



Microcare® Protocol Explanation

For

Microcare® MPPTs,

UPS, and

Energy Meters

Prepared by:

Microcare®

www.microcare.co.za

Revision Sheet

Release No.	Date	Revision Description

Approvals

Title	Printed Name	Signature	Date
Client Representative			
Project Manager			
Project Leader			

Protocol Explanation

Contents

GENERAL INFORMATION	3
RESTRICTIONS:	3
License Information	3
Authorized Use Permission	3
1. Introduction	4
Spec. (When used on a Microcare MPPT solar regulator)	4
2. A Frame	4
3. MPPT available commands	6
4.0. Transmit Real-time Data	7
Transmit Command: 22	7
Reply Command: 2	7
4.1. 7 day Log	9
Transmit Command: 23	9
Reply Command: 4	9
4.2. Accumulated data since log started	10
Transmit Command: 24	10
Reply Command: 5	10
4.3. New Charge Mode	11
Transmit Command: 25	11
Reply Command: 254	11
4.4. Update MPPT status	11
Transmit Command: 6	11
Reply Command: N/A	11
4.5. Sending Battery Status (V+T)	11
Transmit Command: 21	11
Reply Command: 254	11
4.6. Calibrate MPPT	11
Transmit Command: 26	11
Reply Command: 254	11
4.7. Set New Supplier Line1	13
Transmit Command: 27	13
Reply Command: 254	13
4.8. Set New Supplier Line2	14
Transmit Command: 28	14
Reply Command: 254	14
4.9. Send MPPT Settings	15
Transmit Command: 29	15

Reply Command: 254	15
4.10. Get MPPT Specifications	19
Transmit Command: 30.....	19
Reply Command: 6	19
4.11. Clear log files.....	20
Transmit Command: 31.....	20
Reply Command: 254	20
4.12. Get MPPT Settings	20
Transmit Command: 32.....	20
Reply Command: 7	20
5. UPS commands	21
5.1. Turn off UPS	21
Transmit Command: 44.....	21
Reply Command: N/A	21
5.2. Turn on UPS	21
Transmit Command: 43.....	21
Reply Command: N/A	21
5.3. Transmit Real-time UPS data	21
Transmit Command: 42.....	21
Reply Command: 12	21
6. Energy meter commands.....	23
6.0. Reset meter	23
Transmit Command: 36.....	23
Reply Command: N/A	23
6.1. Return Channel 1 and 2 RMS and Total Kw/Hr.....	23
Transmit Command: 37.....	23
Reply Command: 35	23

GENERAL INFORMATION

RESTRICTIONS:

Copyright © 2014 by Microcare®

This publication is protected by federal copyright Law, with all rights reserved. No part of this publication may be reproduced, stored in a retrieval system, translated, transcribed, or transmitted, in any form, or by any means manual, electric, electronic, electro-magnetic, mechanical, chemical, optical, or otherwise, with prior explicit written permission from Microcare®.

License Information

THIS DOCUMENTATION IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE AUTHORS BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE PRODUCTS TO WHICH THE INFORMATION HERE APPLIES TO.

Authorized Use Permission

CHANGING ANY OF THE SETTINGS IN OUR PRODUCTS DIRECTLY AFFECTS THE PERFORMANCE OF THE PRODUCT AND MAY CAUSE IT TO FUNCTION INCORRECTLY OR GET DAMAGED. AS SUCH IT IS ADVISABLE TO CONTACT MICROCARE® OR AN AUTHORIZED INSTALLER BEFORE MAKING ANY CHANGES IF YOU ARE NOT SURE OF THE OUTCOME OF MAKING THOSE CHANGES.

MAKE ALL CHANGES AT YOUR OWN RISK

1. INTRODUCTION

The Microcare protocol is a standard protocol developed for use in all Microcare products for communication to and between products. It can also be used to extract data like charge voltage and current from a product such as the MPPT.

The protocol is intended for uses over a 3wire serial port, where the protocol will set:

- data flow direction
- data flow rate
- data flow path
- destination and source address
- Auto retransmit
- Auto replay
- CRC error checking
- Automatic data splitting and joining values larger than 8 bits
- Serial number checking.
-

It can setup variable data packet lengths and can automatically explore and link to other devices connected.

Spec. (When used on a Microcare MPPT solar regulator)

The protocol runs on baud rate= 9600

+/-10v DC logic state (equivalent to standard MAX232 or PC ports)

Broadcast serial no = 65000 (all Microcare products)

Broadcast serial no = 65000 (all Microcare MPPT's only)

The CRC is the sum of the data transmitted / received from byte 1 to byte 21.

2. A FRAME

A single frame consists of 25 packets; each packet (byte) is equivalent to 8bits.

The data length is set to 1 byte or 8 bits so if a 16 bit or higher value needs to be sent it is broken up into 8 MSB and 8 LSB bits for a 16 bit value.

One Frame:

Byte 0 = "Start" = 'S' (character) = 83

Byte 1 = "Destination (MSB)"

Byte 2 = "Destination (LSB)"

Byte 3 = "Source (MSB)"

Byte 4 = "Source (LSB)"

Byte 5 = "Command"

Byte 6 = "Packet length"

Byte 7 - 21 = "Packet payload"

Byte 22 = "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = "End" = 'E' (character) = 69

An example of "Packet payload" further sub divided (command 22):

Byte 7 = "Device serial no (MSB)"

Byte 8 = "Device serial no (LSB)"

Byte 9 = "Battery voltage (MSB)"

Byte 10 = "Battery voltage (LSB)"

Byte 11 = "Battery temperature (MSB)"

Microcare

Byte 12 = "Battery temperature (LSB)"
Byte 13 = "Charge current (MSB)"
Byte 14 = "Charge current (LSB)"
Byte 15 = "Panel/Turbine voltage (MSB)"
Byte 16 = "Panel/Turbine voltage (LSB)"
Byte 17 = "Charge mode"
Byte 18 = "LED & PB status"
Byte 19 = "current screen"
Byte 20 = "state of connection"
Byte 21 = "no of retransmits"

NB: when a certain byte is not required, **do not** leave it as blank. Put anything, usually 170. To make sure you have a full 25 byte frame. So everywhere you see **N/A** you can replace with 170 or anything you want (any byte).

3. MPPT AVAILABLE COMMANDS

When data is sent to the MPPT or data is requested it is done with a corresponding command so that the protocol can know what it is that it must construct and transmit or what type of data it is receiving.

0 = Request to make a connection to the MPPT (not necessary), If transmitted MPPT will replay with 1 to acknowledge the connection

1 = Sent as acknowledgement for 0

2 = MPPT sending real time data

4 = MPPT sending 7 day log data

5= MPPT sending total log's data

22 = Request the following from MPPT: serial no, battery volts, battery temperature, battery charge current, panel/turbine voltage, charge mode, LED & PB status, battery pack and current screen, state of connection, no of retransmits
MPPT replies with command 2

23 = Request the following from MPPT: Total Kw/h for the last 7 days
MPPT replies with command 4

24 = Request the following from MPPT: Total Kw/h charged into the batteries for this/that day, average power charged per day (24 hours), The total power charged since the start of the log, the no of days, hours and minutes of the loge.
MPPT replies with command 5

26 = Send calibration information: You can set the Gain, Supplier Number, serial Number(MSB,LSB) and MPPT size.
MPPT replies with command 254.

27 = Send New Supplier Name Line 1 you can set Line 1 of a new Supplier Name. You have a total of 15 characters for Line 1 of the Supplier Name
MPPT replies with command 254

28 = Send New Supplier Name Line 2: You can set Line 2 of a new Supplier Name. You have a total of 15 characters for Line 2 of the Supplier Name
MPPT replies with command 254

Microcare

29 = Send New Settings to MPPT:	This command allows you to send settings to the MPPT. Most of the individual settings for voltage and current can be set using this command MPPT replies with command 254
30 = Get MPPT Specifications:	MPPT replies with command 6 This command is used to request for information about the MPPT specification e.g. MPPT serial number, Amp rating, Software version etc.
31 = Clear log files:	MPPT replies with command 254 The MPPT can accumulate up to 63 days of log data showing the amount of power produced each day. This command is used to clear that data.
32 = Get MPPT Settings:	MPPT replies with command 7 This command can be used to request the MPPT to transmit all its settings

For more commands or to request a new command please contact MICROCARE

Below is the breakdown of the commands available for the MPPTMPPT

4.0. Transmit Real-time Data

Transmit Command: 22

Reply Command: 2

For this command the MPPT will transmit nearly all of its real time data in the following format with command = 2.

Battery voltage = Battery voltage received / 10

Battery temperature = Battery temperature received * 0.48828

Panel/Turbine voltage = Panel/Turbine voltage received / 10

Charge mode, example, when bit b3 = true then charge mode is "equ_wait"

LED & PB status, same technique as used with charge mode (bit banging)

Charge current = Charge current received * shunt constant

For a 20 and 40 amp MPPT shunt constant = 0.125

For a 60 amp MPPT shunt constant = 0.25

For a 100 amp MPPT shunt constant = 0.375

If the software version of the MPPT = x.x5 then the above is valid.

If the software version of the MPPT = x.x0 then the above calculation must be done and then the result (battery current) must be multiplied by 2.

Microcare

Also see **shunt constants table** for the value to be used for your equipment at the end of this document.

Frame format received:

Byte 0 = 83 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = 2

Byte 6 = n/a

Byte 7 = "Device serial no (MSB)"

Byte 8 = "Device serial no (LSB)"

Byte 9 = "Battery voltage (MSB)"

Byte 10 = "Battery voltage (LSB)"

Byte 11 = "Battery temperature (MSB)"

Byte 12 = "Battery temperature (LSB)"

Byte 13 = "Charge current (MSB)"

Byte 14 = "Charge current (LSB)"

Byte 15 = "Panel/Turbine voltage (MSB)"

Byte 16 = "Panel/Turbine voltage (LSB)"

Byte 17 = "Charge mode"

b7 = NC, b6 = NC, b5 = ext_signal,
b4 = nigh, b3 = equ_wait, b2 = float,
b1 = boost, b0 = equ_timed

Byte 18 = "LED & PB status"

b7 = NC, b6 = NC, b5 = NC, b4 = LED_G, b3 =
LED_O, b2 = LED_R, b1 = PB_M, b0 = PB_D

Byte 19 = "current screen"

0 = main

Byte 20 = "state of connection" 0 = false 1 = true

Byte 21 = MPPT Size

Byte 22 = "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 69 'E'

4.1. 7 day Log

Transmit Command: 23

Reply Command: 4

For this command the MPPT will transmit the data it has saved in its memory allocated for the 7 day log in the following format with command = 4.

Total Kw/h = Total Kw/h received / 1000

Frame format:

Byte 0 = 83 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = 4

Byte 6 = N/A

Byte 7 = "Total for 1 day ago (MSB)"

Byte 8 = "Total for 1 day ago (LSB)"

Byte 9 = "Total for 2 days ago (MSB)"

Byte 10 = "Total for 2 days ago (LSB)"

Byte 11 = "Total for 3 days ago (MSB)"

Byte 12 = "Total for 3 days ago (LSB)"

Byte 13 = "Total for 4 days ago (MSB)"

Byte 14 = "Total for 4 days ago (LSB)"

Byte 15 = "Total for 5 days ago (MSB)"

Byte 16 = "Total for 5 days ago (LSB)"

Byte 17 = "Total for 6 days ago (MSB)"

Byte 18 = "Total for 6 days ago (LSB)"

Byte 19 = "Total for 7 days ago (MSB)"

Byte 20 = "Total for 7 days ago (LSB)"

Byte 21 = N/A

Byte 22 = "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 69 'E'

4.2. Accumulated data since log started

Transmit Command: 24

Reply Command: 5

For this command the MPPT will transmit the data it has saved in its memory allocated for the accumulation of data sampled since the log has started, it will also transmit the number of days, hours and minutes that it has been logging in the following format with command = 5.

Total Kw/h = Total Kw/h received / 1000

Time is as it is received

Frame format:

Byte 0 = 83 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = 5

Byte 6 = N/A

Byte 7 = "Device serial no (MSB)"

Byte 8 = "Device serial no (LSB)"

Byte 9 = "24hr average Kw/h (MSB)"

Byte 10 = "24hr average Kw/h (LSB)"

Byte 11 = "Total Kw/h (MSB)"

Byte 12 = "Total Kw/h (LSB)"

Byte 13 = "No of days (MSB)"

Byte 14 = "No of days (LSB)"

Byte 15 = "No of hours (MSB)"

Byte 16 = "No of hours (LSB)"

Byte 17 = "No of minutes (MSB)"

Byte 18 = "No of minutes (LSB)"

Byte 19 = N/A

Byte 20 = N/A

Byte 21 = N/A

Byte 22 = "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 'E'

4.3. New Charge Mode

Transmit Command: 25

Reply Command: 254

4.4. Update MPPT status

Transmit Command: 6

Reply Command: N/A

4.5. Sending Battery Status (V+T)

Transmit Command: 21

Reply Command: 254

4.6. Calibrate MPPT

Transmit Command: 26

Reply Command: 254

Use this command to set calibration information. This command allows you to set different options of the MPPT specifications.

The frame sent will be filled as follows:

Hints:

Supplier number (Byte 8): a list is available of the supplier numbers that are pre-programmed into the MPPTS. The position of a supplier name on this list corresponds to the supplier number that will be sent to the MPPT.

For example:

The first 3 names on the list are:

"J&J Electronics",

"AGRI SOLAR",

"ECO NOMICS"

So when you send "0" as supplier number, supplier name will be set to "J&J Electronics ",

So when you send "1" as supplier number, supplier name will be set to "AGRI SOLAR",

So when you send "2" as supplier number, supplier name will be set to "ECO NOMICS"

NB: send "254" as supplier number, to set a **custom Supplier Name** not available on the list, then use command "27" and "28" to send a maximum of 15 characters for line 1 and 15 characters for line 2 of the supplier name.

MPPT Size (Byte 11)

Likewise for MPPT size send "20" to set as a 20A, "40" to set as a 40A and so on

Option	Byte to send
20A	20
40A	40
60A	60
100A	100

Frame format:

Byte 0 = 83 'S'
Byte 1 = Destination MSB
Byte 2 = Destination LSB
Byte 3 = Source MSB
Byte 4 = Source LSB
Byte 5 = the command = 26
Byte 6 = 15
Byte 7 = Gain default =0
Byte 8 = Supplier number
Byte 9 = "Serial number of MPPT (MSB)"
Byte 10 = "Serial number of MPPT (LSB)"
Byte 11 = MPPT size: 0=20A MPPT, 1=40A...
Byte 12 = 170
Byte 13 = 170
Byte 14 = 170
Byte 15 = 170
Byte 16 = 170
Byte 17 = 170
Byte 18 = 170
Byte 19 = N/A
Byte 20 = N/A
Byte 21 = N/A

Byte 22= "CRC (MSB)"
Byte 23 = "CRC (LSB)"
Byte 24 = 'E'

4.7. Set New Supplier Line1

Transmit Command: 27

Reply Command: 254

Use this command to set Line 1 of a custom Supplier Name

This command works in conjunction with command 26

The frame sent will be filled as follows:

The characters are sent as the **ASCII equivalent** of the letters.

E.g. to set line1 of the supplier name to "iSupply"

Byte 7 = 105 "i"

Byte 8 = 83 'S'

Byte 9 = 117 "u"

Byte 10 = 112 "p"

Byte 11 = 112 "p"

Byte 12 = 108 "l"

Byte 13 = 121 "y"

Byte 14 to Byte 21 = 032 – space character

Frame format:

Byte 0 = 83 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = the command = 27

Byte 6 = 15

Byte 7 = New Supplier Name character 1

Byte 8 = New Supplier Name character 2

Byte 9 = New Supplier Name character 3

Byte 10 = New Supplier Name character 4

Byte 11 = New Supplier Name character 5

Byte 12 = New Supplier Name character 6

Byte 13 = New Supplier Name character 7

Byte 14 = New Supplier Name character 8

Byte 15 = New Supplier Name character 9

Byte 16 = New Supplier Name character 10

Byte 17 = New Supplier Name character 11

Byte 18 = New Supplier Name character 12

Byte 19 = New Supplier Name character 13

Byte 20 = New Supplier Name character 14

Byte 21 = New Supplier Name character 15

Byte 22 = "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 'E'

4.8. Set New Supplier Line2

Transmit Command: 28

Reply Command: 254

Use this command to set Line 2 of a custom Supplier Name
This command works in conjunction with command 26

The frame sent will be filled as follows:

The characters are sent as the **ASCII equivalent** of the letters.
E.g. to set line2 of the supplier name to **"Tell:0776666666"**

Byte 7 = 084 **"T"**

Byte 8 = 101 **'e'**

Byte 9 = 108 **"l"**

Byte 12 = 048 **"0"**

Byte 10 = 055 **"7"**

Byte 11 = 055 **"7"**

Byte 12 = 054 **"6"**

Byte 13 = 054 **"6"**

Byte 14 = 054 **"6"**

Byte 15 = 054 **"6"**

Byte 16 = 054 **"6"**

Byte 17 = 054 **"6"**

Byte 18 = 054 **"6"**

Byte 19 to Byte 21 = 032 – space character

Byte 0 = 83 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = the command = 28

Byte 6 = 15

Byte 7 = New Supplier Name character 1

Byte 8 = New Supplier Name character 2

Byte 9 = New Supplier Name character 3

Byte 10 = New Supplier Name character 4

Byte 11 = New Supplier Name character 5

Byte 12 = New Supplier Name character 6

Byte 13 = New Supplier Name character 7

Byte 14 = New Supplier Name character 8

Byte 15 = New Supplier Name character 9

Byte 16 = New Supplier Name character 10

Byte 17 = New Supplier Name character 11

Byte 18 = New Supplier Name character 12

Byte 19 = New Supplier Name character 13

Microcare

Byte 20 = New Supplier Name character 14

Byte 21 = New Supplier Name character 15

Byte 22= "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 'E'

4.9. Send MPPT Settings

Transmit Command: 29

Reply Command: 254

Use this command to adjust settings in the MPPT

Hints:

Special values (Byte 7):

bit: 7 = NC, bit: 6 = NC, bit: 5 = NC, bit: 4 = NC, bit: 3 = NC,

bit: 2 = Turbine break voltage (1=brake at float, 0 = manual),

bit: 1 = equalize mode (0=off, 1=Auto), bit: 0 = MPPT type (0=Solar, 1= Wind)

Float voltage (Byte 8): Voltage range: between **13.2V - 14.5V; increments of 0.1**

To set as **Default value**; Send **Byte 8 = 0**

To set a custom value (between 13.2V and 14.5V increments of 0.1) *10:

➤ To set as 13.2V; Send **132** (13.2*10)

Boost voltage (Byte 9): Voltage range: between **13.5V - 16.0V; increments of 0.1**

To set as **Default value**; Send **Byte 9 = 0**

To set a custom value (between 13.5V and 16.0 increments of 0.1) *10:

➤ To set as 13.5V; Send **135** (13.5*10)

Boost Time (Byte 10): the list of options available and value to send is shown below:

Option	Byte to send
"INTERVAL SCAN 30Mins"	0
"INTERVAL SCAN 1Hr"	1 <default>
"INTERVAL SCAN 2Hr"	2

Microcare

Boost Amps (Byte 11): the list of options available and value to send is shown below:

Option	Byte to send
"IF CHARGE < 3A	0
"IF CHARGE < 6A	1 <default>
"IF CHARGE < 15A	2
"IF CHARGE < 30A	3
"AMP SELECT DISABLED	4

Battery Pack (Byte 12): the list of options available and value to send is shown below:

Option	Byte to send
"AUTO"	0 <default>
"6CELL/ 12V BATTERY"	1
"12CELL/ 24V BATTERY"	2
"18CELL/ 36V BATTERY"	3
"24CELL/ 48V BATTERY"	4
"36CELL/ 72V BATTERY"	5
"24CELL/ 48V BATTERY"	6
"36CELL/ 72V BATTERY"	7
"48CELL/ 96V BATTERY"	8

External Relay Type (Byte 13): the list of options available and value to send is shown below:

Option	Byte to send
"UNUSED OUTPUT N/C"	0 <default>
"SOLAR ASSIST SIGNAL"	1
"DAY NIGHT no L-S SIG"	2
"LOAD SHED SIGNAL"	3
"SOLAR AST v2 SIGNAL"	4
"SOLAR AST UPS CNTRL"	5
"WIND TURBINE BREAK"	6
"DAY + L-S SIGNAL"(7)	7
"NIGHT + L-S SIGNAL"	8

Battery Low Disconnect (Byte 14): Voltage range: between **10.0V - 12.0V**; increments of **0.1**

To set as **Default value (11.0V)**; Send **Byte 14 = 110V (11.0 *10)**

To set a custom value (between 10.0V and 12.0 increments of 0.1) *10:

- To set as 11.2V; Send **112** (11.2*10)

Battery Low Reconnect (Byte 15): Voltage range: between **12.0V - 14.0V**; increments of **0.1**

To set as **Default value (13.0V)**; Send **Byte 15 = 130V (13.0 *10)**

To set a custom value (between 12.0V and 14.0 increments of 0.1) *10:

- To set as 13.2V; Send **132** (13.2*10)

Microcare**batteryPackSelected value for Turbines**

Option	batteryPackSelected
"6CELL/ 12V BATTERY"	1
"12CELL/ 24V BATTERY"	2
"18CELL/ 36V BATTERY"	3
"24CELL/ 48V BATTERY"	4
"36CELL/ 72V BATTERY"	5
"24CELL/ 48V BATTERY"	6
"36CELL/ 72V BATTERY"	7
"48CELL/ 96V BATTERY"	8

Turbine cut-in voltage (Byte 16):**DEFAULT** = Auto Selected.To set as **Default value**; Send **Byte 16 = 0**

To set a custom value:

Range: **15** * batteryPackSelected to **100** * batteryPackSelected
Increments of 1To set as **Custom value**; Send **Byte 16 = Custom value**

- To set as 16V for a **24V battery pack**; Send **32** (16*2)

Turbine Load dump voltage (Byte 17)**DEFAULT** = Auto Selected.To set as **Default value**; Send **Byte 17 = 0**

To set a custom value:

Range: **16** * batteryPackSelected to **135** * batteryPackSelected
Increments of 1To set as **Custom value**; Send **Byte 17 = Custom value**

- To set as 16V for a **24V battery pack**; Send **32** (16*2)

Turbine Release voltage (Byte 18)**DEFAULT** = 11.4To set as **Default value**; Send **Byte 18 = 114** (11.4*10)

To set a custom value:

Range: **11.5** * batteryPackSelected to **13.5** * batteryPackSelected
Increments of 0.1To set as **Custom value**; Send **Byte 18 = Custom value*10**

- To set as 12.0V for a **24V battery pack**; Send **240** (12.0*2)*10

Hours (Byte 19) and Minutes (Byte 20)

To set time as 14h20 (24hr clock)

Byte 19 = 14

Byte 20 = 20

The frame sent will be filled as follows:

Byte 0 = 83 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = the command = 27

Byte 6 = 15

Byte 7 = Special values

Byte 8 = float voltage

Byte 9 = Boost voltage

Byte 10 = Boost Time

Byte 11 = Boost Amps

Byte 12 = Battery Pack

Byte 13 = External Relay Type

Byte 14 = Battery Low Disconnect

Byte 15 = Battery Low Reconnect

Byte 16 = Turbine cut-in voltage

Byte 17 = Turbine Load dump voltage

Byte 18 = Turbine Release voltage

Byte 19 = Hours

Byte 20 = Minutes

Byte 21 = 170

Byte 22 = "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 'E'

4.10. Get MPPT Specifications

Transmit Command: 30

Reply Command: 6

Use this command to get the device Specifications. This includes information like the Serial Number, Amp rating, software version etc.

The frame received will be filled as follows:

Byte 0 = 83 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = the command = 6

Byte 6 = 15

Byte 7 = Supplier Number

Byte 8 = Device (MSB)

Byte 9 = Device (LSB)

Byte 10 = AMP rating / MPPT size e.g. 40A or 60A

Byte 11 = Software Version. 48 = 4.8

Byte 12 = Shunt Size

Byte 13 = MPPT Voltage e.g. 150V MPPT

Byte 14 = battery pack Size: 1= 12V, 2 = 24V...

Byte 15 = MPPT Status; 1 = Ready for operation, 0 = still booting

Byte 16 = N/A

Byte 17 = N/A

Byte 18 = N/A

Byte 19 = N/A

Byte 20 = N/A

Byte 21 = N/A

Byte 22 = "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 'E'

4.11. Clear log files

Transmit Command: 31

Reply Command: 254

This command is used to clear the log files that the MPPT has accumulated over the course of 63 days or less.

4.12. Get MPPT Settings

Transmit Command: 32

Reply Command: 7

Use this command to get all the MPPT settings.

Hint

The settings are received in the same format that they are sent to the MPPT using the Send MPPT settings command.

Special values: b7 = NC, b6 = NC, b5 = NC,

b4 = NC, b3 = NC, b2 = Turbine break voltage (1=brake at float, 0 = manual),

b1 = equalize mode (0=off, 1=Auto), b0 = MPPT type (0=Solar, 1= Wind)

The frame received will be filled as follows:

Byte 0 = 83 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = the command = 7

Byte 6 = 15

Byte 7 = Special values

Byte 8 = float voltage: 138 = 13.8V

Byte 9 = Boost voltage 145 = 14.5V

Byte 10 = Boost Time

Byte 11 = Boost Amps

Byte 12 = Battery Pack

Byte 13 = External Relay Type

Byte 14 = Battery Low Disconnect 110 = 11.0V

Byte 15 = Battery Low Reconnect 130 = 13.0V

Byte 16 = Turbine cut-in voltage

Byte 17 = Turbine Load dump voltage

Byte 18 = Turbine Release voltage 114 = 11.4V

Byte 19 = Hours

Microcare

Byte 20 = Minutes

Byte 21 = 170 n/ a

Byte 22= "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 69 'E'

5. UPS COMMANDS

5.1. Turn off UPS

Transmit Command: 44

Reply Command: N/A

5.2. Turn on UPS

Transmit Command: 43

Reply Command: N/A

5.3. Transmit Real-time UPS data

Transmit Command: 42

Reply Command: 12

For this command the UPS will transmit nearly all of its real time data in the following format, replying with command = 12.

See **shunt constants table** for the value to be used for your equipment at the end of this document.

UPS voltage = UPS voltage received * 0.429

Ex. 512 received = 220v AC output

UPS amps = UPS amps received * AC_shunt_CON * 1.11

Ex. 123 received = 34.1 amps AC output

Battery voltage = Battery voltage received / 10

Ex. 483 received = 48.3v battery

Battery amps = Battery amps received * DC_shunt_CON

Ex. 123 received = 30.75amps charging / discharging

UPS temperature = UPS temperature received * 0.48828

Ex. 53 received = 25.9deg/C (UPS)

Microcare

Frame format.

Byte 0 = 'S'

Byte 1 = Destination MSB

Byte 2 = Destination LSB

Byte 3 = Source MSB

Byte 4 = Source LSB

Byte 5 = 12

Byte 6 = N/A

Byte 7 = "UPS voltage (MSB)"...Normally 220v AC

Byte 8 = "UPS voltage (LSB)"

Byte 9 = "UPS amps (MSB)"

Byte 10 = "UPS amps (LSB)"

Byte 11 = "Battery voltage (MSB)"

Byte 12 = "Battery voltage (LSB)"

Byte 13 = "Battery amps (MSB)" ...charge or discharge

Byte 14 = "Battery amps (LSB)"

Byte 15 = "UPS temperature (MSB)"

Byte 16 = "UPS temperature (LSB)"

Byte 17 = "UPS status"

UPS off = 1

UPS on battery = 2 (discharging)

UPS on mains = 3 (charging)

Byte 18 = "no of retransmits" not used always 170

Byte 19 = "no of retransmits" not used always 170

Byte 20 = "no of retransmits" not used always 170

Byte 21 = "no of retransmits" not used always 170

Byte 22 = "CRC (MSB)"

Byte 23 = "CRC (LSB)"

Byte 24 = 69 'E'

Ex If "UPS status" = 2 then the load is connected to battery power and
"Battery amps" = discharging.

Ex If "UPS status" = 3 then the load is connected to AC and
"Battery amps" = charging.

6. ENERGY METER COMMANDS

6.0. Reset meter

Transmit Command: 36

Reply Command: N/A

Zero all data

6.1. Return Channel 1 and 2 RMS and Total Kw/Hr.

Transmit Command: 37

Reply Command: 35

Meter_1_RMS = meter_1_RMS received
Meter_2_RMS = meter_2_RMS received

Kw/Hr_1 = Kw/Hr_1 received / 100;
Kw/Hr_2 = Kw/Hr_2 received / 100;

Frame format.

Byte 0 = 'S'
Byte 1 = Destination MSB
Byte 2 = Destination LSB
Byte 3 = Source MSB
Byte 4 = Source LSB
Byte 5 = 35
Byte 6 = N/A

Byte 7 = "Meter_1_RMS (MSB)"
Byte 8 = "Meter_1_RMS (LSB)"
Byte 9 = "Meter_2_RMS (MSB)"
Byte 10 = "Meter_2_RMS (LSB)"
Byte 11 = "KwHr_1 (MSB)"
Byte 12 = "KwHr_1 (LSB)"
Byte 13 = "KwHr_2 (MSB)"
Byte 14 = "KwHr_2 (LSB)"

Byte 22 = "CRC (MSB)"
Byte 23 = "CRC (LSB)"
Byte 24 = 'E'

UPS								
Kw	12V		24V		36V		48V	
...	AC	DC	AC	DC	AC	DC	AC	DC
1	50amp	200amp	50amp	200amp	50amp	200amp	50amp	200amp
1.5	50amp	400amp	50amp	200amp	50amp	200amp	50amp	200amp
2	50amp	400amp	50amp	200amp	50amp	200amp	50amp	200amp
3	...	...	50amp	400amp	50amp	200amp	50amp	200amp
5	...	...	100amp	400amp	100amp	400amp	100amp	200amp
6	...	...	...	...	100amp	400amp	100amp	400amp
8	...	...	...	...	...	...	100amp	400amp
10	...	...	...	...	...	...	200amp	400amp

Kw	MAX INPUT AMPS AT 10,20,30,40 Vdc				RMS AC	2xPEEK AC
	12V	24V	36V	48V		
...						
1	120	60	40	30	4.5	12.8
1.5	180	90	60	45	6.8	19.3
2	240	120	80	60	9.1	25.7
3	...	180	120	90	13.6	38.6
5	...	300	200	150	22.7	64.3
6	...	...	240	180	27.3	77.2
8	...	...	...	240	36.4	102.2
10	...	...	...	300	45.5	128.6

MPPT								
Size (amps)	Software Vx.x0				Software Vx.x1			
	20	1x =	50amp =	50amp =	0.125	1x =	100amp =	100amp =	0.25
40	1x =	50amp =	50amp =	0.125	1x =	100amp =	100amp =	0.25
60	2x =	50amp =	100amp =	0.25	2x =	100amp =	200amp =	0.5
100	3x =	50amp =	150amp =	0.375	3x =	100amp =	300amp =	0.75

SHUNT	mV / A	SHUNT constant	
50	40	0.12207	0.125
100	20	0.24414	0.25
150	13.333		
200	10	0.48828	0.5
400	5	0.97656	1