

Technical Reference

Capstone Remote Monitoring System (Maintenance Edition)

This document (plus the User Edition), presents the additional capability to monitor, control, and troubleshoot the MicroTurbine via the Capstone Remote Monitoring System (CRMS) software.

Chapter 7: Software Uploads

This chapter presents information relative to Software Uploads. CRMS is able to load a single MicroTurbine, or up to 100 MicroTurbines connected to a MultiPac controller. The uploading can be performed through different types of connections, either Serial, Modem, or Ethernet.

The software uploading is fully automated. CRMS detects and loads code for different types of MicroTurbines and MultiPac systems. The uploading procedure depends on uploading of a single unit or MultiPac system, MicroTurbine configuration, controller and communication connection types.

In case of communication errors, the program will resend the data. In case of a Code checksum error, the program will repeat the same uploading operation, and only after a second failure, will it continue the process by uploading the next turbine code segment or the next MicroTurbine.

In case of MultiPac connection through the Power Server, CRMS supports uploading of mixed MicroTurbine types (that is, a grouping of Model C30 and Model C60 MicroTurbines).

Controller Code Set

The different controllers require loading different code set information. The Controller software codeset can combine any of the following software code items:

- Main
- Boot
- Generator DSP
- Inverter DSP
- Battery Controller DSP

- Liquid Fuel Control (LFC) DSP
- CPS Main and Backup codes

The Controller software codeset is user-selectable from the Upload Control panel.

The software distribution kit includes an information file that specifies the Code Versions and the Part Numbers for each of the software code items.

Program verifies compatibility between selected upload software and controller type.

The CPS Backup code uploading can be performed only from CRMS Depot Edition.

Software Upload Settings Panel

To open software uploading panel, select **[Settings][Software Upload]** from the Windows Menu bar, or by clicking on the Software Upload icon of the Windows Menu Toolbar. See Figure 7-1.

The **Select Upload Files Directory** panel will appear on your computer screen. See Figure 7-2. Browse and select the Controller software codeset directory at which the software upload files are located.

To start software uploading the following steps should be performed in the sequence described below:

1. Select the specific MicroTurbine with the **Select Upload MicroTurbine** or **MultiPac** pull-down menu.
2. Establish connection to the MicroTurbine or to the MultiPac system.

Note: For MultiPac system, the connection should be established from the MultiPac Control Panel. All MultiPac MicroTurbines should be activated from the Site Configuration Panel.

3. Click on the **Browse** button and specify the software directory at which the upload codeset files are located. Then, select **Done**.

Note: If the selected software is not compatible with hardware, the program will issue a warning and not allow any uploading process.

4. The **Code Version** and **Part Number** panel fields will be updated with the version numbers and part numbers of all the software code items that are specified in the code set information file.
5. To upload specific software code items, select or deselect the corresponding **Upload Code** checkboxes.

Note 1: Make sure that the code version agrees with the version provided from your Capstone Technical Support Representative.

Note 2: The Boot code is uploaded only if the software version of the target Boot code is different from the current controller version. In the event the target Boot code is the same as the current controller boot code, the "**Boot code the same - bypass upload**" message will appear on the Upload Code status display.

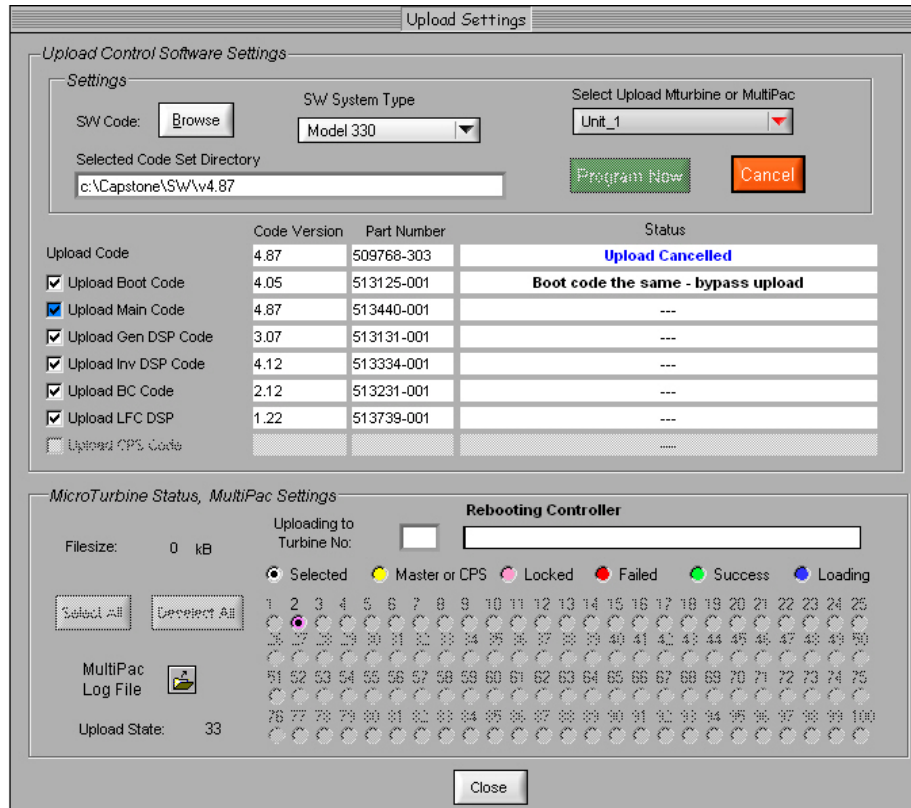


Figure 7-1. Software Upload Settings Panel

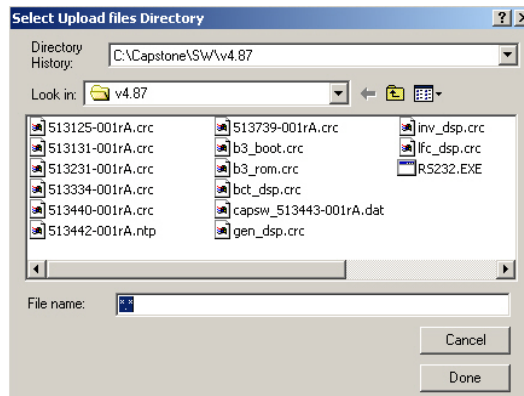


Figure 7-2. Select Upload Files Directory

No further selection is required in case of uploading the single MicroTurbine. In case of MultiPac connection, the selection of upload MultiPac turbines is required.

- Each locked MicroTurbine (turbines communicating with a MultiPac controller) can be individually selected by clicking on the corresponding round toggle button, located on the MultiPac Settings section of the Upload Settings Panel. This toggle button represents the Turbine ID (or MicroTurbine number). To select all locked MultiPac turbines, click on **Select All** button. By clicking on the **Select All** control button, all round toggle buttons representing locked turbines will be displayed with the purple background color. The round toggle buttons for all locked turbines with the hardware type matching to upload software code set will be checked. The User can de-select all locked turbines by clicking on **Deselect All**. The User can manually select and de-select any locked turbine by clicking on any turbine's round toggle button.
- Select the **Program Now** button to begin the uploading process. The software should begin uploading.

Monitor the upload progress from the status display bars that are provided next to each code item.

All software codes will be sequentially programmed. For MultiPac systems, the same code item will be loaded for all selected turbines and, only then, will the next sequential code item be loaded.

During uploading, the user can change the upload software codeset and MultiPac turbine selections. However, any change in the Software Upload Settings will affect the correctness of the Upload Log file.

The status and states for each uploaded turbine will be displayed on the status display bar, provided on the MultiPac Settings section, during uploading. Also, the current upload Turbine number will be displayed on the MultiPac Settings section in the **Uploading to Turbine No:** field.

When the uploading is complete, the Status bar will indicate **Code Uploading Complete** and the Controller will automatically reboot.

Upon completion of the reboot operation, the MicroTurbine(s) will be ready for operation.

Canceling Software Uploading

An Operator can cancel the Software Uploading activity at any time by clicking on the **Cancel** button.

Color Coding

The following colors are used to show the MicroTurbine status on the round toggle buttons:

- Blue:** Indicates current loading event
- Red:** Indicates failure
- Green:** Indicates success
- Purple:** Indicates a locked turbine
- Yellow:** Indicates MultiPac controller (Master turbine or CPS Server)

The color-coding is used to indicate Micro Turbine uploading status on the round toggle buttons and **Upload Code** checkboxes. In case of MultiPac uploading, the color-coding for **Upload Code** checkbox will indicate upload status for entire MultiPac system.

Log File

Upon completion of software uploading, the detailed information about all software code items uploaded for each MultiPac MicroTurbine is saved into the MultiPac Upload Log File (identified as **Uploadlog.txt**).

The Log File displays the results of software uploading for each MicroTurbine and in case of failure, reports the state at which the software uploading had failed.

To review the Upload Log File, click on the **MultiPac Log File** button located on the MultiPac Settings section.

The following information is saved in the Upload Log File:

- Successfully loaded turbines
- Failed upload turbines, with an indication of the sequential step when the failure occurred.
- Turbine numbers and code items that should be reloaded.

The Upload Log File information helps to analyze the failure mode, and also helps to troubleshoot the MicroTurbine.

NOTES