

# Water Quality Data Logging, Transmission and Retrieval Options Using Aquaread Equipment

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### **1.** Introduction

This document is intended as a guide to the various options available for logging, transmitting and retrieving water quality data using Aquaread Aquaprobes. It starts with the simplest options and progresses through more complex solutions. Please see individual product brochures for detailed information.

#### 2. Logging using an Aquameter

The simplest way to log water quality data is with an Aquameter and Aquaprobe combination. There are ten different models of Aquaprobe and two models of Aquameter to choose from. The AquaPlus optical DO/EC probe can also be used in this configuration. The distance between the Aquameter and the Aquaprobe 'A' can be up to 100 meters.

Data can be logged manually by pressing the M+ key on the Aquameter or by switching the automatic data logging function on. In auto logging mode, the logging interval can be set between 1 minute and 99 minutes.

The maximum number of data sets that can be logged in 1900. The maximum logging duration is dependent upon the batteries selected. The AM-200 GPS Aquameter can run for up to 40 hours on a single set of batteries. The AM-100 non-GPS Aquameter can run for up to 60 hours on a single set of batteries.

Data is retrieved to a PC via a USB cable using AquaLink software. See section 6 for details of AquaLink.

## 3. Logging using an AquaLogger

For serious long term data logging, the AquaLogger, used in conjunction with any model Aquaprobe or the AquaPlus optical DO/EC probe, is the answer. The distance 'A' between the AquaLogger and the Aquaprobe can be up to 100 meters. The AquaLogger is the same diameter as the Aquaprobe and can be suspended in a well or bore hole above the Probe.

The AquaLogger is powered by two standard alkaline 'C' cells that can give up to 6 months continuous logging, dependent upon logging and event testing rates set. One set of alkaline batteries will log approximately 12,000 complete sets of data. The full memory capacity is 32,000 complete sets of data.

The logging rate can be set between 1 minute and 120 hours. An event trigger can also be set that will increase the logging rate if a selected parameter changes rapidly.

Dependent upon the specification of Aquaprobe selected, the following can be logged: Depth, Turbidity, pH, ORP, EC, RES, DO, TDS, SAL, SSG, Temperature and Barometric Pressure.

Setup of the AquaLogger and data retrieval is done via a USB cable on a PC running LoggerLink utility software. See section 6 for further details.





#### 4. Logging using a third party Data Logger

The Aquaread BlackBox is a data converter that allows any model of Aquaread water quality probe to be interfaced directly to a third party processing, control or logging device. The distance 'A' between the BlackBox and the Aquaprobe can be up to 100 meters.

With a choice of industry standard digital and analogue interfaces, the BlackBox offers a versatile and cost effective data collection solution utilising any of the advanced range of Aquaread multiparameter probes.

The BlackBox features an integral barometric pressure sensor for automatic depth and DO correction and can output Depth, Turbidity, pH, ORP, EC, RES, DO, TDS, SAL, SSG, Temperature and Barometric Pressure on an SDI-12 or Modbus (RS485) Digital Interface. Data is refreshed every two seconds.

In addition, the BlackBox provides eight analogue voltage outputs that can be programmed to the customer's own specification.

Low current consumption, a wide operating voltage range and a rugged aluminium case make the BlackBox particularly suitable for long term unattended deployment.

### 5. Data collection and transmission using a third party Telemetry Device

For those applications where water quality data needs to be collected remotely, the BlackBox is again the answer.

As with the solution featured in section 4 above, the BlackBox can be used in conjunction with any of the Aquaread water quality probes. The distance 'A' between the BlackBox and the Aquaprobe can be up to 100 meters.

In this configuration, data is collected and transmitted by a third party telemetry device to a remote monitoring station anywhere in the world.

The third party telemetry device can collect fresh data from the BlackBox every two seconds, and either transmit the data live, or store it for batch transmission on request from the remote monitoring station.

At the remote monitoring station, the data can be either logged or viewed in real time, dependent upon the equipment in use.

Again, the low current consumption and wide operating voltage range of the BlackBox make it particularly suitable for this remote, unattended application.





#### 6. Data Retrieval

Once data has been logged on either an Aquameter or an AquaLogger, it can be easily retrieved using one of the Aquaread PC utilities (AquaLink or LoggerLink). Simply connect the Aquameter or AquaLogger to your PC with the USB cable provided, then click the 'Upload Data' button. All the available logged data will be transferred to your PC. A progress bar and file counter is displayed during this process.

Once upload is complete, the memory Tag, date and time for all the logged data that has been uploaded will be displayed in the 'Uploaded Data' box on the left of the screen.



To view any of the logged data records, simply click on the desired Tag, date and time label in the left-hand 'Uploaded Data' box as shown above. The data for the highlighted label will be displayed in the individual data boxes, which are grouped by electrode function. To move up and down the list in the 'Uploaded Data' box, use either your mouse or the cursor up/down keys.

The PC Utilities can export data in three different formats: Microsoft<sup>®</sup> Excel<sup>®</sup> (for use in spreadsheets, a Text Report (for use in any word processor) and for data logged using an AM-200 GPS Aquameter, Google<sup>™</sup> (for use in Google<sup>™</sup> Maps and Google<sup>™</sup> Earth).

Before exporting data, the actual data to be exported is selected by checking the relevant checkboxes in the 'Uploaded Data' box. Next, individual data classes are selected for export by checking or un-checking the check-boxes next to each individual data box.

Finally, clicking one of the three 'Export' buttons will export the selected data. It's as simple as that!

Sample outputs are shown on the following pages.

# The Text Report exported by AquaLink and LoggerLink includes an analytical cover page as well as all the selected individual readings. A typical Text Report cover page is shown below.

AQUALINK REPORT							
File name: Operator name: Company name: Site name:		C:\Test\3 G.E.M. Aquarea Test Site	C:\Test\3 day test 024690136.txt G.E.M. Aquaread Ltd Test Site 4				
Start date and time: Start position:		24-Jul-20 Lat: N 51	24-Jul-2009 10:09:33 Lat: N 51°21.4989' Lon: E 001°24.3232' OSGB: TR 370 677				
End date and time: End position:		27-Jul-20 Lat: N 51	27-Jul-2009 13:01:00 Lat: N 51°21.4988' Lon: E 001°24.3233' OSGB: TR 370 677				
Total number of readings: 877							
Highest readings							
Temp: Baro: Turb: pH: pHmV: ORP: DO: EC: RES: TDS: SAL: SSG:	19.8C 1020mb 05.8 NTU 7.63 -36.3mV 365.7mV 79.4% Sat 810uS/cm 1,445 Ω•cm 526mg/L 0.40ppt 0.0st	Tag: 064 Tag: 031 Tag: 056 Tag: 056 Tag: 000 Tag: 032 Tag: 074 Tag: 058 Tag: 058 Tag: 058 Tag: 000 Tag: 000	8 Dat   5 Dat   60 Dat   85 Dat   90 Dat   92 Dat   82 Dat   83 Dat   95 Dat   96 Dat   97 Dat   98 Dat   91 Dat	e: 26-Jul-2009 e: 25-Jul-2009 e: 26-Jul-2009 e: 26-Jul-2009 e: 25-Jul-2009 e: 25-Jul-2009 e: 26-Jul-2009 e: 26-Jul-2009 e: 26-Jul-2009 e: 24-Jul-2009 e: 24-Jul-2009	Time: 15:51:00 Time: 12:19:00 Time: 08:46:00 Time: 09:09:00 Time: 10:49:01 Time: 12:44:00 Time: 01:46:00 Time: 10:51:00 Time: 10:51:00 Time: 10:09:33 Time: 10:09:33		
Lowest readings							
Temp: Baro: Turb: pH: pHmV: ORP: DO: EC: RES: TDS: SAL: SSG:	17.9C 1005mb 04.1 NTU 7.55 -40.8mV 354.4mV 30.1% Sat 782uS/cm 1,358 Ω•cm 508mg/L 0.39ppt 0.0st	Tag: 025 Tag: 083 Tag: 083 Tag: 083 Tag: 055 Tag: 055 Tag: 082 Tag: 042 Tag: 014 Tag: 065 Tag: 014 Tag: 001 Tag: 000	64 Dat   68 Dat   60 Dat   66 Dat   27 Dat   29 Dat   51 Dat   52 Dat   53 Dat   54 Dat   55 Dat   7 Dat   51 Dat   51 Dat   51 Dat   51 Dat   51 Dat	e: 25-Jul-2009 e: 27-Jul-2009 e: 27-Jul-2009 e: 24-Jul-2009 e: 26-Jul-2009 e: 25-Jul-2009 e: 25-Jul-2009 e: 24-Jul-2009 e: 24-Jul-2009 e: 24-Jul-2009 e: 24-Jul-2009 e: 24-Jul-2009	Time: 07:14:01 Time: 09:46:00 Time: 09:06:00 Time: 01:19:01 Time: 08:16:00 Time: 21:39:00 Time: 22:29:01 Time: 18:11:13 Time: 22:09:01 Time: 11:29:01 Time: 10:09:33	_	
Variance Average values							
Temp: Baro: Turb: pH: pHmV: ORP: DO: EC: Res: TDS: SAL: SSG: 	1.90 15n 1.7 0.08 4.5i 11.3 49.3 28u 87 9 18n 0.0 0.05 50n (GLP) data	C nb NTU 3 mV 3mV 3% Sat S/cm 2•cm ng/l Ippt st	18.81C 1013mb 4.87 NTU 7.60 -39.09mV 358.45mV 59.10% Sat 792.2uS/cm 1,415.4 Ω•cm 514.4mg/l 0.391ppt 0.00st				
Turb Zero: 24-Jul-20   pH 7.00: 24-Jul-20   DO Zero: 23-Jul-20   EC: 24-Jul-20		Jul-2009 Jul-2009 Jul-2009 Jul-2009	Turb 1000: pH 4.01: DO 100%: ORP:	23-Jul-20 23-Jul-20 24-Jul-20 23-Jul-20	09 09 09		

Blocks of individual readings, laid out in chronological order, follow this cover page. The readings picked out on the cover page can be cross-referenced to the blocks of individual readings using the Tag numbers. Great for just dropping into a report as an appendix!

#### **Aquaread Data Logging Options**

AquaLink can export data logged on the AM-200 GPS Aquameter to both Google™ Maps and Google™ Earth. The images below show the same logged data displayed in Google™ Maps, then in Google™ Earth.



The data displayed on Google™ Maps is useful, but for real detail, Google™ Earth (below) is better.



Zooming in on the satellite photos in Google<sup>™</sup> Earth is a great way to spot potential sources of pollution. If the readings you have taken start to show abnormalities, the chances are that you will be able to spot the possible source of the problem (a riverside factory for example) directly on the satellite photo!