Manta RS-232 Communications Protocol

You can talk to the Manta 2 multiprobe without using Eureka's Manta 2 Control Software.

You can connect a Manta 2 to a variety of third-party devices, such as data loggers, PLC's, and telemetry systems if you know the Manta 2's connector assignments and basic commands.

Most of you will need only the most basic Manta 2 commands; those are shown in (1) below. A few of you will need the advanced commands shown in (3) below. We advise that you stick with the basic commands if possible.

1) Most Common Applications

If you are connecting a Manta 2 to common dataloggers, etc., here's all you need to know:

a) We run at 19,200 baud, No parity, 8 data bits, 1 stop bit, no flow control.
b) Send an ASCII command "read" and you get back one line of data separated by commas. You can put the parameters in any order you want. This is most easily done from the Manta 2 control software Sensors and Parameters list.
c) You can send an "hdr' command and get the parameter and unit of measure.
d) Power consumption is approx. 200 mA at 12 volts; could be more or less depending on the number of sensors installed in your Manta 2.

2) Basic Protocol

a) All commands will consist of strings of alphanumeric ASCII characters terminated by **Carriage Return** (0x0D). All commands will elicit a response. Unsupported commands and/or incorrect syntax result in an error response.
b) The messages will contain a **command**, optional arguments, and the carriage return. The command and arguments (**tokens**) will be separated by at least 1 but possibly more whitespace characters or commas.

c) Arguments shown as in **[arg]** are optional. All output is terminated by **CR** and **LF** (0x0A). Input is not case insensitive.   **BS** (backspace) erases the last character from the input stream. The communication parameters are: 19200 baud, 8 bits, 1 stop bit, no parity, and no handshaking.

d) Commands will be converted to upper case before being sent to the Manta 2 for execution.

3)   Commands

a) **GUI [-on, -off]** - Sets output format for either a computer or a dumb terminal. **–on** sets computer mode and **–off** sets terminal mode. No arguments returns current mode. The primary difference between modes is the inclusion of commas and message type prefixes in GUI mode. Prefixes are in the form #TYPE.

b) **VER** (version) - returns Firmware version

c) **SI** or **SENSORINFO** (sensor information) - returns a list of information about the installed sensors

d) **SCR** or **SCROLL** (scroll) **[-on,-off] [-I** *interval* **]** - sets scrolling on or off and sets the interval (in seconds) between outputs; omitted **–on-off** argument defaults to **–on** and omitted **–I** argument defaults to 2 seconds

e) **HDR** (header) – returns a three-line header containing the date, time, and parameter types and units

f) **READ (read parameters)** – returns one line containing all active parameter values

g) **PT N** or **PASSTHRU N** (pass through) - enables a direct dialog to a sensor on port N; subsequent commands are send directly to the sensor and sensor responses are displayed; "exit" exits this mode

h) **PT N RAW** is a special case that directs input to port N; this means that there is no timeout for commands, commands are case sensitive, and this mode cannot be exited by **EXIT** – you must cycle power.

i) **P** or **PARAM** (parameter)
    a. Lists all currently active parameters if no arguments given.
    b. **-ADD ParamName [N]** - adds parameter name to active list at position **N** or at end if no **N**

  c. **-DEL N,-ALL** - deletes parameter at position **N** or all parameters if **–ALL** given.

  d. **–DEF** - adds a default parameter for each installed sensor to Active Parameters

  e. **–L** - lists all available parameters.

j) **READPARAMETERS** (read parameters) - read all active parameters; CSV Format TBD; used by GUI

k) **WRITEPARAMETERS** (write parameters) - writes all active parameters; CSV Format TBD; used by GUI

l) **PARAMOPTIONS** (get parameter options) - dumps out TYPE,UNITS,SCALE for all parameters; CSV Format TBD; used by GUI

m) **SETDEFAULTS** (set default values for most settings) - sets a default for most of the values; mostly used on a new CPU with random flash contents; follow this command with **WCONFIG** to save these values to flash RAM.

n) **LOG [-ON,-OFF] [-I Interval] [-F Filename]** (log) - displays current state if no arguments given

  a. -ON,-OFF - turns logging on or off.

  b. -I Interval - lets logging interval in minutes. If no Interval given, defaults to 2 min.

  c. -F Filename - sets log file name

  d. We recommend setting all parameters except –on,-off first, then issue a WCONFIG to store them, and issue the command again with –on or –off. The on/off state is not stored in the flash and needs no wconfig.

o) **CAL TYPE** – (calibrate sensor) - enters calibration dialog for sensor type if one exists; TYPE must be the parameter number or the parameter name and units (e.g. CAL PH_UNITS).

p) **WU** or **WARMUP [TYPE,N] [-DEF][-MAX]** (warmup times) - sets warmup time **N** in seconds for sensor **–DEF** sets all sensors to default times. **–MAX** returns the maximum warmup time; no arguments displays list of all warmup times

q) **D** or **DIR** (directory) - displays all files in file system along with creation date & time

r) **DELETE [filename,-ALL]** (delete file) - delete file specified by filename or all files if **–ALL** given

s) **EMPTY [filename]** - empties contents of **filename**; zero length file remains

t) **MKFILE Filename** (make file) - create new empty file **Filename**

u) **GF [Filename]**(Get file) - output contents of **Filename; c**urrent log file is output if no filename specified

v) **FORMAT** (format file system) - prepares flash storage for use as a file system; destroys all current data

w) **FORMAT63** will format sector 63 to clear Customer Parameter memory.

x) **MEM N** or **MEMUSAGE** - displays program memory (the 32 bits of memory in address N) in reverse byte order (e.g. N = 0, 1, 2, or 3 each return the same values with byte 3 displayed first, byte 2 second, etc.)

y) **PD SECTOR PAGE** - Dumps a File System Flash Page in hex and ascii.

z) **DATE [YYYY MM DD]** (Set/Get date) - set date; no arguments returns current date

aa) **TIME [HH MM SS]** (Set/Get time) - set time; no arguments returns current time

bb) **BP ["BP",N]** (Set/Get Barometric Pressure) - set barometric pressure to **N** or obtain it from Depth sensor if **BP** entered; no arguments returns current BP

cc) **WCONFIG** - writes system configuration variables to a flash block in the CPU; this command must be executed after any configuration changes if the changes are to be persistent across system power cycles or resets

dd) **CIRC: [-ON,-OFF]** - turns circulator on or off; returns OK if successful or ERR if no circulator

ee) **WIPE -** issues a WIPE command to all sensors that have a wiper - this currently includes the Eureka Wiper and the Turbidity Sensor

ff) **IO PORT [BITN] [STATE]** - diagnostic command to set/get microprocessor port bits; PORT BITN STATE sets the indicated bit to STATE; without STATE argument, returns the current state of the bit; without BITN, returns state of all bits on port; ports are 0,1,2; bits are 0 to 31; state is 0,1, or X for tristate; this command will not affect port bits assigned to non-GPIO functions

gg) **PROGRAM** - puts the microprocessor into Program Mode so new firmware can be loaded with the Phillips Flash Utility; **PGMSENSOR N** prepares the sensor board attached to port N for programming with the Phillips Flash Utility

hh) **RESTART** - restarts the firmware by jumping to location 0 (which is the same response as when power is applied)

ii) **TO N** - turns off scrolling, turns off sensor power, and puts the microprocessor to sleep; activity on the RX input will wake it up; be sure to use an N large enough so you have enough time to type a change to that format; **TO 0** means the processor will never go to sleep

jj) **UV [-ON, -OFF]** – turns UV light parameter on or off

kk) **SPWR [0,1]** – turns sensor power off for 0; on for 1

ll) **CHKS** – displays remaining stack memory

mm)   **XREAD** – used internally for reading multiple depth sensors

nn) **SETTEMP [1,2]** – returns the temperature sensors ADC type; SETTEMP[1] sets older type AD7788; SETTEMP [2] sets sensor type AD7790

oo) **T** – displays temperature in degrees C and thermistor info

pp) **A** – legacy function to debug onboard ADC (most notable reads line voltage)

qq) **CUSTOMPARAM** – create a customer parameter

rr) **DELCUSTOMPARAM** – delete a custom parameter

ss) **WRITEFILE** – legacy function that simulates log data for testing file system

tt) **SN-[N]** -retrieve serial number or set it to the eight-digit value N

4)   Sensor Identification Tags

TEMP	temperature	**DPTH**	depth
COND	conductivity	**DO**	dissolved oxygen

ODO	optical dissolved oxygen	**CIRC**	circulator
ODOT	ODO temperature	**WIPR**	wiper
PH	pH	**CHL**	chlorophyll
ORP	oxidation - reduction potential	**RHO**	rhodamine
TURB	turbidity	**TDG**	total dissolved gas

5) Manta 2 Connector Pin Assignments

The Manta 2 Underwater Cable has a DB-9 nine-pin connector on one end. Here are that connector's pin assignments:

pin 1 - no connect	pin 6 - power (5 - 15 VDC)
pin 2 - TXD (Transmit Data)	pin 7 - no connect
pin 3 - RXD (Receive Data)	pin 8 - no connect
pin 4 - power (5 - 15 VDC)	pin 9 - power (5 - 15 VDC)
pin 5 - ground	

Problems? No problem. E-mail us at support@waterprobes.com or call 512-302-4333, Ext 1111.