powerbox
Powering Progress

Operation and installation manual

PB251A series

Battery chargers / DC uninterruptible power supplies



251-1603 ISSUE X1

PB251A series battery chargers / DC UPS

The PB251A series is a family of 13.8Vdc and 27.6Vdc 275W/330W off-line battery chargers / DC uninterruptible power supplies which operate from 220/240Vac mains power. When connected to a lead-acid battery, these units provide uninterrupted power to a DC load in the event of a mains failure.

The PB251A contains a two step current limited float charger, battery charge current limiting, a battery low voltage disconnect, mains/charger and battery alarms, battery present detection and optional float voltage temperature compensation (option –T). It employs high efficiency switching technology, combined with very low output noise which makes it suitable for powering sensitive loads such as radio equipment.

The PB251A is available with a 10BaseT / 100BaseTX Ethernet interface (option –N). This interface supports SNMP V1, XML and an embedded webpage allowing the PB251A to be monitored remotely.

The PB251A is available in chassis mount (CM) and 2RU 19" rack mount (RML and B) variants. A supplementary heatsink (option-H) is available to increase the output power or maximum ambient temperature rating of the chassis mount variant. All models employ natural convection cooling.

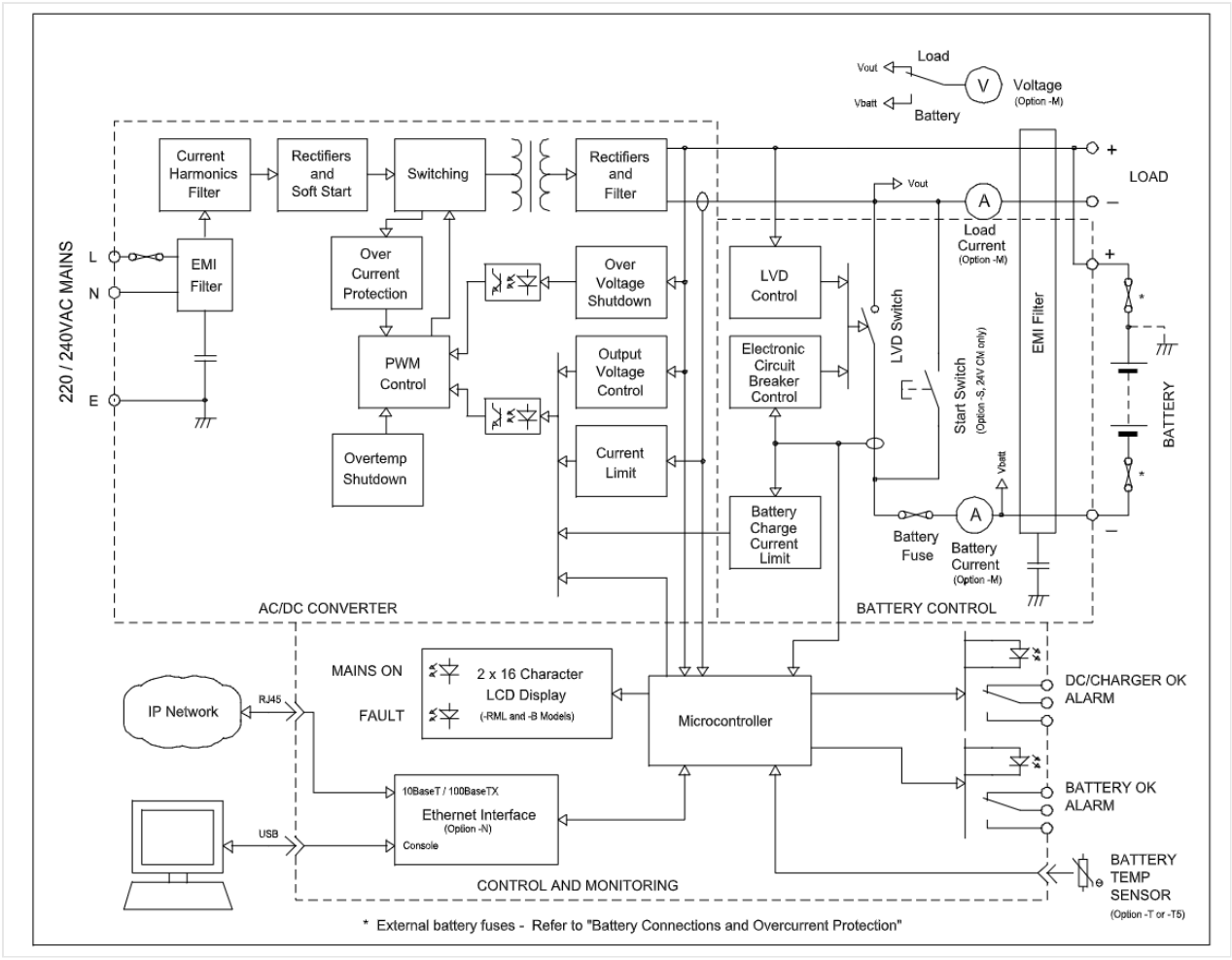
The rack mount (RML and B) variants incorporate an alphanumeric LCD display as standard. These variants are also available with analogue meters (option –M).

Features and operation

Figure 1 is a block diagram of the PB251A detailing its various functions as follows.

- A high efficiency switching AC/DC converter provides 13.8Vdc @ 16A/20A or 27.6Vdc @ 11A/12A directly to the load and to charge the battery. This converter provides a constant output float voltage and a constant current limit. Latching output overvoltage shutdown and autoresetting overtemperature shutdown are also included.
- The battery is connected across the output of the AC/DC converter via an electronic low voltage disconnect switch (LVD switch) in the negative lead. As a result, the output and battery voltage are essentially equal and the battery is available to supply the load the instant when mains power fails.
- The PB251A operates as a two step charger. If the battery is discharged and mains voltage is applied, the PB251A provides constant current to the battery. Once the battery voltage has risen to the float voltage, the AC/DC converter operates as a constant voltage charger.
- Battery charging current is controlled by its own constant current limiter. This circuit reduces the AC/DC converter output to control the charging current into the battery. It is factory adjustable between 10% and 100% of the rated output of the AC/DC converter. Consequently, the maximum battery charging current can be set to suit the installed battery capacity (typically 0.1C), and battery damage due to excessive charging current is prevented. This current limiter has no effect on output current to the load. The unit is protected against battery reverse polarity by an internal fuse.
- To protect the battery against overdischarge, the electronic LVD switch disconnects the negative load terminal from the negative battery terminal when the battery is fully discharged. This switch is automatically reset on reapplication of mains power. For this switch to operate correctly, the battery negative and load negative must not be connected together outside of the PB251A.
- To reset the LVD switch without mains voltage, momentarily connect battery negative and load negative together externally to the PB251A. This will raise the output voltage above the LVD threshold causing the LVD switch to close. After this connection is removed, the load will operate from the battery until the battery becomes fully discharged and the LVD switch reopens.
- A "start" switch is available on 24V chassis mount (CM) models only (Option –S). This option adds a built-in push button switch which momentarily connects battery negative to load negative bypassing the electronic LVD switch causing it to close.
- The LVD switch also operates as a self-resetting electronic circuit breaker for the battery. This protects the load wiring against overcurrents or accidental short circuits. The circuit breaker trips in less than 2mS for short duration current surges of greater than typically 350% of the AC/DC converter output current rating and in less than 300ms for overcurrents greater than typically 170% of the AC/DC converter output current rating.

FIGURE 1: PB251A BLOCK DIAGRAM



- Advanced monitoring and control functions are provided by an embedded microcontroller.
- The microcontroller provides two alarms with separate voltage free changeover contacts. The alarm terminal markings show the contact state in the normal (no alarm) condition. An LED is provided for each of these alarms on the chassis mount models (CM) and on the rack mount models with analogue meters (Option –M). These green LEDs are ON in the normal (no alarm) condition.
  - DC/CHARGER OK indicates an alarm (LED off) in the following conditions.
    i. Loss of mains power, or
    ii. Failure of the off-line AC/DC converter and battery charger.
  - BATTERY OK indicates an alarm (LED off) in the following conditions.
    i. The battery voltage is less than 1.8V/cell, or
    ii. No battery is connected to the PB251A, or
    iii. The battery wiring is faulty, or
    iv. A battery fuse has failed.
- Once per hour, the embedded microcontroller performs a battery present test. It momentarily reduces the float voltage setpoint causing the load to be supplied from the battery. If no battery is present, the microcontroller asserts a battery disconnected alarm. This causes the BATTERY OK alarm to change to the alarm state. This alarm will also be raised in the event one or more of the battery fuses has failed, or the battery wiring is faulty. This alarm is reset when the battery connection is restored. On initial application of ac mains to the system, a battery present test is not performed until the battery voltage rises to 2.3V/cell.
- Temperature compensation of the battery float voltage is available with the optional battery temperature sensor (Option –T or –T5). The battery float voltage is set to 2.30V/cell at 25°C with compensation of -3.3mV/°C/cell at other temperatures.

- A 2 line, 16 character LCD display is provided on the RML and B rack mount models. This display shows the following.
  i. Load and battery voltage,
  ii. Load current
  iii. Battery current. Positive battery current indicates that the battery is charging. Negative battery current indicates that the battery is discharging.
  iv. AC Mains status: OK / FAIL
  v. Battery status: OK / Charging / DISCHARGING / LOW VOLTS / DISCONNECTED /Test.
  vi. Load status: ON Mains / ON BATTERY.
- Two status LEDs are provided on the RML and B rack mount models. MAINS ON (Green) and FAULT (Red). FAULT is asserted under any of the following conditions indicating an alarm: MAINS FAIL / LOAD ON BATTERY/ BATTERY DISCHARGING / BATTERY LOW VOLTS / BATTERY DISCONNECTED.
- Analogue meters (instead of the LCD display) are optional on the RML and B rack mount models (Option –M). Three front panel meters (load voltage or battery voltage / switch selected, load current and battery current) and two alarm LED's (DC OK and BATTERY OK) are provided with this option.
- A 10BaseT / 100BaseTX Ethernet interface for remote monitoring via the Internet is available on all models (Option –N). See "Ethernet Interface" for configuration and operating details of this interface.

Model summary and ratings

PB251A Ordering Information

PB251A	-12	CM	- ☐
1	2	3	4

1 Series name

2 Output Voltage
12: 13.8Vdc
24: 27.6Vdc

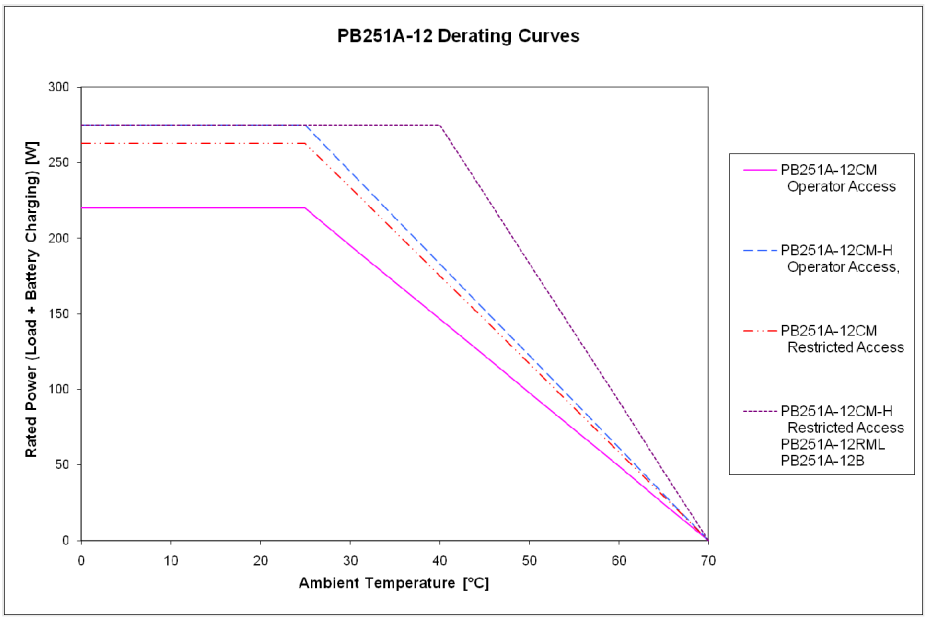
3. Enclosure
CM: chassis mount
RML: rack mount
B: rack mount with radio connectors

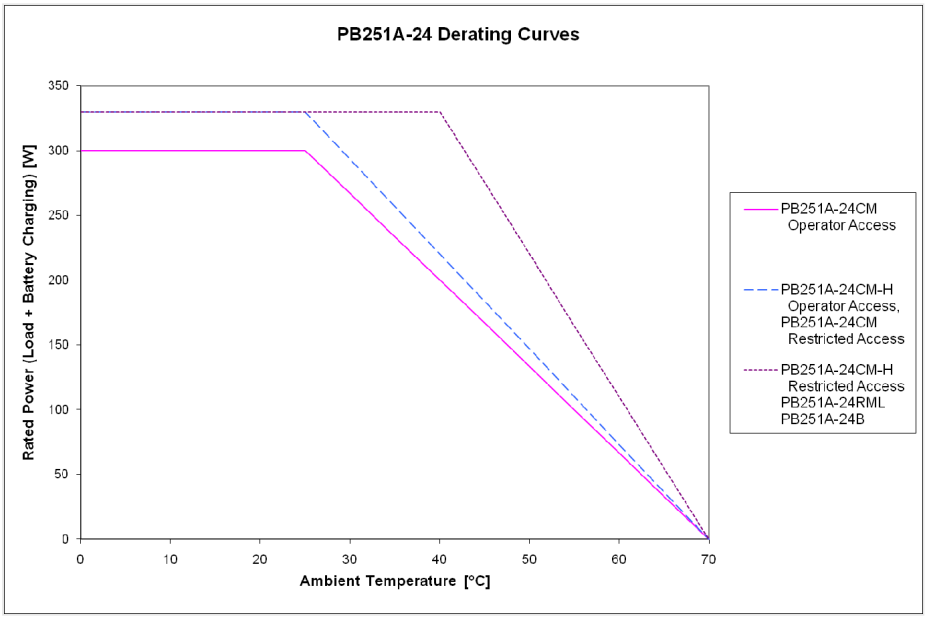
4. Options (Multiple options can be specified)
Options must be specified at time of order.

-H: Supplementary heatsink (-CM models only)
-T: Battery temperature sensor with 2 meter cable
-T5: Battery temperature sensor with 5 meter cable
-S: "Start" switch (24V –CM models only)
-CC: Conformal coating
-M: Analogue meters (-RML and –B models only)
-BCT: Battery capacity test (Contact Powerbox)
-N: Ethernet interface
-##: Non standard battery charging current limit, if different from default. (## = Current limit in Amperes)

MODEL	PB251A-12CM	PB251A-24CM	PB251A-12CM-H	PB251A-24CM-H	PB251A-12RML/ PB251A-12B	PB251A-24RML/ PB251A-24B
Total Load+Charge Power	220W	300W	275W	330W	275W	330W
DC Output	13.8V 16A	27.6V 11A	13.8V 20A	27.6V 12A	13.8V 20A	27.6V 12A
Default Battery Charge Current Limit	2A	2A	4A	2A	4A/20A	2A/12A
Size	264 x 172 x 67mm (L x W x H)		264 x 186 x 67mm (L x W x H)		19" x 2RU x 233mm 483 x 88.1 x 250mm (W x H x D)	
Weight	1.9kg		2.1kg		5.5kg	

Derating Curves





Sizing Example

The total output power (load plus battery charging) must be less than or equal to the rated power (load plus battery charging) at the required maximum ambient temperature.

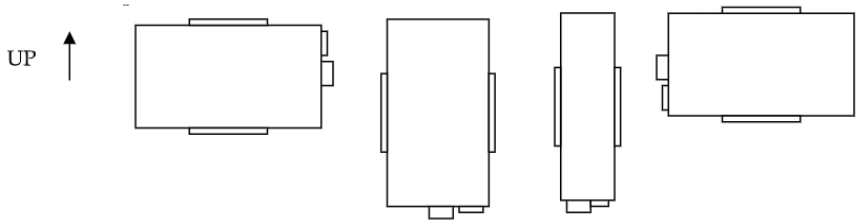
For example: An installation must supply a 13.8V load of 10A and charge a 20Ah backup battery in a maximum ambient temperature of 40°C with free access to the PB251A by any user. The battery requires a maximum charging current of 2A (0.1C). The sum of the load current and maximum battery charging current is 10A +2A = 12A. Multiplying by the float voltage gives a maximum output power of 13.8V x 12A = 166W. Referring to the derating curve, model PB251A-12CM has a maximum rated output power of 147W at 40°C so it is not suitable for this application. However, model PB251A-12CM-H (with the supplementary heatsink) has a maximum rated output power of 187W at 40°C so it is suitable. The default charge current limit on PB251A-12CM-H is 2A, so battery charging current does not need to be specified.

Installation

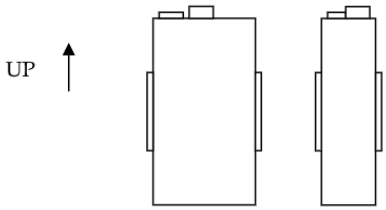
Mounting

CM Models:

Chassis mount models are designed to be mounted on a flat horizontal or vertical surface. Two mounting brackets with screws are provided to allow the unit to be mounted by either the bottom or one side. The unit can be mounted horizontally or in the following vertical orientations without additional protection



If a chassis mount model is to be mounted in any of the following orientations, a non-combustible plate must be mounted below the PB251A or the PB251A must be installed inside a separate enclosure complying with AS/NZS60950, Cl. 4.6.2.



Ensure that airflow around the unit is not impeded.

RML and B Models:

Rack mount models occupy 2RU in a 19” rack and are attached by four M6 screws via the front panel. Other equipment can be installed above and below the PB251A provided that the ambient air temperature around the unit complies with the derating curves. Areas to the left and right sides and to the rear of the PB251A must be open to provide circulation of cooling air.

Terminals

Refer to mechanical outline drawings for terminal sizes and locations.

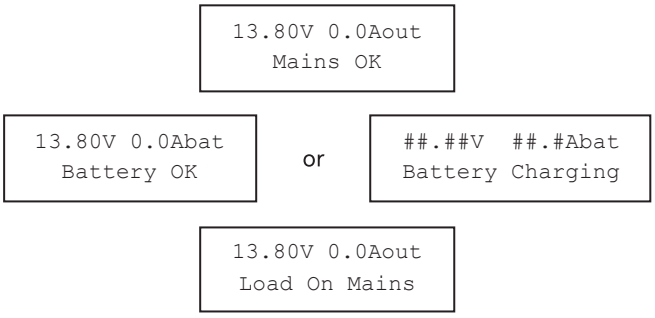
Battery Connections and Overcurrent Protection

The PB251A family is intended be used with valve regulated lead acid batteries of capacities typically between 20Ah and 40Ah. Larger batteries can be accommodated; however, the battery charging current limit may need to be adjusted at Powerbox’s factory.

It is recommended that batteries be installed according to AS2676.2:1992. In particular, one or both of the battery leads must be protected against overcurrent by a fuse or circuit breaker located close to the battery. Refer to figure 1. If the positive terminal of the battery is earthed, then a fuse or circuit breaker is only required in the negative terminal. If neither terminal of the battery is earthed, then a fuse or circuit breaker is required in both terminals. It is recommended that the negative terminal of the battery not be earthed. These protective devices must be sized to interrupt the short circuit current of the battery.

Commissioning

1. Ensure that the external battery fuse in the negative battery lead is not installed and that all loads are either disconnected or turned off.
2. Apply 220/240Vac mains voltage to the input.
3. Wait for approximately one minute. This allows the PB251A to complete its first battery present test after which it will raise a BATTERY DISCONNECTED alarm. Measure the voltage at the output terminals of the unit. This voltage should be either 13.8Vdc or 27.6Vdc. On rack mount versions (RML and B), this can be measured using the front panel LCD or analogue voltmeter with the switch set to “LOAD”.
4. Measure the voltage drop across the fuse holder in the negative battery lead. This voltage should be less than ±2.5Vdc for 13.8V models and less than ±5Vdc for 27.6V models. If the voltage is above this limit, the battery polarity is reversed and should be corrected before proceeding.
5. Install the fuse in the battery negative lead. The BATTERY DISCONNECTED alarm should clear within approximately 10 seconds.
6. Measure the voltage across the battery. This should equal 2.30V/cell (13.8V or 27.6V) or it should gradually rise indicating that the battery is charging. On rack mount models, the LCD should display the following or similar screens appropriate to the model and the load / battery conditions.



The battery current (`##.#Abat`) should be positive current into the battery.

7. On chassis mount models (CM) and rack mount units with analogue meters, confirm that both LEDs on the unit are ON indicating no alarms.
8. On rack mount models with the LCD display, the MAINS ON LED should be ON and the FAULT LED should be OFF.
9. Turn on loads or connect loads to the unit.

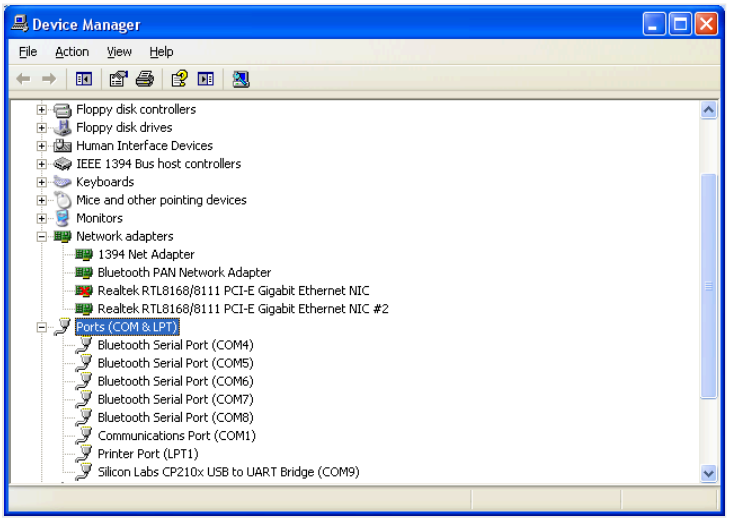
Ethernet interface (Option –N)

Configuration

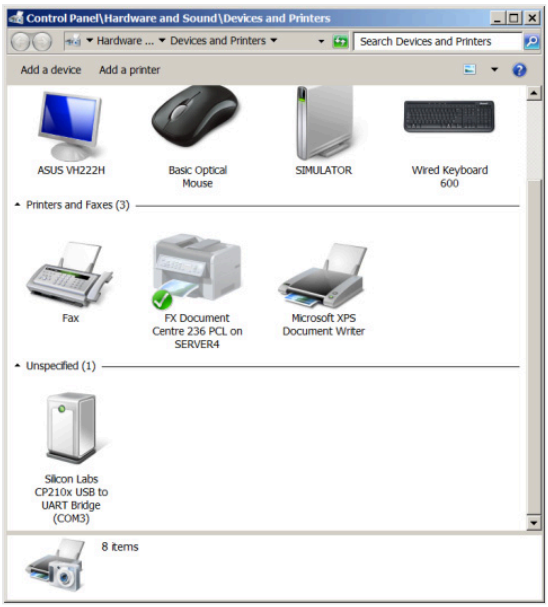
Setup of the Ethernet interface requires the following:

- A PC running Windows XP, Vista or Windows 7 with one free USB port
- A terminal emulator program such as Hyperterminal.
- The driver disk supplied with the unit (CD or USB thumbdrive).

1. DO NOT connect the PB251A network port to an IP internet until it is configured.
2. DO NOT connect the PB251A USB port to the PC at this time.
3. Before configuring the Ethernet interface, you will need to define the following parameters:
   - IP address for the PB251A: The PB251A supports static IP addresses only.
   - IP address for the Default Gateway
   - Subnet mask if different from 255.255.255.0
   - SNMP Target Address: If using SNMP, this is the IP address of the SNMP manager which will be receiving SNMP traps generated by the PB251A.
   - SNMP Target Port: This is the port number for the trap receiver on the SNMP manager. It is usually set to 162.
   - SNMP Community Name: This is the community name which you wish to use on the PB251A for SNMP read and write operations being performed by the SNMP manager. This can be an alphanumeric string up to 20 characters long.
4. Install the Silicon Labs CP2102 USB to UART Bridge Virtual COM Port Driver on the PC. This driver can be found in the directory <X: \CP2102 USB to UART Bridge VCP Driver\> on the PB251A USB Flash Drive supplied with the PB251A. Double click on the file named “CP210x_VCP_Win_XP_S2K3_Vista_7.exe” to install the driver.
5. Connect the USB “CONSOLE” port on the PB251A to a spare USB port on the PC. The PC should recognize the CP2102 USB to UART Bridge and set up the driver automatically. This process opens a new COM port on the PC for communication with the PB251A.
6. Note the COM port number for the PB251A by reviewing the following:
   - Windows XP: <Start ><Control Panel><System><Hardware><Device Manager><Ports (COM & LPT)><+>

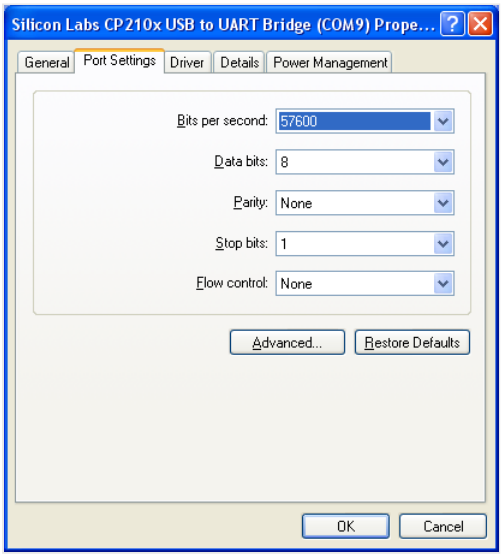


- Windows 7: <Start><Devices and Printers>



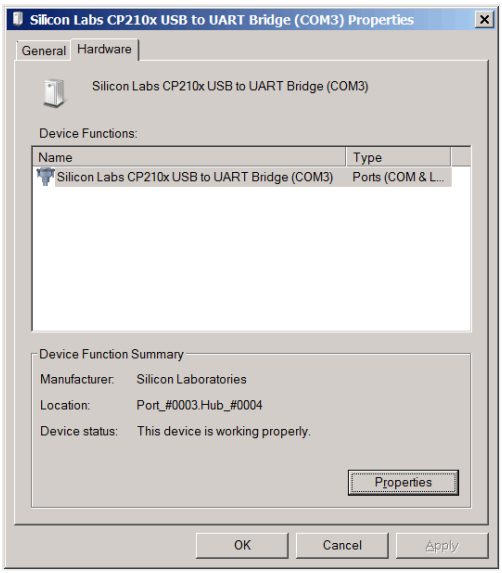
7. Configure this COM port to the following settings:
   - Baud rate: 57,600
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: None

   - Windows XP: Under <Ports (COM & LPT)> right mouse click on “Silicon Labs CP210x USB to UART Bridge (COMX)” and select <Properties>. Enter the above settings on the “Port Settings” tab.

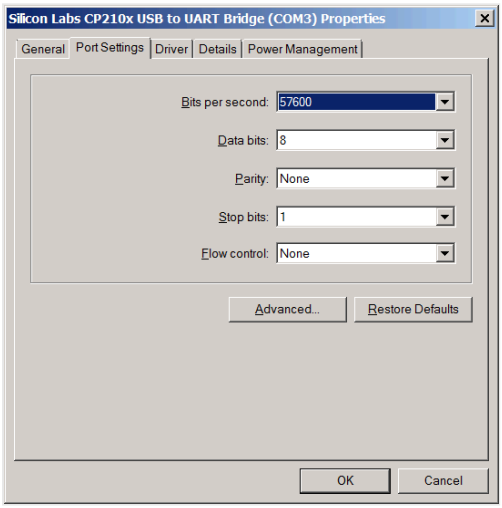


Click OK

- Windows 7: On <Devices and Printers> right mouse click on “Silicon Labs CP210x USB to UART Bridge (COMX)” and select <Properties>. Click on the “Hardware” tab.



Click “Properties”. Enter the above settings on the “Port Settings” tab.



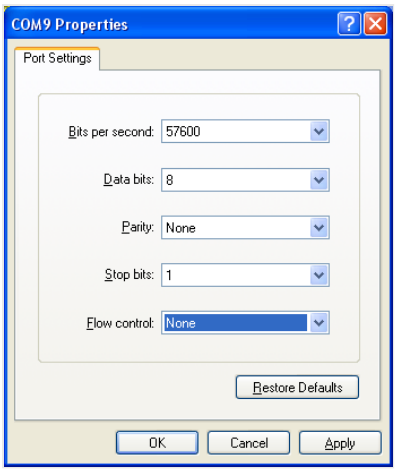
Click OK.

8. Start the terminal emulator program and set up a connection to the CP2102 USB to UART Bridge COM port.



Click OK

- Configure the COM port settings in Hyperterminal to the settings in 7 above. Note, Hyperterminal does not automatically use the COM port setting which you have set above.



Click “OK”.

- Save this Hyperterminal connection so that you can re-open it in the future without having to reload the port settings.

9. Push the reset switch on the PB251A network interface. This switch is accessed through the cutout next the USB “CONSOLE” port on the PB251A. Put a small flat screwdriver into this cutout and push to the side.

10. After approximately five seconds, Hyperterminal should show a screen similar to the following.

```
.....Unable to establish Ethernet Connection

Initializing network stack...

IP Address                    192.168.3.3
Default Gateway               192.168.3.254
DHCP                          Disabled
Subnet Mask                   255.255.255.0
MAC Address                   4C:32:D9:0 :4 :0
SNMP Target Address           192.168.1.124
SNMP Target Port              162
SNMP Community Name           test
Model Number                  PB251A-12RML-N
Firmware Version              317-3001 V1.03 200911

HTTPD ready
Press 1 to change IP configuration.     9
```

11. Press “1” within ten seconds to access the IP configuration program.

- Hyperterminal should display the following screen:

```
                Change IP Configuration

Enter new values in dotted decimal ("a.b.c.d") notation.
Press <enter> to retain existing value or to accept new value.
Press <esc> anytime to exit without changing.

Existing IP Address:          192.168.3.3
Enter new IP Address:
```

- Enter the IP address for the PB251A followed by <enter>.

```
Enter new IP Address:          192.168.1.171<enter>   (for example)

Existing Default Gateway:      192.168.3.254
Enter new Default Gateway:
```

- Enter the IP Address of the Default Gateway for the PB251A followed by <enter>.

```
Enter new Default Gateway:     192.168.1.240<enter>   (for example)

Existing Subnet Mask:          255.255.255.0
Enter new Subnet Mask:
```

- Enter the new Subnet Mask if different than 255.255.255.0 followed by <enter>. Otherwise press <enter>.

```
Enter new Subnet Mask:         <enter>   (for example)
Enter new Subnet Mask:         255.255.255.0

Existing SNMP Trap Target Address:     192.168.1.124
Enter new SNMP Trap Target Address:
```

- Enter the new SNMP Trap Target Address followed by <enter>.

```
Enter new SNMP Trap Target Address:    192.168.1.208<enter>   (for example)

Existing SNMP Trap Target Port:        162
Enter new SNMP Trap Target Port (162):
```

- Enter the new SNMP Trap Target Port if different than 162 followed by <enter>. Otherwise press<enter>.

```
Enter new SNMP Trap Target Port (162):   <enter>   (for example)
Enter new SNMP Trap Target Port (162):   162

Existing SNMP Community Name: test
Enter new SNMP Community Name (Max 20 char):
```

- Enter the SNMP Community Name for the PB251A followed by <enter>.

```
Enter new SNMP Community Name (Max 20 char):  abcde<enter>   (for example)

Do you wish to save changes (Y/N)?:
```

- Type Y <enter>.
- Hyperterminal will display the following or similar screen with the new configuration.

```
Saving changes.
Save successful.
Rebooting network interfaceî.....Unable to establish Ethernet Connection

Initializing network stack...

IP Address                     192.168.1.171
Default Gateway                192.168.1.240
DHCP                           Disabled
Subnet Mask                    255.255.255.0
MAC Address                    4C:32:D9:0 :4 :0
SNMP Target Address            192.168.1.208
SNMP Target Port               162
SNMP Community Name            abcde
Model Number                   PB251A-12RML-N
Firmware Version               317-3001 V1.03 200911

HTTPD ready
Press 1 to change IP configuration.     0
IP configuration change program terminated.
```

13. Plug the an Ethernet cable into the network port on the PB251A. Depending on the network, Hyperterminal should display a message similar to the following.

```
100 Mbps Full-Duplex
```

14. To confirm that the PB251A Ethernet interface is working properly, perform a “ping” on the PB251A’s IP address using the ping utility at the Windows command prompt or equivalent.

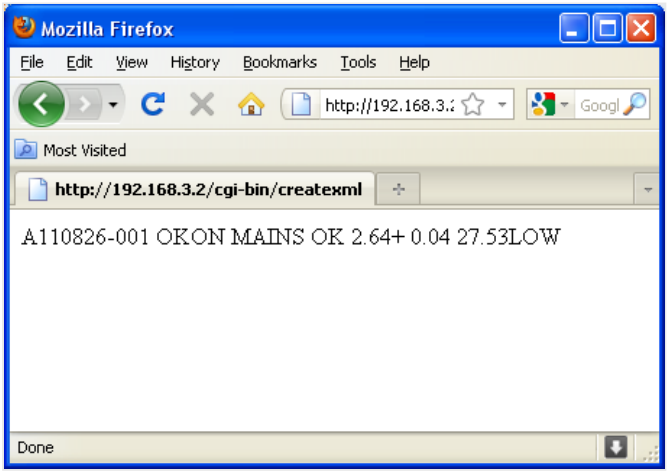
15. The PB251A Ethernet interface is now ready to be used. Hang up the Hyperterminal session. Close Hyperterminal and unplug the USB connection from the PB251A. Note, if the USB cable is unplugged during any of the above configuration, you will need to close the Hyperterminal program and start from item 5 above.

Embedded Webpage

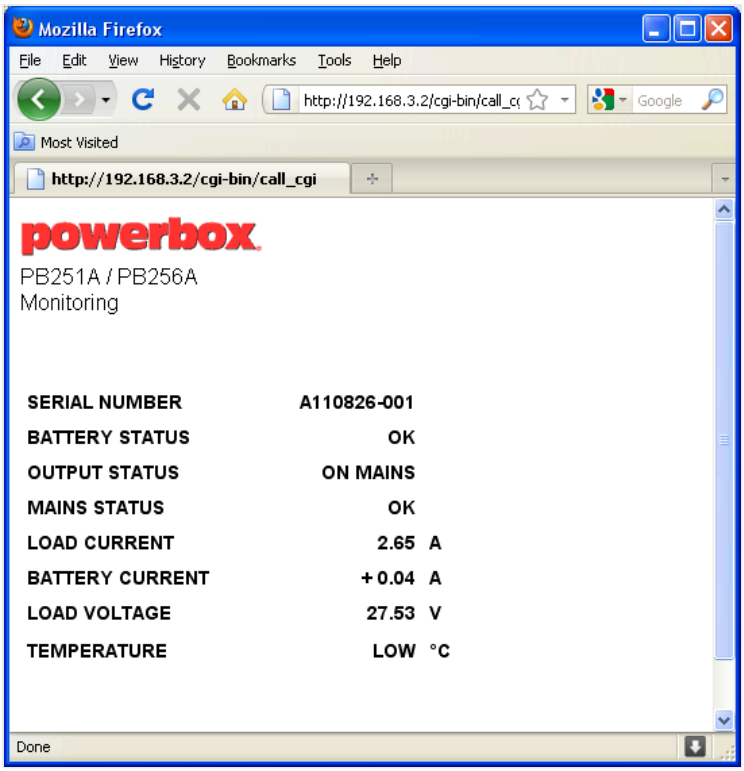
To access the embedded html webpage for the PB251A, enter the IP address for the PB251A into the address bar on your web browser. This should display the following webpage.



Clicking on XML displays the current parameters for the PB251 in XML format as follows.



Clicking on Webpage displays the current status of the PB251A. This webpage regenerates automatically approximately once every 30 seconds.



Note: The temperature parameter “LOW” indicates that no battery temperature probe is attached to the PB251A.

SNMP

The PB251A Ethernet interface supports SNMP V1 and operates as an SNMP agent. It supports the following MIB's

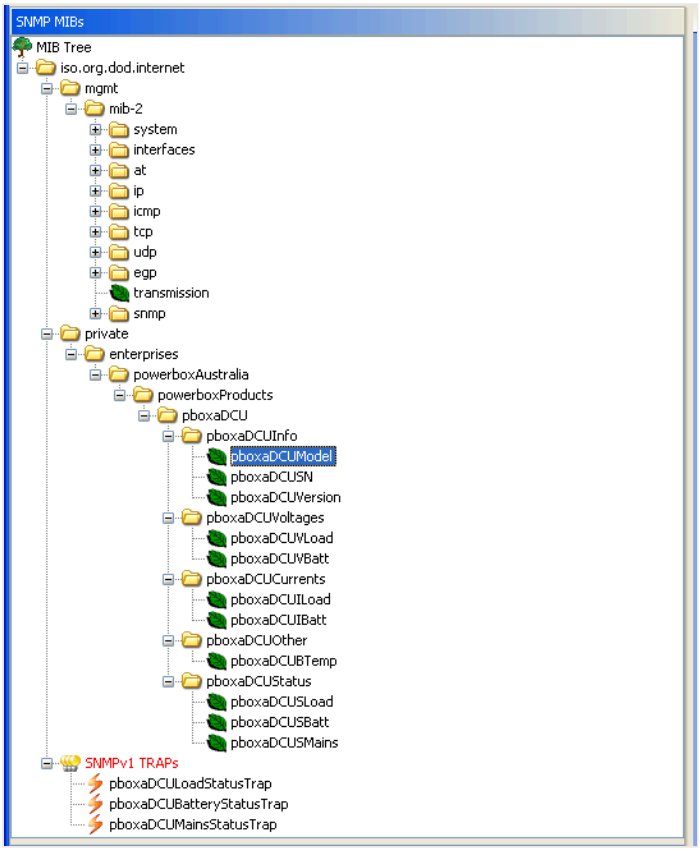
- MIB-II per RFC 1213
- POWERBOX-AUS-MIB: Top-level structure of the Powerbox Australia MIB.
- POWERBOX-AUS-DCU-MIB: DC Uninterruptible Power Supply (DCU) Group object definitions.

The Powerbox MIB's require the following additional MIB's to be loaded in the SNMP manager.

- RFC1155-SMI
- RFC-1212
- RFC1213-MIB
- RFC-1215

Copies of these MIB's are available in <X: \MIBs \> on the PB251A USB Flash Drive supplied with the PB251A.

The following is a graphical representation of the MIB tree structure supported by the PB251A Ethernet interface.



MIB Leaf Objects and OID's

The SNMP leaf objects supported by the PB251A are as follows. All leaf objects are read only.

Object Identifier	OID	Description	Syntax
pboxaDCUModel	.1.3.6.1.4.1.31933.1.1.1.1	Model number	Display String
pboxaDCUSN	.1.3.6.1.4.1.31933.1.1.1.2	Serial number	Display String
pboxaDCUVersion	.1.3.6.1.4.1.31933.1.1.1.3	Software version	Display String
pboxaDCUVLoad	.1.3.6.1.4.1.31933.1.1.2.1	Load voltage in millivolts	Integer
pboxaDCUVBatt	.1.3.6.1.4.1.31933.1.1.2.2	Battery voltage in millivolts	Integer
pboxaDCUILoad	.1.3.6.1.4.1.31933.1.1.3.1	Load current in milliamperes	Integer
pboxaDCUIBatt	.1.3.6.1.4.1.31933.1.1.3.2	Battery current in milliamperes	Integer
pboxaDCUBTemp	.1.3.6.1.4.1.31933.1.1.4.1	Battery temperature in °C	Integer
pboxaDCUSLoad	.1.3.6.1.4.1.31933.1.1.5.1	Load status	Integer
pboxaDCUSBatt	.1.3.6.1.4.1.31933.1.1.5.2	Battery status	Integer
pboxaDCUSMains	.1.3.6.1.4.1.31933.1.1.5.3	AC mains status	Integer

SNMP Traps

The following table summarizes the SNMP traps generated by the PB251A.

pboxaDCULoadStatusTrap	This trap is generated once whenever there is a change in pboxaDCUSLoad. It is repeated every approximately 30 seconds if pboxaDCUSLoad is in an alarm condition.
pboxaDCUBatteryStatusTrap	This trap is generated once whenever there is a change in pboxaDCUSBatt. It is repeated every approximately 30 seconds if pboxaDCUSBatt is in an alarm condition.
pboxaDCUMainsStatusTrap	This trap is generated once whenever there is a change in pboxaDCUSMains. It is repeated every approximately 30 seconds if pboxaDCUSMains is in an alarm condition.

POWERBOX-AUS-MIB

The following is a copy of POWERBOX-AUS-MIB detailing the Powerbox Australia enterprise and group objects.

```
POWERBOX-AUS-MIB DEFINITIONS ::= BEGIN
--
-- Top-level structure of the Powerbox Australia MIB
--
-- Powerbox Australia Pty. Ltd.
-- Contact:          Peter R. Keeler
--                   P.O. Box 128
--                   Mount Kuring-Gai NSW 2080
--                   Australia
--         p:        +61-2-9457-2200
--         email:    design@powerbox.com.au
--
-- Version:          1.00
-- Description:      Origin
-- Author:           Peter R. Keeler
-- Date:             21/06/11
--

IMPORTS
        enterprises
                FROM RFC1155-SMI;

-- Powerbox Australia enterprise
powerboxAustralia   OBJECT IDENTIFIER ::= { enterprises 31933 }

-- Groups in powerbox-australia enterprise
powerboxProducts         OBJECT IDENTIFIER ::= { powerboxAustralia 1 }

-- powerboxProducts group management objects
pboxaDCU                      OBJECT IDENTIFIER ::= { powerboxProducts 1 }

END
```

POWERBOX-AUS-DCU-MIB

The following is a copy of POWERBOX-AUS-DCU-MIB detailing group and leaf objects and SNMP traps generated by the PB251A Ethernet Interface.

```
POWERBOX-AUS-DCU-MIB DEFINITIONS ::= BEGIN

--
-- DC Uninterruptible Power Supply (DCU) Group object definitions
--
-- Powerbox Australia Pty. Ltd.
-- Contact:          Peter R. Keeler
--                   P.O. Box 128
--                   Mount Kuring-Gai NSW 2080
--                   Australia
--         p:        +61-2-9457-2200
--         email:    design@powerbox.com.au
--
-- Version:          1.01
-- Description:      Syntax corrections. Trap definitions added.
-- Author:           Peter R. Keeler
-- Date:             17/08/11
--

IMPORTS
        OBJECT-TYPE
                FROM RFC-1212
        DisplayString
                FROM RFC1213-MIB
        TRAP-TYPE
                FROM RFC-1215
        pboxaDCU
                FROM POWERBOX-AUS-MIB;

-- pboxaDCU group management objects

pboxaDCUInfo      OBJECT IDENTIFIER ::= { pboxaDCU 1 }
pboxaDCUVoltages  OBJECT IDENTIFIER ::= { pboxaDCU 2 }
pboxaDCUCurrents  OBJECT IDENTIFIER ::= { pboxaDCU 3 }
pboxaDCUOther     OBJECT IDENTIFIER ::= { pboxaDCU 4 }
pboxaDCUStatus    OBJECT IDENTIFIER ::= { pboxaDCU 5 }

-- pboxaDCUInfo group objects

pboxaDCUModel OBJECT-TYPE
        SYNTAX DisplayString (SIZE (0..255))
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "DC UPS Model number"
        ::= { pboxaDCUInfo 1 }

pboxaDCUSN OBJECT-TYPE
        SYNTAX DisplayString (SIZE (0..255))
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "DC UPS Serial number"
        ::= { pboxaDCUInfo 2 }

pboxaDCUVersion OBJECT-TYPE
        SYNTAX DisplayString (SIZE (0..255))
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "DC UPS Software version"
        ::= { pboxaDCUInfo 3 }

-- pboxaDCUVoltages group objects

pboxaDCUVLoad OBJECT-TYPE
        SYNTAX INTEGER
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "Load voltage in millivolts"
        ::= { pboxaDCUVoltages 1 }
```

```
pboxaDCUVBatt OBJECT-TYPE
        SYNTAX INTEGER
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "Battery voltage in millivolts"
        ::= { pboxaDCUVoltages 2 }

-- pboxaDCUCurrents group objects

pboxaDCUILoad OBJECT-TYPE
        SYNTAX INTEGER
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "Load current in milliamperes."
        ::= { pboxaDCUCurrents 1 }

pboxaDCUIBatt OBJECT-TYPE
        SYNTAX INTEGER
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "Battery current in milliamperes. A positive value indicates
                charging current flowing into the battery. A negative value
                indicates that the battery is discharging at the measured
                current."
        ::= { pboxaDCUCurrents 2 }

-- pboxaDCUOther group objects

pboxaDCUBTemp OBJECT-TYPE
        SYNTAX INTEGER
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "Battery temperature in degrees C. This is used for battery
                float voltage temperature compensation. If no temperature
                sensor is installed, this value is set to -20 and the
                temperature compensation is turned off"
        ::= { pboxaDCUOther 1 }

-- pboxaDCUStatus group objects

pboxaDCUSLoad OBJECT-TYPE
        SYNTAX INTEGER {
                on-mains(1),
                on-battery(2)
        }
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "Load status.
                This object indicates whether the load is being supplied from
                the AC mains power source (normal operation), or from the
                backup battery (AC mains or battery charger failure)."
        ::= { pboxaDCUStatus 1 }

pboxaDCUSBatt OBJECT-TYPE
        SYNTAX INTEGER {
                battery-ok(1),
                battery-low-voltage(2),
                battery-disconnected(3),
                battery-discharging(4),
                battery-charging(5),
                battery-test(6)
        }
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "Battery status.
                Battery Status = battery-low-voltage is given for battery
                voltage less than 1.80 V/cell.
                Battery Status = battery-disconnected indicates that no
                battery is connected to the DC UPS. This indicates if there
                is a failed battery fuse or an open circuit in the battery
                wiring. If all battery wiring is good, this indicates that
                the battery is defective and is not able to support the
```

```
                load for even a few seconds.
                Battery Status = battery-test is given when the DCU is
                checking if a battery is connected to it.
                Battery Status = battery-charging is given then the battery
                charging current is greater than 250mA (12V battery) or 100mA
                (24V battery).
                Battery Status = battery-OK is given when the battery current
                is in the range -250mA to 250mA (12V battery) or -100mA to
                100mA (24V battery)."
        ::= { pboxaDCUStatus 2 }

pboxaDCUSMains OBJECT-TYPE
        SYNTAX INTEGER {
                mains-ok(1),
                mains-fail(2)
        }
        ACCESS read-only
        STATUS optional
        DESCRIPTION
                "AC Mains status."
        ::= { pboxaDCUStatus 3 }

-- Trap definitions

pboxaDCULoadStatusTrap TRAP-TYPE
        ENTERPRISE pboxaDCU
        VARIABLES {
                pboxaDCUModel,
                pboxaDCUSN,
                pboxaDCUSLoad
        }
        DESCRIPTION
                "pboxaDCULoadStatusTrap:
                This trap is sent once whenever there is a change in
                pboxaDCUSLoad (Load Status) to indicate that the load has
                changed from being powered from AC mains to being powered from
                the battery, or vice versa. If pboxaDCUSLoad is on-battery(2),
                this trap is repeated every approximately 30 seconds to
                indicate an alarm condition."
        ::= 1

pboxaDCUBatteryStatusTrap TRAP-TYPE
        ENTERPRISE pboxaDCU
        VARIABLES {
                pboxaDCUModel,
                pboxaDCUSN,
                pboxaDCUSBatt,
                pboxaDCUVBatt,
                pboxaDCUIBatt
        }
        DESCRIPTION
                "pboxaDCUBatteryStatusTrap:
                This trap is sent once whenever there is a change in
                pboxaDCUSBatt (Battery Status). If pboxaDCUSBatt is
                battery-low-voltage(2), battery-disconnected(3),
                battery-discharging(4), or battery-test(6), this trap is
                repeated every approximately 30 seconds to indicate an alarm
                condition.
                In a normally functioning system, a 6 second battery test
                is performed once every hour. This will generate at least
                two battery status traps: one when the battery test starts,
                and one at the end of the test when pboxaDCUSBatt returns
                to either battery-charging(5) or battery-ok(1). If no
                battery is connected to the system, or if the battery fuse
                has blown, pboxaDCUSBatt will be battery-disconnected(3) after
                this test. In this case, a battery status trap will be
                repeated every approximately 30 seconds until the battery
                connections are repaired."
        ::= 2

pboxaDCUMainsStatusTrap TRAP-TYPE
        ENTERPRISE pboxaDCU
        VARIABLES {
                pboxaDCUModel,
                pboxaDCUSN,
                pboxaDCUSMains
        }
        DESCRIPTION
```

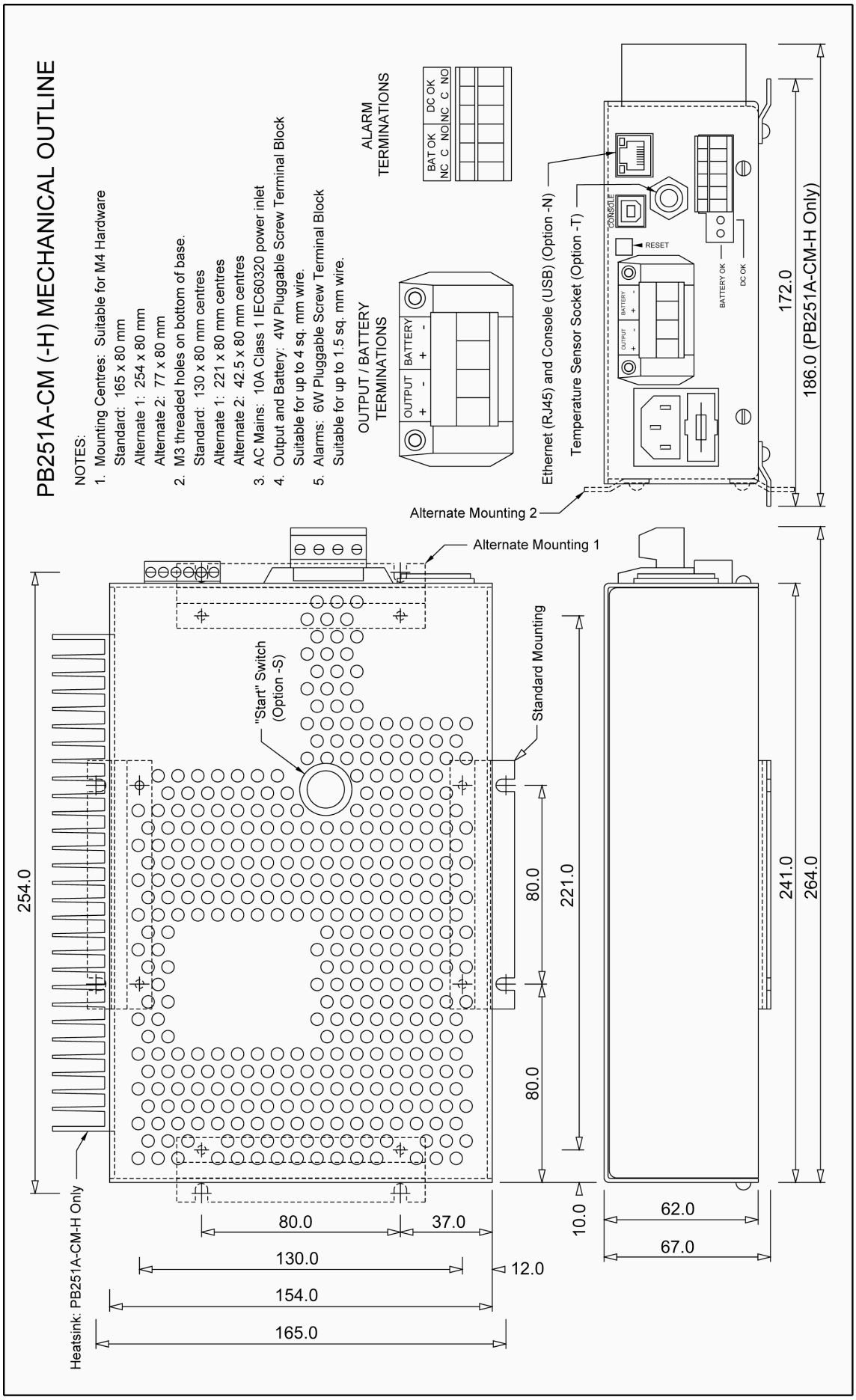
```
                "pboxaDCUMainsStatusTrap.
                This trap is sent once whenever there is a change in
                pboxaDCUSMains (AC Mains Status). If pboxaDCUSMains
                is mains-fail(2), this trap is repeated every approximately
                30 seconds to indicate an alarm condition."
        ::= 3

END
```

Specifications

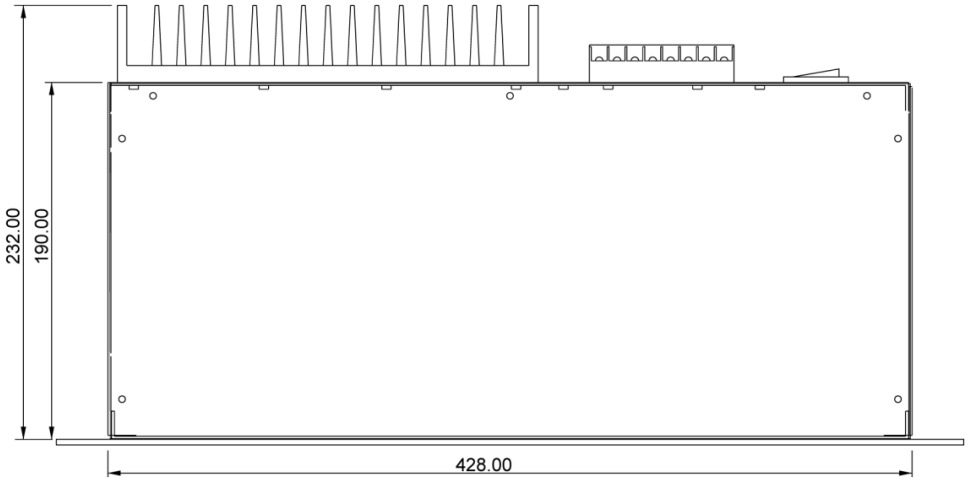
MODEL		PB251A-12CM	PB251A-12CM-H	PB251A-24CM	PB251A-24CM-H	PB251A-12RML /PB251A-12B	PB251A-24RML /PB251A-24B
INPUT	VOLTAGE [V]	AC190 - 265 1ø or DC225 - 400					
	CURRENT [A]	3.0 max.					
	FREQUENCY [Hz]	50/60 (45 - 65)					
	EFFICIENCY [%]	85 min.		88 min.		85 min.	88 min.
	INRUSH CURRENT [A]	10 max. (cold start)					
OUTPUT (AC Mains Operation)	VOLTAGE [VDC]	13.8		27.6		13.8	27.6
	Adjustment Range	12.0 - 16.0V		24.0 - 31.0V		12.0 - 16.0V	24.0 - 31.0V
	CURRENT [A][*1]	16.0	20.0	11.0	12.0	20.0	12.0
	CURRENT LIMIT [A][*1]	20.5	20.5	12.5	12.5	20.5	12.5
	Adjustment Range	10 - 20.5A		5.0 - 12.5		10 - 20.5A	5.0 - 12.5
	BATTERY CHARGING CURRENT LIMIT [A][*2]	2.0	4.0	2.0	2.0	4.0 / 20.0	2.0 / 12.5
	Adjustment Range	2.0 - 20.5A		1.0 - 12.5		2.0 - 20.5A	1.0 - 12.5
	LINE REGULATION [%]	0.2 typ.					
	LOAD REGULATION [%]	0.5 typ.				1.0 typ.	
	RIPPLE [mVp-p][*3]	28 max.		55 max.		28 max.	55 max.
	NOISE [mVp-p][*3]	28 max.		55 max.		28 max.	55 max.
	OVERVOLTAGE SHUTDOWN	17.5 - 20.0 (Latching)		31.5 - 39.0 (Latching)		17.5 -20.0 (Latching)	31.5 - 39.0 (Latching)
	OUTPUT SHORT CIRCUIT PROTECTION	Indefinite (Autoresetting)					
	BATTERY CHARGER SHORT CIRCUIT PROTECTION	Indefinite (Autoresetting)					
	OVERTEMPERATURE SHUTDOWN [°C]	100 typ. (Autoresetting)					
OUTPUT (Battery Operation)	VOLTAGE DROP BATTERY TO OUTPUT [V]	0.2 typ.				0.25 typ.	
	LOW VOLTAGE DISCONNECT [V]	10.5 typ.		21.0 typ.		10.5 typ.	21.0 typ.
	Adjustment Range	9.6 - 12.0		19.2 - 24.0		9.6 - 12.0	19.2 - 24.0
	OUTPUT OVERLOAD PROTECTION	Battery Electronic Circuit Breaker					
	BATTERY REVERSE POLARITY PROTECTION	Internal Fuse					
DISPLAYS AND ALARMS	DC / CHARGER OK	LED (Green) ON=OK, Voltage-free Changeover Contact (32V,1A) Alarm on loss of mains or failure of AC/DC converter and battery charger.					
	BATTERY OK	LED (Green) ON=OK, Voltage-free Changeover Contact (32V,1A) Alarm on battery low voltage, if no battery is connected or on failure of battery fuse or wiring.					
	Alarm Voltage (Falling) [V]	10.8		21.6		10.8	21.6
	LCD DISPLAY	N/A				2 Line x 16 character LCD, Load Voltage, Battery Voltage, Load Current, Battery Current, AC Mains Status, Battery Status, Load Status, MAINS ON - LED, FAULT - LED	
	METERS	N/A				Option (-M) Output / Battery Voltage, Load Current, Battery Current	
ISOLATION	INPUT - OUTPUT	4242 VDC, 1 minute					
	INPUT - GROUND	2121 VDC, 1 minute					
	OUTPUT - GROUND	707 VDC, 1 minute					
SAFETY AND EMC	SAFETY	AS/NZS 60950, Class I					
	EMC	Complies with ACA EMC Scheme - C-Tick RF Emissions Comply with AS/NZS CISPR11 Group1, Class B Harmonic Current Emissions Comply with AS/NZS 61000.3.2, Class A					
ENVIRONMENT AND OTHERS	OPERATING TEMP AND HUMIDITY	0 to 70°C, 5 to 90%RH (Non condensing) (Refer to DERATING CURVES)					
	CASE SIZE / WEIGHT	-CM Models: 264 x 172 x 67mm (LxWxH) / 1.9 kg -CM-H Models: 264 x 186 x 67mm (LxWxH) / 2.1 kg				19"x2RUx232mm rack mount enclosure 483x88.1x250mm (WxHxD) / 5.5 kg	
	COOLING METHOD	Natural Convection					

Notes: [*1] Sum of load + batt. charging current. [*2] This feature limits batt. charging current but not load current. [*3] Using a 100MHz oscilloscope at the output terminals.

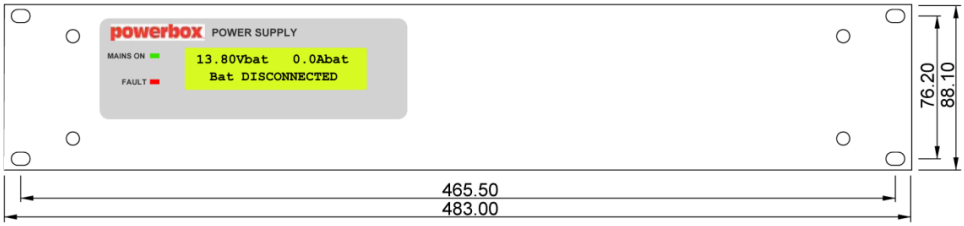

PB251A-CM (-H) MECHANICAL OUTLINE
NOTES:
1. Mounting Centres: Suitable for M4 Hardware
Standard: 165 x 80 mm
Alternate 1: 254 x 80 mm
Alternate 2: 77 x 80 mm
2. M3 threaded holes on bottom of base.
Standard: 130 x 80 mm centres
Alternate 1: 221 x 80 mm centres
Alternate 2: 42.5 x 80 mm centres
3. AC Mains: 10A Class 1 IEC60320 power inlet
4. Output and Battery: 4W Pluggable Screw Terminal Block
Suitable for up to 4 sq. mm wire.
5. Alarms: 6W Pluggable Screw Terminal Block
Suitable for up to 1.5 sq. mm wire.
ALARM TERMINATIONS
BAT OK NC C NO
DC OK NC C NO
OUTPUT / BATTERY TERMINATIONS
OUTPUT + -
BATTERY + -
Ethernet (RJ45) and Console (USB) (Option -N)
Temperature Sensor Socket (Option -T)
CONSOLE
RESET
BATTERY OK
DC OK
172.0
186.0 (PB251A-CM-H Only)
Alternate Mounting 2
Alternate Mounting 1
"Start" Switch (Option -S)
Standard Mounting
254.0
80.0
221.0
80.0
241.0
264.0
Heatsink: PB251A-CM-H Only
80.0
37.0
130.0
154.0
165.0
12.0
10.0
62.0
67.0

PB251A-RML & -B MECHANICAL OUTLINE

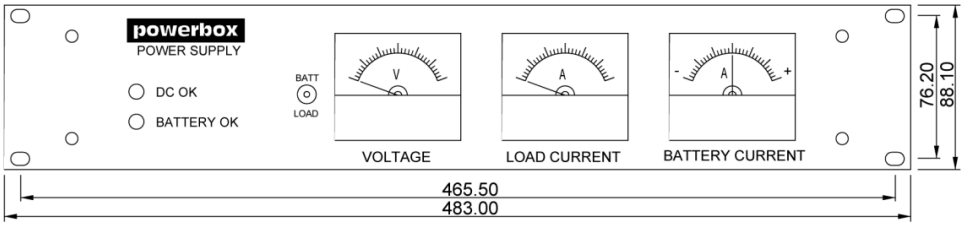
TOP VIEW



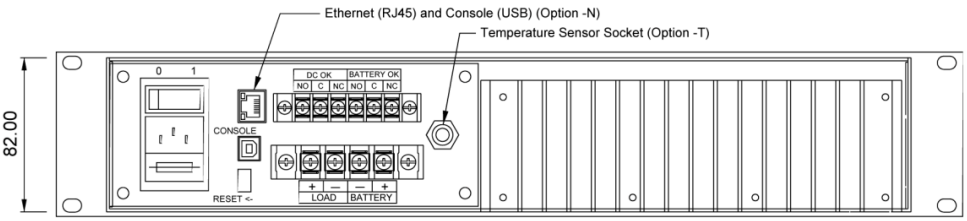
FRONT VIEW



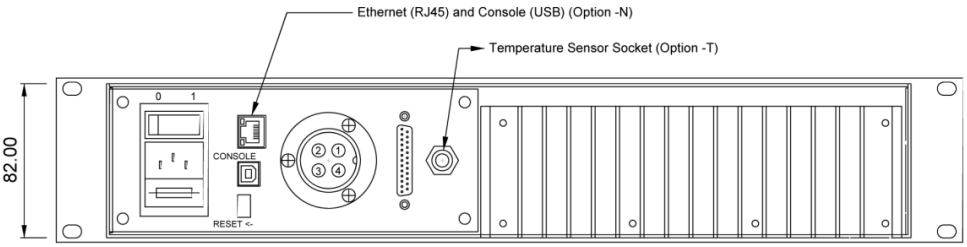
FRONT VIEW
(Option -M)



REAR VIEW
PB251A-RML

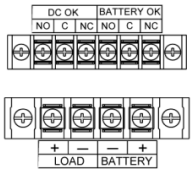


REAR VIEW
PB251A-B

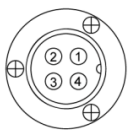


NOTES:
1. 2RU x 19" rack enclosure per IEC297
2. Mounting slots are suitable for M6 hardware.
3. Input connector is a 10A Class 1 IEC60320 inlet.
4. 2 meter IEC mains cord with Australian plug is supplied with unit.
5. PB251A-B alarm terminal is DB25 female.
6. PB251A-B output and battery connector is Hirose pn. HS28R-4A. Mating connector is Hirose pn. HS28P-4A (not supplied).
7. PB251A-RML output terminals are M4 screws suitable for ring or fork lugs up to 9.5 mm wide.
8. PB251A-RML alarm terminals are M3.5 screws suitable for ring or fork lugs up to 8 mm wide.

PB25A1-RML ALARM AND OUTPUT TERMINALS

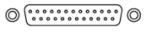


PB251A-B OUTPUT & BATTERY CONNECTOR



PIN1: + OUTPUT
PIN2: - OUTPUT
PIN3: + BATTERY
PIN4: - BATTERY

PB251A-B ALARM CONNECTOR



PIN 1: COMMON
PIN 6: DC OK (NC)
PIN 15: BATTERY OK (NO)

powerbox
Powering Progress

Powerbox Australia Pty Ltd

HEAD OFFICE

4 Beaumont Road
Mount Kuring-Gai NSW 2080

Telephone: 1 800 251 380
Website: powerbox.com.au
Email: sales@powerbox.com.au

Powerbox Pacific Ltd

NEW ZEALAND

1a Henry Rose Place
Albany Auckland 0632

Telephone: +64 9 4158 320
Website: powerbox.co.nz
Email: sales@powerbox.co.nz