

## Instructions for Operation and Programming of Data Logger Using STARLOG 3.09

Each data logger has to be programmed with a corresponding scheme. The scheme specifies the configuration parameters for the instrument(s) connected to the logger. Complete instructions on the general configuration of the logger are found in the manual. A review of the specific configuration applied to the case of a tipping bucket rain gauge will be detailed in Appendix II found at the end of this document.

Once the scheme has been created it can be used over and over again to initialize and download data from the logger. Furthermore, schemes can be modified through an editing procedure. All operations involving the creation, editing, and use of schemes are done by executing the program STARLOG.EXE. This software is provided by UNIDATA. See Appendix I for the installation.

In order to program the logger you will need a PC (preferably a notebook) and an RS-232 cable. A weatherproof housing has also been supplied with a termination strip for connecting instruments to the logger. The logger fits neatly into the housing. The termination strip connects to the plug labeled **Input Signals** on the logger. Wires have been supplied for connecting the gauge to the termination strip, however for field measurements site technicians may want to do their own wiring.

Once the gauge has been connected to the logger, connect the RS-232 cable to the PC and logger. Run the software by double clicking the shortcut **STRLOG.3** on your desktop. The scheme menu will show up. Chose one scheme to download the data.

```
----- Scheme Name -----  
List all Unload files          Incremental Unload  
Display an Unload file        Scheme Test mode  
Delete an Unload file         Report Editor  
Program Logger with Scheme    Display Scheme Information  
Unload data from Logger
```

Before data can be collected, the logger needs to be initialized with the scheme. Using the mouse or down arrow, move the cursor down to “*Program Logger with Scheme*”. Answer yes to any prompts. Initialization takes about 10-20 seconds. Now data can be collected. Tests can be performed in the lab by moving the bucket back and forth. The measurements can be observed directly by selecting “*Scheme Test mode*” from the above menu. The screen that appears shows the state of the logger, the log interval, and the accumulation that occurs within the interval. Note that a scheme can be set up for collecting event driven measurements over a several second interval (records consist of number of tips every several seconds). When it rains, you can get non-zero tips. You can also edit the scheme to get a zero tip if no rain for every several hours.

To unload the data, select “*Unload data from Logger*”. The user will be prompted for a comment. This can consist of anything, though should be named uniquely because this is what is contained in the file listing (first option in above menu). Unloading the data takes about 10-20 seconds. The data written to disk is in binary format. This format can be quickly converted to an ASCII format by selecting “*Display an Unload file*” from the above menu. The default convention is to number the files chronologically in accordance with the scheme name (i.e. NASA.###). The scheme name may be modified to reflect the gauge name or number once placed in the field (i.e. kwa201). This change would be a simple one to make. Once familiar with this procedure it should not require more than a couple of minutes to download the data from the logger. **Remember that in the field, first unload the data, then, if the logger memory is near full, initialize the logger by loading the scheme. ONLY INITIALIZE IF DATA DOWNLOAD EXCEEDS 100 KBYTES. In the above instructions, it was assumed that logger was not yet programmed and so the order was reversed.**

## **Appendix I: Installing Starlog3.09**

Get starlog3.0X software from UNIDATA (2 diskettes). And, go to UNIDATA web page at <http://www.unidata.com.au/> to download Version 3.09 updates (2 diskettes).

Place the starlog3.0x diskette into your computer disk drive and enter:

**A: install**

The installation will proceed automatically. The default setting is fine.

When installation is done, place the update diskette into your computer disk drive and enter:

**A: update**

The default setting is fine. The updates can fix STARLOG Software bugs.

Once installation and updating are complete, start the STARLOG Software by entering the command:

**Starlog**

If you use default setting during installation and updating, starlog.exe should be at c:\starlog\. You can create a shortcut for starlog.exe on your desktop. System files are stored at: c:\starlog\. The schemes and data are stored at: c:\starlog\schemes\

## **Appendix II: Configuring Parameters for**

## Tipping Bucket Rain Gauge

All of the instructions for programming the logger are contained in the manual however there are some nuances to the specific case of an event driven tipping bucket and so a brief review of the configuration used will be described below.

Run **STARLOG** Software. If you already have a scheme and want to edit it, you can chose that scheme now. If you want to create a new scheme, you should close the window called "Open a Scheme". Then you can select "Scheme Editor" from system menu. Then click on "Create ..." from the new Scheme menu. The Hardware window will pop out. Select your data logger you are using. Click ok, then go to "window" menu. There are following six categories of parameters, which need to be defined for every scheme.

- General
- Communications
- Instruments
- Program
- Log Buffer
- Events

### General:

You can edit description for this scheme. Check the "Unload Comment" if you want to add comment to your data file name.

### Communications:

Use default setting.

### Instruments

Click on Install or Edit under Instruments menu. Select "**6506A Tipping Bucket Rainfall Gauge - 0.2 mm**" or "**6506B Tipping Bucket Rainfall Gauge - 0.5 mm**". Now the selected instrument has been added. Then you need to edit **Transducers** by double clicking on it. Chose following parameters.

Output: Byte

Min: 0

Max: 255

Scale: FullScale a to b

A: 0

B: 2.55

Channel: C0 (depend on how you connect gauge to termination strip)

Title: Rain

Unit: in

Using ###.##

**Then you should define Events now.** Click on window menu and select "events". The "events" menu will show up.

## Events

You may need to define two events here.

**Event 1:** get one zero tip every 6 hours if no rain

Select Delta Channel A>B

Set A as Time, B as times of scan rates.

$(B + 1) \times \text{scanrate} = 6\text{hr}$

If scanrate = 15 sec, B=1439. Set B=1439. Click OK.

**Event 2:** get non-zero tips if rain

Select Channel A>B

Set A as C0, B=0 in, Check "Force a Log". Click OK.

This means that any signal from C0 will be interpreted as a tip of the gauge.

Event 1 above establishes a continuous recording interval based on the scanrate and the desired fixed time interval. For example if delta t is set for one hour, an additional record will be written every hour. This type of event is useful for querying gauge activity.

Multi-gauge schemes can be easily configured in the v3.09 by selecting additional events and associating those events with other channels (e.g. C0, C1, C2).

Now let's go to Program

### Program

Log While: It has been set automatically if events were defined.

Buffer - There are two options:

1) LINEAR (stop when full) [default]

2) CIRCULAR (wrap around)

Scan Rate: 15 s. (You can set it to other numbers.)

Log Interval: 15 s ( must be greater or equal to scan rate)

Sub interval: 0 ( If you want sub interval, you can set a non-zero number)

The logger program type allows for data to be collected over a fixed time interval and for a discrete event. The log interval, for the case of the rain gauge here, accumulates the events over a 15 second interval. There would be a zero tip every 6 hrs.

### Log Buffer

Check "RAW" for Time and C0 (Rain). This will let logger report both time and rain tips.

Go back to Scheme menu. Choose "Report Editor", then double click on the scheme name

You can define the Report format as follows:

Title: Starlogger Default Scheme [default]

Report Format: ASCII file

Data Format: mo/dd/yy hh:mm:ss  
File: scheme.A\$z

If your scheme name is NASA, the ASCII files would be NASA.A01, NASA.A02,  
..., NASA.A0A,.....

Once all the parameters have been defined, choose "Save Scheme".

**Note this information is intended as a supplement to the user manual. All of the categories described above are explained in the manual, however as mentioned, some of the specific settings applicable to the rain gauge are not specifically addressed in the manual. This document should therefore be particularly useful configuring the parameter settings required for the tipping bucket rain gauge.**

If there are any questions contact:

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