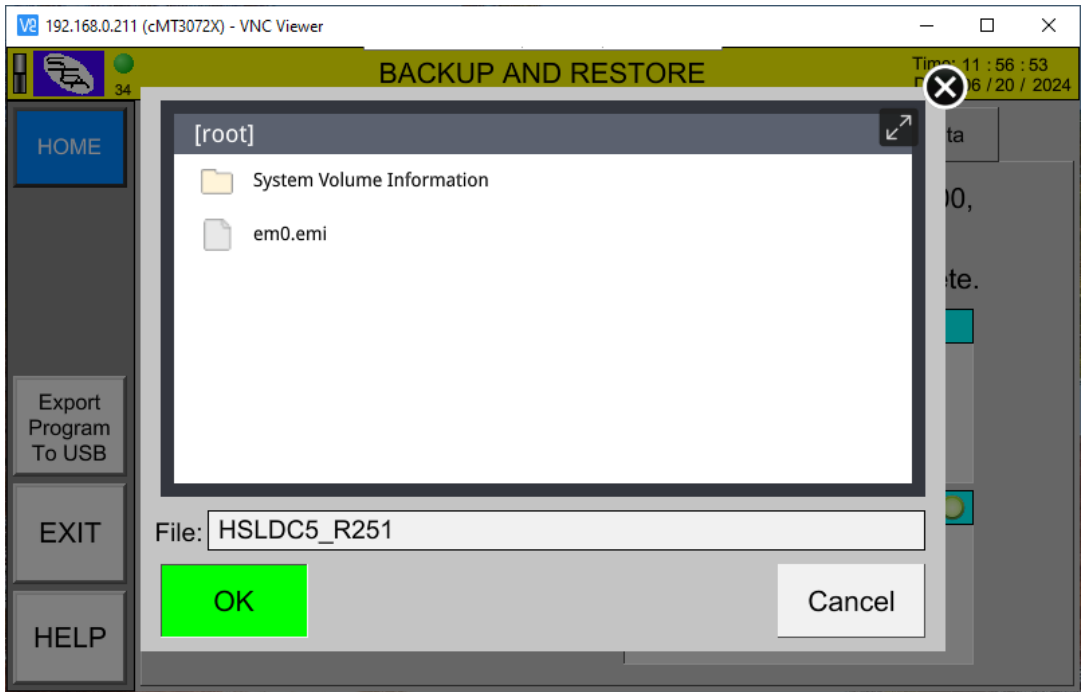

Once the export process is complete, the header for the "USB:" information will display the name of the selected ".emi" file, as well as the information in the data area below will match that of the "Current Program Upload".

Note: It will take a short time to completely write the data to the USB thumb drive. Be sure to wait about 10 seconds before removing the thumb drive from the USB port to complete the write process.

Exporting the setup "DATA" to the USB thumb drive will function the same as exporting the PLC program.
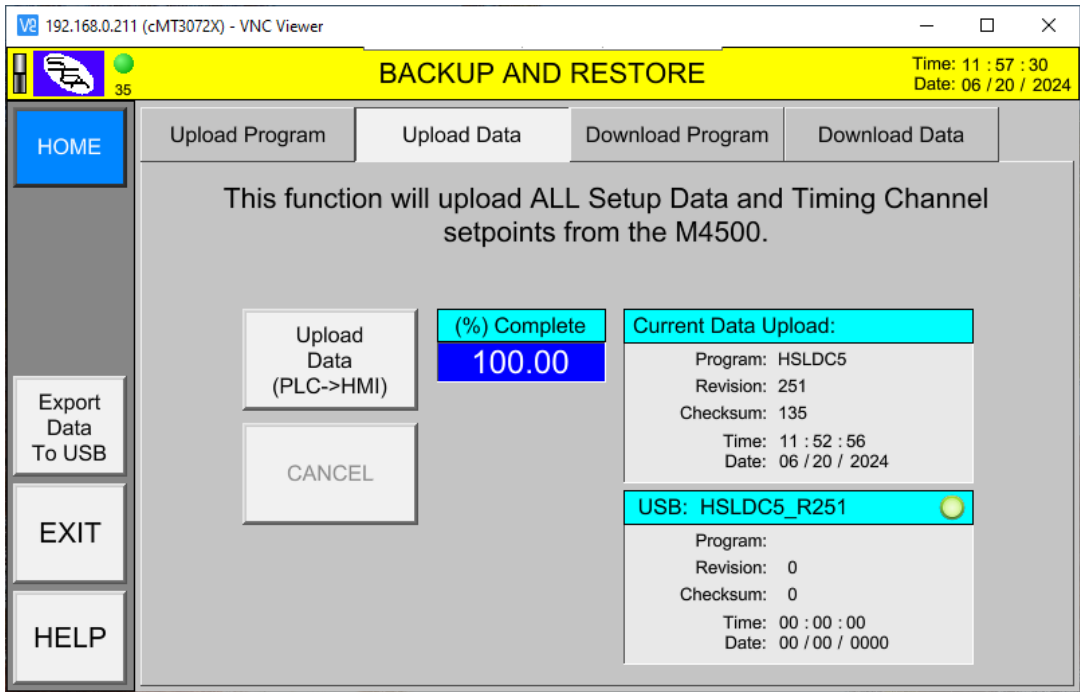
From the "Upload Data" TAB, select the "Export Data to USB" button. This will display the file explorer popup, as before.
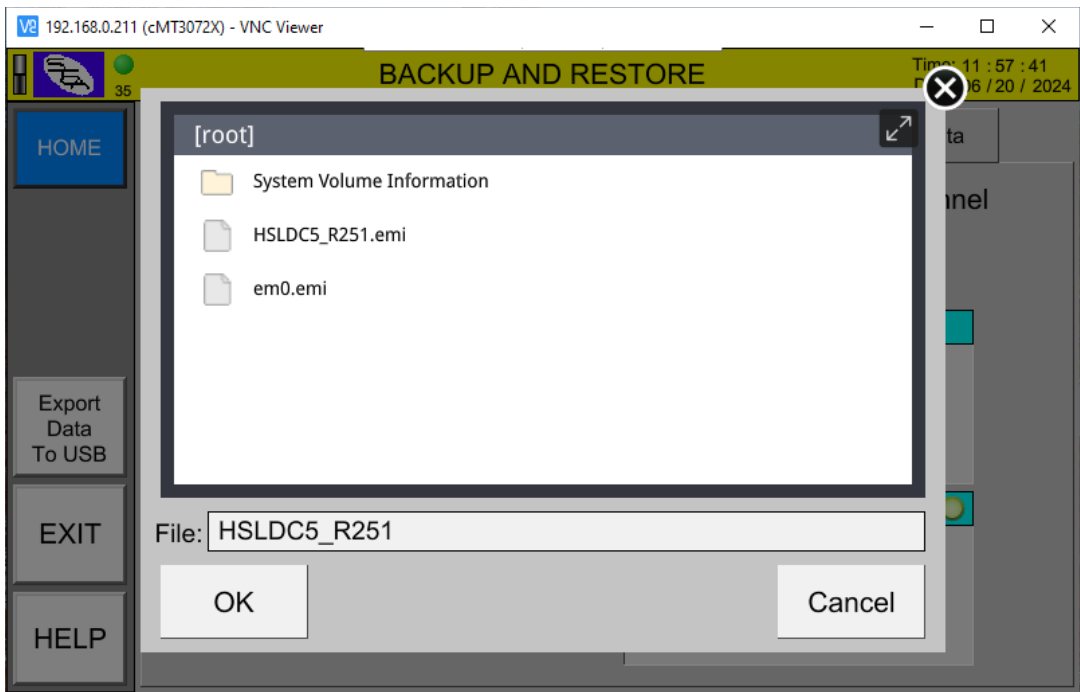
Select the same file used for the PLC program and press the "OK" button to initiate the export process. Pressing the "Cancel" button will abort the export process.
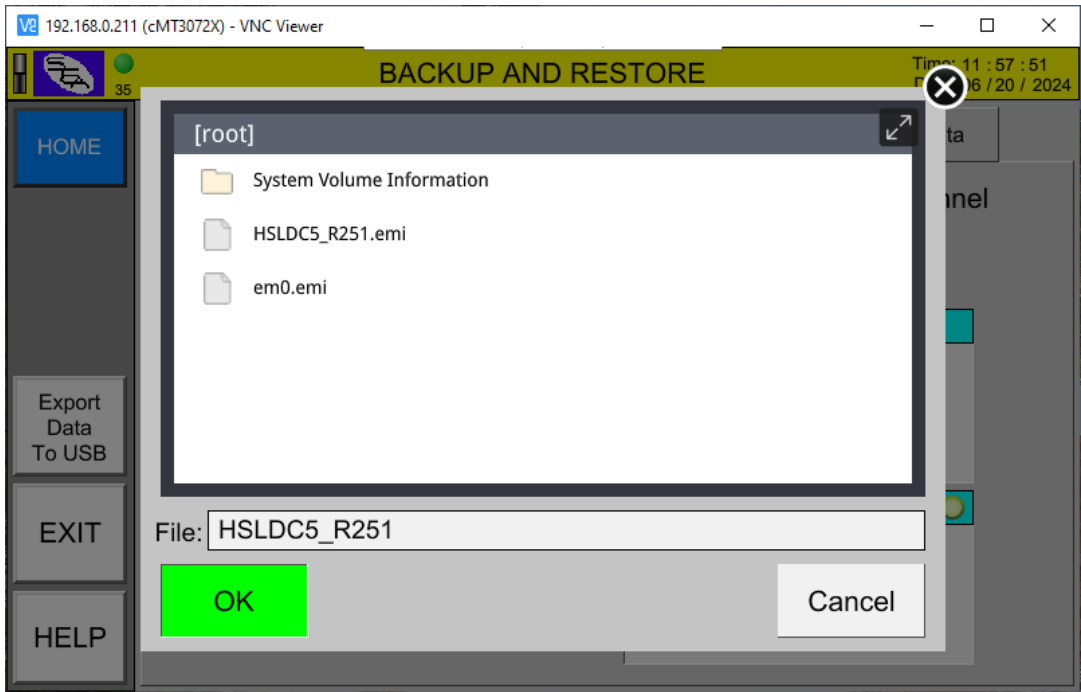

Once the export process is complete, the "USB:" information will display the same "Program Ident" information as that of the "Current Data Upload". The Time/Date stamp information will be that of when the export was executed..

Note: It will take a short time to completely write the data to the USB thumb drive. Be sure to wait about 10 seconds before removing the thumb drive from the USB port to complete the write process.
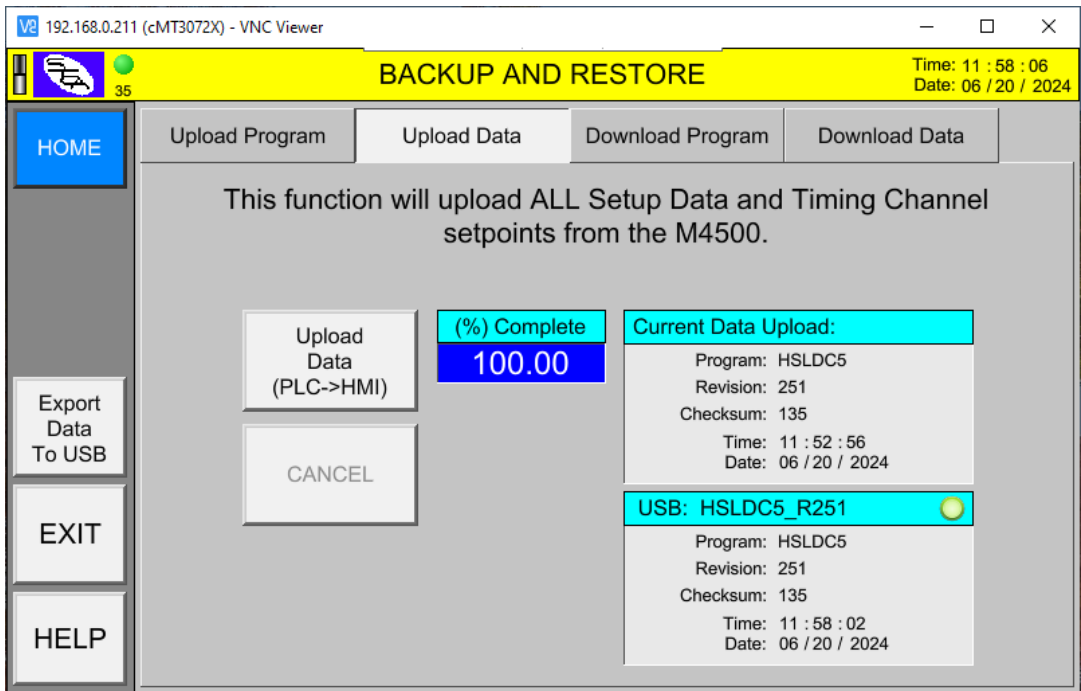
Perform the following to **DOWNLOAD TO** the M4500 using the Maple Systems HMI display:

Select "**Download Program**" TAB:
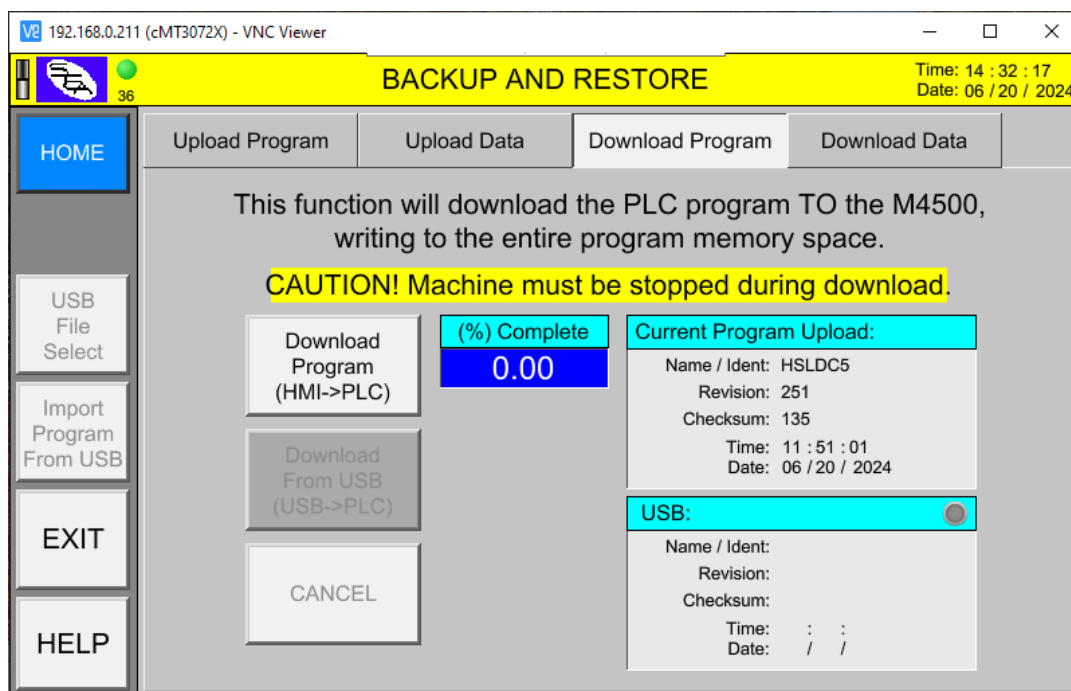
Select the "**Download Program (HMI→PLC)"** button to initiate the DOWNLOAD process of writing the PLC program to the M4500. This process should complete in about 90 seconds.

A popup will be displayed to confirm the selected operation. Select "OK" to confirm and initiate program download.
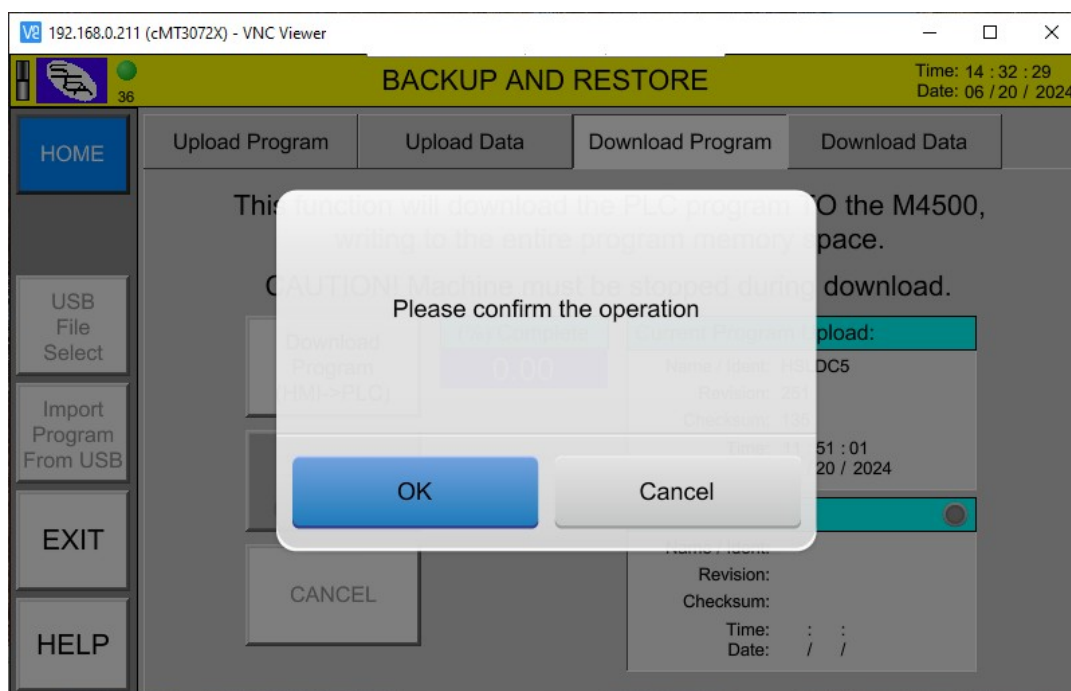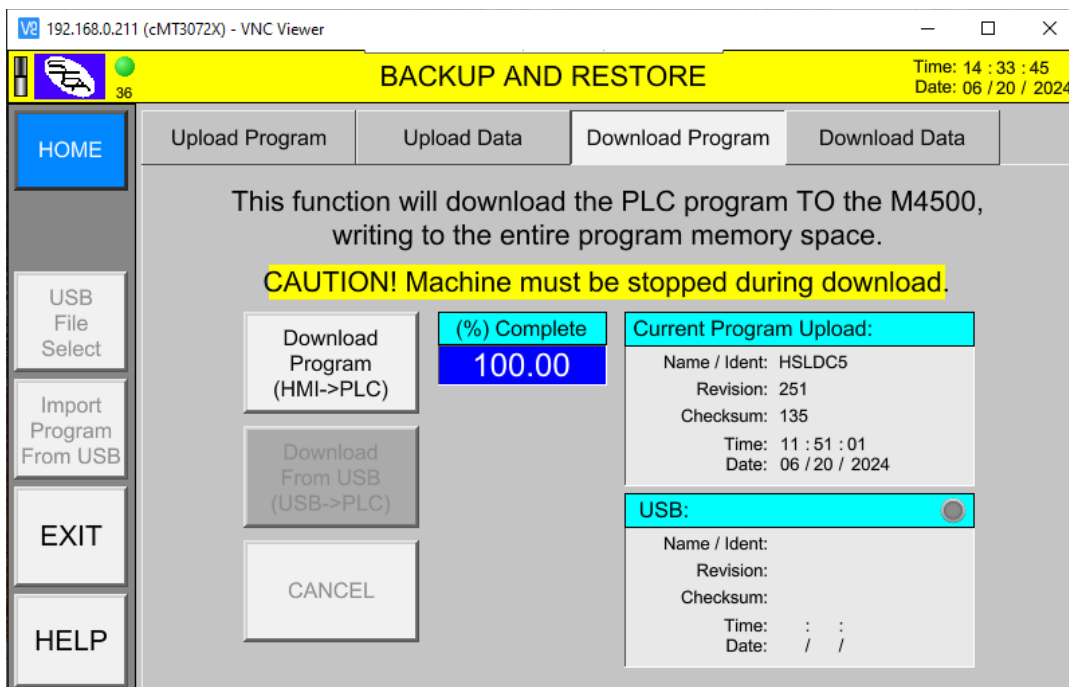
The DOWNLOAD process will restore (write) the PLC program (previously backed up to the HMI). This process should complete in about 90 seconds.
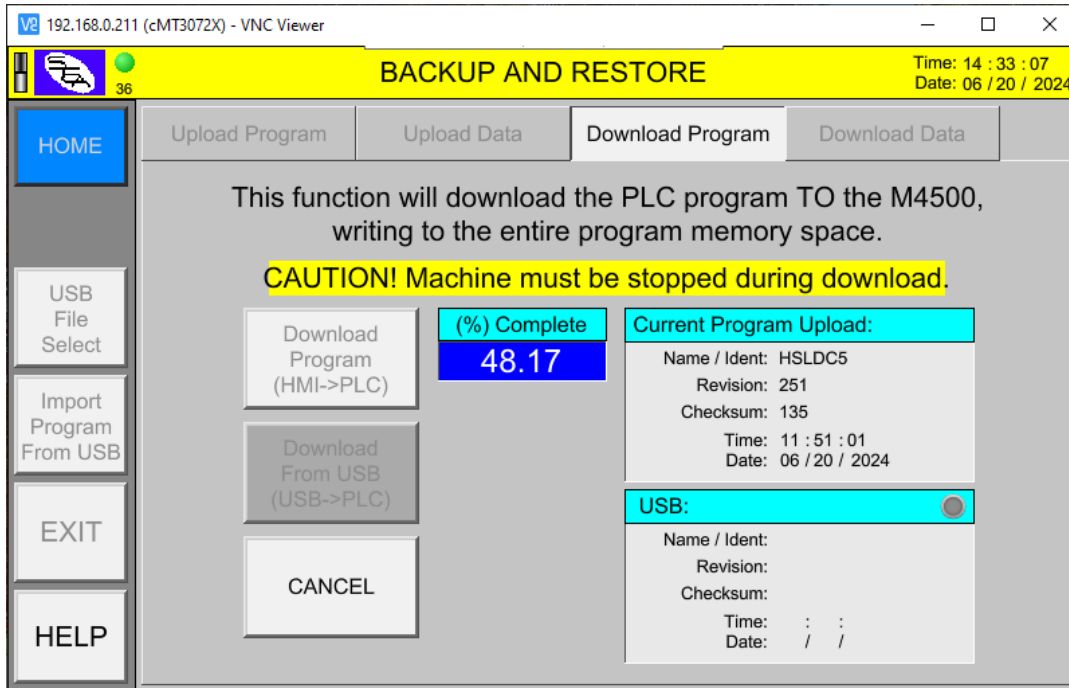
Note: The "**CANCEL**" button is used to **TERMINATE** the process at anytime.

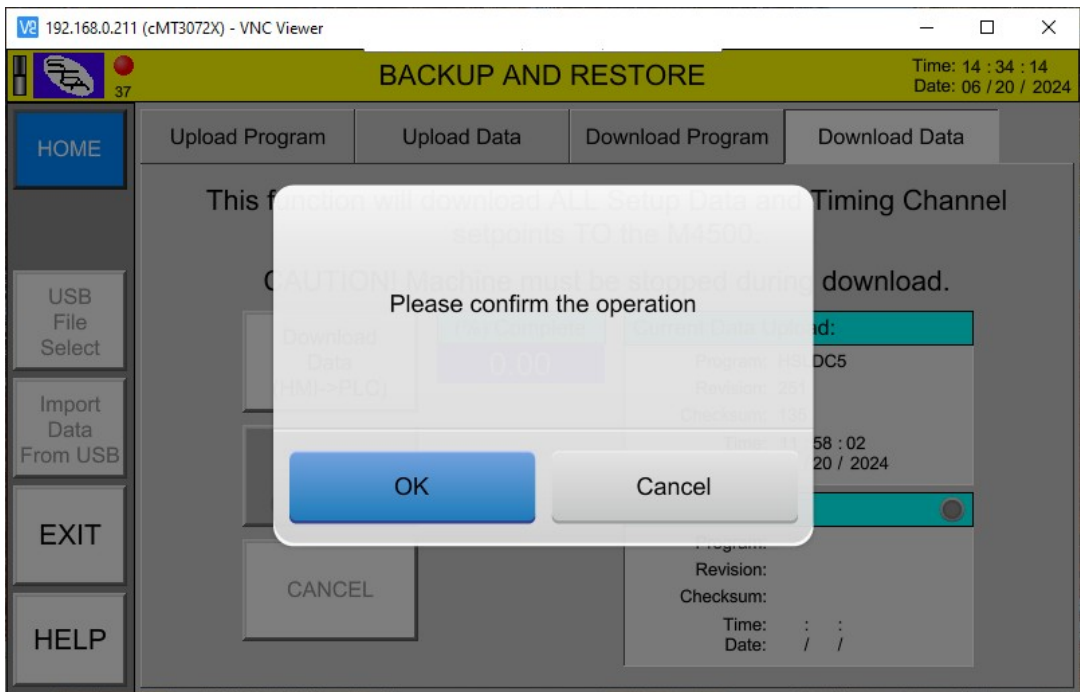Once the download is at 100% Complete, the user can:
- Use the "**HOME**" button to return to the HOME screen.
- Selec the "**EXIT**" button to return to "**Backup and Restore**".
- Select the "**Download Data**" TAB to restore the setup data.

Select the "**Download Data**" TAB to restore the setup variables and timing channel setpoints:
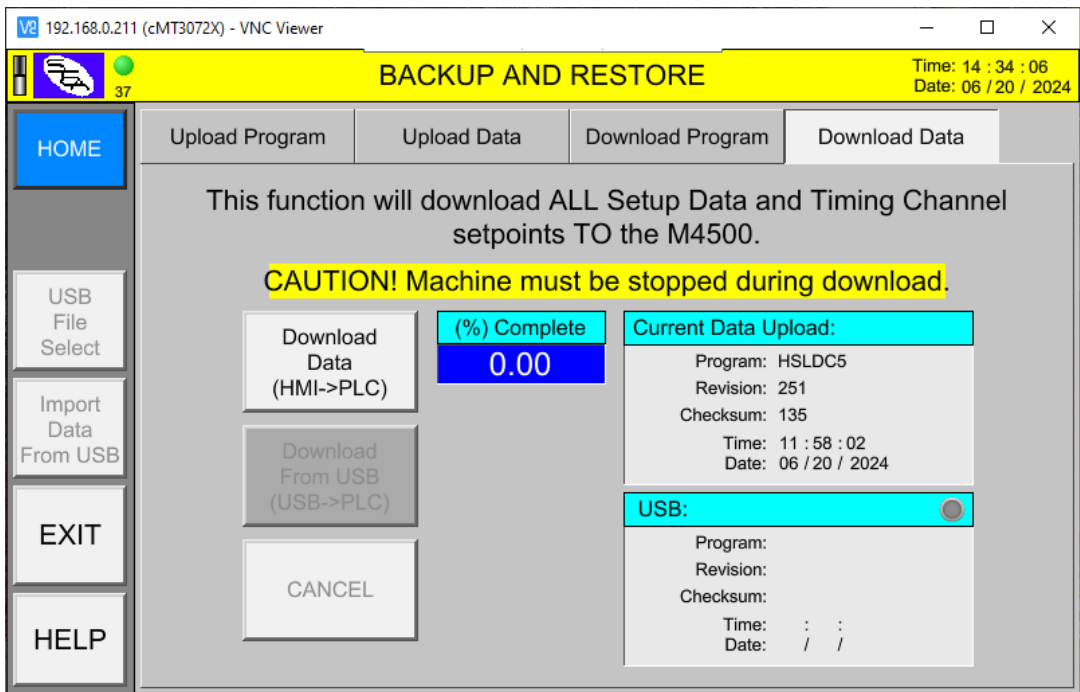
Selecting the "**Download Data (HMI->PLC)**" button will display a popup to confirm the operation. Select the "OK" button to continue or "Cancel" to abort.

The DOWNLOAD process will restore (write) the setup parameters and timing channel setpoints to the M4500 (previously backed up to the HMI). This process should complete in about 90 seconds.
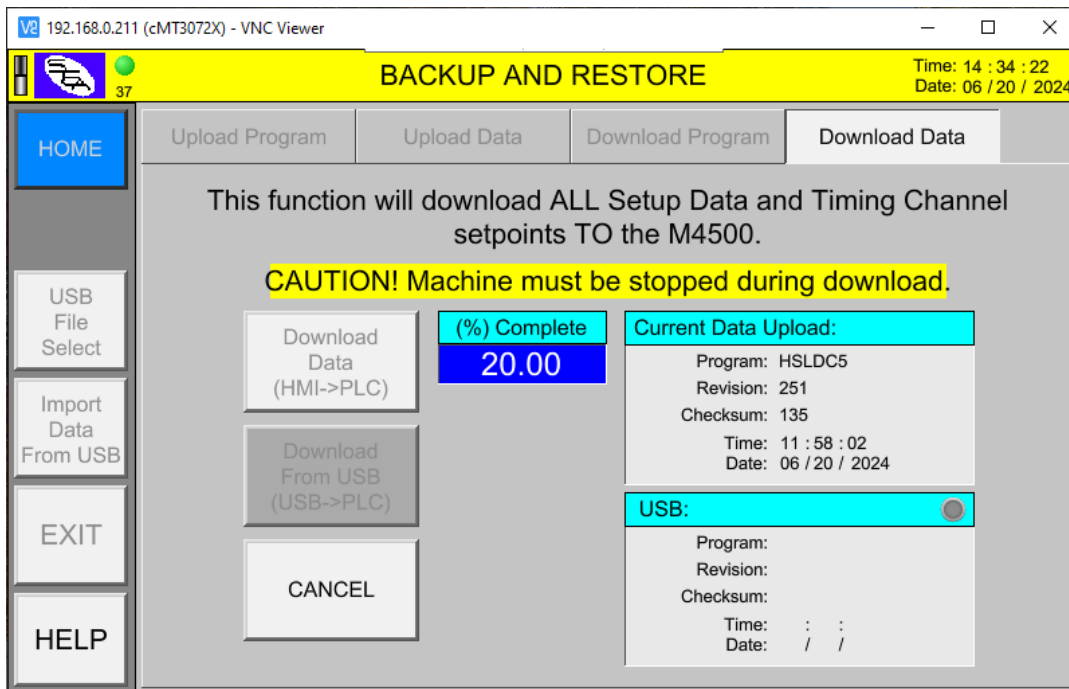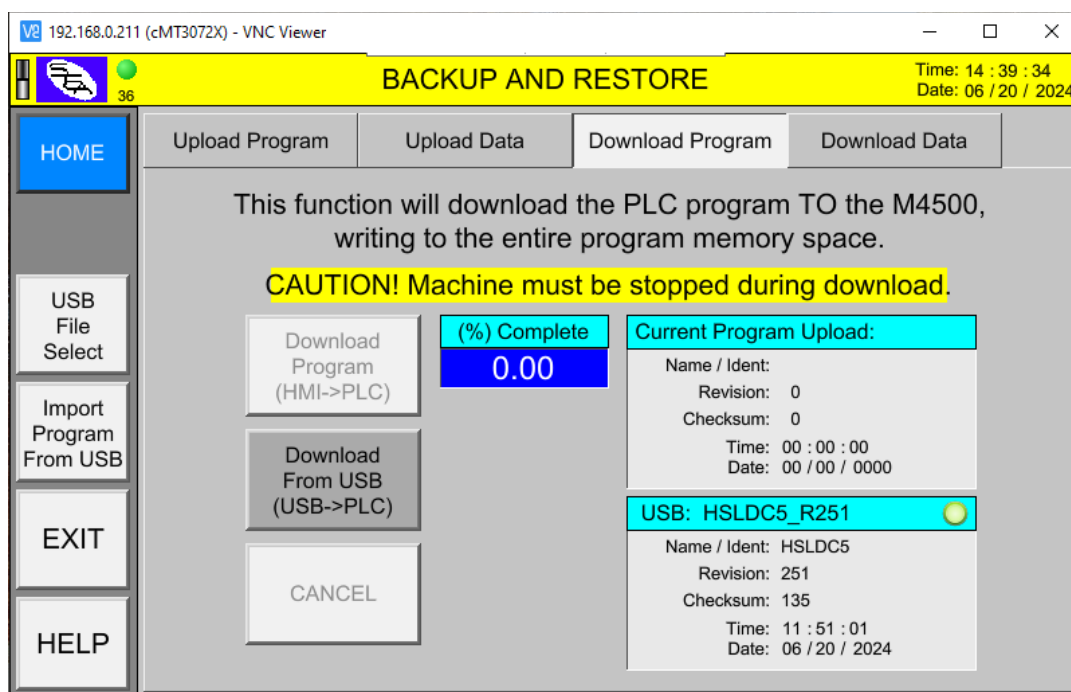

Note: The "**CANCEL**" button is used to **TERMINATE** the process at anytime.

Once the download is at 100% Complete, the user can:
- Use the "**HOME**" button to return to the HOME screen
- Selec the "**EXIT**" button to return to "**Backup and Restore**"
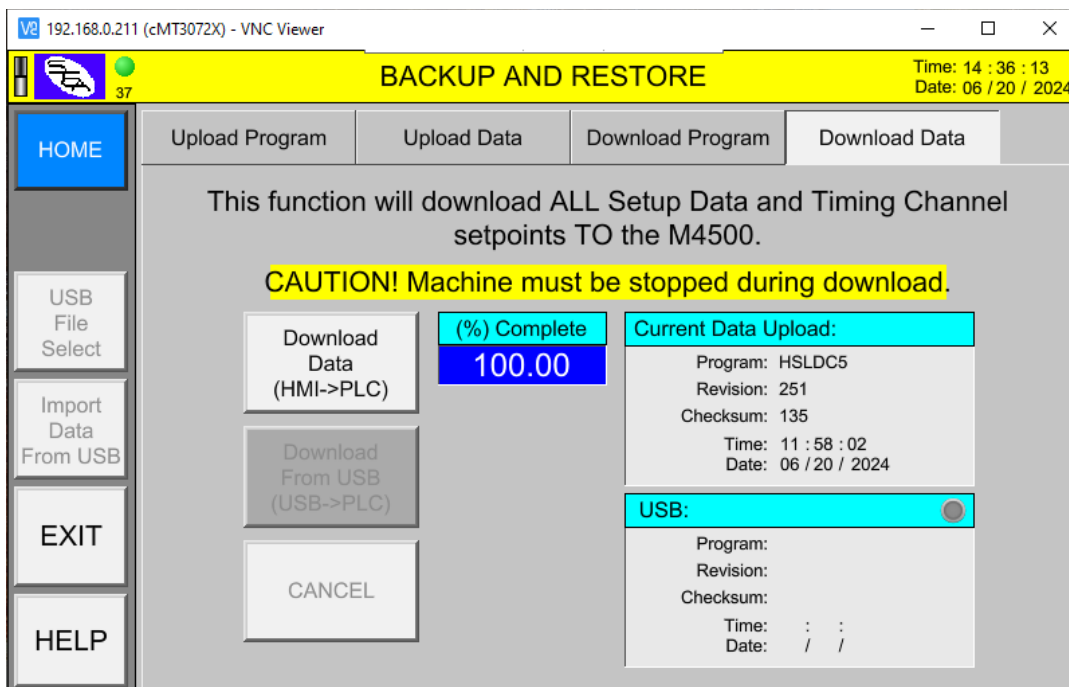
Alternatively, the PLC program and seup parameters can be **downloaded FROM an "expanded memory" file (.emi) on a USB thumb drive**. With the USB thumb drive inserted into the USB port of the HMI the "USB File Select" button will become active (button is gray when NOT active).
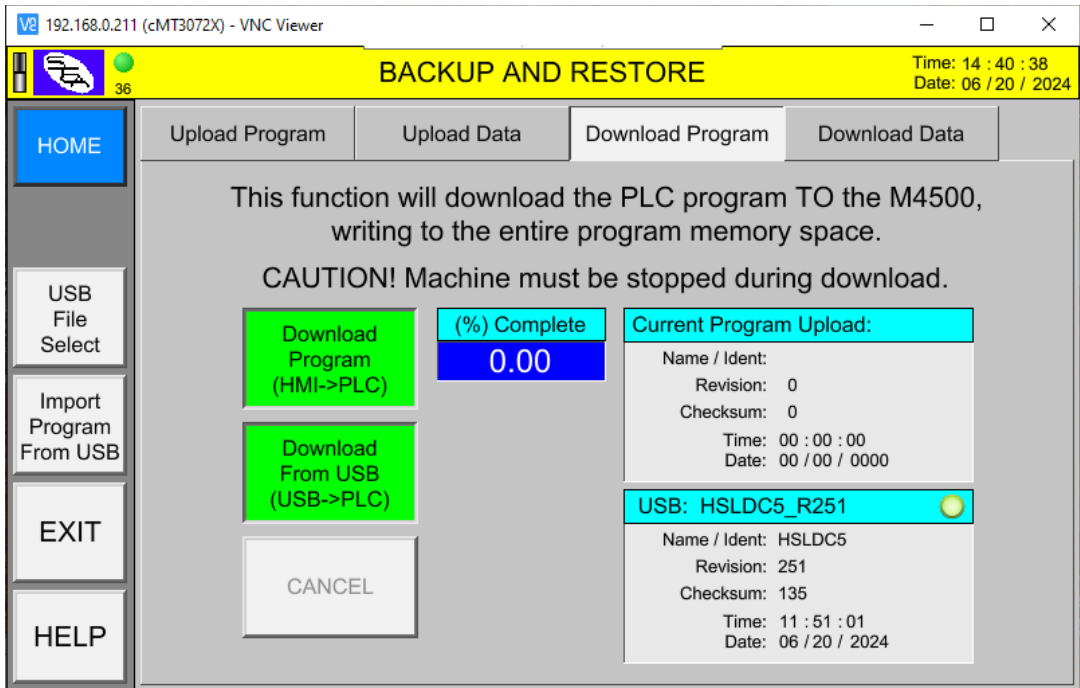

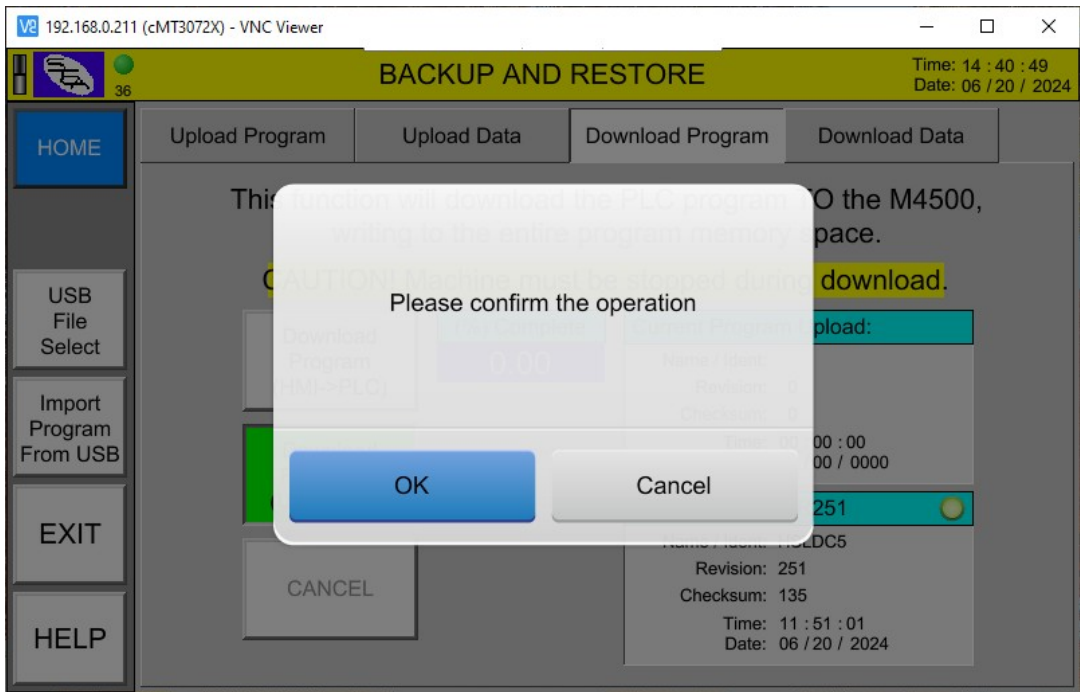Select the desired file and select "OK".
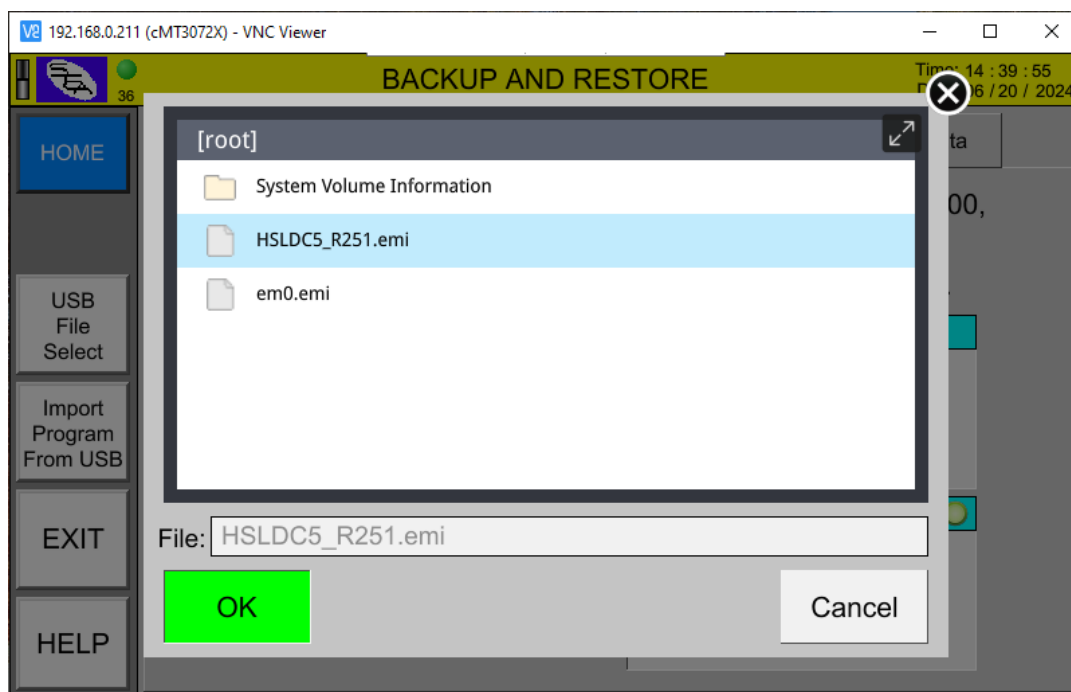
Select the "Download from USB (USB->PLC) option.
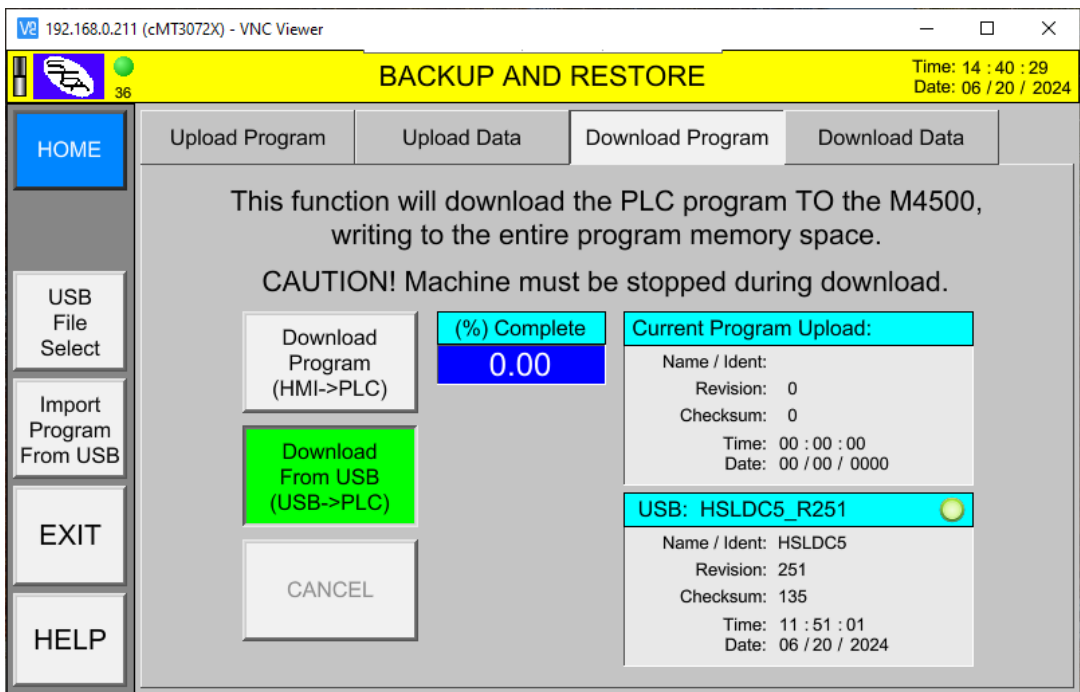
Select the "Download Program (HMI->PLC)" button. This will initiate the download process using the information from the selected "expanded memory" file (.emi) of the USB thumb drive.

This will display a popup asking to confirm the operation. Select "OK" to confirm the Download Program process or select "Cancel" to abort.
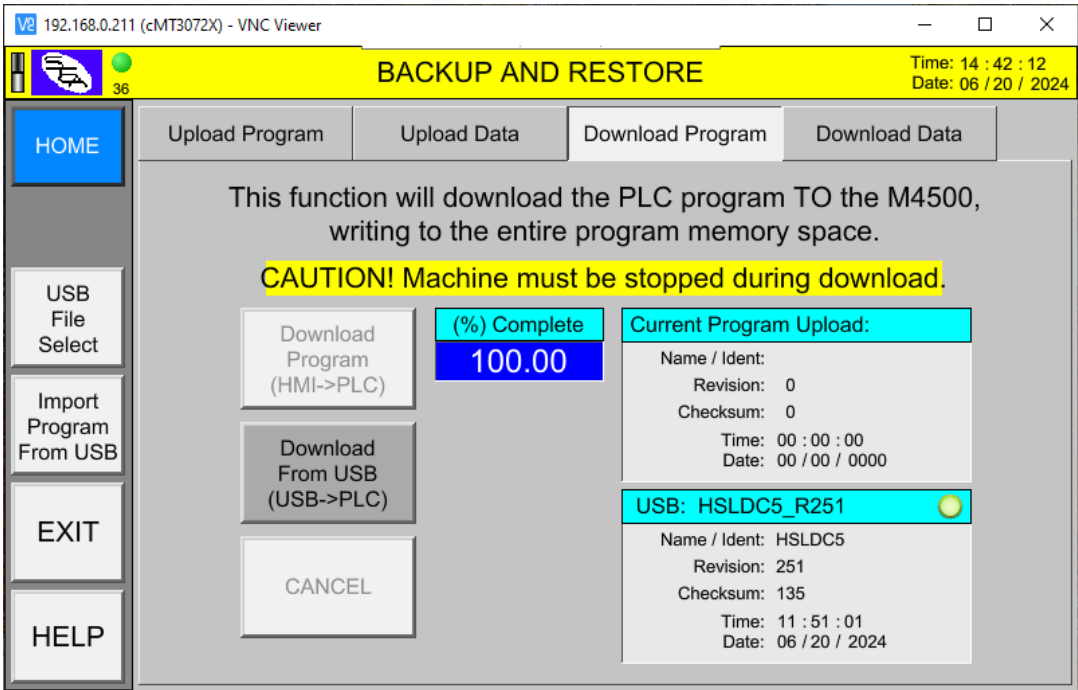

Selecting "OK" will initiate the download process, restoring (writing) the PLC program from the selected file.
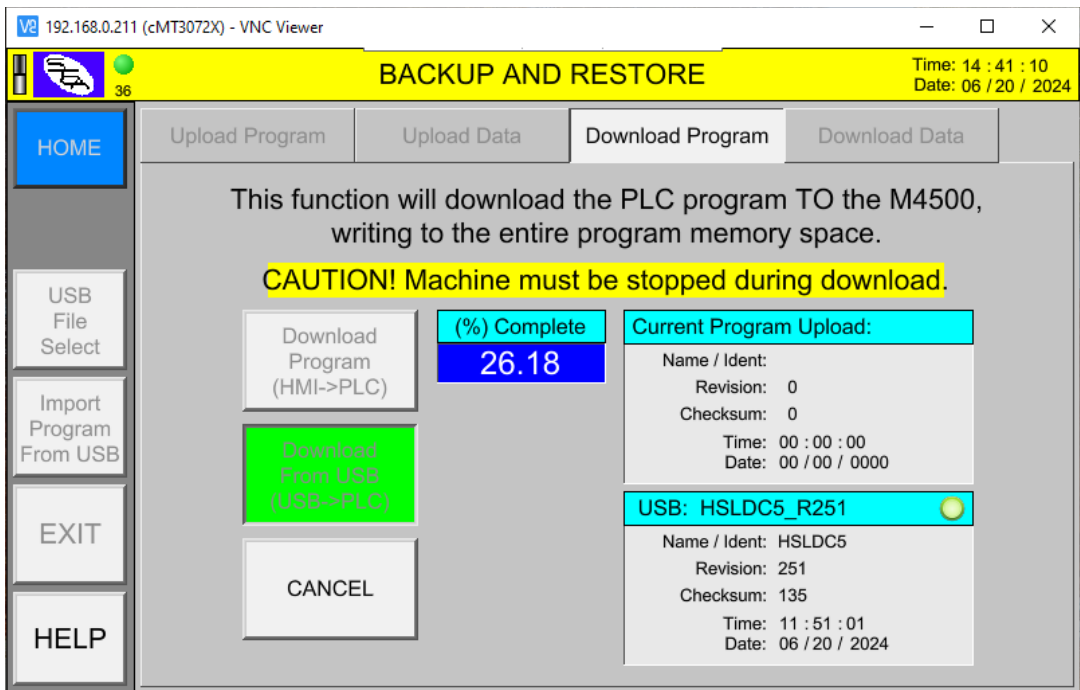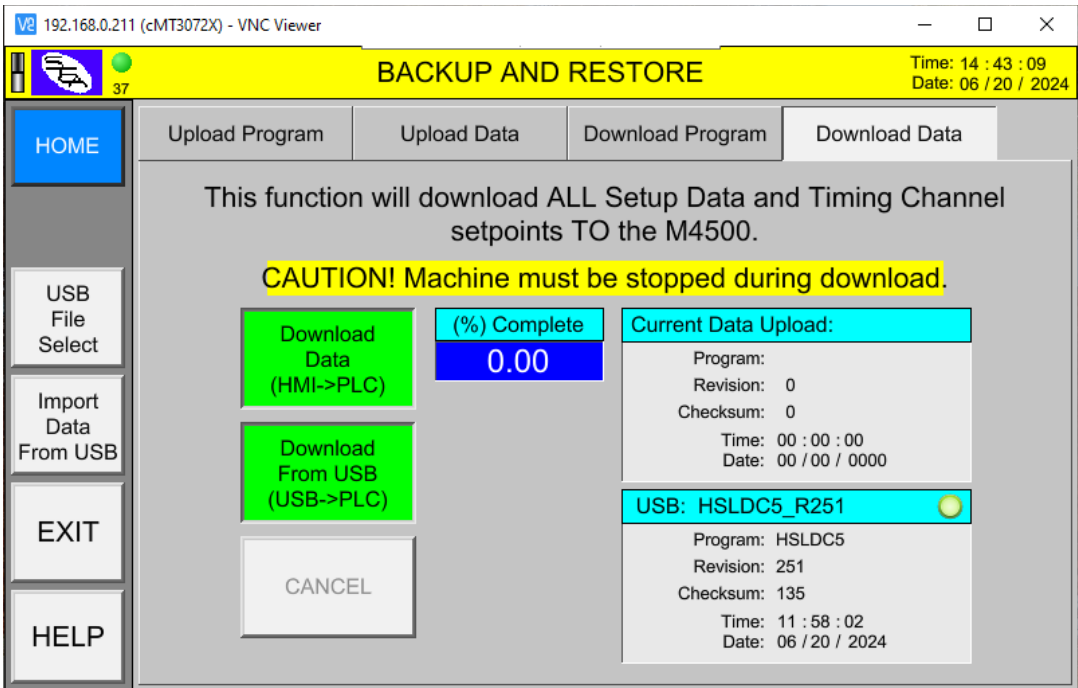

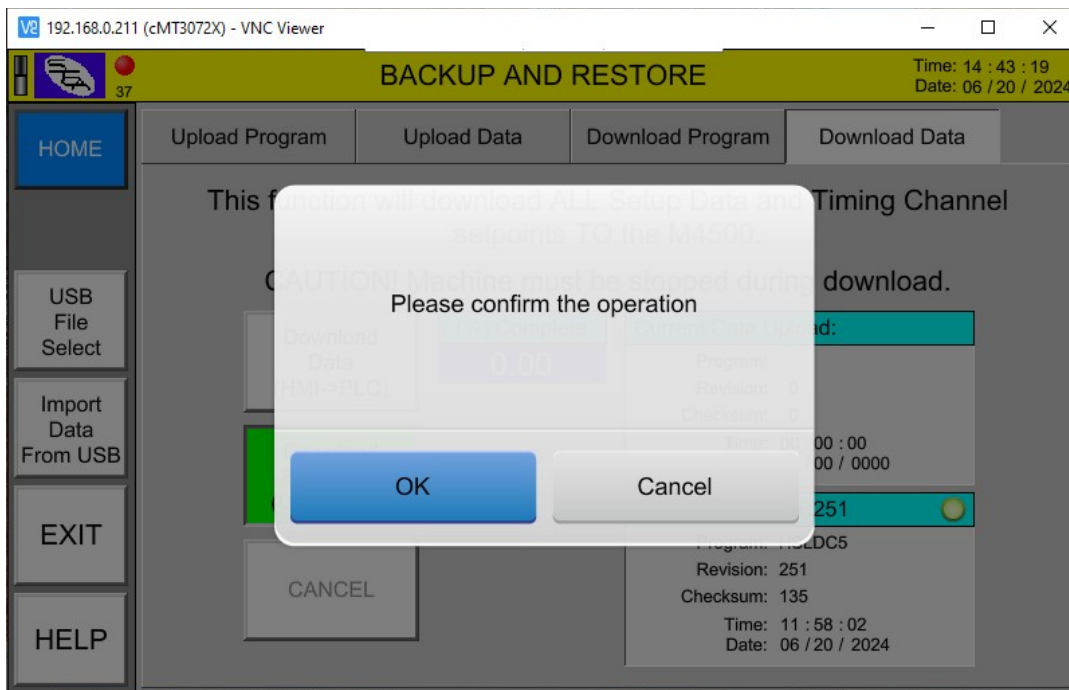**Note**: The "CANCEL" button is used to TERMINATE the process at anytime.

Once program download is 100% complete, the previously saved (exported) setup DATA can also be restored from the USB thumb drive.
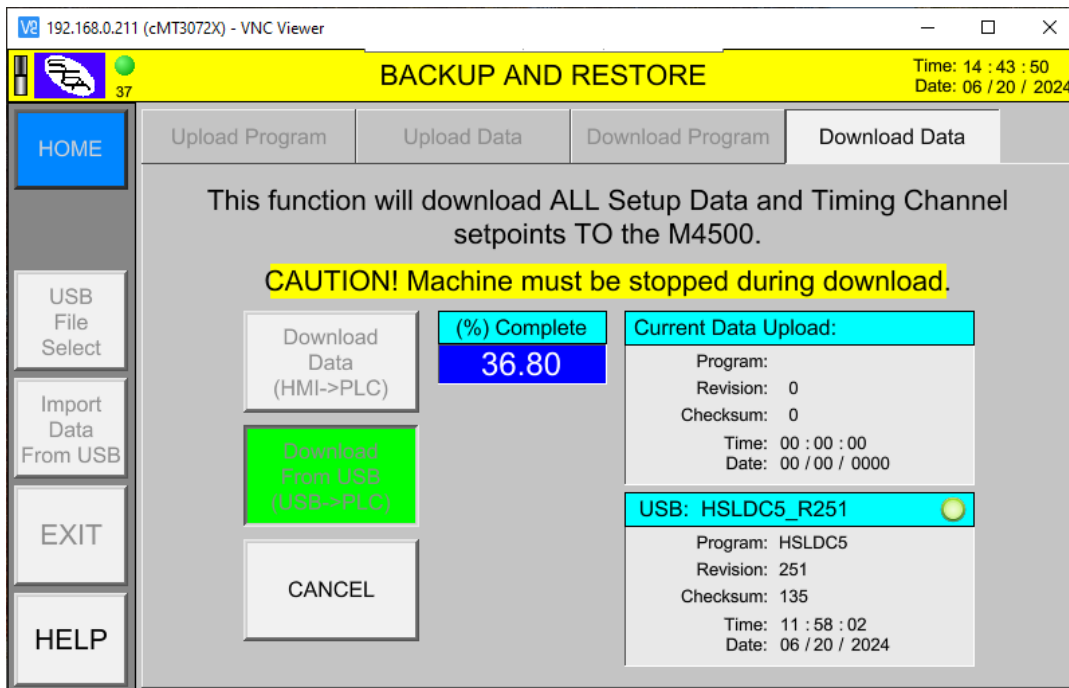

From the Download Data TAB, select the "**Download from USB (USB->PLC)**" option and then select the "**Download Data (HMI->PLC)"** button.

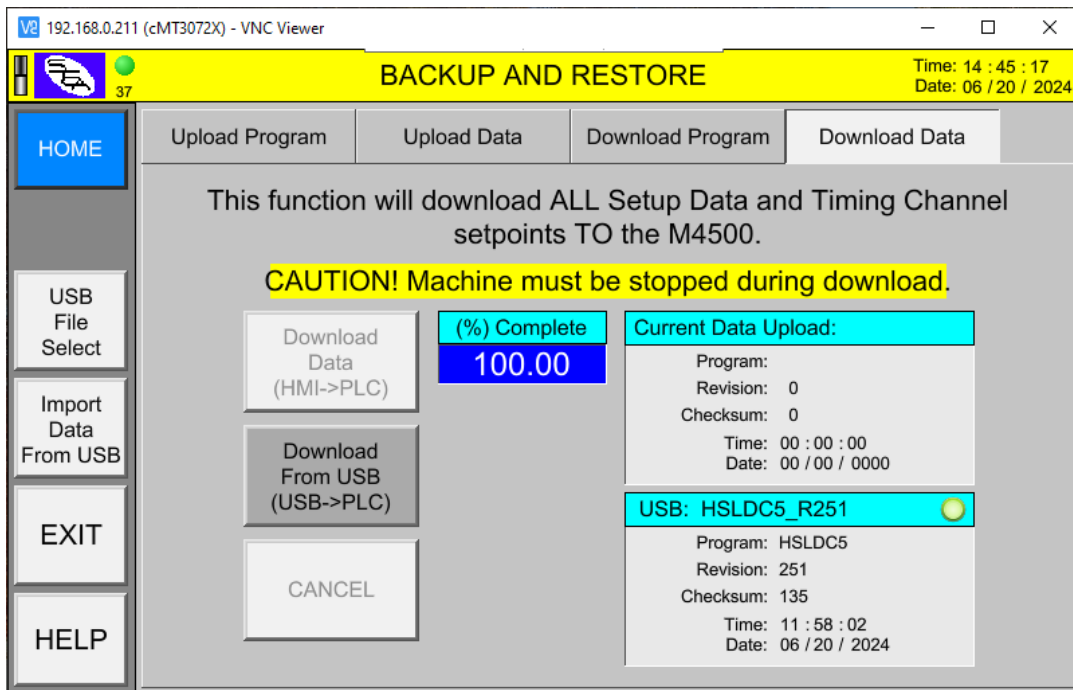A popup will be displayed confirming the choice of operation.

Selecting "OK" will initiate the download process. Selecting "Cancel" will abort.

Note: The "**CANCEL**" button is used to **TERMINATE** the process at anytime.

Once the download is at 100% Complete, the user can:
- Use the "**HOME**" button to return to the HOME screen
- Select the "**EXIT**" button to return to "**Backup and Restore**"

Although the PLC program and setup data have been restored, this information can also be imported into the HMI from the selected USB expanded memory file (.emi).

The import process is particularly useful in that it will normalize the data that was downloaded to the controller with the retentive memory of the HMI without having to upload it from the controller.
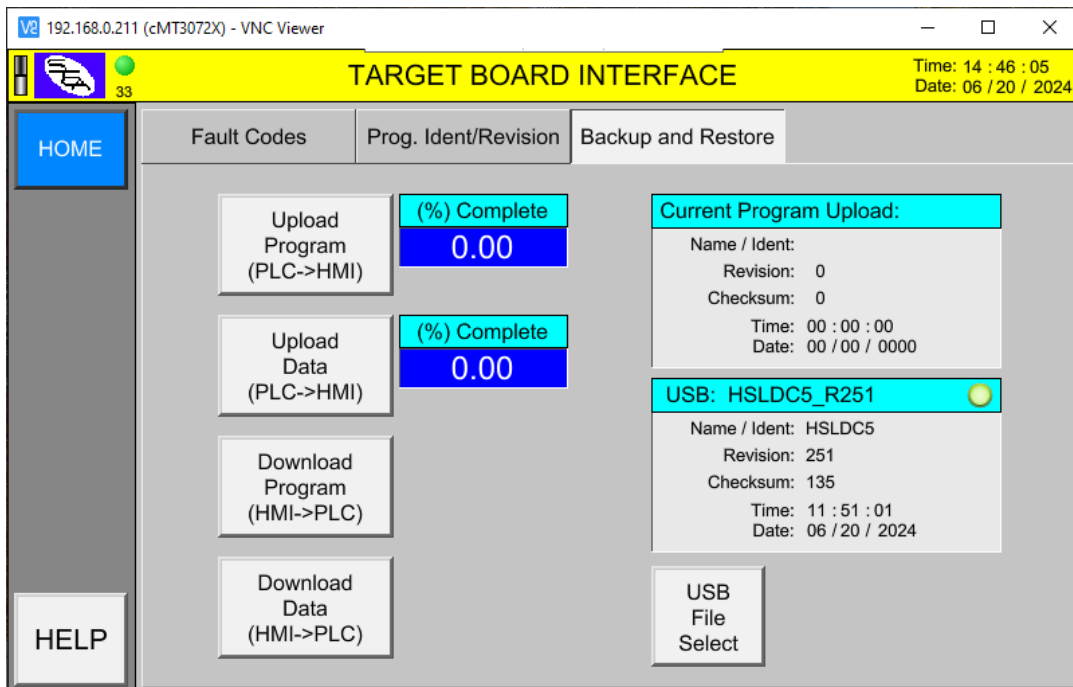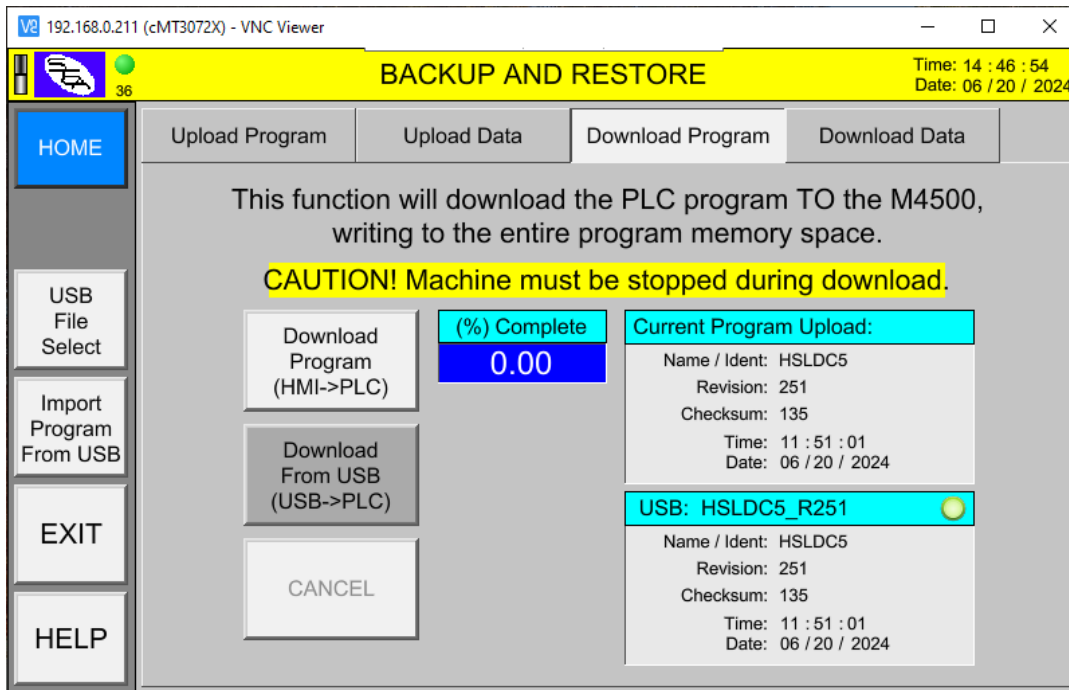
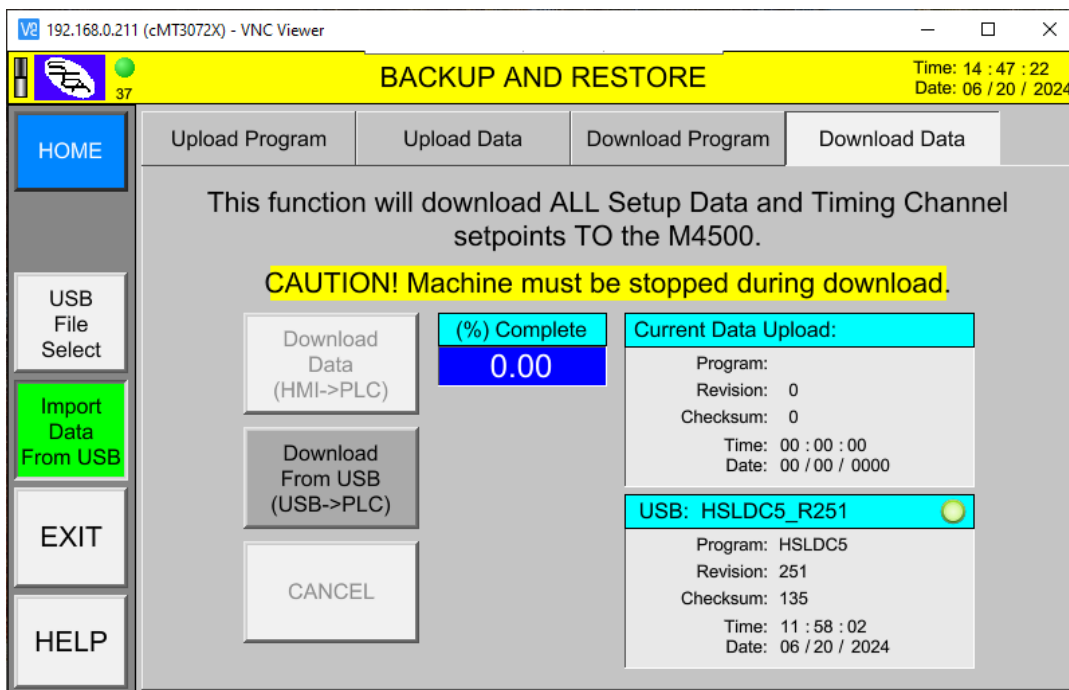From the "Download Program" TAB, select "Import Program From USB".
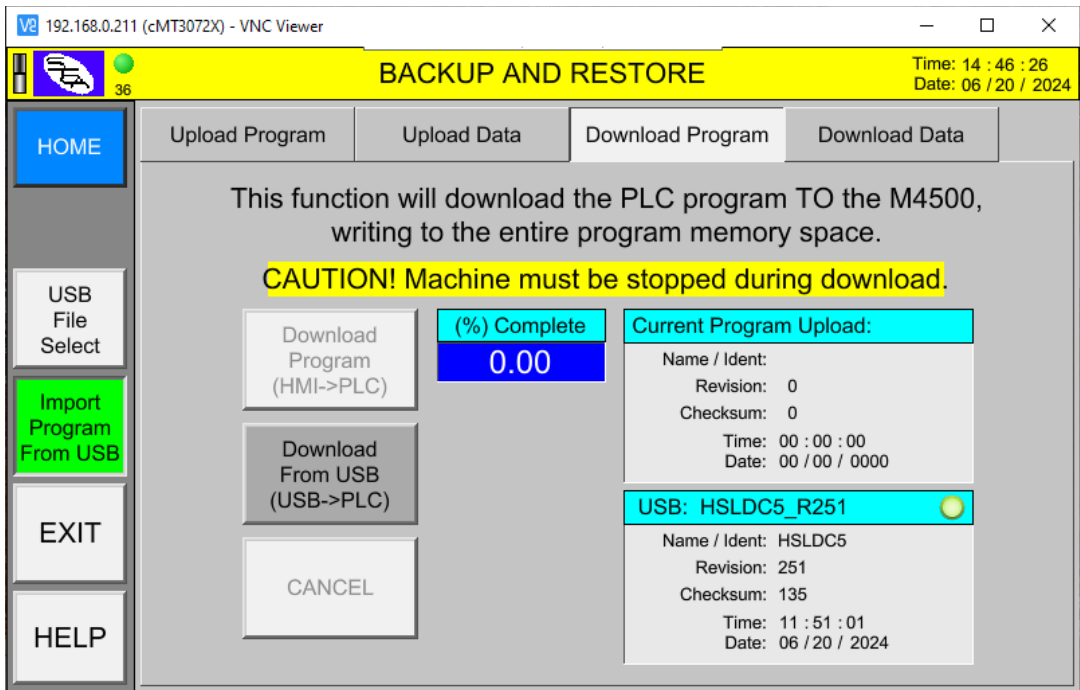
A popup will be displayed confirming the choice of operation. Select "OK" to initiate and continue with the "Import" operation or "Cancel" to abort. This operation will import (copy) the PLC program data to the HMI, overwriting the previously saved program data.
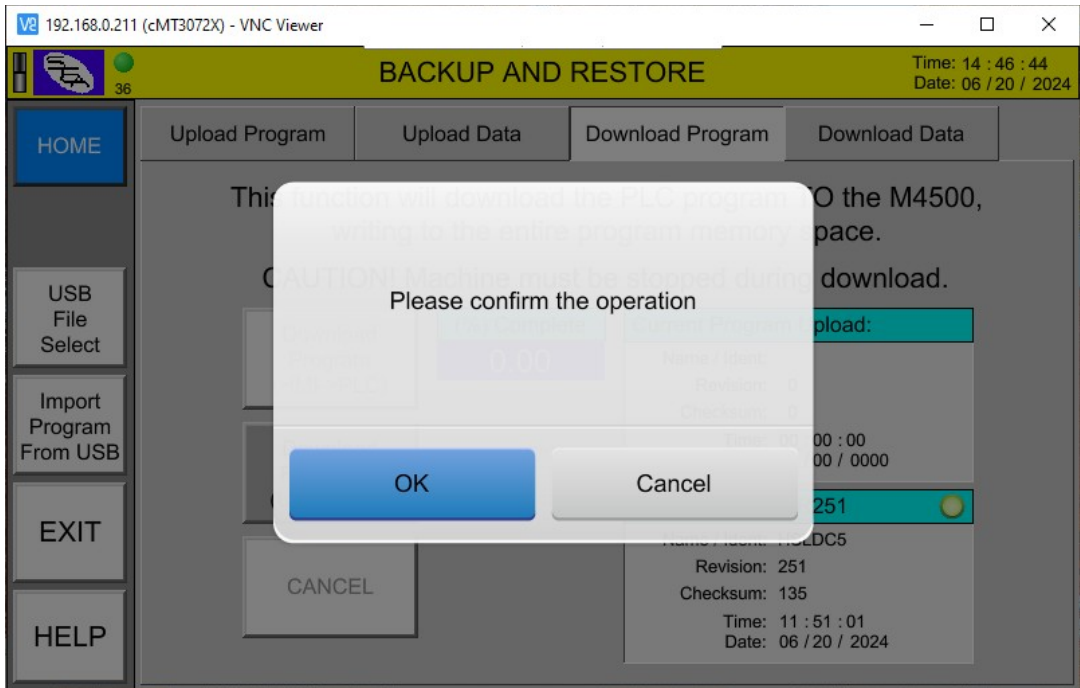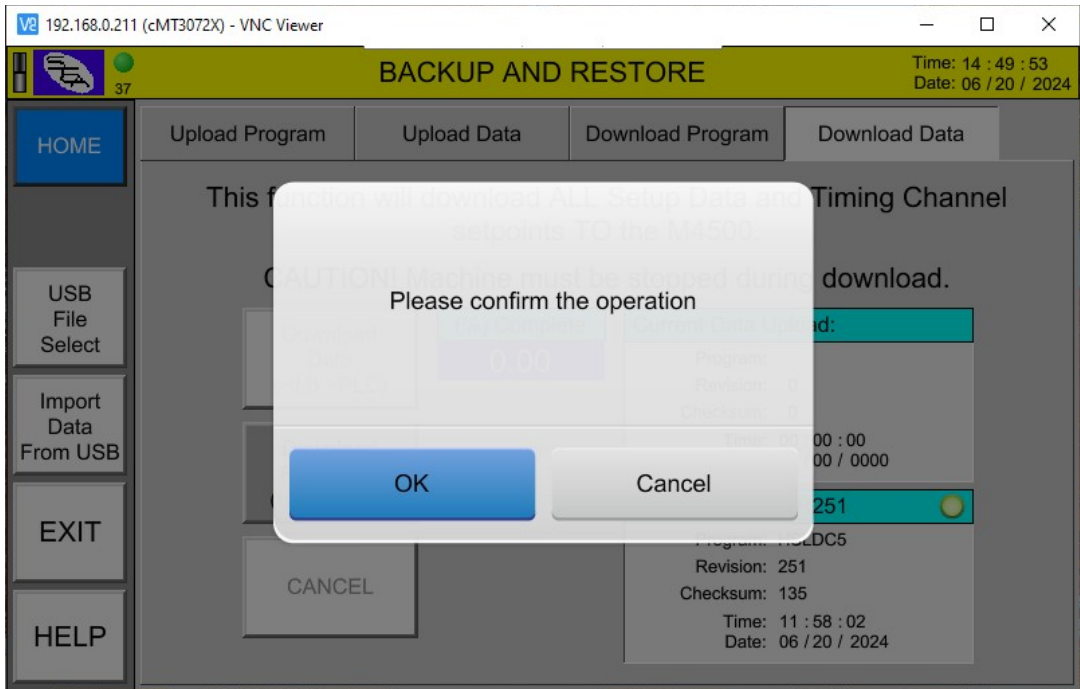
Once the import process is complete, the information for the "Current Program Upload" will match that of the selected expanded memory file (.emi).


The import function is generally a two step process. After importing the PLC program, the previously saved setup data can also be imported (but isn't required). From the Download Data TAB, select the "Import Data from USB" button.

A popup will be displayed confirming the choice of operation. Select "OK" to initiate and continue with the "Import" operation or "Cancel" to abort. This operation will import (copy) the setup data (and timing channel setpoints) to the HMI, overwriting the previously saved setup data.

Once the import process is complete, the information for the "Current Program Upload" will match that of the selected expanded memory file (.emi).
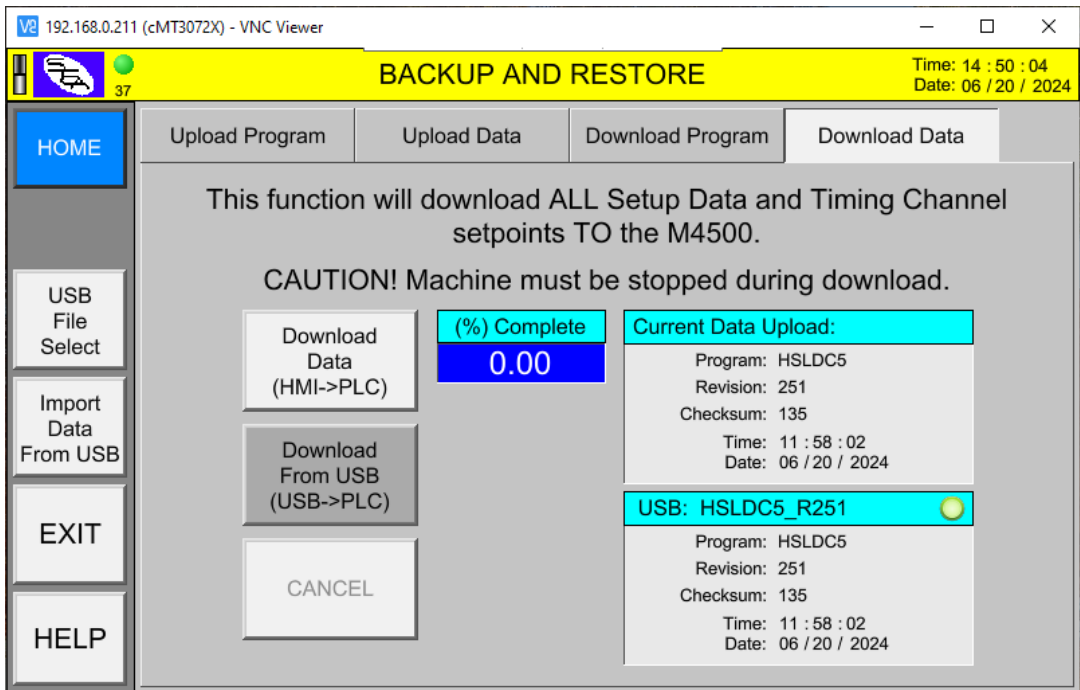
The Backup and Restore TAB will now show the upload operation at 100% complete and the information for the "Current Program Upload" will match that of the selected expanded memory file on the USB thumb drive.