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UPS Communication Protocol for
BP650CH/BP1000CH
(Password is V command)

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1 Document Description

1.1 Goals

This document specifies the RS232 and USB communication protocol used in the UPS.

1.2 Organization

There are two parts in this manual:

1. Introducing the Inquiry Command. By sending the commands you can get the information of the UPS you need.
2. Introducing the control Command. By sending the control commands you can control the UPS.
3. Computer will control information exchange by a query followed by <cr>.
4. Computer and UPS respond both the "<cr>" as the end of a response.
5. UPS respond with "(start, and with one space separate the data.
(exception: off-line Arista UPS)
6. In a UPS's response, if there is no data, with "-" instead of data, and the length of the "-" as long as data.
7. In a UPS's response, if some data length is less than the definition, type enough "#" before the data.

2 Hardware Description

RS232:

BAUD RATE.....: 2400 bps

DATA LENGTH.....: 8 bits

STOP BIT.....: 1 bit

PARITY.....: NONE

Cabling:

COMPUTER

UPS

RX (pin2) <-----> TX

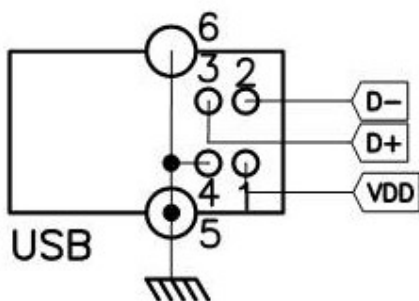
TX (pin3) <-----> RX

GND (pin5) <-----> GND

(9 pins female D-type connector)

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USB:



3 Inquiry Command

3.1 M<cr>: UPS password

Computer: M<cr>

UPS: V<cr>

Function : To request the UPS password which identify the offline UPS.

3.2 QS<cr>: UPS Status parameters Inquiry

Computer: QS<cr>

UPS: (MMM.M NNN.N PPP.P QQQ RR.R SS. S TT.T b7b6b5b4b3b2b1b0<cr>

Function : To obtain UPS current status and data

Note:

One space (ASCII Hex: 20H) is added between each data stream for the data separation.

All data should capture at same timing when UPS receive this command.

Item	Data	description	Unit
a	(Start code	
b	MMM.M	Input voltage	V rms
c	NNN.N	Input fault voltage	V rms
d	PPP.P	Output voltage	V rms
e	QQQ	Output load	Percentage (%)
f	RR.R	Output frequency	Hz

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g	SS.S	Battery voltage	V rms
h	TT.T	Internal temperature	Degree-C
i	U	UPS status	(8 bits)

a. Start byte : (

b. I/P voltage : MMM.M

M is an integer number ranging from 0 to 9. The unit is Volt.

c. I/P fault voltage: NNN.N

N is an integer number ranging from 0 to 9. The unit is Volt.

Note:

Its purpose is to identify a short duration voltage glitch which cause off line UPS to go to Inverter mode. If this occurs, the input voltage will appear normal at query prior to glitch and will still appear normal at next query.

The I/P fault voltage will hold glitch voltage till next query. After query, the I/P fault voltage will be same as I/P voltage until next glitch occurs.

d. O/P voltage : PPP.P

P is an integer number ranging form 0 to 9. The unit is Volt.

If there is no output, the value must be forced to 000.0.

e. Load percentage: QQQ

QQQ is a percentage of rated load capability, not an absolute value.

If there is no output, the value must be forced to 000.

f. O/P frequency: RR.R

R is an integer number ranging from 0 to 9. The unit is Hz.

If the output frequency is high than 99.9Hz, force the value to 99.9.

If there is no output, the value must be forced to 00.0.

g. Battery voltage: SS.S

S is an integer number ranging from 0 to 9. For off-line UPS, the actual battery voltage is provided in the form SS.S.

h. Temperature : TT.T

T is an integer number ranging form 0 to 9. The unit is degree Celsius.

If the value can't be obtained, fill the field with '--.-'.

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i. UPS Status : <U>

<U> is one byte of binary information such as <b7b6b5b4b3b2b1b0>. Where bn is a character of ASCII '0' or '1'.

UPS status:

Bit	Logic 1	Logic 0
b7	Utility Fail	Utility OK
b6	Battery Low	No Battery Low
b5	Boost or Buck mode	Neither boost nor buck mode
b4	UPS is fault	UPS is not fault
b3	UPS Type is Line-Interactive	UPS Type is On-line
b2	UPS is in self test progress	UPS is not in self test progress
b1	UPS is in Shutdown Active status	UPS is not in Shutdown Active status
b0	Beeper is Active	Beeper is Mute

j. Stop Byte : <cr>

For example:

Computer: QS<cr>

UPS: (208.4 208.4 208.2 034 59.9 12.8 --.- 00110000<cr>

Means:

I/P voltage is 208.4V,

I/P fault voltage is 208.4V,

O/P voltage is 208.2V,

O/P load percent is 34 %.

O/P frequency is 59.9 HZ,

Battery voltage is 12.8V,

Temperature is reserve, degrees of centigrade.

UPS type is on-line, UPS failed. AVR active, and shutdown not active.

3.3 F<cr>: UPS Rating Information inquiry

Computer: F<cr>

UPS: #MMM.M QQQ SS.SS RR.R<cr>

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Function : This command makes the UPS answer the rating value of UPS. There should be a space character between every field for separation. The UPS's response contains the following information field:

- (1) Output Rating Voltage: MMM.M
- (2) Output Rating Current: QQQ
- (3) Battery Voltage : SS.SS(less than 99.99V) or SSS.S(99.99V upwards)
- (4) Output Rating Frequency: RR.R

4 Control Command

4.1 T<cr>: 10 seconds test.

Computer: T<cr>

UPS: None response.

Means: Test for 10 seconds and then return to utility.

- (1) If battery low occurs during testing, UPS will return to utility immediately.
- (2) Only when UPS is in line mode, and the battery voltage is not less than 13V/pcs, the command is executed.

4.2 S<n>R<m><cr>: Shutdown and restore

Computer: S<n>R<m><cr>

UPS: None response

Means: Cut UPS output off in <n> minutes and waiting for <m> minutes and then turn on UPS output again.

The shut down sequence is the same as the previous command. When the <m> minutes expired, the utility do not restore, the UPS will wait until utility restore.

If UPS is in waiting shutdown status, the "C" command can let the shut down command cancelled.

If UPS is in restore waiting status, the "C" command can let the UPS output turned on, but UPS must be hold off at least 10 seconds. (if utility is present)

<n> is a number ranging from .2, .3, ..., 01, 02, ..., to 99.

<m> is a number ranging from 0000 to 9999. If it is 0000, there will be no restore, and if control power could be shut off, then turn off it immediately.

4.3 C<cr>: Cancel shutdown

Computer: C<cr>

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UPS: None

Function: Cancel the S<n>R<m><cr> command.

Note:

UPS only accepts this command when the SnRm command has not been complete.

If UPS is in shut down waiting state, the shut down command is cancelled.

If UPS is in restore waiting state, the UPS output is turned on, but UPS must be hold off at least 10 seconds (if utility is present).

4.4 Q<cr>: Toggle beep

PC sends to UPS: Q<cr>

Response from UPS: None.

Function: Toggle the UPS beep

Note:

When the AC power failed, UPS will generate a warning beep to inform the manager. Manager could toggle the warning beep by sending this command