



Remote Firmware Upgrade Tool User Manual

Table of Contents

1	Introduction.....	3
1.1	Overview of the Upgrade Process	3
2	What you need to do the Remote Upgrade.....	4
3	Examples of the Upgrade Process.....	5
3.1	Interfacing via I ² C	6
3.1.1	Port selection	6
3.2	Installation of the RS485 interface driver.....	6
3.3	Installation of the USB-to-I ² C Adapter driver.....	7
3.3.1	USB-to-I ² C Adapter Setup.....	9
4	Running the Remote Firmware Upgrade Tool	9
4.1	Discovery of upgradable modules.....	10
4.2	Loading the upgrade program.....	10
4.3	Upgrading the Power Supplies.....	11
5	Error Messages from the Remote Firmware Upgrade Tool.....	13
5.1	The adapter was not found	13
5.2	No modules found.....	13
5.3	Module upgrade error	13
5.4	Loss of connection error	13
5.5	RS-485 installation error	13
5.6	Compatibility code mismatch.....	13

1 Introduction

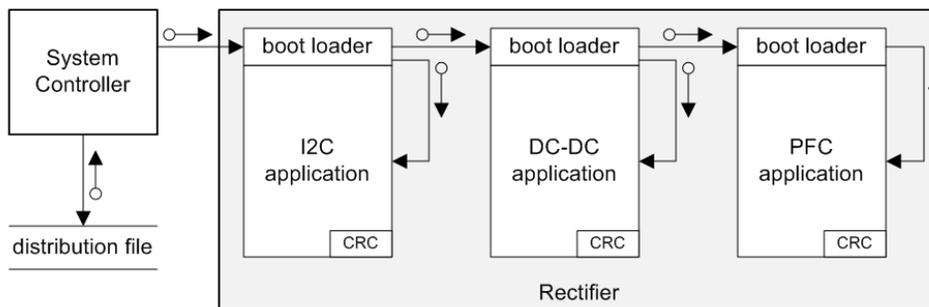
The GE Remote Firmware Upgrade Tool allows users to perform firmware updates of certain upgradeable **GE Critical Power** power supplies. On-site upgrading is rapid and economical. It avoids having to send power supplies back to the factory for firmware updates. The upgrade of the power supply can be accomplished either stand-alone externally from the system, or, with the power supply in the system.

The tool can be downloaded from the **GE Critical Power** web site. It runs on Windows based computers. Please note that Windows versions higher than 7 may reject the upgrade program because of enhanced security requirements built into the latter operating systems.

The upgrade can be performed through either I²C or RS-485 interfaces, whichever is supported by the power supply. Check the web site to see which power supply products can be upgraded via this tool.

1.1 Overview of the Upgrade Process

The Remote Firmware Upgrade process replaces the existing application firmware in the power supply with newer versions. As an example, in the CP3500 rectifier there are three separate processors controlling different portions of the power supply. Each of these processors is partitioned into a boot loader and an application section as shown in the figure below;



Functional representation of processors in the CP3500 Rectifier

During the upgrade process, the Remote Firmware Upgrade Tool serves as a System Controller communicating to and instructing the rectifier via the communications interface (I²C or RS-485). In a system there may be multiple power supplies connected to the same communications interface. The first step in the Upgrade Process is to identify all power supplies connected to the communication interface. The user then loads into the tool the new firmware from a distribution file. This is followed by selecting which of the identified power supplies the user would like to upgrade. Once a set of power supplies are selected for upgrade, the upgrade commences automatically. The tool sequentially sends the new firmware to the various processors, bypassing those that do not need to be upgraded. In the process the tool first turns OFF output power of the power supply, directs the processor into the boot block section, erases the application in the processor, and then writes into the application section the updated firmware. When the upgrade is completed, the tool turns ON the output power of the power supply. This upgrade process is repeated for all power supplies that have been chosen to be upgraded.

In the CP3500 example above, if the RS-485 communications interface is used, there is no need to upgrade the I²C processor, and hence the Remote Upgrade Tool bypasses it and updates only the DC-DC and PFC firmware.

An alternate approach to using the Remote Firmware Upgrade Tool to upgrade power supplies is to use commands listed in the product data sheet to support an upgrade in a running system with power supplies. In this scenario, this

tool is not needed and customers can implement the firmware upgrade using the set of upgrade-related commands. The new versions of firmware can be downloaded from the GE Critical Power Website. Please contact your GE Critical Power Technical Representative for additional details on how to accomplish this method of upgrading power supply firmware.

2 What you need to do the Remote Upgrade

The following list details what is needed to perform a successful Remote Firmware Upgrade.

- The Remote Firmware Upgrade Tool
 - Downloaded from the GE Critical Power Website
- .Zip files containing the new firmware programs
 - Downloadable from the GE Critical Power Website
- Physical interface from the computer running the Remote Upgrade Tool to the power supply
 - If I²C is being used, the GE USB-to-I²C interface adapter shown below is required along with the connecting cables. Please contact your GE Critical Power Technical Representative for details on how to obtain the adapter and cables.

	I2C_USB_ISO_Translator_kit Part #: 150036482 (Isolated Adapter with cables)
--	--

- If RS-485 is being used, an appropriate USB to RS-485 cable along with a USB isolator is recommended. Although the isolator is not required for establishing communications, but it could protect against hardware damage if a grounding fault exists. The adapter cable set below terminates the blunt end of the *Future Technology Devices International LTD* USB to RS485 Serial Converter module with an RJ45 connector. The adapter with the blunt-end could also be procured directly from the manufacturer, if a different termination than RJ45 is desired by the user. Power for the adapter is obtained from the USB port on the computer. The communications protocol is compatible with USB 2.0. The adapter cable may be procured through your GE sales contact (see the part number below).

The adapter plugs into either

- RJ45 connectors of the GE RS485 based shelves
- Into the RJ45 connector of a dedicated interface board designed for communicating to stand-alone power supplies.
- Customer provided RJ45 interface

	USB to RJ45 interface adapter Part #: 850047401 USB to blunt-end <i>obtained from Future Technology</i> Part #: USB-RS485-WE-1800-BT
	USB isolator - available from a number of sources (example: UH201 - B&B Electronics)

Upgrading power supplies in a GE shelf in I²C mode requires a dedicated shelf interface board. The dedicated interface board converts the signals from the J1 signal connector of the shelf to the connector mate of the USB to I²C interface adapter.

In RS-485 mode the interfacing cable connects directly into the RJ45 connector of the GE RS485 based shelf. Shelves include all the required interfacing functions and a mechanical interlock for securing the rectifier.

In system upgrade may be accomplished while the system is operational. The remote upgrade tool could be used if the system tolerates such intrusion. Note that since the specific power supply being upgraded must be turned off, the system must have sufficient numbers of rectifiers to allow redundant operation while the rectifier being upgraded is turned off.

3.1 Interfacing via I²C

Updating in I²C mode requires the GE USB Interface Adapter if the GE Remote Upgrade is used. The adapter's functionality is to translate between the USB protocol in the computer and the I²C protocol in the power supply. Functions such as start, stop, clock signals, PEC computation and other required I²C functions are generated by the processor to the adapter. Note that the adaptor is specifically designed for communicating with GE modules.

Power for this USB 2.0 compatible adapter is provided by the USB port of the computer. Adapters may be procured through your GE sales contact.

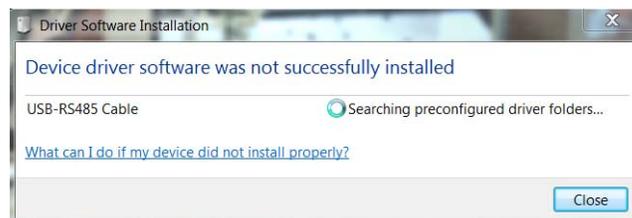
3.1.1 Port selection

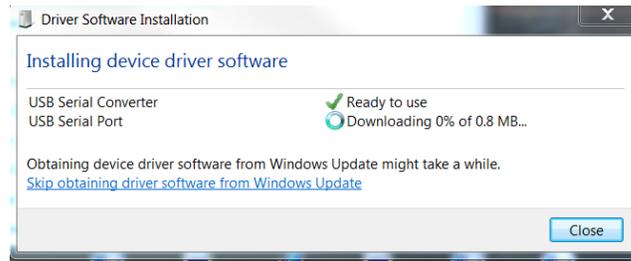
The CP3500 rectifier has dual I²C ports, of which only one is in control at any one time. The interface adapter can be connected into either Port-0 or Port-1 of the power supply. The upgrade automatically issues a 'take-over-control' command instruction prior to finding the modules on the bus.

3.2 Installation of the RS485 interface driver

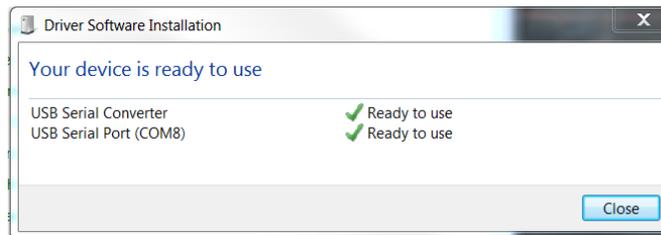
There are two ways of obtaining the required drivers for the USB-RS-485 interface. The first is by letting the computer find the drivers automatically. The second way is by configuring the drivers manually. The manual configuration starts by obtaining the drivers free from: <http://www.ftdichip.com>. The driver makes the cable appear as a virtual COM port.

We recommend the automatic installation process for the USB-RS-485 interface drivers. Switch to the manual install only if the automatic installation fails. Simply plug the cable into any USB port of the computer and allow the computer to find the driver automatically. The computer will display a message that the driver has not been successfully installed and that it is searching for the driver. Let the search continue. After some time the search completes and the computer will install the USB serial converter driver first, followed by the USB serial port driver. Shown below are example messages displayed by a computer during a USB-RS-485 driver install.

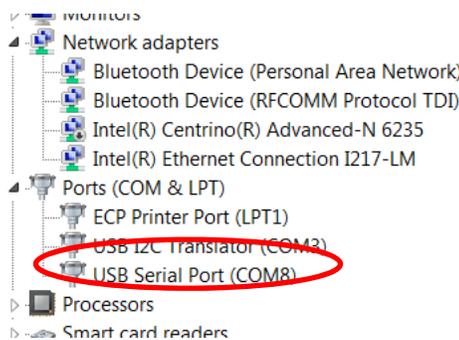




It will take some time for both drivers to install, when completed the completion announcement should appear



On the host computer, verify through **Control Panel – Device Manager** that the serial port is identified under Ports. When identified, the driver is correctly installed in the computer.

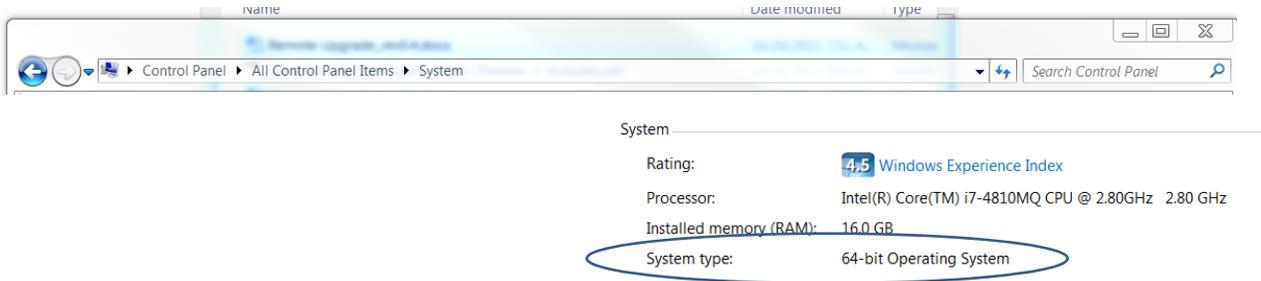


3.3 Installation of the USB-to-I²C Adapter driver

If the GE Critical Power DPI software suite has previously been installed on the computer used to perform the Remote Firmware Upgrade, then the USB driver for the USB-to-I²C interface adapter is likely already installed on the computer. If the driver is not installed, the computer will indicate that it cannot find the appropriate driver when the USB-to-I²C adapter is connected to one of the USB ports of the computer.

Two versions of the USB-to-I²C drivers are available, one for 32-bit computers and the other for 64-bit computers. To verify the computer's capability click on the **START** button, followed by clicking on **Computer**, and that followed by clicking in the upper left corner on **System properties**. The resulting window will show the capability of the operating system.

In the example shown below a number of system properties are listed. Next to system type, the 64-bit operating system is identified. So, on this computer the 64 bit driver needs to be installed.



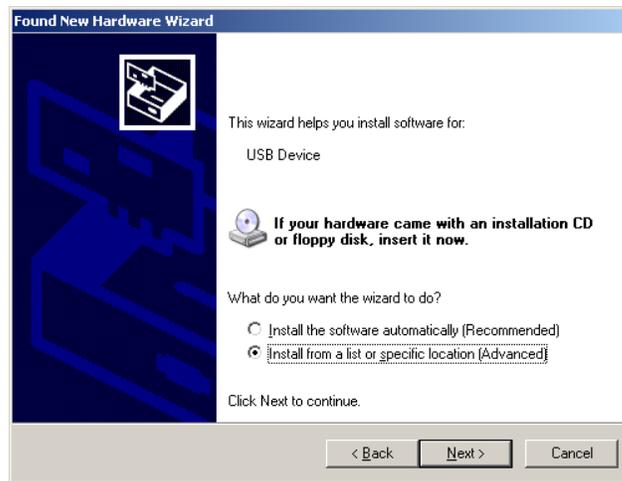
Download the required driver, either 32-bit or 64-bit, from the GE website into either the WINDOWS\System32 or WINDOWS\System64 directory, or another specific directory of your choice (You may create a special directory within program files to handily identify the down loaded drivers).

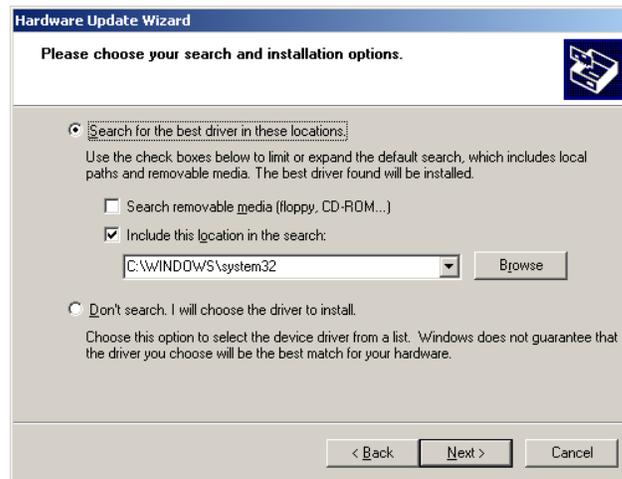
The driver files are:

GE_Power_Electronics_USB_Interface_Adapter.inf for 32 bit machines
GE_Power_Electronics_USB_Interface_Adapter_64bit.inf for 64 bit machines

Once the appropriate driver file is downloaded, the Interface Adapter may need to be reinserted again into the USB port of the computer in order to get the unidentified driver message on the screen again.

When prompted for the driver location, select the *Install from a list of specific location (advanced)* then click on the **NEXT >** button. On the next screen, enter the location of the downloaded that was selected above. In the example below the driver was placed into the WINDOWS\System32 directory.





Click on the **Next>** button and the computer should now install the driver for the USB Interface Adapter. Wait until the driver installation completes before proceeding to the next step.

Once the adapter is properly recognized by the computer further feature selection may be required depending on needs of the system connection.

3.3.1 USB-to-I²C Adapter Setup

3.3.1.1 Pull-up resistors

The USB Interface Adapter has internal pull-up resistors connected to 3V for clock (SCL), Data (SDA) and SMBAlert. The default setting for SCL and SDA is 3.3mA. [Other possible values are 0.9mA, 0.44mA, or no pull-up]. SMBAlert# is pulled up to 3V via a 7.5k Ω resistor. This value cannot be changed. The pull-up resistors can be changed using the Command Line Interface (CLI). The gui application note describes the correct procedure.

3.3.1.2 LED status indicator

A tri-color (Green/Orange/Red) LED located next to the mini USB interface connector provides visual adapter status messaging as follows:

- Green ON – Normal operation
- Green – Fast Blinking – The translator is communicating on the bus.
- Orange – Blinking or ON – The SMBAlert# line is active. An SMBAlert# LO state requests service from the system controller because an event change occurred in one of the modules connected to the system. The Alert# signal will remain LO until it gets cleared.
- Red – Internal fault

3.3.1.3 I²C Clock Speed Settings

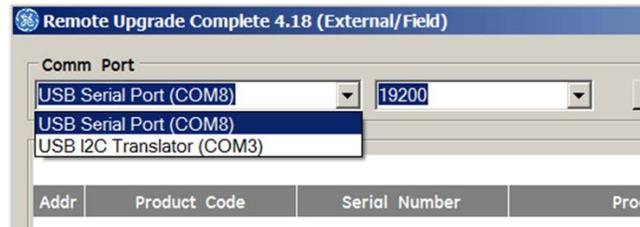
The default value of the I²C clock speed within the Interface Adapter is set at 100kHz. The upgrade program changes the adapter's clock speed to 400kHz, in order to upgrade the application as rapidly as possible.

4 Running the Remote Firmware Upgrade Tool

Click on the Remote Upgrade icon on the desktop to open the program. The Comm Port area in the Remote Upgrade display will identify connected interfaces. Select the desired method of communications, either I²C (USB-to-I²C

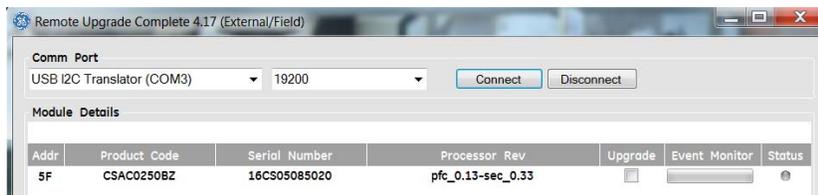
Translator) or GP (USB Serial Port). Both communication interfaces can be connected to the computer simultaneously, but only one can be selected for the upgrade.

The screen below shows that both the RS485 and I²C interfaces are available on the Comm ports. In this case the GP interface is selected. Once the appropriate interface is selected in the Comm Port window (the selected interface will highlight in blue), click on the **Connect** button



4.1 Discovery of upgradable modules

The upgrade tool starts by identifying all power supplies connected to the communications bus. The display example below shows a single CSAC0250BZ power supply connected to the I²C bus. The tool displays the address, product code, serial number, and the revision numbers of the processors in this power supply.



Connection through the I²C interface

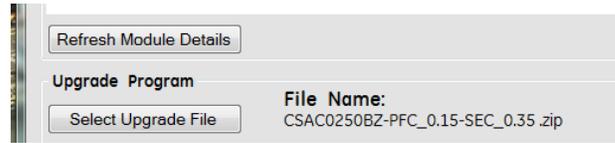
If more than one power supply is identified, it would be listed sequentially below the first unit.

4.2 Loading the upgrade program

The next step is to load the upgrade firmware into the tool. The Remote Firmware Upgrade tool remembers the last upgrade firmware file that has been uploaded into the tool. If the listed upgrade firmware revision is correct then go to the next step. If it is not displayed, or if it not correct, then load the desired upgrade firmware file into the upgrade tool at this time.

The upgrade firmware package can be downloaded from the GE Critical Power Website. If it is not found, please contact your local sales or FAE for further assistance. If the upgrade firmware package is found it first needs to be downloaded into a specific directory in the computer. After completion of the download, click on the **Select Upgrade File** button of the tool. The click brings up the standard Windows Explorer screen. Navigate to the directory where the upgrade firmware has been placed. This file is a .zip file containing the upgrade programs. Do not open the .zip file, simply identify it and click on the **Open** button.

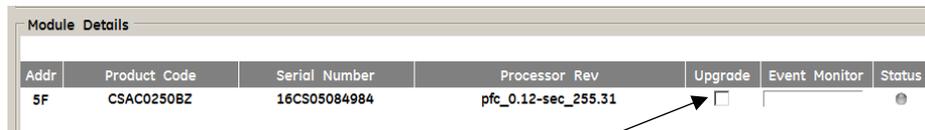
In the example below the CSAC0250BZ power supply upgrade file has been selected. The file name includes the product code followed by the processors names and revision numbers. Subsequent executions of the program will automatically bring in the selected upgrade file.



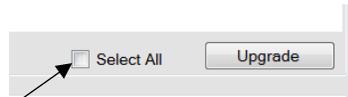
4.3 Upgrading the Power Supplies

Now that the power supplies have been identified, and an upgrade package has been brought into the tool, it is time to initiate an upgrade. Click inside the box in the Upgrade column to select individual power supplies or click in the select-all box to upgrade all listed power supplies simultaneously.

Once the power supply selection has been made, start the upgrade process by clicking on the <Upgrade> button.

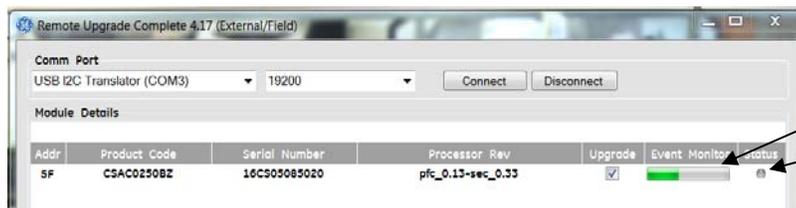


Click in the box to select an individual or a set of power supplies



Click in the **Select All** box to upgrade all modules simultaneously

The upgrade is accomplished one power supply at a time. The **Event Monitor** bar will scroll as the upgrade is progressing. When the upgrade is completed, the word **completed** will be displayed in the **Status** bar and the Status LED will turn Green.

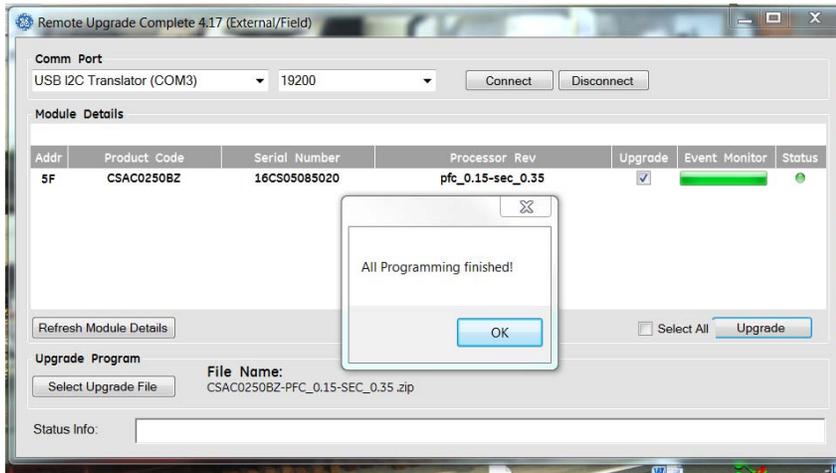


The upgrade commences one module at a time. The Event Monitor and the Status LED display the state of the upgrade. The Status LED will change to RED if an upgrade error occurred.

The tool will perform the upgrade only if the firmware revision numbers in the power supply and in the upgrade file are different. If the firmware versions are the same, the tool will skip the upgrade and lit the green LED in the Status column.

The upgrade tool can be used to either modify the programs in the power supply with an updated version, or, the tool can also be used to down grade the programs in the power supply to an earlier version.

Once all of the selected power supplies have been upgraded the tool announces that the upgrade has been completed.

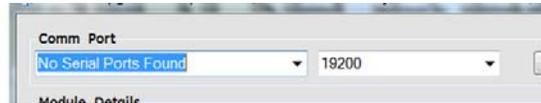


Note: The program will attempt to upgrade a specific processor several times before finally abandoning the upgrade process if the upgrade is still unsuccessful.

5 Error Messages from the Remote Firmware Upgrade Tool

5.1 The adapter was not found

Note: If neither the USB Interface Adapter nor the RS-485 cable is found by the program, the Comm Port message would indicate that no suitable devices have been located. Try closing the program, connecting the adapter to one of the USB ports and restarting the program. Sometimes repeating this process two or three times can result in the adapter being found by the program.



Another known error message indicates that the dongle is an early revision less than rev1.5. In fact the problem is that the dongle does not respond. Disconnect and reconnect the USB cable to the dongle to reset the USB port of the computer. Try again.

5.2 No modules found

If an upgrade is terminated prior to completion of the upgrade, the USB port or Interface Adapter may have hung up. For example, this may occur if a battery powered laptop turns off in the middle of an upgrade. To recover, disconnect the Interface Adapter, wait for about a minute and reconnect the adapter. Restart the Remote Firmware Upgrade Tool and continue.

5.3 Module upgrade error

If a specific module cannot get upgraded, the Status LED in the GUI screen for that power supply will turn RED.

5.4 Loss of connection error

If the interface should get disconnected during the upgrade process, the Tool will display a message indicating a disconnect and upon correction of the problem the upgrade can restart.

5.5 RS-485 installation error

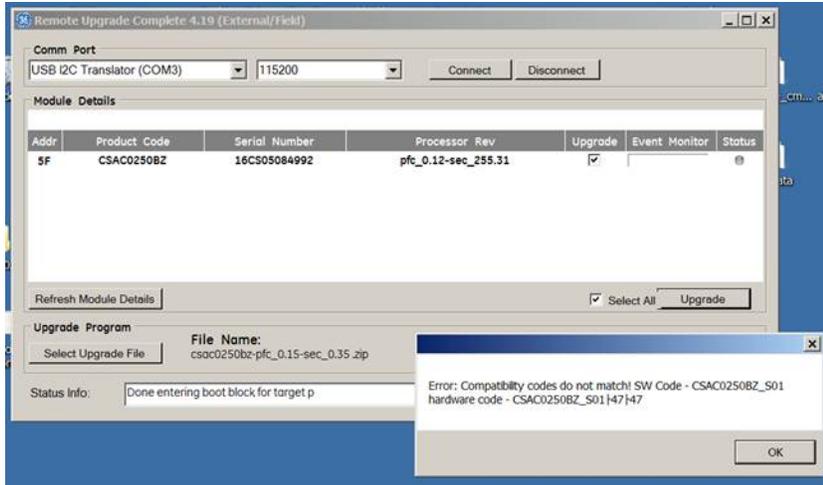
Connecting the RS-485 cable may not always be successful the first time. Disconnect and reconnect the RS485 cable.

5.6 Compatibility code mismatch

Compatibility codes are used to validate that the firmware in the power supply is suitable to be upgraded by the uploaded program. If a compatibility code mismatch occurs between the firmware inside the power supply and the upgrade package, the Tool will not execute the upgrade.. In the event of this error, please contact your GE Technical Representative for further help.

If multiple power supplies are being upgraded the tool upgrades them one at a time. If an error occurs while upgrading one of the power supplies, a message is displayed, and the program halts until the OK button is clicked. The Tool will then proceed to the next power supply and attempt to upgrade it.

Below is an example of a compatibility error message, in this case the secondary processor compatibility code inside the power supply does not match that of the upgrade package secondary processor. The upgrade will not commence.



5.7 Program error

The error below indicates that a non-recoverable programming problem occurred. Contact your local representatives for further assistance.

