



**PS080, PowerTool™ 800  
Development Software  
User's Guide**

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## Chapter 1. Preface

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### Features

- Supports user-friendly environments for development of battery systems incorporating Microchip's PS8XX IC family
- Microsoft® Windows® XP compatible
- Interfaces to PS8XX using Microchip PowerInfo™ 2 or PowerCal™ 2 hardware
- Direct input of system parameters in battery cell specified units
- Advanced interactive editor allows quick IC configuration
- Logs reported parameters during discharge test for PS8XX device-based battery systems
- Verifies proper assembly and correct communication
- Can be used without hardware to develop configuration files for PS8XX

### Ordering Information

Part No.	Description
PS080	PowerTool™ 800 Development Software

### Supported Hardware

Part No.	Description
PS051	PowerInfo™ 2 Interface Board
PS052	PowerCal™ 2 Calibration Board
PS8070	PS8XX Fuel Gauge Evaluation Board

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## **Chapter 2. Overview**

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### **2.1 GENERAL OVERVIEW**

PowerTool 800 is a Windows XP compatible software package that supports the rapid development and production of rechargeable battery systems based on Microchip's PS8XX ICs. PowerTool 800 simplifies the design process by providing a high-level, menu driven environment that allows the designer to quickly and easily develop, calibrate and test PS8XX device-based battery systems.

PowerTool 800 software interfaces to the battery system through the PowerInfo 2 interface board and PowerCal 2 calibration board. Dual data screens for raw and calculated data provide a user-friendly environment for design and debug.

During development, configuration defaults allow quick setup of PS8XX controlled systems. A simple parameter editor and an enhanced, interactive wizard help tailor the IC to the specific needs of the application and battery. Entry of battery parameters is performed using battery cell specified units, such as volts (V), millivolts (mV), milliamperes (mA) and milliampere-hours (mAh). The PowerTool 800 interface is divided into several pages which give access to a variety of fuel gauge functions.

With all of its advanced features, PowerTool 800 software increases the value of the complete Microchip battery management solution by lowering the costs associated with development, minimizing time to market and maximizing production throughput. PowerTool 800 software is offered free of charge and is available for download on the Microchip web site. It is also included with Microchip's hardware development tools summarized in Table 5-1. The following is a very brief overview of PowerTool 800 features. Please use the HTML Helpfile for additional information. It can be activated by clicking "Help" in the lower right corner of PowerTool 800.

#### **2.1.1 Configuration Wizard**

Upon initial start-up of PowerTool 800, the configuration wizard begins. This five-step wizard guides you through basic PS8XX configuration. Click "Step 1" to begin.

NOTES:

## Chapter 3. Manufacturing Mode

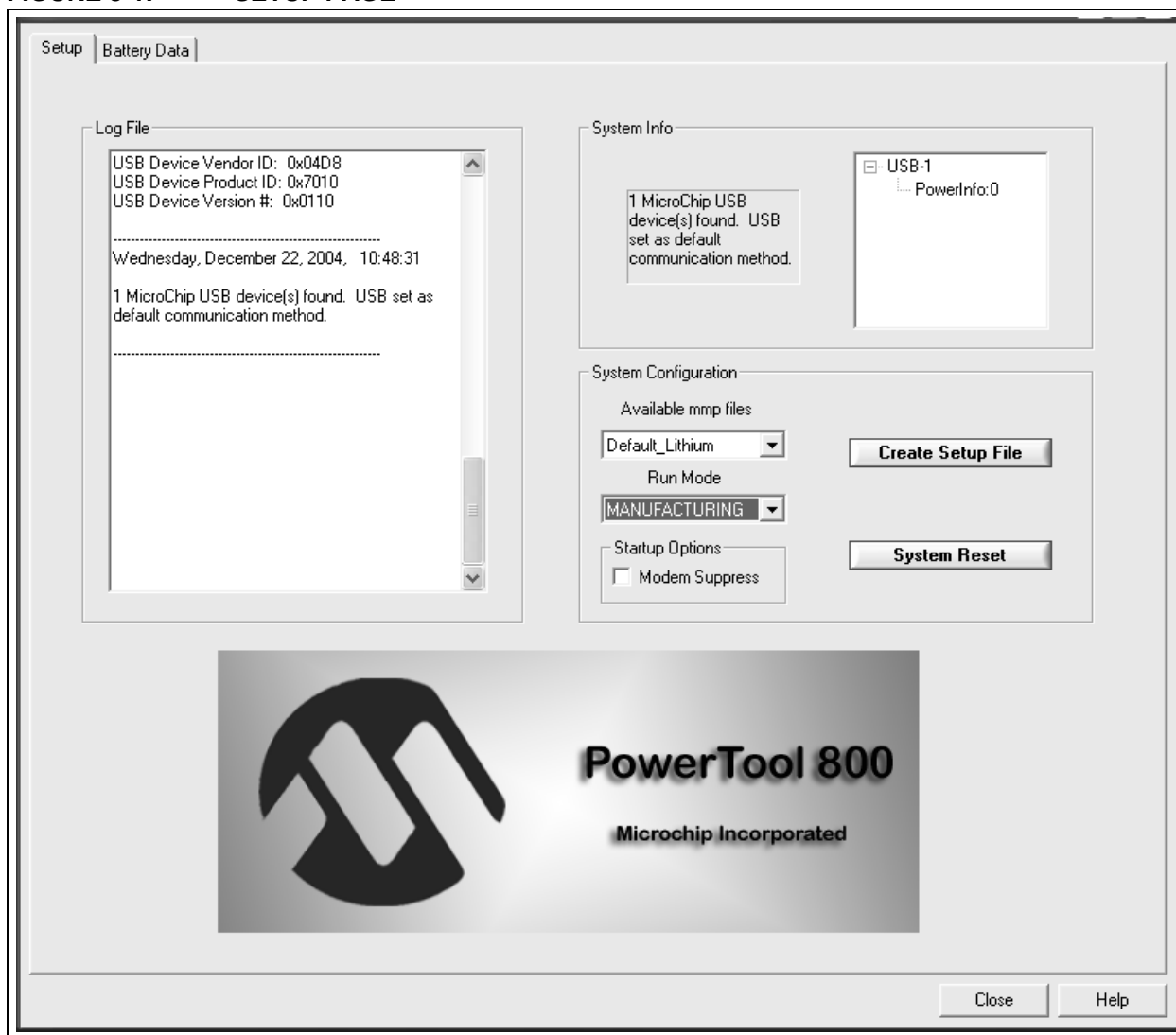
### 3.1 MANUFACTURING MODE

PowerTool 800 can be run in Manufacturing or Advanced Configuration mode. Manufacturing mode is typically used in production environments to limit access to only the programming and calibration functions.

#### 3.1.1 Setup Page

Page which contains detailed operation log, Run mode selection, system information and software Reset.

**FIGURE 3-1: SETUP PAGE**



## 3.1.2 Battery Data Page

Read all battery data values which are available over the communication interface. Write the values to a file and read and log data continuously from this page.

**FIGURE 3-2: BATTERY DATA PAGE**

Setup Battery Data

Port 1

Temperature		AbsoluteSOC		CycleCount		ManufID	
Voltage		RemCap		DesignCap		DeviceID	
Current		FullChargeCap		CoinVoltage		KEELOQ	
AvgCurrent		AvgTTEmpty		ManufDate		GPIO	
RelativeSOC		BatteryStatus		SerialNumber			

PowerTool 800 Battery Data

Read Registers Read Continuous Clear Registers Write Screen To ASCII

Close Help

## 3.1.3 Calibration Page

Set up and perform parameter initialization, calibration and testing. Use the View buttons to display the various routines. Click "Start" to write the configuration hexa-decimal data file and fuel gauge created with the wizard and the date (the green buttons indicate that these two functions are enabled) to PS8XX memory.



## Chapter 4. Advanced Configuration Mode

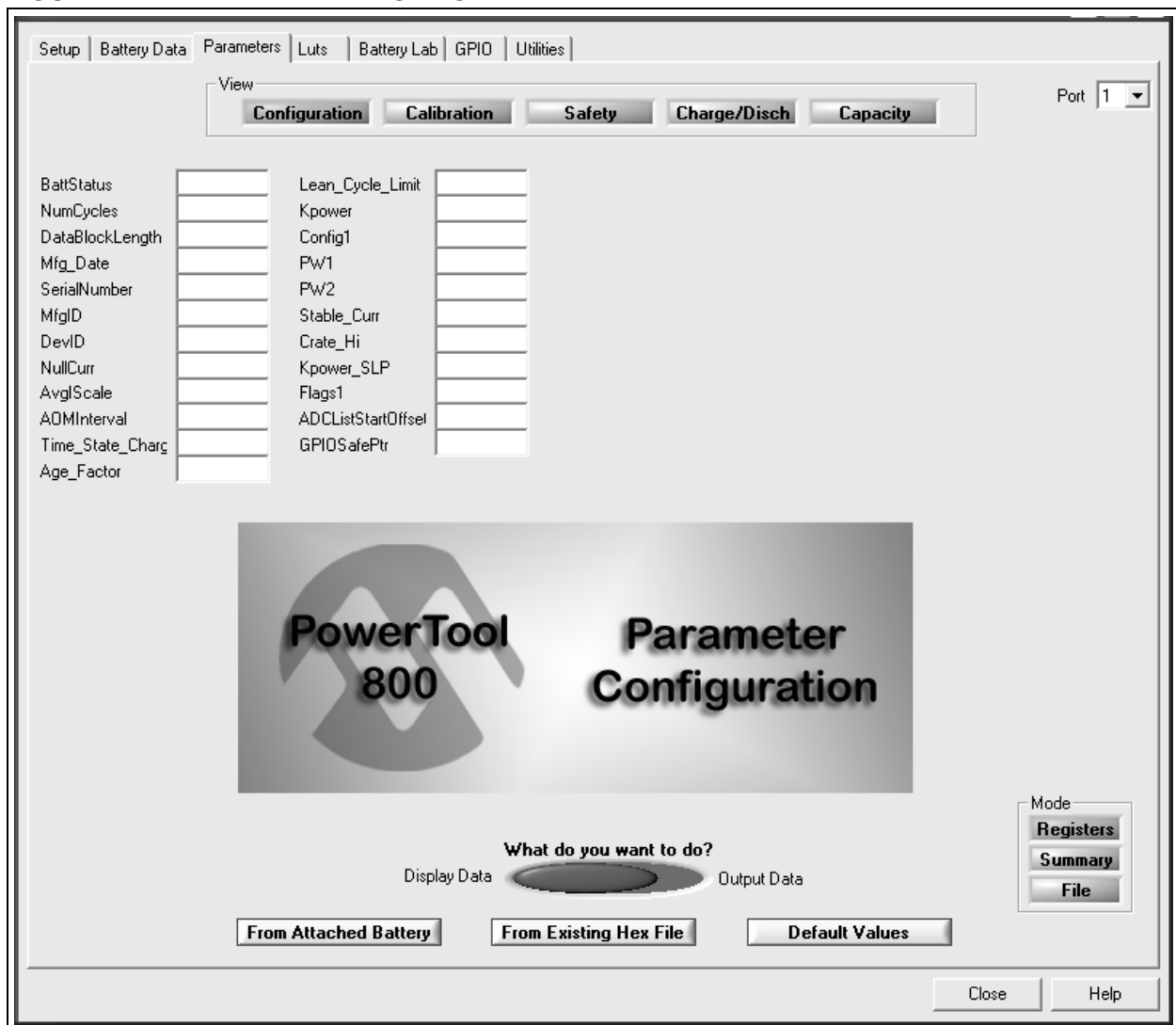
### 4.1 ADVANCED CONFIGURATION MODE

PowerTool 800 can be run in Manufacturing or Advanced Configuration mode. Advanced Configuration mode is typically used by engineers during system development and testing. Advanced Configuration mode includes the pages available in Manufacturing mode and those explained in this section.

#### 4.1.1 Parameters Page

Read and write all memory locations. Use buttons in the View box to display parameters in various categories. Click in the value text box of any parameter to display a description.

**FIGURE 4-1: PARAMETERS PAGE**



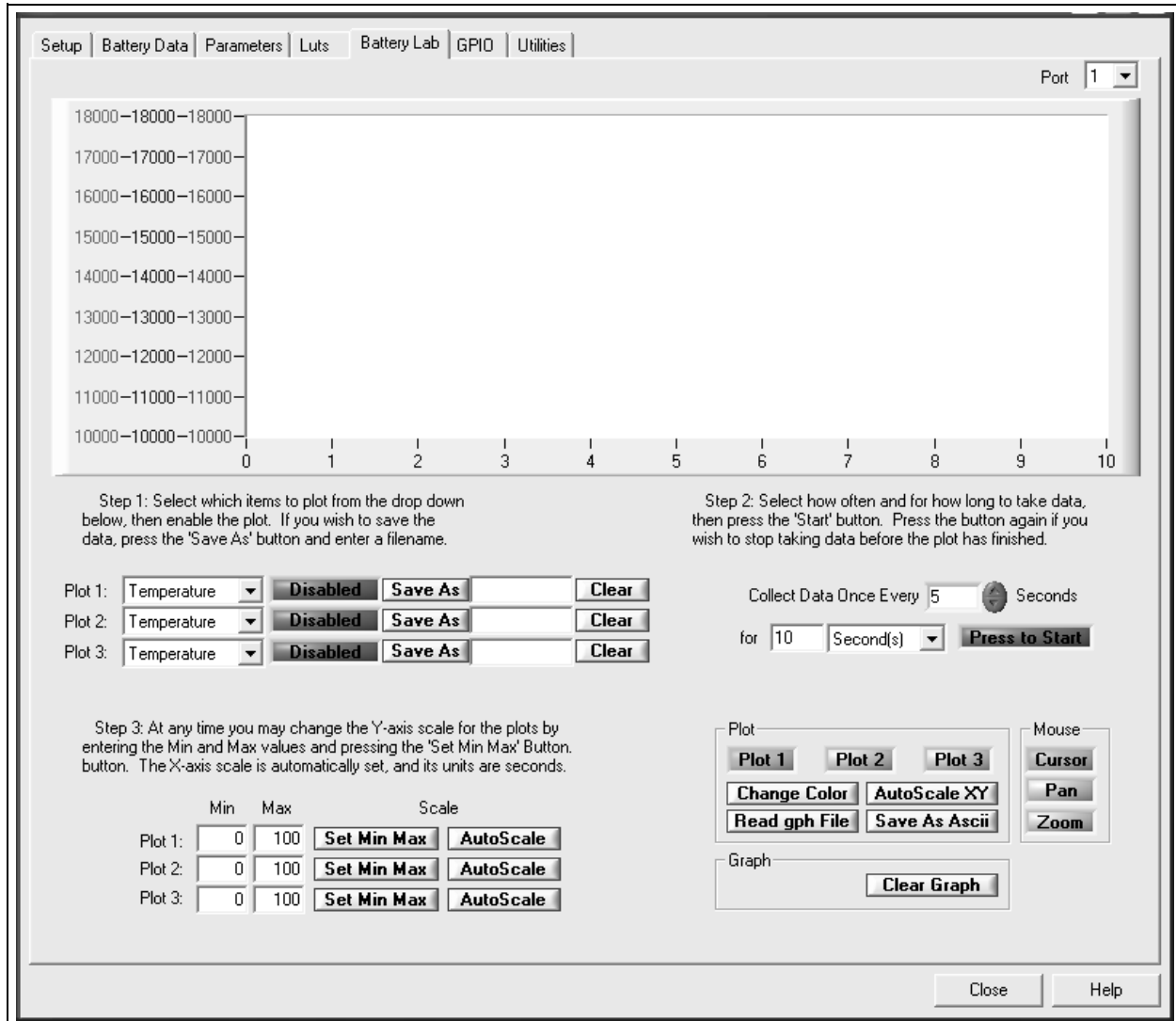
The modeled cell data is displayed here in raw (internal units) or decoded format.

[illegible]

## 4.1.3 Battery Lab Page

Graphical data can be collected and saved using the integrated plot utility.

**FIGURE 4-3: BATTERY LAB PAGE**



## 4.1.4 GPIO Page

The general purpose I/Os are configured with the utility on this page. It is very flexible and allows the user to easily set up complex conditions to set and clear the GPIO pins.

**FIGURE 4-4: GPIO PAGE**

The screenshot shows the GPIO configuration page of the PS080 PowerTool 800 software. The interface includes a top menu bar with tabs: Setup, Battery Data, Parameters, Luts, Battery Lab, GPIO, and Utilities. The GPIO tab is active. Below the menu bar, there is a 'View' section with 'Default' and 'Safety' buttons, and a 'Port' dropdown menu set to '1'. The main area is divided into three columns: 'Condition Group Set', 'GPIO Set', and 'GPIO Clear'. The 'Condition Group Set' column contains a table with headers 'Param', 'Comp', 'Thresh', and 'Units', and a list of condition groups (CG 0 to CG 7). The 'GPIO Set' column contains a list of GPIO pins (GPIO 0 to GPIO 6) and buttons for 'EOC' and 'EOD'. The 'GPIO Clear' column contains a list of GPIO pins (GPIO 0 to GPIO 6) and buttons for 'EOC' and 'EOD'. Below the main area, there are two buttons: 'OR CG 0 to GPIO 1' and 'Remove CG 0 From GPIO 1'. At the bottom, there are five buttons: 'Read Battery', 'Read Hex File', 'Write To Battery', 'Write To Hex File', and 'Write To ASCII'. The bottom right corner has 'Close' and 'Help' buttons.

Setup | Battery Data | Parameters | Luts | Battery Lab | **GPIO** | Utilities

View: **Default** **Safety** Port: 1

**Mode** **GPIO Set** **GPIO Clear** **Mode**

Param	Comp	Thresh	Units

Condition Group Clear

Param	Comp	Thresh	Units

Step 1: If you have not already, read an attached battery or a hex file using the buttons below. Modify or build condition groups by selecting a CG button, right clicking inside the Condition Group Set or Clear boxes, and editing individual conditions.

Step 2: Assign Condition Groups to GPIOs by selecting a CG button and a GPIO button, then pressing the 'OR CG to GPIO' button. You can assign several condition groups to an individual GPIO.

Step 3: You can verify condition group and GPIO assignments by using the Mode buttons. Once you have created the condition groups and assigned them to the appropriate GPIOs, you can write this data to a battery or a hex file using the buttons below.

**OR CG 0 to GPIO 1** **Remove CG 0 From GPIO 1**

**Read Battery** **Read Hex File** **Write To Battery** **Write To Hex File** **Write To ASCII**

**Close** **Help**

## 4.1.5 Utilities Page

Various utilities related to the power controller boards, PowerInfo 2 and PowerCal 2, are located here.

**FIGURE 4-5: UTILITIES PAGE**

Setup | Battery Data | Parameters | Luts | Battery Lab | GPIO | Utilities |

Port 1

PowerController

These operations allow you to display information about the powercontroller, download new firmware, and perform basic diagnostics. Activity is displayed in the text box to the right and automatically written to the log file.

- PwrController Info
- Cal Factor Check
- LED Test
- COM Test
- TPIN Test
- Download F/W
- VPP Off

Attach battery first

Detach battery first

Clear All

PS8xx

These diagnostics perform pass/fail tests on various functions of the PS8xx. Activity is displayed in the text box to the left and is automatically written to the log file.

- P8 Status
- P8 Version Info
- P8 FDB Pointer
- P8 Reset
- P8 Unlock
- Enter Bootloader Mode
- Exit Bootloader Mode
- SCLSET Cmd
- Trigger GPIO 0

PowerCal Calibration

To calibrate PowerCal, select parameter to calibrate, press 'Begin' and follow instructions. Old and new calibration factors are displayed on the right and automatically written to the log file.

Parameter to Calibrate	Instructions	Old	New
VPack	Press 'Begin' to begin calibration.	CO:	
Actual		CF:	

Begin

Start Over

Close Help

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## Chapter 5. Development Tools

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### 5.1 DEVELOPMENT TOOL SUMMARY

Microchip provides all the necessary hardware and software to enable easy tailoring of charging, battery control algorithm parameters and cell performance models to meet specific application requirements and attain the highest accuracy available anywhere. Table 5-1 summarizes the development tool offering from Microchip to support the PS8XX family. Please refer to the Microchip web site for ordering information and design documentation (including schematics) at [www.microchip.com](http://www.microchip.com).

**TABLE 5-1: MICROCHIP DEVELOPMENT TOOL SUMMARY**

Development Tool	Use
PowerInfo™ 2 hardware with PowerTool™ 800 software (PS051)	Read and write memory and test
PowerCal™ 2 hardware with PowerTool™ 800 software (PS052)	Read and write memory, calibration and test



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