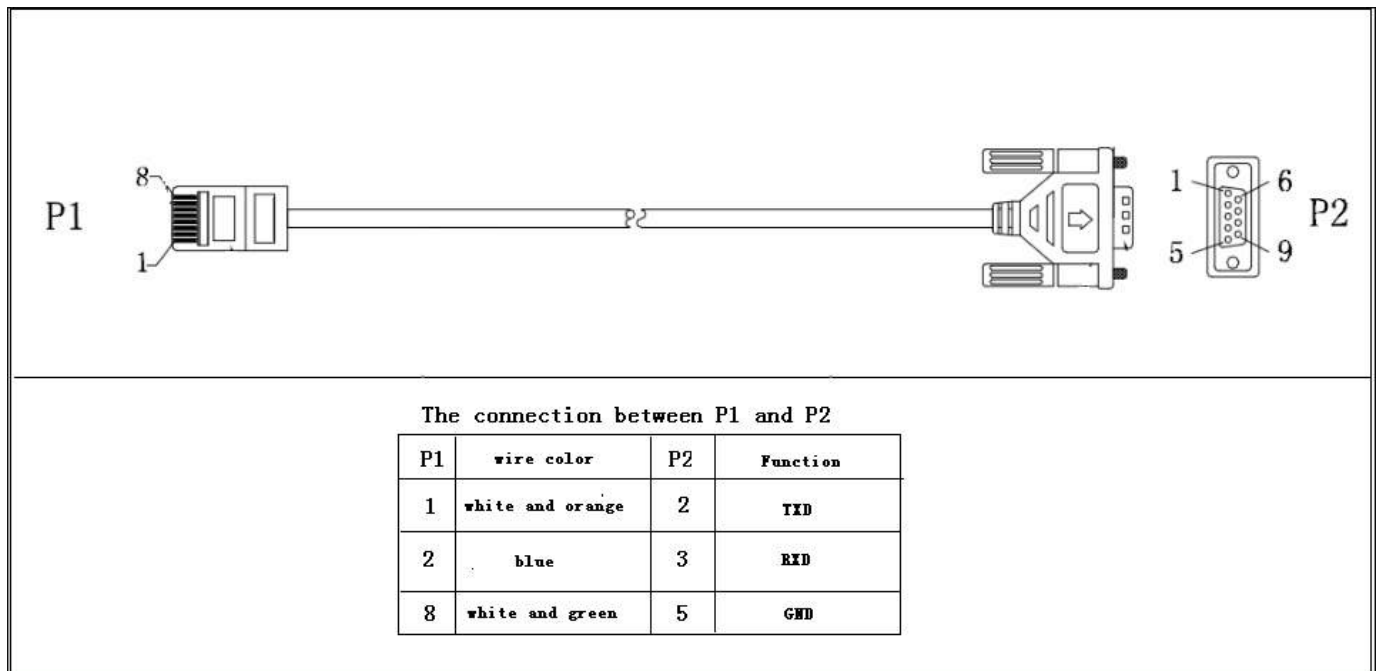


OPTI-Solar

SP Efecto & Brilliant RS232 communication Protocol

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RJ45 to RS232 cable between computer and device



1 Communication format

Baud rate	Start bit	Data bit	Parity bit	Stop bit
2400	1	8	N	1

2 Inquiry Command

2.1 QPI<cr>: Device Protocol ID Inquiry

Computer: QPI<CRC><cr>

Device: (PI<NN> <CRC><cr>

N is an integer number ranging from 0 to 9.

Function: To request the device Protocol ID.

Protocol ID distribution: 30 for this model.

2.2 QID<cr>: The device serial number inquiry

Computer: QID <CRC><cr>

Device: (XXXXXXXXXXXXXXXX <CRC><cr>

2.3 QVFW<cr>: Main CPU Firmware version inquiry

Computer: QVFW<CRC><cr>

Device: (VERFW:<NNNNN.NN><CRC><cr>

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

Example:

Computer: QVFW<CRC><cr>

Device: (VERFW:00123.01<CRC><cr>

00123: firmware series number; 01: version

2.4 QVFW2<cr> :Another CPU Firmware version inquiry

Computer: QVFW2<CRC><cr>

UPS: (VERFW2: <NNNNN.NN><CRC><cr>

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

2.5 QPIRI<cr>: Device Rating Information inquiry

Computer: QPIRI<CRC><cr>

Device: (BBB.B CC.C DDD.D EE.E FF.F HHHH IIII JJ.J KK.K JJ.J KK.K LL.L O PP QO
O P Q R SS T U<CRC><cr>

	Date	Description	Notes
A	(Start byte	
B	BBB.B	Grid rating voltage	B is an integer ranging from 0 to 9. The units is V.
C	CC.C	Grid rating current	C is an Integer ranging from 0 to 9. The units is A.
D	DDD.D	AC output rating voltage	D is an Integer ranging from 0 to 9. The units is V.
E	EE.E	AC output rating frequency	E is an Integer ranging from 0 to 9. The units is Hz.
F	FF.F	AC output rating current	F is an Integer ranging from 0 to 9. The unit is A.
H	HHHH	AC output rating apparent power	H is an Integer ranging from 0 to 9. The unit is VA.
I	IIII	AC output rating active power	I is an Integer ranging from 0 to 9. The unit is W.
J	JJ.J	Battery rating voltage	J is an Integer ranging from 0 to 9. The units is V.
K	KK.K	Battery re-charge voltage	K is an Integer ranging from 0 to 9. The units is V.

I	JJ.J	Battery under voltage	J is an Integer ranging from 0 to 9. The units is V.
M	KK.K	Battery bulk voltage	K is an Integer ranging from 0 to 9. The units is V.
N	LL.L	Battery float voltage	L is an Integer ranging from 0 to 9. The units is V.
O	O	Battery type	0: AGM 1: Flooded 2: User
P	PP	Current max AC charging current	P is an Integer ranging from 0 to 9 The units is A.
Q	Q0	Current max charging current	Q is an Integer ranging from 0 to 9. The units is A.
O	O	Input voltage range	0: Appliance(90Vac ~ 280Vac) 1: UPS(170Vac ~ 280Vac)
P	P	Output source priority	0: Utility first 1: Solar first 2: SBU first
Q	Q	Charger source priority	0: Utility first 1: Solar first 2: Solar + Utility 3: Only solar charging permitted
R	R	Reserved	
S	SS	Machine type	01: Off Grid;
T	T	Reserved	Only valid for 4kVA and 5kVA model
U	U	Output mode	Only valid for 4kVA and 5kVA model 00: single machine output 01: parallel output 02: Phase 1 of 3 Phase output 03: Phase 2 of 3 Phase output 04: Phase 3 of 3 Phase output
V	VV.V	Battery re-discharge voltage	Only valid for 4kVA and 5kVA model V is an Integer ranging from 0 to 9. The units is V.

2.6 QFLAG<cr>: Device flag status inquiry

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

x	Control setting
A	Enable/disable silence buzzer or open buzzer
B	Enable/Disable overload bypass function
J	Enable/Disable power saving
K	Enable/Disable LCD display escape to default page after 1min timeout
U	Enable/Disable overload restart
V	Enable/Disable over temperature restart
X	Enable/Disable backlight on
Y	Enable/Disable alarm on when primary source interrupt
Z	Enable/Disable fault code record

Computer: QFLAG <CRC><cr>

Device: (ExxxDxxx <CRC><cr>

2.7 QPIGS<cr>: Device general status parameters inquiry

Computer: QPIGS <CRC><cr>

Device: (BBB.B CC.C DDD.D EE.E FFFF GGGG HHH III JJ.JJ KK OOO TTTT EEEE
UUU.U WW.WW PPPP b7b6b5b4b3b2b1b0 <CRC><cr>

	Data	Description	Notes	
a	(Start byte		
b	BBB.B	Grid voltage	B is an Integer number 0 to 9. The units is V.	
C	CC.C	Grid frequency	C s an Integer number 0 to 9. The units is Hz.	
D	DDD.D	AC output voltage	D is an Integer number 0 to 9. The units is V.	
E	EE.E	AC output frequency	E is an Integer number from 0 to 9. The units is Hz.	
F	FFFF	AC output apparent power	F is an Integer number from 0 to 9. The units is VA	
G	GGGG	AC output active power	G is an Integer ranging from 0 to 9. The units is W.	
H	HHH	Output load percent	DEVICE: HHH is Maximum of W% or VA%. VA% is a percent of apparent power. W% is a percent of active power. The units is %.	
I	III	BUS voltage	I is an Integer ranging from 0 to 9. The units is	

			V.	
j	JJ.JJ	Battery voltage	J is an Integer ranging from 0 to 9. The units is V.	
k	KK	Battery charging current	K is an Integer ranging from 0 to 9. The units is A.	
o	OOO	Battery capacity	X is an Integer ranging from 0 to 9. The units is %.	
P	TTTT	Inverter heat sink temperature	T is an integer ranging from 0 to 9. The units is °C (NTC A/D value for 1~3K)	
r	EEEE	PV Input current for battery.	E is an Integer ranging from 0 to 9. The units is A.	
t	UUU.U	PV Input voltage 1	U is an Integer ranging from 0 to 9. The units is V.	
u	WW.WW	Battery voltage from SCC	W is an Integer ranging from 0 to 9. The units is V.	
w	PPPPP	Battery discharge current	P is an Integer ranging from 0 to 9. The units is A.	
x	b7b6b5b4 b3b2b1b0	Device status	b7: Reserved b6: configuration status: 1: Change 0: unchanged b5: SCC firmware version 1: Updated 0: unchanged b4: Load status: 0: Load off 1: Load on b3: reserve b2: Charging status(Charging on/off) b1: Charging status(SCC charging on/off) b0: Charging status(AC charging on/off) b2b1b0: 000: Do nothing 110: Charging on with SCC charge on 101: Charging on with AC charge on 111: Charging on with SCC and AC charge on	

2.8 QMOD<cr>: Device Mode inquiry

Computer: QMOD<CRC><cr>

Device: (M<CRC><cr>

MODE	CODE(M)	Notes
Power On Mode	P	Power on mode

Standby Mode	S	Standby mode
Line Mode	L	Line Mode
Battery Mode	B	Battery mode
Fault Mode	F	Fault mode
Power saving Mode	H	Power saving Mode

Example:

Computer: QMOD<CRC><cr>

DEVICE: (L<CRC><cr>

Means: the current DEVICE mode is Grid mode.

2.9 QPIWS<cr>: Device Warning Status inquiry

Computer: QPIWS<CRC> <cr>

Device: (a0a1.....a30a31<CRC><cr>

a0,...,a31 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	Description
a0	Reserved	
a1	Inverter fault	Fault
a2	Bus Over	Fault
a3	Bus Under	Fault
a4	Bus Soft Fail	Fault
a5	LINE_FAIL	Warning
a6	OPVShort	Warning
a7	Inverter voltage too low	Fault
a8	Inverter voltage too high	Fault
a9	Over temperature	Compile with a1, if a1=1,fault, otherwise warning
a10	Fan locked	Compile with a1, if a1=1,fault, otherwise warning
a11	Battery voltage high	Compile with a1, if a1=1,fault, otherwise warning
a12	Battery low alarm	Warning
a13	Reserved	
a14	Battery under shutdown	Warning
a15	Reserved	Warning
a16	Over load	Compile with a1, if a1=1,fault, otherwise warning

a17	Eeprom fault	Warning
a18	Inverter Over Current	Fault
a19	Inverter Soft Fail	Fault
a20	Self Test Fail	Fault
a21	OP DC Voltage Over	Fault
a22	Bat Open	Fault
a23	Current Sensor Fail	Fault
a24	Battery Short	Fault
a25	Power limit	Warning
a26	PV voltage high	Warning
a27	MPPT overload fault	Warning
a28	MPPT overload warning	Warning
a29	Battery too low to charge	Warning
a30	Reserved	
a31	Reserved	

2.10 QDI<cr>: The default setting value information

Computer: QDI<CRC><cr>

Device: (BBB.B CC.C 00DD EE.E FF.F GG.G HH.H II J K L M N O P Q R S T U V
W<CRC><cr>

	Data	Description	Notes	Remark
A	(Start byte		
B	BBB.B	AC output voltage	B is an Integer ranging from 0 to 9. The units is V.	
C	CC.C	AC output frequency	C is an Integer ranging from 0 to 9. The units is Hz.	
D	00DD	Max AC charging current	D is an Integer ranging from 0 to 9. The unit is A.	
E	EE.E	Battery Under voltage	E is an Integer ranging from 0 to 9. The unit is V.	Only for 4kVA/5kVA model
F	FF.F	Charging float voltage	F is an Integer ranging from 0 to 9. The unit is V.	Only for 4kVA/5kVA model
G	GG.G	Charging bulk voltage	G is an Integer	Only for 4kVA/5kVA model

			ranging from 0 to 9. The unit is V.	
H	HH.H	Battery default re-charge voltage	H is an Integer ranging from 0 to 9. The units is V.	.
I	II	Max charging current	I is an Integer ranging from 0 to 9. The units is A.	
J	J	AC input voltage range	J is an Integer ranging from 0 to 1. No unit	
K	K	Output source priority	K is an Integer ranging from 0 to 1. No unit	
L	L	Charger source priority	L is an Integer ranging from 0 to 1. No unit	
M	M	Battery type	M is an Integer ranging from 0 to 1. No unit	
N	N	Enable/disable silence buzzer or open buzzer	N is an Integer ranging from 0 to 1. No unit	
O	O	Enable/Disable power saving	O is an Integer ranging from 0 to 1. No unit	
P	P	Enable/Disable overload restart	P is an Integer ranging from 0 to 1. No unit	
Q	Q	Enable/Disable over temperature restart	Q is an Integer ranging from 0 to 1. No unit	
R	R	Enable/Disable LCD backlight on	R is an Integer ranging from 0 to 1. No unit	
S	S	Enable/Disable alarm on when primary source interrupt	S is an Integer ranging from 0 to 1. No unit	
T	T	Enable/Disable fault code record	T is an Integer ranging from 0 to 1. No unit	
U	U	Overload bypass	U is an Integer ranging from 0 to 1. No unit	

V	V	Enable/Disable LCD display escape to default page after 1min timeout	V is an Integer ranging from 0 to 1. No unit	
W	W	Output mode	W is an Integer ranging from 0 to 4. No unit	
Y	YY.Y	Battery re-discharge voltage	W is an Integer ranging from 0 to 9. The unit is V	

2.11 QMCHGCR<cr>: Enquiry selectable value about max charging current

Computer: QMCHGCR<CRC><cr>

Device: (AAA BBB CCC DDD.....<CRC><cr>

More value can be added, make sure there is a space character between every value.

2.12 QMUCHGCR<cr>: Enquiry selectable value about max utility charging current

Computer: QMUCHGCR<CRC><cr>

Device: (AAA BBB CCC DDD.....<CRC><cr>

More value can be added, make sure there is a space character between every value

2.13 QOPM<cr>: Enquiry output mode

Computer: QOPM<CRC><cr>

Device: (nn<CRC><cr>

nn:

00: single machine output

01: parallel output

02: Phase 1 of 3 Phase output

03: Phase 2 of 3 Phase output

04: Phase 3 of 3 Phase output

Only for 4kVA/5kVA model

3 Setting parameters Command

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

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

Device: (ACK<CRC><cr> if DEVICE accepts this command, otherwise, responds (NAK<cr>

PExxxPDxxx set flag status. PE means enable, PD means disable

x	Control setting
A	Enable/disable silence buzzer or open buzzer
B	Enable/disable overload bypass
J	Enable/Disable power saving
K	Enable/Disable LCD display escape to default page after 1min timeout
U	Enable/Disable overload restart
V	Enable/Disable over temperature restart
X	Enable/Disable backlight on
Y	Enable/Disable alarm on when primary source interrupt
Z	Enable/Disable fault code record

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

Computer: PF<CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

All Device parameters set to default value.

Note: The correct default value can be gain by QDI command.

3.3 MCHGC<nnn><cr>: Setting max charging current

Computer: MCHGC<nnn><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

Setting value can be gain by QMCHGCR command.

3.4 MUCHGC<nnn><cr>: Setting utility max charging current

Computer: MUCHGC<nnn><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

Setting value can be gain by QMUCHGCR command.

3.5 F<nn><cr>: Setting device output rating frequency

Computer: F<nn><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

Set UPS output rating frequency to 50Hz.or 60Hz

3.6 POP<NN><cr>: Setting device output source priority

Computer: POP<NN><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

Set output source priority, 00 for utility first, 01 for solar first, 02 for SBU priority

3.7 PBCV<nn.n><cr>: Set battery re-charge voltage

Computer: PBCV<nn.n><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

12V unit: 11V/11.3V/11.5V/11.8V/12V/12.3V/12.5V/12.8V

24V unit: 22V/22.5V/23V/23.5V/24V/24.5V/25V/25.5V

48V unit: 44V/45V/46V/47V/48V/49V/50V/51V

3.8 PBDV<nn.n><cr>: Set battery re-discharge voltage

Computer: PBDV<nn.n><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

12V unit: 00.0V/12.5V/12.8V/13V/13.3V/13.5V/13.8V/14V/14.3V/14.5

24V unit: 00.0V/25V/25.5V/26V/26.5V/27V/27.5V/28V/28.5V/29V

48V unit: 00.0V/50V/51V/52V/53V/54V/55V/56V/57V/58V

00.0V means battery is full(charging in float mode).

3.9 PCP<NN><cr>: Setting device charger priority

Computer: PCP<NN><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

Set output source priority, 00 for utility first, 01 for solar first, 02 for solar and utility, 03 for only solar charging

3.10 PGR<NN><cr>: Setting device grid working range

Computer: PGR<NN><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<cr>

Set device grid working range, 00 for appliance, 01 for UPS

3.11 PBT<NN><cr>: Setting battery type

Computer: PBT<NN><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds

(NAK<CRC><cr>

Set device grid working range, 00 for AGM, 01 for Flooded battery, 02 for user

3.12 POPM<nn><cr>: Set output mode

Computer: POPM <nn><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

nn:

00: single machine output

01: parallel output

02: Phase 1 of 3 Phase output

03: Phase 2 of 3 Phase output

04: Phase 3 of 3 Phase output

Only for 4kVA/5kVA model

3.13 PSDV<nn.n><cr>: Setting battery cut-off voltage

Computer: **PSDV** <nn.n><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds (NAK<CRC><cr>

nn.n: 40.0V ~ 48.0V

Only for 4kVA/5kVA model

4 Appendix

4.1 CRC calibration method



CRC. c