Freedom EX 4000 USB Operations Guide

⚠ DANGER
RISK OF FIRE, ELECTRIC SHOCK, EXPLOSION, AND ARC FLASH
This guide is in addition to, and incorporates by reference, the relevant product manuals for Freedom EX 4000. Before reviewing this guide you must read the relevant product manuals. Unless specified, information on safety, specifications, installation, and operation is as shown in the primary documentation received with the product. Ensure you are familiar with that information before proceeding.
Failure to follow these instructions will result in death or serious injury.

1.0 Purpose

The purpose of this guide is to provide instructions on how to use a USB drive to transfer data between the USB drive and the Freedom EX 4000 inverter/charger/converter for the purpose of upgrading firmware for the Freedom EX 4000 inverter/charger/converter, to change device settings, or to extract device logs.

2.0 Requirements

- USB drive - Class 2, FAT32, 1 – 500 GB, USB 2.0 or higher
  - recommended brands are from Sandisk (3.0), Vital (3.0), Kingston (3.0), Philips, Onn
  - incompatible brand is from Emtec. DO NOT USE.
  - format the USB drive to FAT32 to avoid reading and writing errors
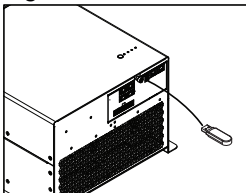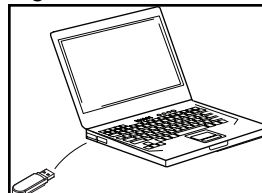
3.0 Operations
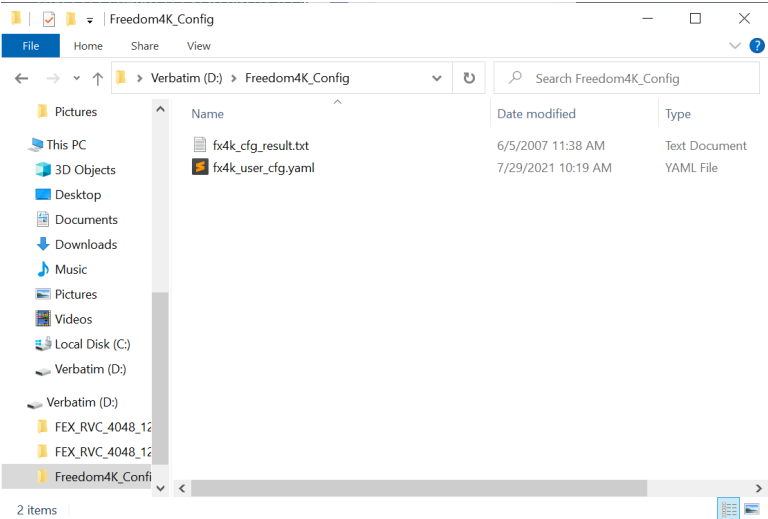
Figure 1 USB drive to Freedom EX 4000
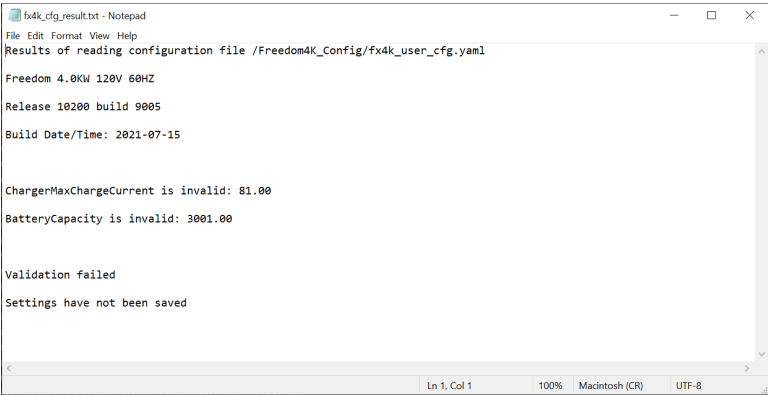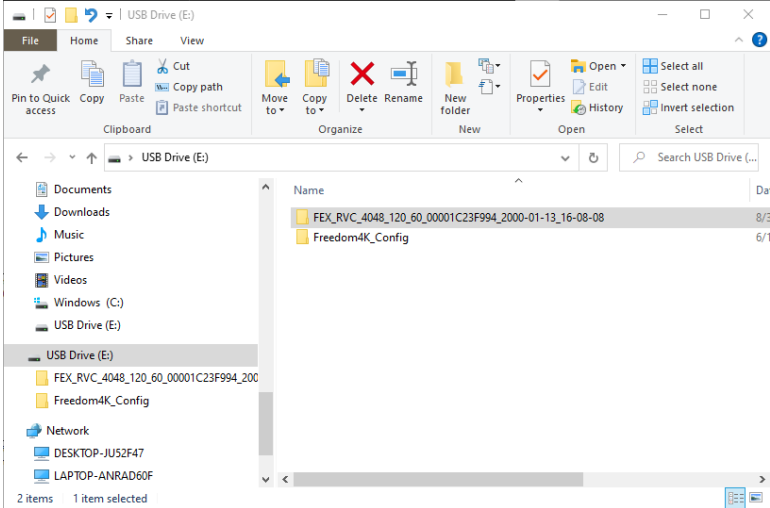
Figure 2 USB drive to a PC

How to...	Steps

Apply new configuration settings to the Freedom EX 4000.	⚠ **TIP**: Make sure to type file and folder names exactly as shown here.
	
	1. Use one of the following options for this step.
	    1a. From a PC, move (or copy) the configuration file (*fx4k_user_cfg.yaml*) to the *Freedom4K_Config* file folder. If this file folder does not already exist, create it from the USB drive's root directory, name it *Freedom4K_Config* and move the *fx4k_user_cfg.yaml* file into it.
	    1b. From a PC, move (or copy) the configuration file (*fx4k_user_cfg.yaml*) to the *Xantrex_Config* file folder. If this file folder does not already exist, create it from the USB drive's root directory, name it *Xantrex_Config* and move the *fx4k_user_cfg.yaml* file into it.
	    NOTE: This option is available for firmware version 1.05 and higher.
	2. Remove the USB drive from the PC.

How to...	Steps
	3. Insert the USB drive that contains the configuration file with the new configuration settings into the Freedom EX 4000's USB port (*Figure 1*). **NOTE**: All programmed configurations (device settings) will be copied from the USB drive into the Freedom EX 4000's internal memory. Wait ~20 seconds for the configuration files to loaded into the unit. 4. Remove the USB drive from the USB port of the Freedom EX 4000. 5. Plug the USB drive into a PC's USB drive (*Figure 2*). 6. Open and examine the autogenerated **fx4k_cfg_result.txt** file under the **Freedom4K_Config** file folder (if you followed step 1a) or the **Xantrex_Config** file folder (if you followed step 1b). If the configuration file contains any invalid setting, the USB configuration will be rejected and a results file will show all invalid settings. 7. Look for lines in the text file that have been flagged as *invalid*. For example,

How to...	Steps
	8. Open the **fx4k_user_cfg.yaml** file using Notepad (or any text editor) and change the value of the INVALID setting to make sure it is within the allowable range according to the Freedom EX 4000's Owner's Guide. For example,

```
59      InverterSearchDelayTime: 2
60      InverterOutputVoltageLN: 120.00
61      InverterIgnitionControl: off
62      ChargerEnable: true
63      ChargerMaxChargeCurrent: 79.00           #Range of value is 4 - 80
64      ChargerAlgorithm: 3stage
65      ChargerBatteryRechargeVoltage: 50.00
66      ChargerAbsorptionTime: 180
67      ChargerBlockStart: 0
68      ChargerBlockStop: 0
69      DefaultBatteryTemperature: warm
70      BatteryCapacity: 2300.00                 #Range of value is 0 - 3000
71      BatteryType: flooded
72      CustomEqualizationSupportEnable: true
73      CustomEqualizationVoltage: 64.00
74      CustomBulkVoltage: 57.60
```

9. Close the **fx4k_user_cfg.yaml** file to save it.

10. Re-apply the configuration from Step 1 up to Step 4. If the configuration file is accepted without invalid settings then the **fx4k_cfg_result.txt** file will be updated accordingly but without INVALID results.

11. To verify that the settings were accepted from the configuration file, check the device settings using the Freedom EX remote panel.

> **NOTE**: In order for changes to be saved properly into the Freedom EX 4000's onboard memory, you must wait at least 10 minutes after you have made these configuration changes before disconnecting from AC and DC power sources. In some circumstances when you need to immediately disconnect the Freedom EX 4000 from AC and DC power sources, be sure to turn off the Freedom EX 4000 using its Power button or from the Remote Panel prior to disconnection so that the changes are made permanent.

How to...	Steps
Extract the current device settings of the Freedom EX 4000 to the USB drive.	⚠ **IMPORTANT**: Make sure that the USB drive is either formatted and empty or without an existing *Freedom4K_Config* folder. If this folder exists as well as an old configuration file, the copy-to-USB-drive process will be reversed and an older configuration file will get transferred to the Freedom EX 4000 instead. 1. Insert the USB drive into the Freedom EX 4000's USB port. **NOTE**: All current configurations (device settings) including up-to-date recorded data logs from the Freedom EX 4000 will be copied into the USB drive automatically under a time stamped folder. The data logs will be created and written to a folder on the USB drive specifying the serial number of the Freedom EX 4000, as well as the date and time stamp of recorded events in the data log. 2. Wait ~10 seconds before removing the USB drive from the USB port of the Freedom EX 4000.

Transfer device settings to the Freedom EX 4000 from the USB drive.	⚠ **TIP**: Make sure to type file and folder names exactly as shown here.
	
	1. Use one of the following options for this step.
	   1a. From a PC, move the extracted device settings file (*fx4k_user_cfg.yaml*) to the *Freedom4K_Config* file folder. If this file folder does not already exist, create it from the USB drive's root directory, name it *Freedom4K_Config* and move the *fx4k_user_cfg.yaml* file into it.
	   1b. From a PC, move the extracted device settings file (*fx4k_user_cfg.yaml*) to the *Xantrex_Config* file folder. If this file folder does not already exist, create it from the USB drive's root directory, name it *Xantrex_Config* and move the *fx4k_user_cfg.yaml* file into it.
	   NOTE: This option is available for firmware version 1.05 and higher.
	2. Remove the USB drive from the PC.
	3. Insert the USB drive into the Freedom EX 4000's USB port.
	   NOTE: The most current configurations (device settings) that were copied into the USB drive will be loaded automatically to the Freedom EX 4000.
	4. Wait ~10 seconds before removing the USB drive from the USB port of the Freedom EX 4000.

How to...	Steps

Upgrade the Freedom EX 4000's firmware.	⚠️ **TIP**: Make sure to type file and folder names exactly as shown here.
	
	1. Obtain the firmware update file from your Xantrex dealer and unzip the compressed files into your computer's local hard drive.
	The decompressed file is ***FEX_RVC_4048_120_60.v##.##.BN####.xf0*** where # is replaced by numerical values.
	2. Plug and format a USB drive (FAT32, 1GB or more) on the PC.
	3. Use one of the following options for this step.
	    3a. Move the ***FEX_RVC_4048_120_60.v##.##.BN####.xf0*** file into a file folder called ***Freedom4K_firmware***. If this file folder does not already exist, create it from the USB drive's root directory, name it ***Freedom4K_firmware*** and move the ***FEX_RVC_4048_120_60.v##.##.BN####.xf0*** file into it.
	    3b. Move the ***FEX_RVC_4048_120_60.v##.##.BN####.xf0*** file into a file folder called ***Xantrex_Firmware***. If this file folder does not already exist, create it from the USB drive's root directory, name it ***Xantrex_Firmware*** and move the ***FEX_RVC_4048_120_60.v##.##.BN####.xf0*** file into it. **NOTE**: This option is available for firmware version 1.05 and higher.
	4. Rename ***FEX_RVC_4048_120_60.v##.##.BN####.xf0*** to ***InvChg.xf0***
	5. Safely eject the USB drive from the PC.
	6. Remove any AC connections to the unit (e.g., open upstream/downstream AC breakers) and ensure the battery/DC power source is connected.
	7. Turn Off the Freedom EX 4000 by pushing the main power button (located next to the 4 LEDs) such that the button is in a released state and wait 20 seconds for the unit to fully shut down.
	8. Insert the USB drive into the USB port of the Freedom EX 4000.
	9. Turn on the Freedom EX 4000 by pushing the main power button such that the button is in a pressed state.
	10. The Freedom EX 4000 will initiate the update process. During this time, observe the LED indicators. Approximately 15–20 seconds into the update, all four LEDs will briefly flash and then turn off. This indicates the update has successfully completed. Ensure no interruptions occur during this process.
	11. Remove the USB drive from the USB port of the Freedom EX 4000.