

Communication Protocol

A. General: This document specifies the RS232C communications protocol used in Centralion UPS.

The protocol provides the following features :

1. Monitor charger status.
2. Monitor battery status and condition.
3. Monitor the utility status.
4. Provide the power switch function for computer to turn on and off the utility on schedule for power saving.

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

COMPUTER	UPS
=====	
RX <-----	TX (pin 2)
TX ----->	RX (pin 3)
GND <----->	GND (pin 5)

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. Test for 10 seconds:

Computer : T<cr>

UPS : Test for 10 seconds and return to utility.

If battery low occurs during testing, UPS will return to utility immediately.

3. 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 .

4. Shutdown and Restore Command :

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

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

a. The UPS output will be off in <n> minutes, even if the utility power is present.

b. If the battery low occurs before <n> minutes, the output is turned off immediately.

c. If UPS is in shutdown waiting state, the "C" command can let the shutdown procedure cancelled.

- d. If, after <m> minutes have expired, the utility has not been restored, the UPS will wait until it is restored.
- e. If UPS is in restore waiting state, the "C" command can let the UPS output turned on, but UPS must be hold off at least 10 seconds. (if utility is present)
- f. <n> is a number ranging form .2, .3, ..., 01, 02, ..., up to 10.
- g. <m> is a number ranging form 0000 to 9999. If it is 0000, there will be no restore.

5. Cancel Shutdown Command :

Computer : C<cr>

UPS : Cancel the SN<n><cr> and SN<n>R<m><cr> command.

- a. If UPS is in shut down waiting state, the shut down command is cancelled.
- b. 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)

6. UPS Information Command:

Computer : I<cr>

UPS : #Company_Name UPS_Model Version<cr>

This function will make the UPS respond with the basic information about the company who manufacture the UPS, the model name of the UPS and the version number of the UPS firmware. The length of every field is listed as follows:

Company_Name : 15 characters, leave space if less than 15 characters

UPS_Model : 10 characters, leave space if less than 10 characters

Version : 10 characters, leave space if less than 10 characters

There should be a space character between every field for separation.(cancel)

7. 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

8. UPS Password

Computer : M<cr>

UPS : C<cr> RUN formula

9. Inverter fault state query

Computer : G? <cr>

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

If UPS fanlock , UPS will answer: "Fan Locked." <cr>

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

If UPS shutcut , UPS will answer: Short Cut. " <cr>

If UPS badbat(AC start battery voltage <9.0V) , UPS will answer: "Bat bad. "<cr>

10. Inverter charger action query

Computer: D<cr>

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

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

11. Charger knob test

Computer: E<cr>

If Charger knob is at 100A ~ 500A level, UPS will answer: '0'

If Charger knob is at 600A ~ 1000A level, UPS will answer: '0'

D. COMMAND SUMMARY:

ITEM	COMMAND	DESCRIPTION
1	Q1	Status Inquiry
2	T	10 Seconds inverter battery tes
3	Q	Turn On/Off beep (buzzer silence command)
4	S<n>R<m>	Remote Shut Down and Restore Command
5	C	Cancel Remote Shut Down Command
6	I	UPS Information Command
7	F	UPS Rating Information

E. Invalid Command/Information Handling

If the UPS receives any command that it could not handle, the UPS should echo the received command back to the computer. The host should check if the command send to UPS been echo or not.

If there is any information field in the UPS's response which is unavailable or not supported, the UPS should fill the field with '@'.

批注 [Kevin1]: