

TTL Communication Protocol

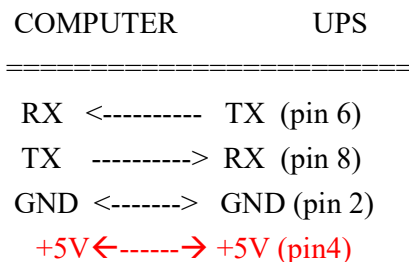
A. General: This document specifies the TTL communications protocol used in UPS. The protocol provides the following features:

1. Monitor charger status.
2. Monitor battery status and condition.
3. Monitor the utility status.

Computer will control information exchange by a query followed by <cr>. UPS will respond with information followed by a <cr> or action.

B. Hardware:

BAUD RATE..... : 2400 bps
DATA LENGTH..... : 8 bits
STOP BIT..... : 1 bit
PARITY..... : NONE



C. COMMUNICATIONS PROTOCOL:

1. Status Inquiry:

Computer : Q1<cr>

UPS : UPS status data stream, such as

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

UPS status data stream : There should be a space character between every field for data separation.

The meaning of each field is list as followed:

- 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)
- d.O/P voltage : PPP.P (P is an integer number ranging form 0 to 9. The unit is Volt)
- e.O/P current : QQQ (QQQ is a percentage of maximum current, not an absolute value)
- f.O/P frequency : RR.R (R is an integer number ranging from 0 to 9. The unit is Hz)
- g.Battery voltage : SS.S or S.SS
S is an integer number ranging from 0 to 9. For on-line units battery voltage/cell is provided in the form S.SS. For standby units actual battery voltage is provided in the form SS.S. UPS type in UPS status will determine which reading was obtained.
- h.Temperature : TT.T (T is an integer number ranging form 0 to 9. The unit is degree celsius)
- i. UPS Status : <U>

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

UPS status :

Bit	Description
7	1 : Utility Fail (Immediate)
6	1 : Battery Low
5	1 : AVR 0: NORMAL
4	1 : UPS Failed
3	1 : UPS Type is Line-Interactive (0 is On line)
2	1 : Test in Progress
1	1 : Shutdown Active
0	1 : Beeper On

j. Stop Byte : <cr>

Example: Computer : Q1<cr>

UPS : (208.4 140.0 208.4 034 59.9 2.05 35.0 00110000<cr>

Means : I/P voltage is 208.4V.

I/P fault voltage is 140.0V.

O/P voltage is 208.4V

O/P current is 34 %.

I/P frequency is 59.9 HZ.

Battery voltage is 2.05V.

Temperature is 35.0 degrees of centigrade.

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

2. Turn On/Off beep -- Toggle the UPS beeper :

Computer : Q<cr>

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 .

3. UPS Rating Information:

Computer: F<cr>

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

This function 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 following information field:

a. Rating Voltage : MMM.M

b. Rating Current : QQQ

c. Battery Voltage : SS.SS or SSS.S

d. Frequency : RR.R

4. UPS Password

Computer : M<cr>

UPS : C<cr> RUN formula

5. Inverter fault state query

Computer : G? <cr>

If UPS normal, UPS will answer: "Normal 04<cr>Fa"<cr>

If UPS overload, UPS will answer: "Over Load"<cr>

6. Inverter charger action query

Computer: D<cr>

If Inverter charging, UPS will answer: "ACK"<cr>

If Inverter not charging, UPS will answer: "NAK"<cr>

D. COMMAND SUMMARY:

ITEM	COMMAND	DESCRIPTION
1	Q1	Status Inquiry
2	Q	Turn On/Off beep (buzzer silence command)
3	F	UPS Rating Information
4	D	Inverter Charger Action Query