

# **Change History for IBM Switched and Monitored pdu\_v01.3\_1**

5/8/2013

## **New part numbers, May 2013**

IBM released new part numbers for these PDUs.

See the table at the bottom for the old and new numbers.

The latest firmware for the original part numbers is v01.2\_1.

The latest firmware for the new part numbers is v01.3\_1.

The option part numbers have stayed the same

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## 0.0 Introduction

This document is to log the change history of the IBM PDU firmware. We categorized the firmware change into two parts:

- 1) Firmware function enhancement,
- 2) Problems fixed

For IBM PDU firmware, each release is coded by date. For example, the IBM PDU initial firmware (MP) is OPDP\_sIBM\_v00.1\_0302, which means it was release on 03-02-2010.

After updating the PDU firmware, log out of the GUI and back in so the GUI will have the latest configuration.

## 1.0 Enhancements

This section describes the new required/added PDU functions to enhance PDU functionality.

### 1.1 Initial release [OPDP\\_sIBM\\_v00.1\\_0302](#)

The firmware version [OPDP\\_sIBM\\_v00.1\\_0302](#) is the official release and approved by IBM to be MP version.

## 2.0 Problems Fixed

This section describes the release history to fix any defect issues of IBM PDU.

### 2.1 Initial release [OPDP\\_sIBM\\_v00.1\\_0302](#)

The official release and approved IBM PDU firmware is [OPDP\\_sIBM\\_v00.1\\_0302](#).

### 2.2 Firmware release [OPDP\\_sIBM\\_v00.1\\_0607](#)

#### 2.2.1 Release Summary

Within this release, we fixed:

- 1) Defect item #503974 – TFTP firmware upgrade fails with Linux environment (atftpd and tftpd).
- 2) Defect item #503975 – DHCP fails if with zeros in IP octet

## 2.2.2 Detailed descriptions and solutions

### 1) Defect item #503974 - TFTP firmware upgrade fails with Linux environment

#### Symptom:

When attempting to update the firmware on the IBM PDU from the web interface using TFTP, if the IP address of the TFTP server entered ends with 255 in the last octet, the TFTP upload fails.

Note that this is a scenario where 255 is valid in the last octet (the subnet mask was 255.255.192.0 and the server IP was 192.168.0.255).

#### Root Cause Analysis:

According to RFC 2349, timeout value should be within the range of (1 ~ 255). As IBM captured data, the timer timeout value is 60000, which is out of range. The out of range timeout value could potentially cause the TFTP download failure.

#### Solution:

By setting the timer timeout value to be the correct value (to be 100) as described in RFC2349, we verified it, in the same procedure of IBM, to be able to fix this problem.

### 2) Defect item #503975 – DHCP fails if with zeros in IP octet

#### Symptom:

When the IBM PDU attempts to DHCP, it will fail, if one of at least three conditions occur:

1. The static address was set, with an IP address with a zero in one of the octets, and then the IBM PDU is set to DHCP. In this case DHCP discover shows up in a network trace as truncated.
2. The static address was set, with an IP address without a zero in one of the octets, and then the IBM PDU is set to DHCP and the DHCP server hands out an address with a zero in one of the octets. In that case, the DHCP discover from the IBM PDU is OK, but the DHCP request from the IBM PDU is truncated.
3. Both the static and offered IP addresses do not have zeros in any of the octets, but the server-identifier in the offer has a zero in one of the octets. In this case, the DHCP request from the IBM PDU will be truncated.

It appears that the reason for all of these errors probably has the same root cause-- whatever code is putting the IP addresses into the DHCP packets in the IBM PDU is interpreting the zero in one of the IP address octets as a string terminator and truncating the packet at that point.

#### Debug Action:

If there are no zeros in any of the IP address octets, the DHCP from the IBM PDU does work.

**Root Cause Analysis:**

As calculated the length of the DHCP option, we used the "strlen" of the standard C library. However, 0x00, which as described in the IP address, is treated as terminated character and cause "strlen" function to return incorrect DHCP option length. This incorrect length causes the incorrect interpretation of the DHCP protocol, and then terminates the DHCP handshaking between DHCP client (IBM PDU) and DHCP server.

**Solution:**

Instead of using standard C library (strlen), we calculate the real length, for example, 192.168.0.1, we calculate the length to be 4 (bytes). With this solution, we verified it to be able to fix this problem.

## **2.3 Firmware release *OPDP\_sIBM\_v00.1\_0624***

### **2.3.1 Release Summary**

Within this release, we fixed:

- 1) Defect item #22770 – The firmware name is too long and will be truncated as doing firmware upgrade.
- 2) Defect item #22771 – PDU fails download if address ends in .255
- 3) Defect item #22808 – PDU TFTP firmware update fails
- 4) Defect item #22809 – PDU telnet cannot use "." character

### **2.3.2 Detailed descriptions and solutions**

- 1) Defect item #22770 – The firmware name is too long and will be truncated as doing firmware upgrade.

**Symptom:**

The switched and monitored Power Distribution Unit (PDU) firmware update Process through the web browser may fail as the text field truncates the text, removing the last characters from the file name.

**Root Cause Analysis:**

The filename is set to be 32 characters. If it is more than 32 characters, it will be truncated, as described.

**Solution:**

We enlarge the size of the filename to be 64 characters to fix this problem. (Please be noted that the MIB file of AEM define this field to be max. 32 characters.)

- 2) Defect item #22771 – PDU fails download if address ends in .255

**Symptom:**

In cases where a server address ends with a 255 octet, the Switched and monitored Power Distribution Unit (PDU) firmware update process will fail stating that it is unable to download the file.

When attempting to update firmware through the web browser, a Trivial File Transport Protocol (TFTP) server address is requested. The server is reachable from the PDU, however, the download displays an error.

**Root Cause Analysis:**

We verify the field to be valid from 0 ~ 254, and will cause reported problem, as the field is 255.

**Solution:**

We correct the field value from 0 ~ 255 to fix the problem.

- 3) Defect item #22808 – PDU TFTP firmware update fails

**Symptom:**

When updating the Switched and Monitored Power Distribution Unit (PDU) firmware through the web interface with the target file residing on a Linux server, an error may occur stating the following:

TFTP Connection Message  
Connect Failed !  
Please Check TFTP IP Address, File Name or Firewall Setting !

**Root Cause Analysis:**

The TFTP option - tsize and ttimeout cause this problem.

**Solution:**

Remove the limitation of tsize and ttimeout to fix this problem.

- 4) Defect item #22809 – PDU telnet cannot use "." character

**Symptom:**

If attempting to change the Internet Protocol (IP) address of the Switched and Monitored Power Distribution Unit (PDU) via Telnet, the user will not be able to input the dot (.) character.

**Root Cause Analysis:**

This is a bug of ignoring the input of ".".

**Solution:**

We modify the code to take care of the input of "." character to fix it.

## **2.4 Firmware release *OPDP\_sIBM\_v01.0\_0.bin***

### **2.4.1 Release Summary**

Release date: 12/7/2010

Please be noted that we updated the release version to OPDP\_sIBM\_v**01.0\_0**, instead of v00.1\_0.xxxx (xxxx is the release day).

Here v01.0\_0, this release code is Delta internal release for QE test

v01.0\_0, this release code is the release for customer to indicate a “minor” change

v**01.0\_0** this release code is the release for customer to indicate a “major” change

Within this release, we fixed:

- 1) The DHCP issue, which the assigned IP will be 0.0.0.0, if the original IP have one “0”, e.g. 192.168.0.2.
- 2) We create a new function for end-user to reset ADMIN/USER login IDs and Password.

### **2.4.2 Detailed descriptions and solutions**

- 1) The DHCP issue to handle assigned IP address

**Symptom:**

If there is any “0” for IP, at the time to “ENABLE” DHCP function, the assigned IP address from DHCP server will be 0.0.0.0

**Root cause Analysis:**

This is a bug. As DHCP assigned a reasonable IP address, the DHCP client (PDU) have a bug to handle this assigned IP address after comparing with the original IP and cause the problem to assign 0.0.0.0 as the IP for PDU.

**Solution:**

We fixed this bug and had verified it.

- 2) the reset ADMIN/USER login ID and password function via reset button

**Symptom:**

As end-user forgot or meshed up the login ID and password, there is no way for end-user to reset the meshed up login ID and/or password. Therefore end-user can not to operate/control this PDU.

**Root cause Analysis:**

New feature added.

**Solution:**

We added a new feature to allow end-user to reset password via reset button. Remotely reset login-ID and password is not provided, regarding to security issue. Only the maintainer aside the PDU can reset the login-ID and password locally.

Here we re-defined the function of the reset button:

- a) If end-user **“hold” the reset button for 2 seconds and then release the reset button**, the **login-ID and password will be restored to default**, which is ADMIN/1001 for ADMIN level, and USER/1000 for user level, no matter what it is before.
- b) If end-user **“hold” the reset button for 8 seconds, no matter whether he/she release the reset button, the system will be restarted (software restart)**
- c) Please be noted that both (a) and (b) reset function (reset login-ID/password and system restart) will not affect any output during proceeding these functions.

## **2.5 Firmware release *OPDP\_sIBM\_v01.1\_1.bin***

### **2.5.1 Release Summary**

Release date: 2/18/2011

Please be noted that we change the release coding to OPDP\_sIBM\_vxx.yy\_zz.bin. Please refer to section 2.4.

Within this release, we fixed:

- 1) The ENP (Environmental Probe)
- 2) The algorithm to enhance the communication between WEB board and Meter board.
- 3) The firmware upgrade mechanism and interface to download the meter firmware via network, i.e. to upgrade the meter firmware remotely. (New added function)

### **2.5.2 Detailed descriptions and solutions**

- 1) The ENP (Environmental Probe) issue



**Symptom:**

Sometimes, the ENP is not detected.

**Root cause Analysis:**

This is a bug. The ENP loses communication with WEB board.

**Solution:**

We fixed this problem by adding the heart-beat to assure the communication with WEB board.

2) The communication confliction between WEB board and meter board

**Symptom:**

As reported issue, the SNMP access is fail.

**Root cause Analysis:**

This is caused due to RS-232 communication confliction between WEB board and meter board. Since this failure, the WEB board is not able to build up the outlet table. Therefore the SNMP access will be failure since the outlet table is “empty”.

**Solution:**

Instead of asking micro-controller (x2) of meter board to initialize the communication with micro-controller of WEB board, we modify the control scheme, initializing by the micro-controller of WEB board to get rid of communication confliction.

3) The mechanism to update the meter firmware via WEB board through network (remotely).

**Symptom:**

New added function.

**Root cause Analysis:**

New added function.

**Solution:**

We create an interface on the embedded WEB server so end-user can upgrade meter firmware via this interface.

## **2.6 Firmware release *OPDP\_sIBM\_v01.2\_0.bin***

### **2.6.1 Release Summary**

Release date: 8/18/2011

Within this release, we resolved following reported issues:

1. History log stop logging data
2. The history log has wrong value
3. The history log displays incorrect label for outlet 9~12
4. The HTTP security concern when using curl tool to get XML data
5. The SNMPv3 contents of the msgAuthoritativeEngineBoots and the msgAuthoritativeEngineTime fields are incorrect
6. Change the ex-factory default Relay setting from “Relay-All-OFF” to Relay-All-ON”, required by IBM (Specification change.)

### **2.6.2 Detailed descriptions and solutions**

- 1) History log stop logging data & wrong value ((1) & (2))

**Symptom:**

The power usage, as light load, is not updated.

**Root cause Analysis:**

This is a bug. As light load, the algorithm may just ignore the energy usages.

**Solution:**

We fixed this problem by adjust the algorithm to response light load case.

- 2) The history log displays incorrect head label for outlet 9~12

**Symptom:**

The head labels of the history are incorrect – the labels for outlet 5 ~ 8 showing twice but no labels for outlet 9 ~ 12.

**Root cause Analysis:**

There is a bug as printing out the head label.

**Solution:**

Fixing this bug by correcting the label printout.

- 3) The HTTP security concern when using curl tool to get XML data.

**Symptom:**

The problem is that the logon ID and password are shown in the output file when the command below is run. It looks like the output file has far more information than is needed by the command.

**Root Cause Analysis:**

The reason of show up the user account and password in curl command is that the embedded web server didn't process the request XML file with login-check, so it will send out unknown data, including account and password information.

**Solution:**

We fix this issue by filtering out the security concerned parameters.

- 4) The SNMPv3 contents of the msgAuthoritativeEngineBoots and the msgAuthoritativeEngineTime fields are incorrect

**Symptom:**

The problem occurs either while using AEM or while using an external client (I am using Net-SNMP) to issue SNMPv3 requests. I currently have IBM PDUs at firmware version OPDP\_sIBM\_v00.1\_0223 and configured for SNMP authNoPriv. When I issue the SNMPv3 requests, I notice that the response always has the same value for msgAuthoritativeEngineBoots (1) and msgAuthoritativeEngineTime (0).

**Root cause Analysis:**

There is a bug to access the values of the msgAuthoritativeEngineBoots and the msgAuthoritativeEngineTime (0).

**Solution:**

We fix this issue by accessing the values correctly.

- 5) Change the ex-factory default setting of the Relays from “Relay-All-OFF” to “Relay-All-On”

**Symptom:**

This is a specification change, required by IBM

**Root cause Analysis:**

This is a specification change, required by IBM.

**Solution:**

Following IBM's requirement, we change the default setting from Relay-All-OFF to Relay-All-ON.

## **2.7 Firmware release [OPDP\\_sIBM\\_v01.2\\_1.bin](#)**

### **2.7.1 Release Summary**

Release date: 2/17/2012

Within this release, due to MIB file change required by IBM, we modified the PDU firmware to add following functions accordingly:

1. ibmPduPhaseLastPowerReading
2. ibmPduThermalLastReading
3. ibmPduHumidityLastReading
4. ibmPduOutletLastPowerReading

- 5. ibmPduExtThermalLastReading
- 6. ibmPduExtHumidityLastReading

### **2.7.2 Detailed descriptions and solutions.**

- 1) ibmPduPhaseLastPowerReading

**Symptom:**

New add function to read phase last power.

**Root cause Analysis:**

New add function..

**Solution:**

New add function.

- 2) ibmPduThermalLastReading

**Symptom:**

New add function to read last temperature.

**Root cause Analysis:**

New add function..

**Solution:**

New add function.

- 3) ibmPduHumidityLastReading

**Symptom:**

New add function to read last humidity.

**Root cause Analysis:**

New add function..

**Solution:**

New add function.

- 4) ibmPduOutletLastPowerReading

**Symptom:**

New add function to read outlet last power.

**Root cause Analysis:**

New add function..

**Solution:**

New add function.

5) ibmPduExtThermalLastReading

**Symptom:**

New add function to read external last temperature.

**Root cause Analysis:**

New add function..

**Solution:**

New add function.

6) ibmPduExtHumidityLastReading

**Symptom:**

New add function to read external last humidity.

**Root cause Analysis:**

New add function..

**Solution:**

New add function.

## **2.8 Firmware release *OPDP\_sIBM\_v01.3\_0.bin*.**

### **2.8.1 Release Summary**

Release date: (temporary release, since the new part number approach is not decided yet.) This fw was not released to the IBM website. It was included in the next release which is for the new part numbers.

Due to the new function requirement (PowerOn Sequencing) from IBM, we have to modify:

1. MIB file (update to ibmdpi\_v1.3\_0.mib)
2. The meter board firmware (update from 1.20 to 1.30)
3. The communication board firmware (update from 1.2\_1 to 1.3\_0)

### **2.8.2 Detailed descriptions and solutions**

- 1) MIB file (ibmdpi\_v1.3\_0.mib)

Due to a new requirement, we modify the MIB file to add:

- **ibmPduOutletGlobalDelayTimer** OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-write

STATUS current

DESCRIPTION "Global delay timer for all outlets. Range: 0 sec ~ 3600 sec. Default value:0 sec. To combine with Individual Delay timer to control outlet state/behavior as rack power on/restore"

::= { ibmPduOutlets 3 }

- **ibmPduOutletIndividualDelayTimer** OBJECT-TYPE  
 SYNTAX Unsigned32  
 MAX-ACCESS read-write  
 STATUS current  
 DESCRIPTION "The delay timer for each outlet as AC power restored. Range: 0 sec ~ 3600 sec. Default Value: 0 sec. To combine with Global Delay timer to control outlet state/behavior as rack power or or restore"  
 ::= { ibmPduOutletEntry 14 }
  
- **ibmPduReboot** OBJECT-TYPE  
 SYNTAX Unsigned32  
 MAX-ACCESS read-write  
 STATUS current  
 DESCRIPTION "Set 1 to reboot PDU."  
 ::= { ibmPduMetadata 12 }

2) Meter board firmware (1.30)

Original meter board firmware design (release 1.20) is to have the initial state of the relay to be “ON” so as power ON, the PDU can provide power immediately. However, as the powerON sequencing requirement, the relay initial state can not be ON otherwise the outlet behavior will be ON → OFF, and then control by the delay timer. To resolve this issue to satisfy the new requirement - **PowerON sequencing function, we have to modify the relay initial state from ON to OFF and to update the meter board firmware accordingly.**

3) Communication board firmware

Due to the new requirement, we modify the communication board firmware to support interfaces for end users to configure the GlobalDelayTimer and IndividualDelayTimer. The interfaces include:

- Serial port (Hyper-terminal or similar serial control applications)
- Ethernet Port (Telnet and SNMP)

**Note that access to the new GlobalDelayTimer and IndividualDelayTimer features is not available through the WebGUI.**

## 2.9 Firmware release **OPDP\_sIBM\_v01.3\_1.bin**

### 2.9.1 Release Summary

Release date: 3/8/2013

Since IBM decided to use new part number (P/N), within the communication board firmware, we have to modify the communication board firmware accordingly to have PDU firmware support both “new” P/N and “old” P/N.

The PDUs with new part numbers have a new function called PowerON sequencing. IBM reserves the right to update hardware and add new features without adding the new features to existing hardware. Note, the new PN PDUs are shipped with the relays off. Refer to the Installation and Maintenance Guide for instructions on how to control the relays. The new PDUs are shipped with the relays off. The customer can turn them on as needed.

IBM IBM PDU									
Delta Part#	Option	IBM PN	NEW IBM PN	IBM FRU	NEW IBM FRU	Program Name	NEW PDU KIT	NEW EC#	Remarks
AD-380/32AA	46M4002	43V6143	46W1607	46M4014	46W1611	1U (Rack)	00AK102	N32463E	9 C19 & 3 C13 (unattached line cord) - 3 phase WYE: 16/32 Amp; Single phase: 24/32/48/63 Amp)
AD-208/48AA	46M4003	43V6144	46W1608	46M4015	46W1612	1U (Rack)	00AK103	N32463E	9 C19 & 3 C13 (attached line cord) - 3 phase Delta: 48 Amp
AD-380/32BA	46M4004	43V6145	46W1609	46M4016	46W1613	1U (Rack)	00AK104	N32463E	12 C13 (unattached line cord) - 3 phase WYE: 16/32 Amp; Single phase: 24/32/48/63 Amp
AD-208/48BA	46M4005	43V6146	46W1610	46M4017	46W1614	1U (Rack)	00AK105	N32463E	12 C13 (attached line cord) - 3 phase Delta: 48 Amp

### 2.9.2 Detailed descriptions and solutions

#### 1) Communication board firmware (OPDP\_sIBM\_v01.3\_1)

This firmware modification is to have the PDU automatically recognize both the new P/N and old P/N. Any PDU can be upgraded to 1.3\_1, even its EEPROM still using old P/N. The new PowerON sequencing functions will only work on the new part number PDUs. Option Numbers are not changed - the same option number can apply to an old P/N or a new P/N PDU. The P/N or FRU Number must be used to distinguish between the old functionality PDU and the new power sequencing functionality PDU.

