

**Smart Charger Utility (SCU.exe)
And
Smart Charger Reader (SCR.exe)
Version 3.0 User Manual**

High Efficiency & Smart Charging
Vehicle Power Supply
Configuration Utility

Designed by
TRI-M ENGINEERING

Technical Manual

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PREFACE

This manual is for integrators of applications of embedded systems. It contains information on the use of the Smart Charger Utility for use with the HEBC, HESC104, HESER and HESC Serial.

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Smart Charger Utility (SCU.exe) Manual

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1. INTRODUCTION

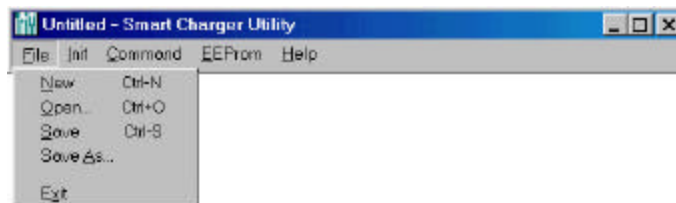
The Smart Charger Utility (SCU.exe) software allows the User to configure and monitor the HESC series of products. The Smart Charger Reader (SCR.exe) has all the same functions as the SCU.exe, but can only monitor and read values from the HESC products. The SCR.exe does **NOT** allow Users to modify or change setpoints, or upload new firmware or install charging profiles. Any reference to the SCU.exe also includes the SCR.exe, except as noted.

The HESC product family includes the HESC104, HESC104+, HESC-SER, HESC-SERD and V5SC power supplies with smart chargers, and the HEBC and HEBC+ smart chargers. The HESC products can be configured for specific applications and uses, and this configuration can be saved and reloaded at any time. This configuration information is known as a “charging profile”. Pre-configured charging profiles are available from Tri-M or the charging profile can be customized with the SCU.exe. The SCU.exe can data log various charging parameters, allowing analysis of the charging process. Firmware updates and charging profiles may also be uploaded with the SCU.exe.

2. INSTALLATION

Copy the SCU.exe and SCU.ini to the desired destination folder. The program will create an SCU.ini file if you do not place one in the destination folder. This file retains previous settings, and will be re-created if it does not exist.

3. FILE MENU



3.1. File New

The “New” option resets all EEPROM variables stored in the SCU.exe to zero and closes any files that may be currently open.

3.2. File Open

The “Open” option allows for loading of a data file. A HEX file may contain firmware updates or EEPROM charging profiles.

3.3. File Save

The “Save” option stores EEPROM data as a HEX file.

3.4. File Save As

The “Save As” option is similar to the “Save” option but allow file name to be specified.

3.5. File Exit

The *Exit* option closes any open files and exits the program.

4. INIT MENU

The initialization must be performed each time the SCU.exe program is started.



4.1. Setup

Setup produces a series of dialog boxes that allow for guided selection of the device. The first dialog asks for the firmware type, UPS16 or UPS18. The next dialog will show which devices are available based on the firmware type selected. The last dialog will allow selection of an RS232 Channel (Com1 – Com8), or an I/O memory address, depending on which device was selected in the previous dialog.

For HESC-SER, HESC-SERD, HESC104+, HEBC, HEBC+, V5SC select the RS232 channel (Com1, Com2, Com3, or Com4) it is connected to. For the HESC104, select the I/O memory address (0x300, 0x310, 0x320 or 0x360) as defined by the hardware jumper selection of the HESC104.

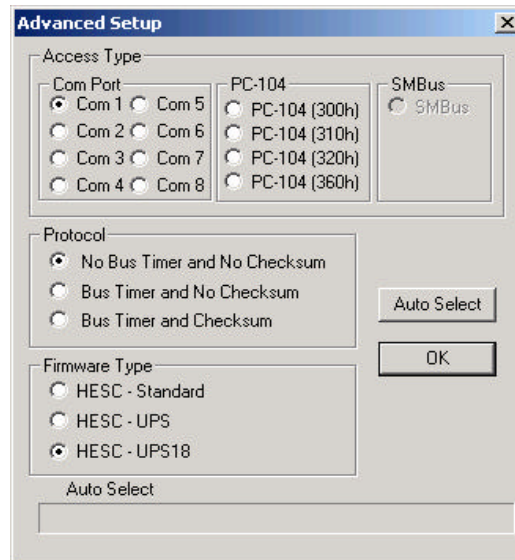
4.2. Advanced Setup

Advanced Setup produces a single dialog box, which allows for manual selection of the access and protocol type.

The “auto select” function tests each communication channel and attempts to make contact with the HESC. If communication cannot be established, the SCU.exe pop-ups an alert box. The User can also select the “communications protocol” to the HESC.

Additionally, the SCU.exe supports the original HESC firmware, and the HESC-UPS firmware. Selecting the type of firmware that is loaded into the HESC.

When the “Setup” window is closed, the SCU.exe saves the setup options into the SCU.ini for use each time the SCU.exe is started.



Note: The “auto select” does NOT work when the HESC is in the Firmware Upload mode.

4.3. Init FW Update (not available for the SCR.exe)

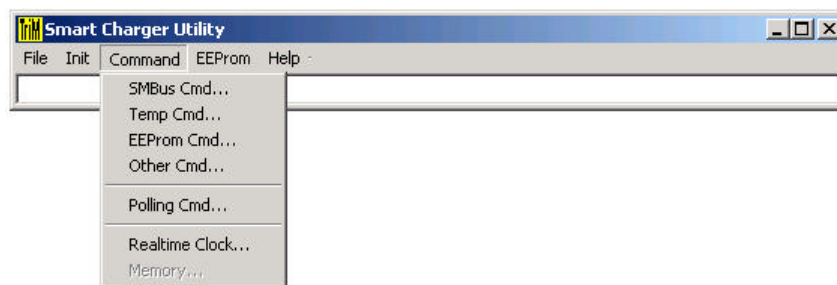
1. Connect a wire between SDA (CN5-5 or CN7-4) and ground (CN5-4 or CN7-2) to put the power supply in firmware upgrade mode.
 2. Apply main power to CN6.
 3. Start SCU.exe utility on host.
 4. Select FILE-OPEN from menu and select the firmware file.
 5. Select INIT-SETUP and select the following:
 - a. Access Type: Select correct port type and address.
 - b. Protocol: Select “Bus Timer and No Checksum”.
 - c. Firmware Type: Select “HESC-UPS”.
 6. Press OK button after HESC is initialized.
 7. Select INIT-FW UPDATE and press the START/STOP UPDATE button.
 8. Read the info from the dialog box and then press OK button.
 9. Remove the wire connecting CN5-5 and CN5-4 'AFTER' firmware update is started.
 10. Close SCU.exe after update is done.
 11. Remove main power from CN6.
 12. Wait for 30 seconds after power down.
- Apply main power again.

The “Update Progress” bar will begin to increment when the update begins. The bar will move slowly, taking approximately 10 minutes to complete. Further feedback is provided as a percentage and as a byte count. Upon completion, a message box will indicate that the firmware update was successful.



5. COMMAND MENU

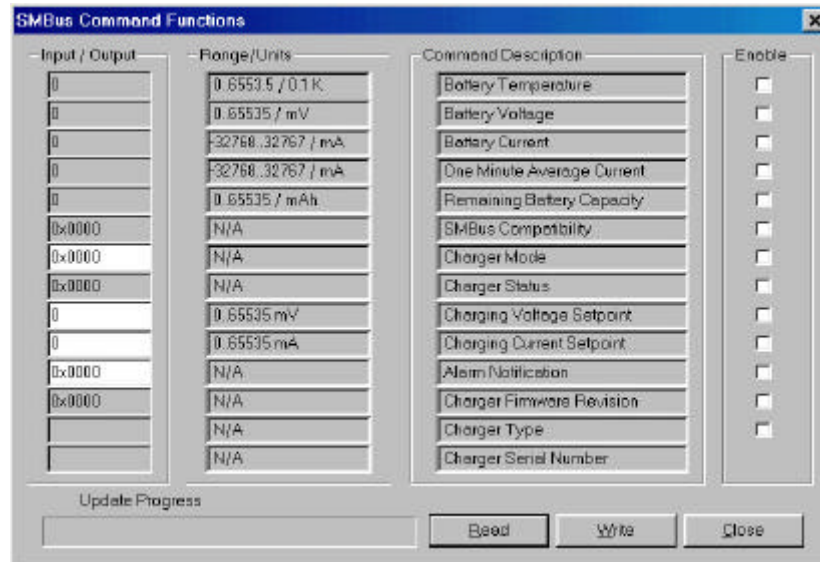
The command option allows for command function execution, as well as polling and logging of data. The interactive SCU.exe can also be “spawned” from the command menu.



5.1. SMBus Command

The *SMBus commands* are selected through the “SMBus Command Functions” window. The grayed input boxes are READ only and the white input boxes are READ or WRITE capable. For the hexadecimal input commands, the format is: 0xYYYY, xYYYY, or YYYY to enter the values, with Y being a valid hexadecimal character such as 0-9 or a-f or A-F.

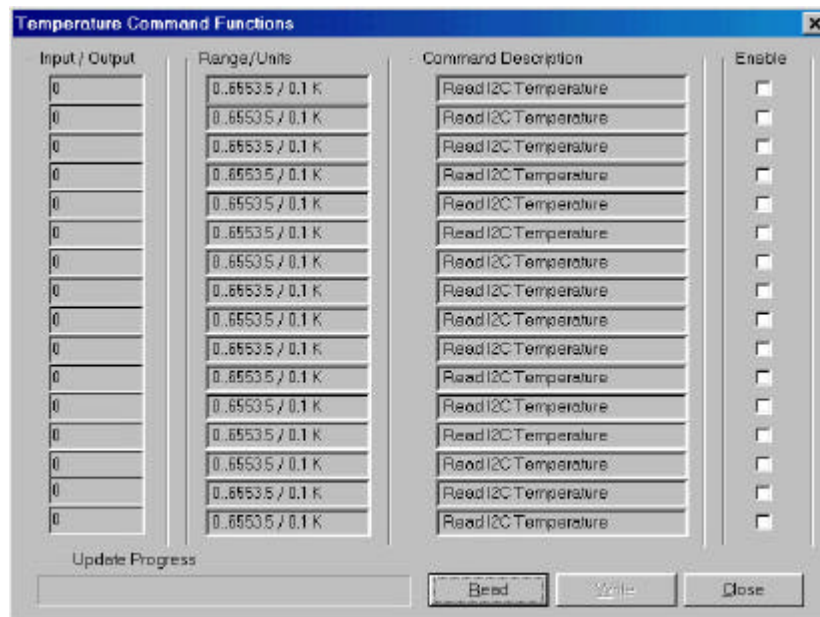
The “Enable” check box must be checked for each command required. These check boxes are also used in the polling mode. The Read and Write buttons know which commands are read only and which are write only. For example, an attempt to read the ChargerModeStatus() will simply be ignored.



(Note: The Write button is disabled on the SCR.exe)

5.2. Temp Command

The “Temperature Commands Functions” operates in the same manner as the SMBus commands.

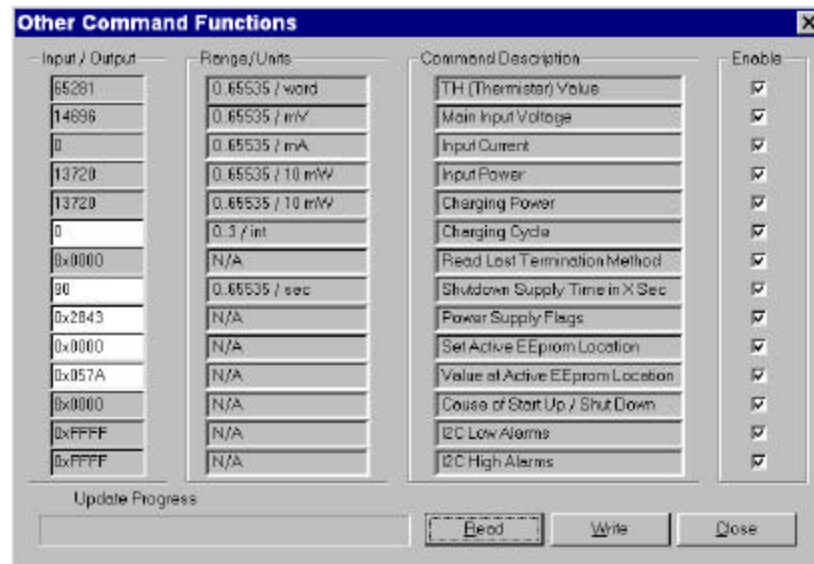


5.3. EEprom Commands

New EEprom Commands.

5.4. Other Command

The "Other Command Functions" operates in the same manner as the SMBus command functions.



(Note: The Write button is disabled on the SCR.exe)

5.5. Polling Command

The "Polling Command" is used to generate a file containing polled data. When the "Start/Stop" button is pressed, polling begins. When the button is pressed again, polling is stopped.

There are two polling options:

- Graph the battery charging data using Microsoft Excel. This option requires Microsoft Excel 97 or 2000. Upon pressing the Start/Stop button, Excel will be loaded and the data will be entered and graphed as charging progresses.
- Log all polled data to a file. The name and location of the data file can be specified in the Poll File box. The default file name is "DATA.TXT" and is stored in the same directory as the SCU.exe file.

The file format is of the form:

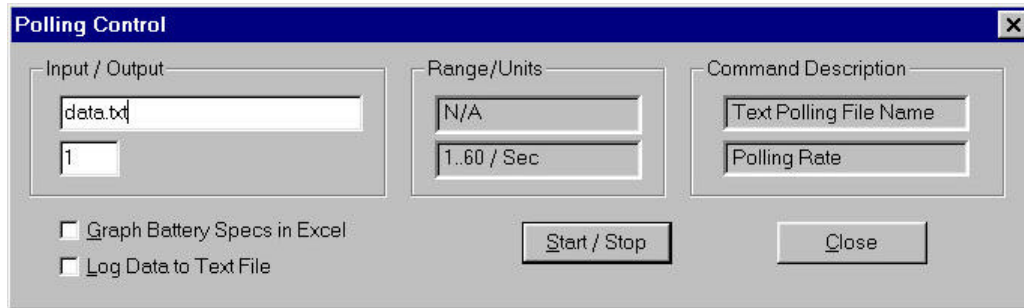
TIME (sec), Func1, Func2, Func3, ...

1, xxxx, yyyy, zzzz, ...

2, xxxx, yyyy, zzzz, ...

3, xxxx, yyyy, zzzz, ...

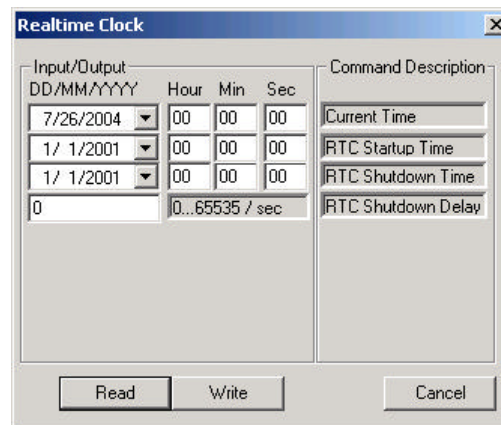
The file can be imported into Microsoft Excel as a comma delimited file by loading Microsoft Excel, and opening the "DATA.TXT" file. Choose the "Delimited" option and then the "Comma" option. You may then use the functionality of Excel to process the file.



Note: When logging to Microsoft Excel, after the three default worksheets are filled, additional logged data over-writes the data in sheet 3. Re-start the SCU.exe to initiate another three “sheets” of logging. As well, while the SCU.exe is communicating with Excel, it is important to not perform complex operations in Excel.

5.6. Real-time Clock

The real-time clock dialog allows the User to set up the real-time clock that is embedded into battery packs, such as the BAT-NiMh-RTC. If the real-time clock is enabled, the power supply will start a shutdown countdown, defined by the *RTC Shutdown Delay* setting, at the time specified by the *RTC Shutdown Time* setting. When the RTC startup time is reached, the RTC embedded into the battery pack will enable the battery pack outputs, thus allowing the power supply will return to full power.



(Note: The Write button is disabled on the SCR.exe)

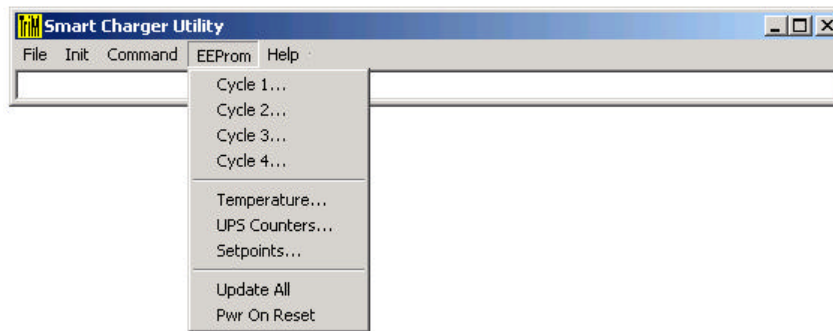
5.7. Memory

Future Feature

6. EEprom MENU

The EEprom menu selection allows for configuring of all the charger EEprom variables.

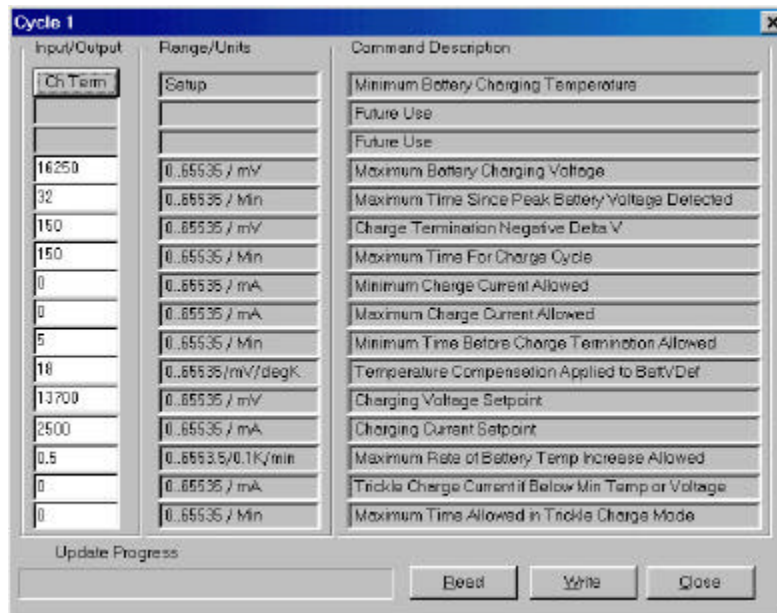
Note: The HESC must be “reset” before any changes to the EEprom will be put into effect. “Cold booting” (turning all power off, then on again) the HESC can be done but this is sometimes difficult as the HESC and a battery pack may be embedded into an assembled application. The SCU.exe has a “Power On Reset” menu item that provides a “software-reset” of the HESC. After selecting “Update All” with the “Write” action, the SCU.exe asks the User if a “Power On Reset” should be performed.



6.1. EEprom Cycle 1

The Cycle 1 configuration window defines the charging parameters for the first stage of charging. The first column contains the default charging values edit boxes, the second column is the range of values that may be entered or displayed, and the third column is a description of the charging parameter. A more detailed description may be found in the HESC-UPS firmware manual.

The Read and Write buttons allow reading and writing the current bank of EEprom parameters for Cycle 1.



(Note: The Write button is disabled on the SCR.exe)

6.2. *EEprom Cycle 2*

Operates in the same manner as that of Cycle 1.

6.3. *EEprom Cycle 3*

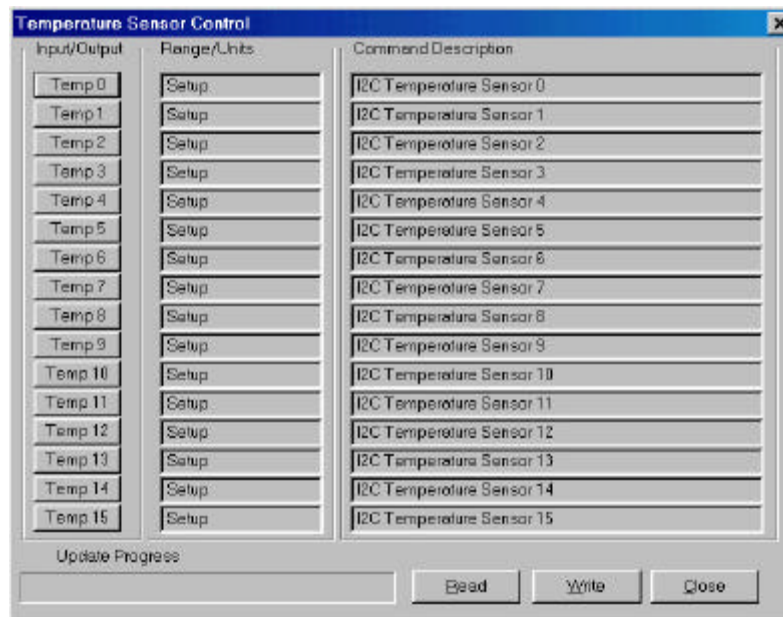
Operates in the same manner as that of Cycle 1.

6.4. *EEprom Cycle 4*

Operates in the same manner as that of Cycle 1.

6.5. *EEprom Temperature*

The “*Temperature Sensor Control*” window contains the 16 temperature sensors (eight for the HESC-UPS firmware), which may be configured. Upon selecting the temperature sensor button, another dialog window is presented with the information pertaining to that sensor. For further information please refer to the HESC-UPS firmware manual.



(Note: The Write button is disabled on the SCR.exe)

Input/Output	Range/Units	Command Description
<input type="checkbox"/>	Cmd Bit 0	For TS-IC mode, UnCheck Cmd Bit 0 and Cmd Bit 1
<input type="checkbox"/>	Cmd Bit 1	
<input type="checkbox"/>	Bit	TC-IC, Enable = Main Power, Disable = Battery Power
<input type="checkbox"/>	Bit	TC-IC, Enable = Limited Power Available (Main or Battery)
<input type="checkbox"/>	Bit	TC-IC, Enable = HESCI04 is in Timed Shutdown Mode
<input type="checkbox"/>	Bit	Enable Low Alarm Reporting
<input type="checkbox"/>	Bit	Enable High Alarm Reporting
<input type="checkbox"/>	Bit	Enable for TC-IC Mode, Disable for TS-IC Mode
79	0..127 / Addr	I2C Temperature Sensor Address
<input checked="" type="checkbox"/>	R/W Bit	Address R/W, Enable For Read, Disable For Write

TC-IC		
0	0.65535	Setpoint value that will be sent
0	0.255	Relative Low Alarm Setting
0	0.255	Relative High Alarm Setting

TS-IC		
65535	0.65535	Low Alarm Setting
65535	0.65535	High Alarm Setting

Close

6.6. UPS Counters

The "UPS Settings" window allows modifying the Start Up and Shut Down counters. To access the UPS Settings windows the "UPS" firmware option must be selected in the "Init" "Setup" menu in order to access the UPS Settings.

Input/Output	Range/Units	Command Description
<input type="checkbox"/>	0..65535 / Sec	Main Power Shut Down Debounce Counter
<input type="checkbox"/>	0..65535 / Sec	Main Power Start Up Debounce Counter
<input type="checkbox"/>	0..65535 / Sec	Main Power Shut Down Counter
<input type="checkbox"/>	0..65535 / Sec	Main Power Start Up Counter
<input type="checkbox"/>	0..65535 / Sec	Ignition Shut Down Debounce Counter
<input type="checkbox"/>	0..65535 / Sec	Ignition Start Up Debounce Counter
<input type="checkbox"/>	0..65535 / Sec	Ignition Shut Down Counter
<input type="checkbox"/>	0..65535 / Sec	Ignition Start Up Counter
<input type="checkbox"/>	0..65535 / Sec	Push Button Shut Down Counter
<input type="checkbox"/>	0..65535 / Sec	Push Button Start Up Counter
<input type="checkbox"/>	0..65535 / Sec	Battery Low Shut Down Counter

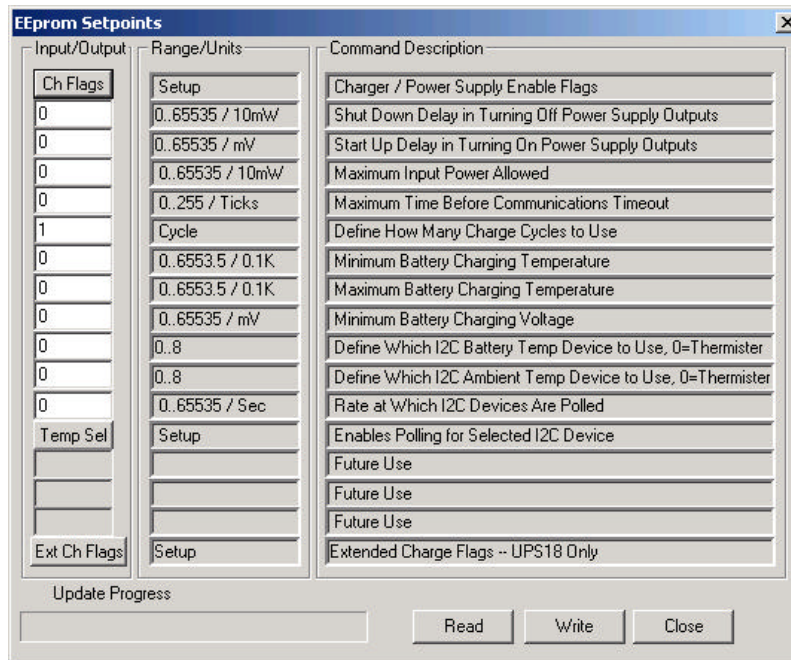
Update Progress

Read Write Close

(Note: The Write button is disabled on the SCR.exe)

6.7. Setpoints

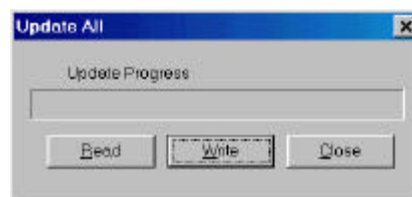
The “EEProm Setpoints” window contains other charging and HESC operational defaults.



(Note: The Write button is disabled on the SCR.exe)

6.8. EEprom Update All

Performs a complete read or write of all the default EEprom parameters. After any “Update All” with a “Write” action, the SCU.exe asks the User if a “Power On Reset” should be performed.



(Note: The Write button is disabled on the SCR.exe)

7. HELP MENU

Provides a variety of helps files.

Note: The Adobe Acrobat reader must be installed, which may be freely downloaded from the Adobe Acrobat web page (www.adobe.com).