

A. General:

This document specifies the RS232C communication protocol of Advanced-Intelligent UPS. This protocol provides the following features :

- 1. Monitor charge status.
- 2. Monitor battery status and conditions.
- 3. Monitor main power status.

Computer gives command to UPS. All commands have to end with a < cr >.

UPS responds to computer. All responses have to end with a < cr > .

*** UPS must respond to every command within 500ms ***

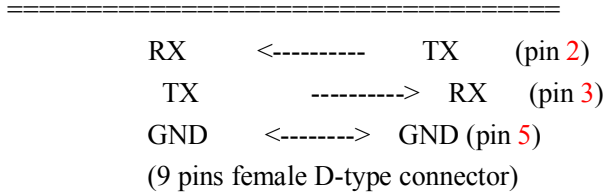
B. Hardware:

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

CABLING :

COMPUTER

UPS



C. COMMUNICATION PROTOCOL:

1. UPS real time data

Computer : G1 <cr>

UPS :!SSS PPP NNNN RRR.R +TT.T FF.F EE.E QQ.Q <cr>

There should be a space character between every field for data separation. The meaning of each field is listed as follows:

a. Start byte : !

b. Battery voltage: SSS

SSS is an integer number ranging from 000 to 999. The unit is "Volt".

c. Battery Capacity percentage : PPP

PPP is an integer number ranging from 000 to 100. The unit is "Percentage"..

d. Battery Time Remaining : NNNN

NNNN is an integer number ranging from 0000 to 9999. The unit is "Minute".

e. Battery current in charge mode or discharge mode: RRR.R (固定为 000.0)

Battery is in charge or discharge mode depends on a2 (Rectifier Status),

When a2 = 1 , means battery is in discharge mode.

When a2 = 0, means battery is in charge mode.

R is an integer number ranging from 0 to 9.

The unit is “Amp”.

f. Temperature : +TT.T

T is an integer number ranging from -99.9 to +99.9.

The unit is “Degree of centigrade”.

g. I/P frequency : FF.F

F is an integer number ranging from 0 to 9.

The unit is “Hz”.

h. Frequency of Bypass Source: EE.E

E is an integer number ranging from 0 to 9.

The unit is “Hz”.

i. O/P frequency : QQ.Q

Q is an integer number ranging from 0 to 9.

The unit is “Hz”.

j. Stop Byte : <cr>

Example: Computer : G1<cr>

UPS : !240 094 0123 025.0 +35.0 60.1 62.0 60.0<cr>

Means : Battery voltage is 240V.

Battery Capacity is 94 %.

Battery Time Remaining is 123 minutes.

Charge current is 25 Amps.

Temperature is 35.0 degrees centigrade.

I/P frequency is 60.1 Hz.

Frequency of Bypass Source is 62.0 Hz.

O/P frequency is 60.0 Hz.

2. UPS status inquiry

Computer : G2 <cr>

UPS :!a7a6a5a4a3a2a1a0 b7b6b5b4b3b2b1b0 c7c6c5c4c3c2c1c0<cr>

There should be a space character between every field for data separation. The meaning of each field is listed as follows:

a. Start byte : !

b. The Status of Rectifier and DC : <U>

<U> is one byte of binary information such as <a7a6a5a4a3a2a1a0>.

“aN” is an ASCII character ‘0’ or ‘1’.

Status of Rectifier and DC :

Byte	Description
7	No Use
6	RECTIFIER ROTATION ERROR
5	1 : Low Battery Shutdown
4	1 : Low Battery
3	1 : Three in –One out 0 : three in –Three out
2	1 : Back Up 0 : AC Normal
1	1 : Boost Charge 0 : Float Charge
0	1 : Rectifier Operating

b7\b6\b3 固定为 0

c. The Status of UPS : <U>

<U> is one byte of binary information such as <b7b6b5b4b3b2b1b0>.

“bN” is an ASCII character ‘0’ or ‘1’.

Status of UPS :

Byte	Description
7	No Use
6	No Use
5	No Use
4	BYPASS FRQUENCY FAIL
3	1 : Manual Bypass Breaker On 0 : Manual Bypass Breaker Open
2	1 : Bypass AC Normal 0 : Bypass AC Abnormal
1	1 : Static Switch in Inverter Mode 0 : Static Switch in Bypass Mode
0	1 : Inverter Operating

d. The Fault Condition of Inverter: <U>

<U> is one byte of binary information such as <c7c6c5c4c3c2c1c0>.

“ cN ” is an ASCII character ‘0’ or ‘1’.

The Fault Condition of Inverter :

Byte	Description
7	No Use
6	1 : Emergency Stop (EPO)
5	1 : High DC Shutdown
4	1 : Manual Bypass Breaker on Shutdown
3	1 : Over Load Shutdown
2	1 : Inverter O/P Fail Shutdown
1	1 : Over Temperature Shutdown
0	1 : Short Circuit Shutdown

B7\b6\b5\b1\b0 固定为 0

Example: Computer : G2<cr>

UPS : !00000010 00000100 00000000<cr>

Means : Three in-Three out UPS.

Boost Charge.

Bypass AC Normal

3. UPS real time data for 3 phases

Computer : G3 <cr>

UPS :!NNN.N/NNN.N/NNN.N PPP.P/PPP.P/PPP.P QQQ.Q/QQQ.Q/QQQ.Q SSS.S/SSS.S/SSS.S<cr>

There should be a space character between every field for data separation. The meaning of each field is listed as follows:

a. Start byte : !

b. I/P voltage of R/S/T 3 phases : NNN.N/NNN.N/NNN.N

N is an integer number ranging from 0 to 9.

The unit is “Volt”.

c. Bypass AC source voltage of R/S/T 3 phases : PPP.P/PPP.P/PPP.P

P is an integer number ranging from 0 to 9.

The unit is “Volt”.

d. O/P voltage of R/S/T 3 phases : QQQ.Q/QQQ.Q/QQQ.Q

Q is an integer number ranging from 0 to 9.

The unit is “Volt”.

e. Load percentage of R/S/T 3 phases : SSS.S/SSS.S/SSS.S

S is an integer number ranging from 0 to 9.

The unit is “Percentage”.

Example: Computer : G3<cr>

UPS :!222.0/222.0/222.0 221.0/221.0/221.0 220.0/220.0/220.0 014.0/015.0/014.0<cr>

Means : I/P voltage R phase is 222V , S phase is 222V , T phase is 222V.

Bypass AC voltage source R phase is 221V , S phase is 221V , T phase is 221V.

I/P voltage R phase is 220V , S phase is 220V , T phase is 220V.

Loading of R phase is 14 % , S phase is 15% , T phase is 14% ..

4. UPS Information Command:

Computer : I<cr>

UPS : #Company_Name UPS_Model Version<cr>

This function makes UPS respond with the basic information about UPS. This includes UPS manufacture's name , UPS model name and UPS firmware version. The length of every field is listed as below:

Company_Name : 15 characters (bytes). Fill in with space characters if data cannot complete the field length .

UPS_Model : 10 characters(bytes), Fill in with space characters if data cannot complete the field length .

Version : 10 characters(bytes), Fill in with space characters if data cannot complete the field length .

There should be a space character between every field for data separation.

Example: Computer : I<cr>

UPS : #MegaTec^^^^^^^^ M1000K^^^^ V001203.12<cr>

Means : Company_Name: MegaTec^^^^^^^^

UPS_Model : M1000K^^^^

Version : V001203.12

‘^’ means a space character.

5. UPS Rating Information:

Computer : GF<cr>

UPS : !Rect_Volt CCC Bpass_Volt FFF O/P_Volt QQQ SSS Power_Rating <cr>

This function makes UPS respond with rating value of UPS.

There should be a space character between every field for data separation. The UPS response contains the following information fields.

a. Rectifier Voltage of Phase to Neutral and Phase to Phase (Rect_Volt) :

14 characters(bytes).

Fill in with space characters if data cannot complete the field length .

For example : 220V 3P3W, 220V/380V 3P4W

b. Rectifier Frequency : CCC

c. Bypass Source Voltage of Phase to Neutral and Phase to Phase (Bpass_Volt) :

14 characters(bytes).

Fill in with space characters if data cannot complete the field length .

For example : 220V 3P3W, 220V/380V 3P4W

d. Bypass Source Frequency : FFF

e. O/P Voltage of Phase to Neutral and Phase to Phase (O/P_Volt) :

14 characters(bytes).

Fill in with space characters if data cannot complete the field length .

For example : 220V 3P3W, 220V/380V 3P4W

f. O/P Frequency : QQQ

g. Battery Voltage: SSS

h. Power_Rating :

10 characters(bytes),

Fill in with space characters if data cannot complete the field length .

Example: Computer : GF<cr>

UPS : !220V/380V^3P4W 060 220V/380V^3P4W 061 220V/3P3W^^^^ 060 396 150KVA^^^^<cr>

Means : UPS Id: 01

Rectifier Voltage of Phase to Neutral and Phase to Phase: 220V/380V^3P4W .

Rectifier Frequency : 60Hz

Bypass Source Voltage of Phase to Neutral and Phase to Phase: 220V/380V^3P4W

Bypass Source Frequency : 61Hz

O/P Voltage of Phase to Neutral and Phase to Phase: 220V/3P3W^^^^

O/P Frequency : 60Hz

Battery Voltage : 396Vdc

Power_Rating : 150KVA^^^^

‘^’ means a space character