UPS Communication Protocol

1 Hardware Description

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)
```

2 Inquiry Command

2.1 QPI<cr>: Protocol ID Inquiry

Computer: QPI<cr>

UPS: (PI <NN><cr>

N is an integer number ranging from 0 to 9.

Function : To request the UPS Protocol ID.

2.2 QMD<cr>: Model Inquiry

Computer: QMD<cr>

UPS: (TTTTTTTTTTTTTTT WWWWWWW KK P/P MMM NNN RR BB.B <cr>

(a) UPS Model: TTTTTTTTTTTTTTT

This whole length is 15bits, if the model value less than 15 bits, please enter "#" before the UPS model instead, for example: #########G10KS.

(b) Output rated VA: WWWWWWW

W is an integer number ranging from 0 to 9. The unit is watt.

The whole length is 7 bits, if the VA value less than 7 bits, please enter "#" before the VA value instead, for example: ##10000.

(c) Output power factor: KK

K is an integer number ranging from 0 to 9.

KK is the percentage of power factor, for example: 70

(d) Input phase/Output phase: P/P

P is an integer number of 1 or 3.

(e) Nominal I/P Voltage: MMM

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

(f) Nominal O/P Voltage: NNN

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

(f) Battery Piece Number: RR

R is an integer number ranging from 0 to 9.

(g) Battery standard voltage per unit: BB.B

B is an integer number ranging from 0 to 9. The unit is volt.

For example:

Computer: QMD<cr>

UPS: (#########G10KS ##10000 70 1/1 220 220 20 12.0<cr>

2.3   QGS<cr>: The general status parameters inquiry

Computer：QGS<cr>

UPS: (MMM.M HH.H LLL.L NN.N QQQ.Q DDD KKK.K VVV.V SSS.S XXX.X TTT.T b9b8b7b6b5b4b3b2b1b0a0a1<cr>

	Data	Description	Notes
a	(	Start byte	
b	MMM.M	Input voltage	M is an Integer number 0 to 9. The units is V.
c	HH.H	Input frequency	H is an Integer number 0 to 9. The units is Hz.
d	LLL.L	Output voltage	L is an Integer number 0 to 9. The units is V.
e	NN.N	Output frequency	N is an Integer number from 0 to 9. The units is Hz.
g	QQQ.Q	Output current	Q is an Integer number from 0 to 9. The units is A.
h	DDD	Output load percent	For Off-line UPS: DDD is a percent of maximum VA, not an absolute value. For On-line UPS: DDD is Maximum of W% or VA%. VA% is a percent of maximum VA. W% is a percent of maximum real power.
j	KKK.K	Positive BUS voltage	K is an Integer ranging from 0 to 9. The units is V.
k	VVV.V	Negative BUS voltage	V is an Integer ranging from 0 to 9. The units is V.
l	SSS.S	P Battery voltage	S is an Integer ranging from 0 to 9. The units is V.

m	XXX.X	N Battery voltage	X is an Integer ranging from 0 to 9. The units is V.
n	TTT.T	Max Temperature of the detecting pointers	T is an integer ranging from 0 to 9. The units is °C

o	b9b8b7b 6b5b4b3 b2b1b0 a0a1	Ups status	B9,b8:
			    00: standy;
			    01: line-interactive;
			    10: on-line.
			B7: Utility Fail
			b6: Battery Low
			b5: Bypass/Boost Active
			b4: UPS Failed
			b3: EPO
			b2: Test in Progress
			b1: Shutdown Active
			b0: bat silence
			a0: Bat test fail
			a1: Bat test OK

Example:

Computer: QGS<cr>

UPS: (220.2 50.0 220.0 50.0 027.0 100 345.8 344.9 241.0 241.5 045.0 100011000000<cr>

Means:

I/P voltage is 220.2V.

I/P frequency is 50.0Hz

O/P voltage is 220.0V

O/P frequency is 50.0Hz.

O/P current is 27.0A

O/P load 100%

Positive BUS voltage is 345.8V

Negative BUS voltage is 344.9V

P Battery voltage is 241.0V.

N Battery voltage is 241.5V.

Temperature is 45.0 degrees of centigrade.

On-line mode, Utility OK, Bypass Active, UPS failed.

2.4   QFS<cr>: Fault Status Inquiry

If there are no UPS fail occur:

computer: QFS<cr>
    UPS: (OK<cr>   (no fault)

If there are UPS fail occur:

Computer: QFS<cr>

UPS: (KK PPP.P FF.F OOO.O EE.E LLL CCC.C HHH.H NNN.N BBB.B TTT.T <b7b6b5b4b3b2b1b0><cr>

Fault type	Fault Name	Fault Code
Bus fault	Bus start fail	0x01
	Bus volt over	0x02
	Bus volt under	0x03
	Bus volt unbalance	0x04
	Bus short	0x05
	PFC over current	0x06
Inverter fault	Inverter soft fail	0x11
	Inverter volt high	0x12
	Inverter volt low	0x13
	L1 inverter short	0x14
	L2 inverter short	0x15
	L3 inverter short	0x16
	L1L2 inverter short	0x17
	L2L3 inverter short	0x18
	L3L1 inverter short	0x19
	L1 inverter negative power	0x1A
	L2 inverter negative power	0x1B
	L3 inverter negative power	0x1C
Electric link fault	Bat SCR fault	0x21
	Line SCR fault	0x22
	Inverter relay open fault	0x23
	Inverter relay short fault	0x24
	Wiring fault	0x25
	Battery reverse fault	0x26
	Battery too high	0x27
	Battery too low	0x28

	Battery Fuse Open-Circuit Fault	0x29
Parallel system fault	CAN communication fault	0x31
	Host line fault	0x32
	Synchronization line fault	0x33
	Synchronization pulse line fault	0x34
	Parallel communication line loss	0x35
	Output circuit fault	0x36
Others	Over temperature	0x41
	CPU communication fault	0x42
	Overload fault	0x43
	Fan fault	0x44
	Charger fault	0x45

(a) Start byte: (

(b) Fault kind: KK

K is 2 bytes of ASCII code, define as following:

(c) I/P voltage before fault: PPP.P

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

(d) I/P frequency before fault: FF.F

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

(e) Inverter O/P voltage before fault: OOO.O

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

(f) Inverter O/P frequency before fault: EE.E

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

(g) O/P load before fault: LLL

LLL is the maximum of W% or VA%.

VA% is a percent of maximum VA.

W% is a percent of maximum real power.

(h) O/P current before fault: CCC.C

CCC is a percent of maximum current.

(i) Positive Bus voltage before fault: HHH.H

P is an integer number ranging from 0 to 9. The unit is volt.

(j) Negative Bus voltage before fault: NNN.N

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

(k) Battery voltage before fault: BBB.B

B is an integer number ranging from 0 to 9. The unit is volt

(l) Temperature before fault: TTT.T

T is an integer number ranging from 0 to 9. The unit is degree of centigrade.

(m) UPS running status before fault: <b7b6b5b4b3b2b1b0>

<b7b6b5b4b3b2b1b0> is one byte of binary information.

Each bit is transferred into ASCII code.   <bn> is a binary number   "0" or "1".

Bit	Remarks
7	1:DCTODC on
6	1:PFC on
5	1: INVERTER on
4	Reserved(always 0)
3	1:input relay on
2	1:O/P relay on
1	Reserved(always 0)
0	Reserved(always 0)

This fault data stream will be saved into EEPROM.

Example:

Computer: QFS<cr>

UPS: (01 208.3 41.0 160.2 50.0 102 027.0 160.0 190.0 041.0 069.0 01101100<cr>

Means: Bus start fault.

I/P voltage is 208.3V.

I/P frequency is 41.0HZ.

O/P voltage is 160.2V.

O/P frequency is 50.0HZ

Load is 102%

O/P current is 27.0A

Positive Bus voltage is 160.0V

Negative Bus voltage is 190.0V

Battery voltage is 41.0V.

Temperature is 69.0 ℃

IC3525 off, PFC on, INVERTER on, input relay on, O/P relay on

2.5 QWS<cr>: Warning Status Inquiry

Computer: QWS<cr>

UPS: (a0a1……a62a63<cr>

a0,…,a63 is the warning status. If the warning is happened, the relevant bit will set 1, else the relevant bit will set 0. The following table is the warning code.

bit	Warning code	warning
a0	01	Battery open
a1	02	IP N loss
a2	03	IP site fail
a3	04	Line phase error
a4	05	Bypass phase error
a5	06	Bypass frequency unstable
a6	07	Battery over charge
a7	08	Battery low
a8	09	Overload warning
a9	0A	Fan lock warning
a10	0B	EPO active
a11	0C	Turn on abnormal
a12	0D	Over temperature
a13	0E	Charger fail
a14	0F	Remote shut down
a15	10	L1 IP fuse fail
a16	11	L2 IP fuse fail
a17	12	L3 IP fuse fail
a18	13	L1 PFC positive error
a19	14	L1 PFC negative error
a20	15	L2 PFC positive error
a21	16	L2 PFC negative error
a22	17	L3 PFC positive error
a23	18	L3 PFC negative error
a24	19	CAN communication error
a25	1A	Synchronization line error
a26	1B	Synchronization pulse error
a27	1C	Host line error
a28	1D	Male connection error
a29	1E	Female connection error
a30	1F	Parallel line connection error

a31	20	Battery connect different
a32	21	Line connect different
a33	22	Bypass connect different
a34	23	Mode type different
a35	24	Parallel Capacity setting different
a36	25	Parallel Auto Start Enable setting different
a37	26	Parallel Bypass Enable setting different
a38	27	Parallel Bat Protected Enable setting different
a39	28	Parallel Bat Open Check Enable setting different
a40	29	Parallel Bypass Forbidden setting different
a41	2A	Parallel Converter Enable setting different
a42	2B	Parallel Bypass Freq High loss setting different
a43	2C	Parallel Bypass Freq Low loss setting different
a44	2D	Parallel Bypass Volt High loss setting different
a45	2E	Parallel Bypass Volt Low Loss setting different
a46	2F	Parallel Line Freq High Loss setting different
a47	30	Parallel Line Freq Low Loss setting different
a48	31	Parallel Line Volt High Loss setting different
a49	32	Parallel Line Volt Low Loss setting different
a50	33	Locked in bypass after overload 3 times in 30min
a51	34	Warning for three-phase AC input current unbalance
a52	35	Battery fuse broken
a53	36	Inverter inter-current unbalance
a54	37	P1 cut off pre-alarm

a55	38	Warning for Battery replace
a56	39	Warning for input phase error for LV 6-10K UPS
a57	3A	Cover of maintain switch is open
a58	3B	Phase Auto Adapt Failed

2.6   QMOD<cr>: UPS Mode inquiry

Computer: QMOD<cr>

UPS: (M<cr>

Mode	Code(M)
Power on mode	P
Standby mode	S
Bypass mode	Y
Line mode	L
Battery mode	B
Battery test mode	T
Fault mode	F
HE/ECO mode	E
Converter mode	C
Shutdown mode	D

For example:

Computer: QMOD<cr>

UPS: (Y<cr>

means: the current UPS mode is bypass mode.

2.7   QRI<cr>: UPS Rating Information inquiry

Computer: QRI<cr>

UPS: (MMM.M QQQ SSS.S 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 the following information field:

a. Rating Output Voltage   : MMM.M

b. Rating Output Current   : QQQ

c. Battery Voltage: SSS.S.

d. Rating Output Frequency   : RR.R

2.8   QBYV<cr>: The bypass voltage range inquiry

Computer: QBYV<cr>

UPS: (HHH LLL <cr>

	Data	Description	Notes
a	(	Start byte	
b	HHH	Voltage high loss point	H is an Integer number 0 to 9. The unit is V.
c	LLL	Voltage low loss point	L is an Integer number 0 to 9. The unit is V.

The bypass voltage rang from 176 to 264, default 176V, the precision is 1 volt.

2.9   QBYF<cr>: The bypass frequency range inquiry

Computer: QBYF<cr>

UPS: (HH.H LL.L <cr>

	Data	Description	Notes
a	(	Start byte	
b	HH.H	Freq high loss point	H is an Integer number 0 to 9. The unit is Hz.
c	LL.L	Freq low loss point	L is an Integer number 0 to 9. The unit is Hz.

The bypass frequency rang from 40.0 to 49.0, default 46.0Hz, the precision is 0.1Hz.

2.10   QFLAG<cr>: Setting flag status inquiry

Computer: QFLAG<cr>

UPS: (ExxxDxxx <cr>

ExxxDxxx is the flag status. E means enable, D means disable

x	Control setting
a	Enable/disable audible alarm
b	Enable/disable battery mode audible warning
c	Enable/disable code start
d	Enable/disable battery open status check
e	Enable/disable high efficiency mode
f	Enable/disable bypass forbiding
g	Enable/disable energy saving
h	Enable/disable short restart 3 times
i	Enable/disable inverter short clear function
j	Enable/disable Output socket1 when the delay release time is over in battery mode .
k	Enable/disable Output socket2 when the delay release time is over in battery mode.

l	Enable/disable Site fault detect
m	Set hot standby master/slave, PEM means master, PDM means slave
n	Enable/disable deep high efficiency mode
o	Enable/disable bypass when UPS turn off.
p	Enable/disable bypass audible warning
q	Enable/disable Constant Phase Angle function
r	Enable/disable auto-Restart.
s	Enable/disable battery deep discharge protect
t	Enable/disable battery low protect (if disable, the battery will discharge to 6V)
u	Enable/disable Free run function
v	Enable/disable converter mode
x	Enable/disable output parallel function in phase angle 0
y	Enable/disable phase auto adapt

2.11 QVFW<cr> : Main CPU Firmware version inquiry

Computer: QVFW<cr>

UPS: (VERFW: <NNNNN.NN><cr>

<n> is a HEX number from 0...9 or A…F.

Example:

Computer: QVFW<cr>

UPS: (VERFW: <00123.01><cr>

00123: firmware series number；01：version。

2.12 QID<cr>: The UPS ID inquiry

Computer：QID<cr>

UPS: (ABCDEEFFGXXXXX<cr>

	Data	Description	Notes
a	(	Start byte	
b	A	Main Production type	8: UPS,9: NONE UPS
c	B	Sub Production type	
d	C	VA type	
e	D	H/LV type	
f	EE	Year	
g	FF	Month	

h	G	Manufacturer ID	
i	XXXXX	Serial number	

Example:

Computer: QID<cr>

UPS: (83320903100001<cr>

2.13 QBV<cr>: The P battery information inquiry

Computer：QBV<cr>

UPS: (RRR.R NN MM CCC TTT<cr>

	Data	Description	Notes
a	(	Start byte	
b	RRR.R	Battery voltage	R is an Integer number 0 to 9. The units is V.
c	NN	Battery piece number	NN is from 01 to 20.
d	MM	Battery group number	MM is an Integer number 01 to 99.
e	CCC	Battery capacity	CCC is an Integer number 000 to 100.
f	TTT	Battery remain time	T is an Integer number 0 to 9. The units is minutes.

2.14 QHE<cr>: High efficiency mode voltage range inquiry

Computer: QHE<cr>

UPS: (HHH LLL <cr>

	Data	Description	Notes
a	(	Start byte	
b	HHH	Voltage high loss point	H is an Integer number 0 to 9. The unit is voltage.
c	LLL	Voltage low loss point	L is an Integer number 0 to 9. The unit is voltage.

2.15 QSK<n><cr>: Output socket status inquiry

Computer: QSK<n><cr>

<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2.

UPS: (N<cr>.

The "N" is "0"or "1" , if "N" is "0",the output socket status is OFF; if "N" is "1",the output socket status is ON。

2.16 QSKT<n><cr>: Output socket release delay time inquiry in battery mode

Computer: QSKT<n><cr>

<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2.

UPS: (NNN<cr>.

The "NNN" is from "000" to "999", unit is minute.

3   Control Command

3.1   T<cr>: 10 seconds test

Computer: T<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

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.

3.2   TL<cr>: Test until battery low

Computer: TL<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Test until battery low and then return to utility.

This command is used to let the user to discharge the battery by setting the time to test, that is to say that the user should discharge the battery by periods, with this command the ups will do it by itself.

3.3   T<n><cr>: Test for specified time

Computer: T<n><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

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

Means: Test for <n> minutes

3.4   S<n><cr>: Shutdown

Computer: S<n><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Shut UPS output off in <n> minutes.

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

But if the battery under occur before <n> minutes, the output is turned off immediately.

After UPS shut down, the controller of UPS monitors the utility. If the utility is there, the UPS will wait for 10 seconds and connect the utility to output.

<n> is a number ranging from .2, .3, ..., 01, 02,..., to 10.

For example: S.3<cr> --- shut out put off in (.3) minutes

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

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

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

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 0001 to 9999.

3.6 CS<cr>: Cancel shutdown

Computer: CS<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Cancel the S<n><cr> and S<n>R<m><cr> **and SON** command.

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

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

3.7 CT<cr>: Cancel test

Computer: CT<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Cancel all test activity and connect the utility to output immediately.

3.8 SON<cr>: Remote turn on UPS

Computer: SON<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Remote turn on UPS.

3.9 SOFF<cr>: Remote turn off UPS

Computer: SOFF<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Remote turn off UPS.

3.10   BZOFF<cr>: Silence buzzer beep

Computer: BZOFF <cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: The buzzer beep silence .

3.11   BZON<cr>: buzzer beep open

Computer: BZON <cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: The buzzer beep open

3.12   SKON<n><cr>: Remote turn on UPS output socket

Computer: SKON<n><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Remote turn on UPS output socket.

<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2,

3.13   SKOFF<n><cr>: Remote turn off UPS output socket

Computer: SKOFF<n><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Remote turn off UPS output socket.

<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2,

4   Setting parameters Command

4.1   PE<XXX>/PD<XXX><cr>: setting some status enable/disable

Computer: PE<XXX>/PD<XXX><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

X	Control setting
A	Enable/disable audible alarm
B	Enable/disable battery mode audible warning
C	Enable/disable code start
D	Enable/disable battery open status check
E	Enable/disable high efficiency mode
F	Enable/disable bypass forbiding

G	Enable/disable energy saving
H	Enable/disable short restart 3 times
I	Enable/disable inverter short clear function
J	Enable/disable "Output socket1 when the delay release time is over in battery mode" .
K	Enable/disable "Output socket2 when the delay release time is over in battery mode".
L	Enable/disable Site fault detect
M	Set hot standby master/slave, PEM means master, PDM means slave
N	Enable/disable deep high efficiency mode
O	Enable/disable bypass when UPS turn off.
P	Enable/disable bypass audible warning
Q	Enable/disable Constant Phase Angle function
R	Enable/disable auto-reboot.
S	Enable/disable battery deep discharge protect
T	Enable/disable battery low protect (if disable, the battery will discharge to 6V)
U	Enable/disable Free run function
V	Enable/disable converter mode
X	Enable/disable output parallel function in phase angle 0
Y	Enable/disable phase auto adapt

4.2   PSK<n><m><cr>: Set output socket release delay time in battery mode

Computer: PSK<n><m><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2,.

<m> is the output socket release delay time in battery mode, it's from"000"to "999",unit is minute.

4.3   PSF<m><cr>: Set bypass frequency loss loss point

Computer: PSF<m><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

In 50Hz system, <m> is a number ranging from 40.0 to 49.0, default 46.0Hz; in 60Hz system, <m> is a number ranging from 50.0 to 59.0, default 56.0Hz; the precision is 0.1Hz;

Computer: PSF42.1<cr>

UPS: (ACK<cr>

Means: The bypass frequency low loss point has been set to 42.1Hz

4.4   PGF<n><cr>: Set bypass frequency high loss point

Computer: PGF<n><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

In 50Hz system, <n> is a number ranging from 51.0 to 60.0, default 54.0Hz; in 60Hz system, <n> is a number ranging from 61.0 to 70.0; the precision is 0.1Hz.

Computer: PGF54.6<cr>

UPS: (ACK<cr>

Means: The bypass frequency high loss point has been set to 54.6Hz.

4.5   PLV<p><cr>: Set bypass voltage low loss point

Computer: PLV<p><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

<p> is a number ranging from 176 to 264, default 176V. The precision is 1 volt.

For example:

Computer: PLV<p><cr>

UPS: (ACK<cr>

Means: Set the bypass voltage low loss point to 185V.

4.6   PHV<q><cr>: Set bypass voltage high loss point

Computer: PHV<q><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

<q> is a number ranging from 176 to 276, default 276V. The precision is 1 volt.

For example:

Computer: PHV<q><cr>

UPS: (ACK<cr>

Means:Set the bypass voltage low loss point to 260V

4.7   PF<cr>: Setting control parameter to default value

Computer: PF<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

All UPS parameters set to default value.

(a) Setting bypass frequency low loss point to 46.0Hz.
(b) Setting bypass frequency high loss point to 54.0Hz.
(c) Setting bypass voltage low loss point to 176V.
(d) Setting bypass voltage high loss point to 264V.

X	Control setting
a	Enable/disable audible alarm
b	Enable/disable battery mode audible warning
c	Enable/disable code start
d	Enable/disable battery open status check
e	Enable/disable high efficiency mode
f	Enable/disable bypass forbidding
g	Enable/disable energy saving
h	Enable/disable short restart 3 times
i	Enable/disable inverter short clear function
j	Enable/disable "Output socket1 when the delay release time is over in battery mode" .
k	Enable/disable "Output socket2 when the delay release time is over in battery mode".
l	Enable/disable Site fault detect
m	Set hot standby master/slave, PEM means master, PDM means slave
n	Enable/disable deep high efficiency mode
o	Enable/disable bypass when UPS turn off.
p	Enable/disable bypass audible warning
q	Enable/disable Constant Phase Angle function
r	Enable/disable auto-reboot.
s	Enable/disable battery deep discharge protect
t	Enable/disable battery low protect (if disable, the battery will discharge to 6V)
u	Enable/disable Free run function
v	Enable/disable converter mode
x	Enable/disable output parallel function in phase angle 0
y	Enable/disable phase auto adapt

Notes: 1 is enable, 0 is disable.

4.8   BATGN<nn><cr>: Setting battery group number

Computer: BATGN <nn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

nn is from 01 to 99

4.9   HEH<nnn><cr>: Set high efficiency mode voltage high loss point

Computer: HEH <nnn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

nnn is form 001 to 300. The units is V.

4.10   HEL<nnn><cr>: Set high efficiency mode voltage low loss point

Computer: HEL<nnn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

nnn is form 001 to 300. The units is V.