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PS051

PowerInfo™ 2 Configuration Interface

Features

- Hardware platform for configuration, verification and test of Microchip PS70X and PS5XX ICs
- Operates under control of Windows® based PowerMate™ (PS70X) software and PowerTool™ 500 (PS5XX) software through an RS-232 port or USB interface to the PC
- Directly connects to assembled PS70X or PS5XX battery pack
- SMBus communication managed by onboard processor
- Supports loading and verification of battery configuration parameters and 3D cell models in memory
- Pluggable battery connector for convenience and flexibility
- Terminals for attachment to an external load or charger
- Powered through USB port or by 12V DC external supply (included) when connected to RS-232 port
- Production proven EMI/ESD protection
- Overall mechanical dimensions:
  - 2.5 W x 4.0 L (inches)
  - 63.5 W x 101.6 L (millimeters)

Ordering Information

Part No.	Description
PS051	PowerInfo™ 2 Interface Board

Development/Test Software

Part No.	Description
PS070	PowerMate™ Software for use with PS70X
PS050	PowerTool™ 500 Software for use with PS5XX

1.0 PRODUCT OVERVIEW

The PowerInfo 2 board is a simple, easy to use hardware interface that supports configuration, verification and test of Microchip PS70X and PS5XX ICs. It operates under the control of Microchip's development/test software interfaced to a Windows PC.

The PowerInfo 2 board facilitates serial or USB communication between the PC and the SMBus battery interface. If connected to the PC's serial (RS-232) port, the PowerInfo 2 board must be powered through an external 12V DC power supply. If connected through a USB port, no additional power is required.

2.0 GENERAL SETUP

The Microchip PowerInfo 2 interface facilitates communication between a battery containing a Microchip PS5XX or PS70X IC and a PC running Microchip's development/test software. The information that follows will guide you through the setup of the various features available.

2.1 Connections

- P1 – Serial (RS-232)
- J1 – USB
- J2 – 12V DC power supply (used with serial connection only)
- TB1 – Pluggable terminal block for device under test. Looking into the connector on the board, the pins from left to right are:
  - V+ (VP): Battery pack positive
  - C: SMBus clock
  - D: SMBus data
  - T: T-pin
  - V- (VN): Battery pack negative
- TB2 – External charger or load connection

2.2 Jumpers

- ADR – Jumper for board address identification

Address	Jumper Position	
	2-3	1-4
0	X	X
1	X	O
2	O	X
3	O	O

Legend: O = open, X = connect

2.3 USB Setup

The preferred method to connect PowerInfo 2 to the PC is through the USB port. Connect the USB cable from J1 on the PowerInfo 2 board to the USB port on the PC. The board is now powered through the USB connection. Attach your battery to the TB1 connector and launch the Microchip development/test software on the PC.

2.4 RS-232 Setup

Connect the serial cable from P1 on the PowerInfo 2 board to the RS-232 port on the PC. Connect a 12V DC power supply to J2 and plug it into the electrical outlet. The board is now powered. Attach your battery to the TB1 connector and launch the Microchip development/test software on the PC.

2.5 Charger/Load Setup (Optional)

A battery charger or a load can be attached at TB2 to exercise the device under test.

3.0 PS700Driver SETUP

The software driver for PS700 was developed for a PIC® microcontroller and can be installed on the PowerInfo 2 board when using a PS705X module board or a PS7070 evaluation board. This software driver is distributed on a PIC16F876 when a license agreement has been executed.

3.1 Installing PS700Driver

Disconnect the PS051 from power and PC. Remove the PIC microcontroller at location U1. Keep this IC in a safe place as it must be replaced to operate the PS051 with another PowerSmart® product, such as PS501. Install the PS700Driver at location U1. The PowerInfo 2 board can now be used with the PS700 development products.

3.2 Removing PS700Driver

To use the PS051 with another PowerSmart product, such as PS501, the PS700Driver must be removed and the PIC microcontroller originally located at U1 replaced. Disconnect the PS051 from power and PC. Remove the PS700Driver at location U1. Install the original PIC microcontroller and reconnect PC and power connections.

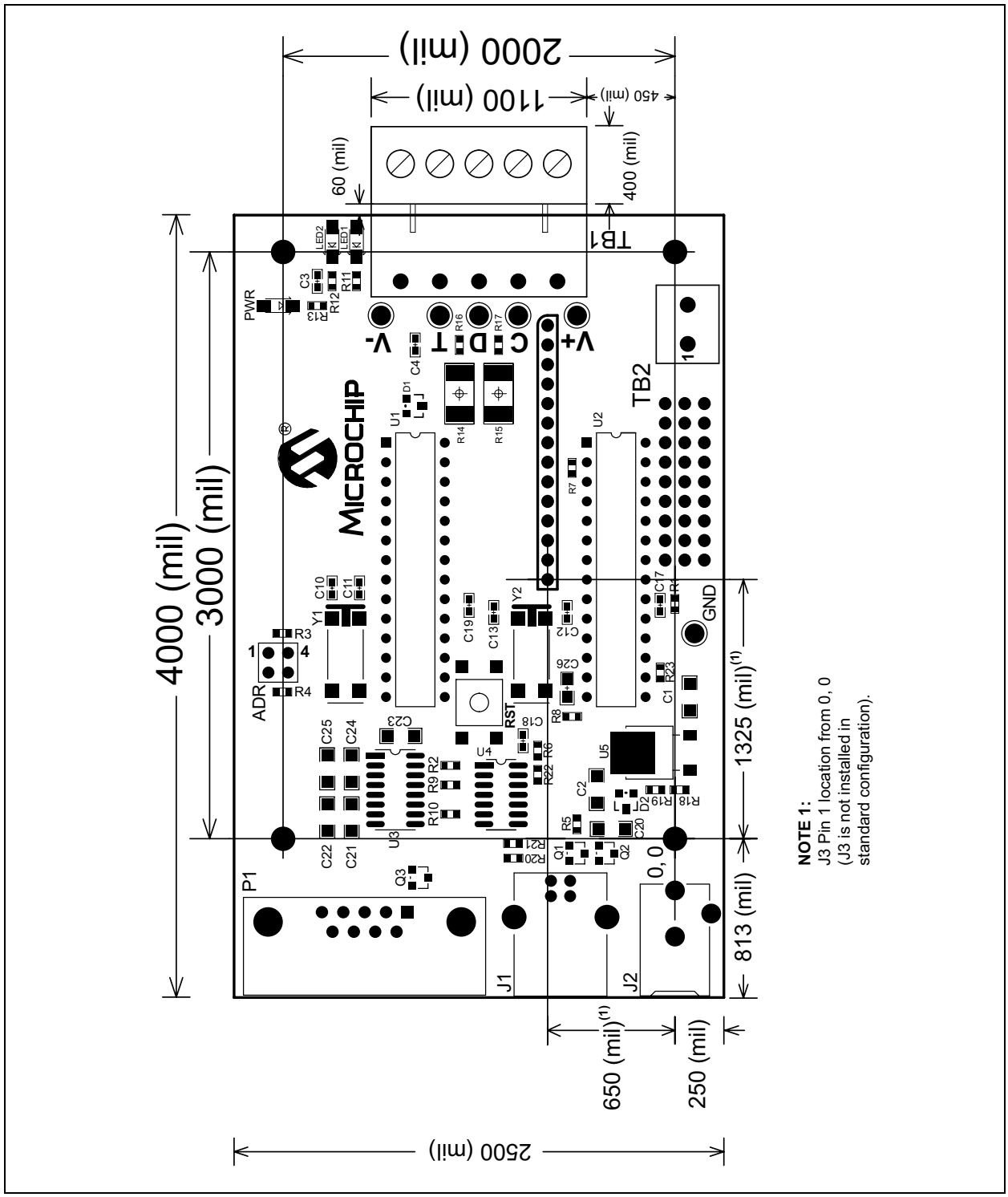
4.0 MECHANICAL DESCRIPTION

PCB schematics and bill of materials are included here for completeness. To download the full size schematic and BOM, please visit the Microchip web site at www.microchip.com.

4.1 Mechanical Dimensions

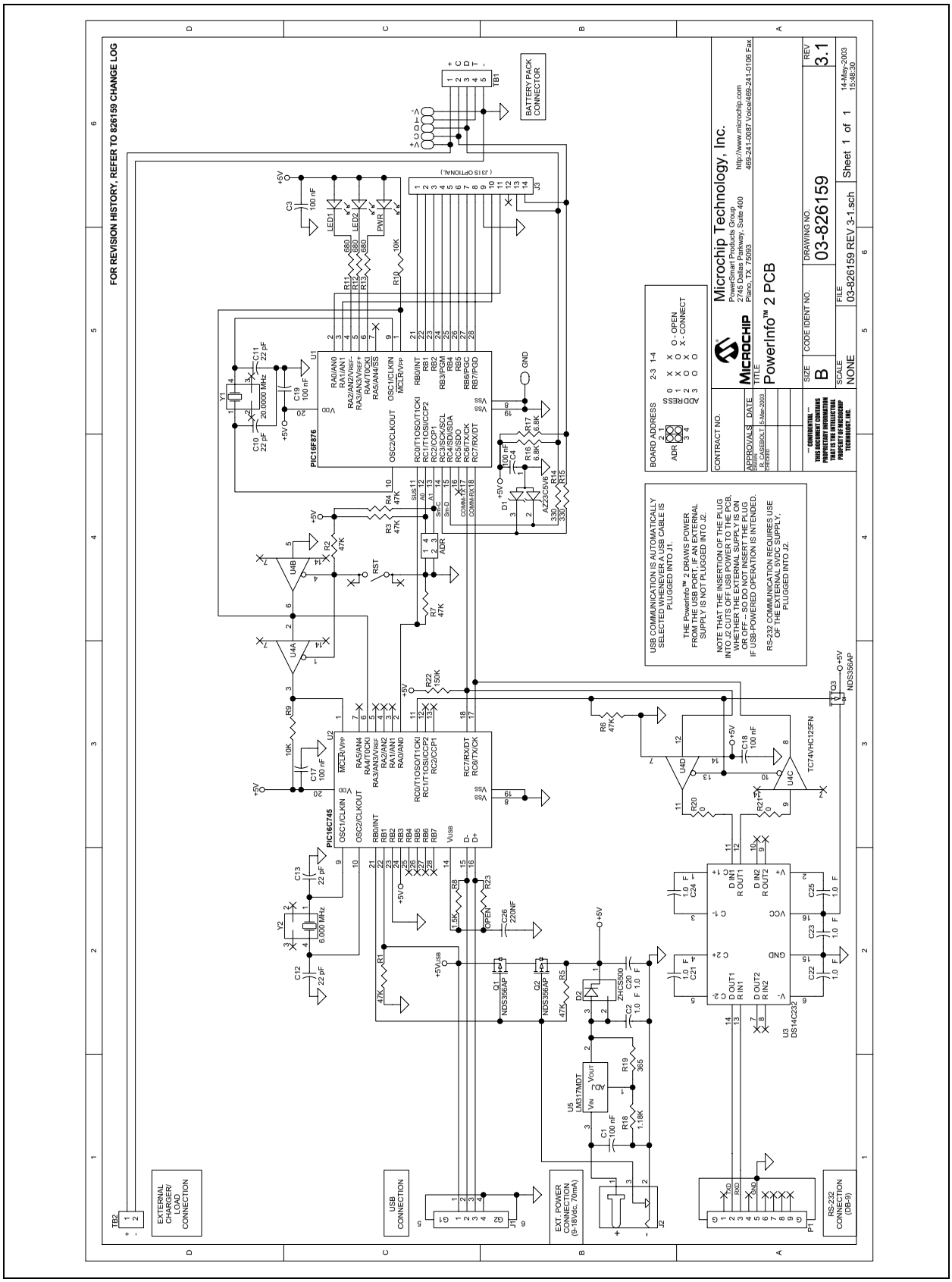
Overall Dimensions: 2.5”W x 4.0”L.

FIGURE 4-1: PS051 DIMENSION DETAILS



4.2 Schematic

FIGURE 4-2: PS051 BOARD SCHEMATIC



4.3 Bill of Materials

TABLE 4-1: PS051 BILL OF MATERIALS

Symbols	Description	Manufacturer	Manufacturer PN	Qty.
	Raw PCB, PowerInfo™ 2	Microchip	04-826159 Rev. 3.1	1
U1	Firmware Specification, PowerInfo™ 2 Main MCU	None	Document	Doc.
U2	Firmware Specification, PowerInfo™/PowerCal™ USB MCU	None	Document	Doc.
C10-C13	Capacitor, Ceramic, 22 pF, 50V, +/-5%, C0G dielectric, 0603	Panasonic	ECJ-1VC1H220J	4
C3-C4, C17-C19	Capacitor, Ceramic, 100 nF, 25V, +80%/-20%, Y5V dielectric, 0603	Panasonic	ECJ-1VF1E104Z	5
C26	Capacitor, Ceramic, 220 nF, 25V, +/-10%, X7R dielectric, 0805	Panasonic	ECJ-2YB1E224K	1
C2, C20-C25	Capacitor, Ceramic, 1.0 µF, 25V, +/-10%, X7R dielectric, 1206	Panasonic	ECJ-3YB1E105K	7
C1	Capacitor, Ceramic, 100 nF, 50V, +/-10%, X7R dielectric, 1206	BC Components	1206B104K500BT	1
LED1-LED2, PWR	LED, clear green, 1206 package	Lumex	SML-LX1206GC-TR	3
D2	Schottky Diode, 40V, 500 mA, SOT-23	Zetex	ZHCS500TA	1
D1	Dual Zener Diode, 5.6V +/- 5%, 300 mW, common-anode, SOT-23	Diodes Inc. General Semi.	AZ23C5V6-7 AZ23-C5V6	1
ADR	Connector, shorting jumper, female, 2-position, 100 mil spacing, mates with 25 mil square pins, 15-microinch gold over nickel	AMP	382811-6	2
TB1	Header, pluggable terminal block, 5.08 mm pitch x 5 positions, 12A/250V, right angle, closed end	Phoenix	1757271	1
U1, U2	IC socket, 28-pin DIP, 300 mil width	Mill-max	110-99-328-41-001	2
J2	Connector, coaxial power, female, 2.0 mm center pin x 6.5 mm sleeve, right angle PCB mount	Cui Stack	PJ-102A	1
TB2	Terminal block, PCB, 5.08 mm pitch x 2 positions, 16A/250V	Phoenix	1729128	1
V-, GND	Test point, 0.125" OD, for 0.062" hole, black	Keystone	5011	2
V+	Test point, 0.125" OD, for 0.062" hole, red	Keystone	5010	1
C, D, T	Test point, 0.125" OD, for 0.062" hole, white	Keystone	5012	3
J1	Connector, USB type B, right angle PCB mount, shielded	Mill-max Molex	897-30-004-90-000000 67068-0000	1
	Bumper, hemispherical, 0.44"D x 0.20"H, transparent plastic	3M	SJ-5303 (CLEAR)	4
ADR	Connector, break-apart PCB header, straight, 2-row x 36-pin, 100 x 100 mil spacing, 235 mil/100 mil/145 mil length, 25 mil square pins, 10-microinch gold	3M	929665-09-36-I	1
TB1	Pluggable terminal block, 5.08 mm pitch x 5 positions, 12A/250V	Phoenix	1757048	1
P1	Connector, DB9 right angle PCB mount, female sockets	Norcomp	182-009-212-531	1
Q1-Q3	MOSFET, P-channel, -30V, -1.1A, 0.2 ohms, SOT-23	Fairchild Semi.	NDS356AP	3
R18	Resistor, film, 0603, 1%, 1.18 kOhms	Panasonic	ERJ-3EKF1181V	1
R19	Resistor, film, 0603, 1%, 365 ohms	Panasonic	ERJ-3EKF3650V	1
R20-R21	Resistor, 0603, zero ohm	Panasonic	ERJ-3GEY0R00V	2
R8	Resistor, film, 0603, 5%, 1.5 kOhms	Panasonic	ERJ-3GEYJ152V	1
R9-R10	Resistor, film, 0603, 5%, 10 kOhms	Panasonic	ERJ-3GEYJ103V	2
R22	Resistor, film, 0603, 5%, 150 kOhms	Panasonic	ERJ-3GEYJ154V	1
R1-R7	Resistor, film, 0603, 5%, 47 kOhms	Panasonic	ERJ-3GEYJ473V	7
R16-R17	Resistor, film, 0603, 5%, 6.8 kOhms	Panasonic	ERJ-3GEYJ682V	2
R11-R13	Resistor, film, 0603, 5%, 680 ohms	Panasonic	ERJ-3GEYJ681V	3
R14-R15	Resistor, film, 2512, 5%, 330 ohms	Panasonic	ERJ-1TYJ331U	2
RST	Switch, SPST momentary tact, surface mount, 6 mm square, 4.3 mm high, 260 G-force	E-Switch	TL3301NF260QG	1
U1	IC, Microcontroller, 20 MHz, with Flash EEPROM, 28-pin/300 mil DIP, 0°C to 70°C	Microchip	PIC16F876-20/SP	1
U2	IC, Microcontroller, 24 MHz, with USB Interface, 28-pin/300 mil DIP, -40°C to +85°C	Microchip	PIC16C745-I/SP	1
U4	IC, quad buffer with tri-state outputs, VHCMOS, SO-14, -40°C to +85°C	Toshiba	TC74VHC125FN	1
U3	IC, RS-232 transceiver, SO-16, 0°C to 70°C	National Semi.	DS14C232CM	1
U5	IC, Linear Voltage Regulator, adjustable 1.2 - 37V output, 500 mA, TO-252 package, 0°C to 125°C	National Semi.	LM317MDT	1
Y1	Crystal, 20.0000 MHz, 18 pF load capacitance, surface mount.	Citizen	CM309S20.000MABJTR	1
Y2	Crystal, 6.0000 MHz, 18 pF load capacitance, surface mount.	Citizen	CM309S6.000MABJTR	1

5.0 DEVELOPMENT TOOL SUMMARY

Microchip provides all the necessary hardware and software to enable easy tailoring of 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 PS5XX and PS70X products. Please refer to the Microchip web site for ordering information and design documentation (including schematics) at www.microchip.com.

5.1 Reference Documents

This data sheet provides an overview of the PS051 Configuration Interface. For further information on other products and development tool operations, please refer to the following documents available for download at www.microchip.com.

TABLE 5-1: MICROCHIP DEVELOPMENT TOOL SUMMARY

Development Tool	Use
PowerInfo™ 2 hardware with Development/Test software (PS051)	Read and write battery registers and memory, pack test
PowerCal™ 2 hardware with Development/Test software (PS052)	Read and write battery registers and memory, pack calibration, pack test

TABLE 5-2: MICROCHIP REFERENCE DOCUMENTS

Document Number	Documents Available
DS21774	PS070 PowerMate™ Development Software Data Sheet
DS21885	PS050 PowerTool™ 500 Development Software User's Guide

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