

MAX Communication Protocol

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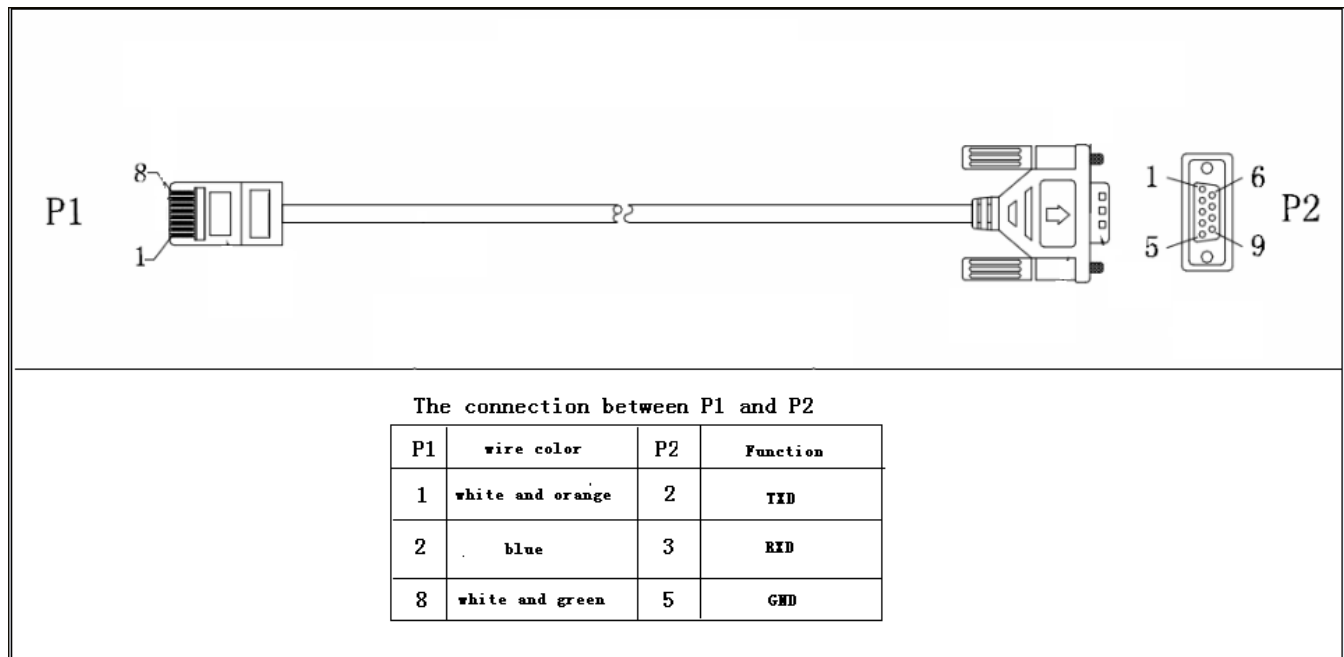
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RJ45 to RS232 cable between computer and device



1 Communication format

1.1 RS232

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 Axpert KS series

2.2 QID<cr>: The device serial number inquiry

Computer: QID <CRC><cr>

Device: (XXXXXXXXXXXXXXXXXX <CRC><cr>

2.3 QSID<cr>: The device serial number inquiry (the length is more than 14)

Computer: QSID<CRC><cr>

Device: (NNXXXXXXXXXXXXXXXXXXXXXXXXX <CRC><cr>

NN: Serial number valid length, X: Serial number, invalid part is filled as '0', total X is 20.

2.4 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:00023.01<CRC><cr>

00123: firmware series number; 01: version

2.5 QVFW3<cr>: Another CPU (remote panel) Firmware version inquiry

Computer: QVFW3<CRC><cr>

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

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

2.6 VERFW:<cr>: Bluetooth version inquiry

Computer: VERFW:<CRC><cr>

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

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

2.7 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** QQO
O P Q R SS T U VV.V W X **YYY Z CCC** <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.
l	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.

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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 3: Pylon 5: Weco 6: Soltaro 8: Lib 9: Lic
P	PP	Max AC charging current	P is an Integer ranging from 0 to 9 The units is A. If the max AC charging current is greater than 99A, then return to PPP
Q	QQ0	Max charging current	Q is an Integer ranging from 0 to 9. The units is A.
O	O	Input voltage range	0: Appliance 1: UPS
P	P	Output source priority	0: UtilitySolarBat 1: SolarUtilityBat 2: SolarBatUtility
Q	Q	Charger source priority	1: Solar first 2: Solar + Utility 3: Only solar charging permitted
R	R	Parallel max num	R is an Integer ranging from 0 to 9.
S	SS	Machine type	00: Grid tie; 01: Off Grid; 10: Hybrid.
T	T	Topology	0: transformerless 1: transformer
U	U	Output mode	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 05: Phase 1 of 2 Phase output 06: Phase 2 of 2 Phase output (120°) 07: Phase 2 of 2 Phase output (180°)
V	VV.V	Battery re-discharge voltage	V is an Integer ranging from 0 to 9. The unit is V.
W	W	PV OK condition for parallel	0: As long as one unit of inverters has connect PV, parallel system will

			consider PV OK; 1: Only All of inverters have connect PV, parallel system will consider PV OK
X	X	PV power balance	0: PV input max current will be the max charged current; 1: PV input max power will be the sum of the max charged power and loads power.
Y	YYY	Max. charging time at C.V stage (only 48V model)	Y is an Integer ranging from 0 to 9. The unit is minute.
Z	Z	Operation Logic (only 48V model)	0: Automatically 1: On-line mode 2: ECO mode
A1	CCC	Max discharging current (only 48V model)	C is an integer ranging from 0 to 9. The units is A.

2.8 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
d	Enable/Disable solar feed to grid (reserved feature)
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>

2.9 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 KKK OOO TTTT EE.E UUU.U WW.WW PPPPP b7b6b5b4b3b2b1b0 QQ VV MMMMM b10b9b8 Y ZZ AAAA <CRC><cr>

	Data	Description	Notes	Axpert
a	(Start byte		
b	BBB.B	Grid voltage	B is an Integer number 0 to 9. The units is V.	

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C	CC.C	Grid frequency	C is 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	KKK	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 Axpert 1~3K)	
r	EE.E	PV1 Input current	E is an Integer ranging from 0 to 9. The units is A.	
t	UUU.U	PV1 Input voltage	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: add SBU priority version, 1: yes,0: no 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: battery voltage to steady while charging b2: Charging status b1: Charging status(SCC charging on/off) b0: Charging status(AC charging on/off) b2b1b0:	Keep b6~b4, b2 ~ b0, reserve other

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			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	
y	QQ	Battery voltage offset for fans on	Q is an Integer ranging from 0 to 9. The unit is 10mV.	
z	VV	EEPROM version	V is an Integer ranging from 0 to 9.	
	MMMM M	PV1 Charging power	M is an Integer ranging from 0 to 9. The unit is watt.	
	b10b9b8	Device status	b10: flag for charging to floating mode b9: Switch On b8: flag for dustproof installed(1-dustproof installed,0-no dustproof, only available for Axpert V series)	
	Y	Solar feed to grid status (reserved feature)	0: normal 1: solar feed to grid	
	ZZ	Set country customized regulation (reserved feature)	00: India 01: Germany 02: South America	
	AAAA	Solar feed to grid power (reserved feature)	A is an Integer ranging from 0 to 9. The units is W.	

2.10 QPIGS2<cr>: Device general status parameters inquiry (Only 48V model)

Computer: QPIGS2 <CRC><cr>

Device: (BB.B CCC.C DDDDD <CRC><cr>

	Data	Description	Notes	Axpert
a	(Start byte		
b	BB.B	PV2 Input current	E is an Integer ranging from 0 to 9. The units is A.	
c	CCC.C	PV2 Input voltage	U is an Integer ranging from 0 to 9. The units is V.	
d	DDDDD	PV2 Charging power	M is an Integer ranging from 0 to 9. The unit is watt.	

2.11 QPGSn<cr>: Parallel Information inquiry (Only 48V model)

Computer: QPGSn<CRC><cr>; n is parallel machine number.

Device: (A BBBB BBBB BBBB BBBB C DD EEE.E FF.FF GGG.G HH.HH III JJJ KKK LL.L MMM NNN OOO.O PPP QQQQ RRRRR SSS b7b6b5b4b3b2b1b0 T U VVV WWW ZZ XX YYY OOO.O XX<CRC><cr>

	Date	Description	Notes
A	(Start byte	
B	A	The parallel num whether	0: No exist.

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		exist	1: Exist.
C	BBBBBBBB BBBBBB	Serial number	B is an Integer ranging from 0 to 9.
D	C	Work mode	C is an character, refer to QMOD
E	DD	Fault code	D is an Integer ranging from 0 to 9.
F	EEE.E	Grid voltage	E is an Integer ranging from 0 to 9. The units is V.
G	FF.FF	Grid frequency	F is an Integer ranging from 0 to 9. The unit is Hz.
H	GGG.G	AC output voltage	G is an Integer ranging from 0 to 9. The units is V.
I	HH.HH	AC output frequency	H is an Integer ranging from 0 to 9. The unit is Hz.
J	III	AC output apparent power	I is an Integer number from 0 to 9. The units is VA
K	JJJ	AC output active power	J is an Integer ranging from 0 to 9. The units is W.
L	KKK	Load percentage	K is an Integer ranging from 0 to 9. The units is %.
M	LL.L	Battery voltage	L is an Integer ranging from 0 to 9. The unit is V.
N	MMM	Battery charging current	M is an Integer ranging from 0 to 9. The units is A.
O	NNN	Battery capacity	N is an Integer ranging from 0 to 9. The units is %.
P	OOO.O	PV1 Input Voltage	O is an Integer ranging from 0 to 9. The units is V.
Q	PPP	Total charging current	P is an Integer ranging from 0 to 9. The units is A.
R	QQQQQ	Total AC output apparent power	Q is an Integer ranging from 0 to 9. The units is VA.
S	RRRRR	Total output active power	R is an Integer ranging from 0 to 9. The units is W.
T	SSS	Total AC output percentage	S is an Integer ranging from 0 to 9. The units is %.
U	b7b6b5b4b3b2b1b0	Inverter Status	b7: 1 SCC OK, 0 SCC LOSS b6: 1 AC Charging 0 AC no charging b5: 1 SCC Charging 0 SCC no charging b4b3: 2 battery open, 1 battery under, 0 battery

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			normal b2: 1 Line loss 0 Line ok b1: 1 load on, 0 load off b0: configuration status: 1: Change 0: unchanged
V	T	Output mode	0: single machine 1: parallel output 2: Phase 1 of 3 phase output 3: Phase 2 of 3 phase output 4: Phase 3 of 3 phase output 5: Phase 1 of 2 Phase output 6: Phase 2 of 2 Phase output (120°) 7: Phase 2 of 2 Phase output (180°)
W	U	Charger source priority	0: Utility first 1: Solar first 2: Solar + Utility 3: Solar only
X	VVV	Max charger current	V is an Integer ranging from 0 to 9. The units is A.
Y	WWW	Max charger range	W is an Integer ranging from 0 to 9. The units is A.
Z	ZZ	Max AC charger current	Z is an Integer ranging from 0 to 9. The units is A. If the max AC charging current is greater than 99A, then return to ZZZ
a	XX	PV1 input current	X is an Integer ranging from 0 to 9. The units is A.
b	YYY	Battery discharge current	Y is an Integer ranging from 0 to 9. The units is A.
c	OOO.O	PV2 input voltage	O is an Integer ranging from 0 to 9. The units is V.
d	XX	PV2 input current	X is an Integer ranging from 0 to 9. The units is A.

Fault Code	Fault Event
01	Fan is locked when inverter is off.
02	Over temperature
03	Battery voltage is too high
04	Battery voltage is too low

05	Output short circuited.
06	Output voltage is too high.
07	Overload time out
08	Bus voltage is too high
09	Bus soft start failed
10	PV over current
11	PV over voltage
12	DCDC over current
13	Battery discharge over current
51	Over current
52	Bus voltage is too low
53	Inverter soft start failed
55	Over DC voltage in AC output
57	Current sensor failed
58	Output voltage is too low
60	Power feedback protection
71	Firmware version inconsistent
72	Current sharing fault
80	CAN fault
81	Host loss
82	Synchronization loss
83	Battery voltage detected different
84	AC input voltage and frequency detected different
85	AC output current unbalance
86	AC output mode setting is different

2.12 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
Shutdown mode	D	Shutdown mode

Example:

Computer: QMOD<CRC><cr>

DEVICE: (L<CRC><cr>

Means: the current DEVICE mode is Grid mode.

2.13 QPIWS<cr>: Device Warning Status inquiry

Computer: QPIWS<CRC> <cr>

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

a0... a35 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	PV loss	Warning
a1	Inverter fault	Fault
a2	Bus Over	Fault
a3	Bus Under	Fault
a4	Bus Soft Fail	Fault
a5	LINE_FAIL	Warning
a6	OPVShort	Fault
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	Battery derating	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	
a23	Current Sensor Fail	Fault
a24	Reserved	
a25	Reserved	
a26	Reserved	

a27	Reserved	
a28	Reserved	
a29	Reserved	
a30	Reserved	
a31	Battery weak (only 48V model)	24V model: a31, a32 is fault code 48V model: a32, a33 is fault code
a32	Reserved	
a33	Reserved	
a34	Reserved	
a35	Battery equalization	Warning

2.14 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 YY.Y X

Z aaa bbb<CRC><cr>

	Data	Description	Notes	AXPERT
A	(Start byte		
B	BBB.B	AC output voltage	B is an Integer ranging from 0 to 9. The units is V.	Default 230.0 for HV models 120.0 for LV models
C	CC.C	AC output frequency	C is an Integer ranging from 0 to 9. The units is Hz.	Default 50.0 for HV models 60.0 for LV models
D	00DD	Max AC charging current	D is an Integer ranging from 0 to 9. The unit is A.	Default 0030
E	EE.E	Battery Under voltage	E is an Integer ranging from 0 to 9. The unit is V.	Default 44.0
F	FF.F	Charging float voltage	F is an Integer ranging from 0 to 9. The unit is V.	Default 54.0
G	GG.G	Charging bulk voltage	G is an Integer ranging from 0 to 9. The unit is V.	Default 56.4
H	HH.H	Battery default re-charge voltage	H is an Integer ranging from 0 to 9. The units is V.	Default 46.0 for HV model
I	II	Max charging current	I is an Integer ranging from 0 to 9. The units is A.	Default 60 for HV model
J	J	AC input voltage range	J is an Integer ranging from 0 to 1. No unit	Default 0 for Appliances range

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K	K	Output source priority	K is an Integer ranging from 0 to 1. No unit	Default 0 for utility first
L	L	Charger source priority	L is an Integer ranging from 1 to 3. No unit	Default 2 for solar and utility
M	M	Battery type	M is an Integer ranging from 0 to 1. No unit	Default 0 for AGM
N	N	Enable/disable silence buzzer or open buzzer	N is an Integer ranging from 0 to 1. No unit	Default 0 for enable buzzer
O	O	Enable/Disable power saving	O is an Integer ranging from 0 to 1. No unit	Default 0 for disable power saving
P	P	Enable/Disable overload restart	P is an Integer ranging from 0 to 1. No unit	Default 0 for disable overload restart
Q	Q	Enable/Disable over temperature restart	Q is an Integer ranging from 0 to 1. No unit	Default 0 for disable over temperature restart
R	R	Enable/Disable LCD backlight on	R is an Integer ranging from 0 to 1. No unit	Default 1 for enable LCD backlight on
S	S	Enable/Disable alarm on when primary source interrupt	S is an Integer ranging from 0 to 1. No unit	Default 1 for enable alarm on when primary source interrupt
T	T	Enable/Disable fault code record	T is an Integer ranging from 0 to 1. No unit	Default 1 for disable fault code record
U	U	Overload bypass	U is an Integer ranging from 0 to 1. No unit	Default 0 for disable overload bypass function
V	V	Enable/Disable LCD display escape to default page after 1min timeout	V is an Integer ranging from 0 to 1. No unit	Default 1 for LCD display escape to default page
W	W	Output mode	W is an Integer ranging from 0 to 4. No unit	Default 0 for single output
Y	YY.Y	Battery re-discharge voltage	W is an Integer ranging from 0 to 9. The unit is V	Default 54.0 for HV model

X	X	PV OK condition for parallel	X is an Integer ranging from 0 to 1	0: As long as one unit of inverters has connect PV, parallel system will consider PV OK;
Z	Z	PV power balance	X is an Integer ranging from 0 to 1	0: PV input max current will be the max charged current;
a	aaa	Max. charging time at C.V stage(only 48V model)	a is an Integer ranging from 0 to 9	
b	bbb	Max discharging current (only 48V model)	b is an integer ranging from 0 to 9. The units is A.	

2.15 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.

2.16 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.

2.17 QOPPT<cr>: The device output source priority time order inquiry

Computer: QOPPT<CRC><cr>

Device: (M N O O O<CRC><cr>

M: 24 hour correspond to the output source priority (0: Utility first, 1: Solar first, 2: SBU)

N: device output source priority

O: selection of output source priority order

Example:

Computer: QOPPT<CRC><cr>

Device: (0 0 0 0 0 2 2 0 1 2<CRC><cr>

Means: the device output source priority time order is SBU from 5 to 6, and output source priority is Utility first.

2.18 QCHPT<cr>: The device charger source priority time order inquiry

Computer: QCHPT<CRC><cr>

Device: (M N O O O<CRC><cr>

M: 24 hour correspond to the charger source priority (1: Solar first, 2: Solar + Utility, 3: Only solar charging permitted)

N: device charger source priority

O: selection of o charger source priority order

Example:

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Computer: QCHPT<CRC><cr>

Device: (1 2 2 2 2 2 2 1 0<CRC><cr>

Means: the device charger source priority time order is solar + utility from 20 to 23, and charger source priority is Solar first.

2.19 QT<cr>: Time inquiry

Computer: QT<cr>

Device: (YYYYMMDDHHMMSS<cr>

Example:

Computer: QT<cr>

Device: (20180101111120<cr>

Means: The time is 2018/01/01 11:11:20.

Data	Description	Notes
(Start byte	
YYYYMMDD	Date	Y, M and D are an Integer number 0 to 9.
HHMMSS	Time	H, M and S are an Integer number 0 to 9.

2.20 QBEQI<cr>: Battery equalization status parameters inquiry

Computer: QBEQI<CRC><cr>

Device: (B CCC DDD EEE FFF GG.GG HHH III J KKKK<CRC><cr>

	Data	Description	Notes
a	(Start byte	
b	B	Enable or Disable equalization	B is an Integer number 0 to 1.
C	CCC	equalization time	C s an Integer number 0 to 9. The unit is Minute.
D	DDD	equalization period	D is an Integer number 0 to 9. The unit is day.
E	EEE	equalization max current	E is an Integer number from 0 to 9. The unit is A.
F	FFF	reserved	reserved
G	GG.GG	equalization voltage	G is an Integer ranging from 0 to 9. The units is V.
H	HHH	reserved	reserved
I	III	equalization over time	I is an Integer ranging from 0 to 9. The unit is Minute.
j	J	equalization active status	J is an Integer ranging from 0 to 1.
k	KKKK	equalization elapse time	K is an Integer ranging from 0 to 9. The units is Hour.

2.21 QMN<cr>: Query model name

Computer: QMN<CRC><cr>

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

MMMMM: model name, NNNN: Rated output VA

2.22 QGMN<cr>: Query general model name

Computer: QGMN<CRC><cr>

Device: (NNN<CRC><cr> if Inverter accepts this command, otherwise, responds (NAK<cr>

2.23 QET<CRC><cr>: Query total PV generated energy

Computer: QET<CRC><cr>

Device: (NNNNNNNN<CRC><cr>

NNNNNNNN: Generated energy, N: 0~9, unit: Wh

2.24 QEYyyyy<CRC><cr>: Query PV generated energy of year

Computer: QEYyyyy<cr>

Device: (NNNNNNNN<CRC><cr>

yyyy: Year, y: 0~9

NNNNNNNN: Generated energy, N: 0~9, unit: Wh

2.25 QEMyyyymm<CRC><cr>: Query PV generated energy of month

Computer: QEMyyyymm <CRC><cr>

Device: (NNNNNNNN<CRC><cr>

yyyy: Year, y: 0~9

mm: Month, m: 0~9

NNNNNNNN: Generated energy, N: 0~9, unit: Wh

2.26 QEDyyyymmdd<CRC><cr>: Query PV generated energy of day

Computer: QEDyyyymmdd<CRC><cr>

Device: (NNNNNNNN<CRC><cr>

yyyy: Year, y: 0~9

mm: Month, m: 0~9

dd: Day, d: 0~9

NNNNNNNN: Generated energy, N: 0~9, unit: Wh

2.27 QLT<CRC><cr>: Query total output load energy

Computer: QLT<CRC><cr>

Device: (NNNNNNNN<CRC><cr>

NNNNNNNN: Output load energy, N: 0~9, unit: Wh

2.28 QLYyyyy<CRC><cr>: Query output load energy of year

Computer: QLYyyyy<CRC><cr>

Device: (NNNNNNNN<CRC><cr>

yyyy: Year, y: 0~9

NNNNNNNN: Output load energy, N: 0~9, unit: Wh

2.29 QLMyyyymm<CRC><cr>: Query output load energy of month

Computer: QLMyyyymm<CRC><cr>

Device: (NNNNNNNN<CRC><cr>

yyyy: Year, y: 0~9

mm: Month, m: 0~9

NNNNNNNN: Output load energy, N: 0~9, unit: Wh

2.30 QLDyyyymmdd<CRC><cr>: Query output load energy of day

Computer: QLDyyyymmdd<CRC><cr>

Device: (NNNNNNNN<CRC><cr>

yyyy: Year, y: 0~9

mm: Month, m: 0~9

dd: Day, d: 0~9

NNNNNNNN: Output load energy, N: 0~9, unit: Wh

2.31 QBMS<CRC><cr>: BMS message

Computer: QBMS<CRC><cr>

Device: (ACK <CRC><cr>

2.32 PBMS<CRC><cr>: BMS message

Remote box: PBMSa bbb c d e fff ggg hhh iiii jjjj<CRC><cr>

Device: (ACK<CRC><cr>

Data	Description	Notes
(Start byte	
a	Battery connect status	0: connect, 1: disconnect.
bbb	Battery percentage	b is an Integer ranging from 0 to 9. The units is %.
c	Force AC charge battery in any case	0: Do not force, 1: Force.
d	Battery stop discharge flag	0: Enable discharge, 1: disable discharging
e	Battery stop charge flag	0: Enable charge, 1: disable charging
fff	Battery C.V. charging voltage	f is an Integer ranging from 0 to 9. The units is V.
ggg	Battery floating charging voltage	g is an Integer ranging from 0 to 9. The units is V.
hhh	Battery cut-off voltage	h is an Integer ranging from 0 to 9. The units is V.
iiii	Battery max. charging current	i is an Integer ranging from 0 to 9. The units is A.
jjjj	Battery max. discharging current	j is an Integer ranging from 0 to 9. The units is A.

2.33 QLED<cr>: LED status parameters inquiry

Computer: QLED<cr>

UPS: (A B C D E aaa1bbb1ccc1 aaa2bbb2ccc2 (aaa3bbb3ccc3)<cr>

Item	Data	description	Notes
a	(Start code	
b	A	Enable or Disable	A is an Integer number 0 to 1.

c	B	LED speed	B is an Integer ranging from 0 to 2. 0 means low; 1 means medium; 2 means fast
d	C	LED effect	C is an Integer ranging from 0 to 3. 0 means breathing; 2 means solid; 3 means right scrolling
e	D	LED brightness	D is an Integer ranging from 1 to 9. 1 means low; 5 means normal; 9 means high
f	E	LED total number of colors	E is an Integer ranging from 2 to 3.
g	aaa1bbb1ccc1 aaa2bbb2ccc2 (aaa3bbb3ccc3)	aaa means red, bbb means green, ccc means blue	aaa1, bbb1, ccc1, aaa2, bbb2, ccc2, aaa3, bbb3, ccc3 is an Integer ranging from 0 to 255.

3 Setting parameters Command

3.1 ATE1<CRC><cr>: Start ATE test, remote panel stop polling

3.2 ATE0: End ATE test, remote panel polling

3.3 PE<X> / PD<X><cr>: Setting some status enable/disable

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

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

PE_x / PD_x 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
d	Enable/Disable solar feed to grid (reserved feature)
k	Enable/Disable LCD display escape to default page after 1min timeout
u	Enable/Disable overload restart and battery over discharge 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

3.4 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>

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

3.5 MNCHGC<mnnn><cr>: Setting max charging current

Computer: MNCHGC<mnnn><CRC><cr>

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

Setting value can be gain by QMCHGCR command.

nnn is max charging current, m is parallel machine number.

3.6 MUCHGC<mnn><cr>: Setting utility max charging current

Computer: MUCHGC<mnn><CRC><cr>

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

Setting value can be gain by QMUCHGCR command.

nn is max charging current, m is parallel machine number.

If the max AC charging current is greater than 99A, modify it to mnn

3.7 F<nn><cr>: Setting Inverter output rating frequency

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

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

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

3.8 V<nnn><cr>: Setting device output rating voltage

Computer: V<nnn><CRC><cr>

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

Set inverter output rating voltage to 220V/230V/240V for HV models.

Set inverter output rating voltage to 127V/120V/110V for LV models.

3.9 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 UtilitySolarBat, 01 for SolarUtilityBat, 02 for SolarBatUtility

3.10 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>

3.11 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>

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

3.12 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,

01 for solar first, 02 for solar and utility, 03 for only solar charging

3.13 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

3.14 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>

Setting battery type, 00 for AGM, 01 for Flooded battery, 02 for user define, 03 for Pylontech, 04 for Shinheung, 05 for Weco, 06 for Soltaro, 07 for BAK, 08 for Lib, 09 for Lic

3.15 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>

Set output mode to 00/01/02/03/04 for HV models.

Set output mode to 00/01/02/03/04/05/06/07 for LV models.

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

05: Phase 1 of 2 Phase output

06: Phase 2 of 2 Phase output (120°)

07: Phase 2 of 2 Phase output (180°)

3.16 PPCP<MNN><cr>: Setting parallel device charger priority

Computer: PCP<MNN><CRC><cr>

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

01 for solar first, 02 for solar and utility, 03 for only solar charging

M is parallel machine number.

3.17 PSDV<nn.n><cr>: Setting battery cut-off voltage (Battery under voltage)

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

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

3.18 PCVV<nn.n><cr>: Setting battery C.V. (constant voltage) charging voltage

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

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

3.19 PBFT<nn.n><cr>: Setting battery float charging voltage

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

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

3.20 RTEY<cr>: Reset all stored data for PV/load energy

Computer: RTEY <CRC><cr>

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

3.21 RTDL<cr>: Erase all data log

Computer: RTDL <CRC><cr>

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

3.22 PBEQE<n><cr>: Enable or disable battery equalization

Computer: PBEQE<n><CRC><cr>

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

Enable or Disable battery equalization, n=1 means enable; n=0 means disable.

3.23 PBEQT<nnn><cr>: Set battery equalization time

Computer: PBEQT<nnn><CRC><cr>

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

Set equalization time, nnn is in the range of 5 to 900minute, every click increase or decrease 5minute.

3.24 PBEQP<nnn><cr>: Set battery equalization period

Computer: PBEQP<nnn><CRC><cr>

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

Set equalization period, nnn is in the range of 0 to 90day, every click increase or decrease 1day.

3.25 PBEQV<nn.nn><cr>: Set battery equalization voltage

Computer: PBEQV<nn.nn><CRC><cr>

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

Set equalization time, nn.nn is in the range as below.

3.26 PBEQOT<nnn><cr>: Set battery equalization over time

Computer: PBEQOT<nnn><CRC><cr>

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

Set equalization time, nnn is in the range of 5 to 900minute, every click increase or decrease 5minute.

3.27 PBEQA<n><cr>: Active or inactive battery equalization now

Computer: PBEQA<n><CRC><cr>

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

Active or inactive battery equalization now, n=1 means active; n=0 means inactive.

3.28 PCVT<nnn><cr>: Setting max charging time at C.V stage

Computer: PCVT<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.

nnn is max charging time at C.V stage, the range is from 000 to 900 but in multiples of 5. 000 means automatically.

3.29 DAT<YYMMDDHHMMSS><cr>: Date and time

Computer: DAT<YYMMDDHHMMSS><CRC><cr>

MAX Communication Protocol

<Y, M, D, H, S> is an integer number 0 to 9

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

3.30 PBATCD<abc><cr>: Battery charge/discharge controlling command

Computer: PBATCD<abc><CRC><cr>

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

a = Discharge completely on/off

b = Discharge on/off, but standby allowed (so small discharge allowed)

c = Charge completely on/off

Detail:

abc:

	Charger	Discharger
1 1 1	Enabled charger	Enabled discharger
0 1 1	Enabled charger, depends on Prog16 setting if AC source valid, charge 2A from AC, even if prog. 16 is "only solar". If prog. 16 is any other setting, ignore and let charging from AC source continue normally.	Disabled discharger and shut down unit completely when insufficient PV or Grid is present.
1 0 1	Enabled charger, depends on Prog16 setting if AC source valid, charge 2A from AC, even if prog. 16 is "only solar". If prog. 16 is any other setting, ignore and let charging from AC source continue normally.	Disabled discharger but keep unit stay at standby mode.
1 1 0	Disabled charger	Enabled discharger
0 1 0	Disabled charger	Disabled discharger and shut down unit completely when no PV or Grid is present.
1 0 0	Disabled charger	Disabled discharger but keep unit stay at standby mode.
0 0 1	N/A	N/A
0 0 0	Cleaned the enable/disable charger flags and return to previous charger status.	Cleaned the enable/disable discharger flags and return to previous discharger status.

3.31 PBATMAXDISC<nnn><cr>: Setting max discharging current

Computer: PBATMAXDISC<nnn><CRC><cr>

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

nnn is max discharging current

48V unit: 000 or 30A~150A

000 means the function will be disable.

3.32 PLEDE<n><cr>: Enable/disable LED function

Computer: PLEDE<n><cr>

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

n: 0 means disable; 1 means enable

3.33 PLEDS<n><cr>: set LED speed

Computer: PLEDS<n><cr>

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

n: 0 means low; 1 means medium; 2 means fast

3.34 PLEDM<n><cr>: set LED effect

Computer: PLEDM<n><cr>

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

n: 0 means breathing; 2 means solid; 3 means right scrolling

3.35 PLEDB<n><cr>: set LED brightness

Computer: PLEDB<n><cr>

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

n means LED brightness, 1 means low; 5 means normal; 9 means high

3.36 PLEDT<n><cr>: set LED total number of colors

Computer: PLEDT<n><cr>

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

n means total number of colors, between 2 and 3

3.37 PLEDC<n><aaabbbccc><cr>: set LED color

Computer: PLEDC<n><aaabbbccc><cr>

UPS: (ACK<cr>

<n> must less than LED total number of colors, if UPS accepts this command, otherwise, responds (NAK<cr>

<n> means LED order, between 1 and 3; 1 indicate Line mode, 2 indicate AVR mode, 3 indicate Battery mode

<aaa, bbb, ccc> means RGB, between 0 and 255

For example:

Computer: PLEDC3160032240 <cr>

UPS: (ACK<cr>

Means: set battery mode to purple.

4 Appendix

4.1 CRC calibration method

