Tasmania Department of Mines—Unpublished Report 1988/32

Field manual for the Unidata 6003 portable logger. Revision 1, for use with version 1.8 software.

by R. J. Sedgman

INTRODUCTION

The UNIDATA model 6003 portable data logger is a battery-operated data gathering unit, ideally suited to automatic data collection at remote, unmanned locations.

The data logger is a microprocessor-based device designed to offer very low power consumption, allowing the use of an internal battery power supply with a typical life of two years. The recorded data is stored in a low power CMOS RAM memory which is 8000 characters long. An internal clock provides accurate time referencing of all recorded data, and also controls the sample rates. The only external connections to the data logger are the input signal connector for the signals to be recorded, and the computer connection for the transfer of data to the unloading device .

HOW TO USE THE LOGGER

To effectively use the data logger four steps have to be employed.

(a) **GENERATE** a program which will tell the logger what instruments are attached, how to collect the data, and what to do with it once it is collected.

(b) **LOAD** a program into the logger so that the above can be carried out effectively.

(c) **UNLOAD** data from the logger after it has been in the field for a period of time.

(d) **OUTPUT/DISPLAY/REPORT** of data, once the information has been unloaded and is stored on the Toshiba laptop computer. This section can be used to display any previously stored data dump.

To use the data logger it is necessary to GENERATE and save a program or scheme to tell the logger what instruments are attached to which channels, how frequently the data are to be collected and how, if at all, they are to be manipulated before the data are stored into the CMOS RAM. If the scheme generated is defective or no longer required, it can be REMOVEd.

Once a satisfactory scheme has been generated it must be LOADed into the logger. The logger can then be connected to the termination station, where the collection of data begins. Having collected the data, the logger is replaced or removed, and returned to the computer installation where the data are UNLOADed from the logger. The coded data can then be viewed or DISPLAYed to either the computer screen or printer.

Each time a logger is unloaded the unloaded data file for that scheme is assigned a two-digit number (commencing with 01 for the first data file dump). A CATALOG of the data file dumps may be viewed for any scheme.

A listing of all the schemes which have been generated can be SHOWn on request. The definition of a scheme can also be EXAMINEd on request. Finally, the STARLOG program can be terminated by QUITing from the COMMAND MENU. This returns control to the Disk Operating System (which produces the prompt Installation>).

At any stage within the STARLOG program package, context sensitive help menus are available by pressing the F1 function key. The commands are prompt driven and often display default values. These may be accepted by simply pressing <CR>. If any other value is required then type in that value. This writes over the default value but does not erase the default. The characters which are not erased are NOT included as part of your response.

STARLOG SOFTWARE SUPPORT PACKAGE

A software package known as STARLOG is installed on a 3.5 inch floppy disk. This is used in conjunction with the Toshiba laptop computer. This package interacts with the data loggers and the data they collect. To use the data loggers it is first necessary to use this software package. This package is activated by:

- Inserting the diskette marked Starlog ver. 1.8 into the top floppy drive.
- turning on the Toshiba laptop computer
- at the system prompt type 'PDLGO'<CR>. This will take you to the Starlog menu.

This sequence will generate the STARLOG COMMAND MENU (see fig. 1)

```
UNIDATA Portable Data Logger Version 1.8

Time: 15:38:31 Date: 04/06/88

1—GENERATE a new scheme definition
2—REMOVE an old scheme
3—LOAD a logger for field operation (setup)
4—UNLOAD data from logger
5—DISPLAY print/plot data from a logger

6—CATALOG of unloaded data files
7—QUIT Return to DOS (normal operating system)
8—TIME Check and reset date/time
9—SHOW list all available schemes
10—EXAMINE a scheme definition

Enter command number :—
```

Figure 1.

Enter the command number that you wish to perform, for example: type 1 <CR> to create a new scheme (program).

To exit the STARLOG system simply type 7 <CR>; this will return you to the normal Disk Operating System (DOS).

If at any time you become unfamiliar or confused with what to do next, press the F1 button and a help menu will appear to guide you through.

TO GENERATE A NEW PROGRAM

If a new LOGGER installation is required then a new scheme (program) must be generated. A few simple steps are all that is required to complete this. Insert a formatted floppy disk into the drive; this disk should always be used when this scheme is being RUN.

1: Enter the STARLOG drive program by typing PDLGO <CR> at the prompt (fig 1.1) and the Starlog menu will appear as in Figure 1.1

2: Type in 1 <CR>; this will now allow you to GENERATE a new scheme (program).

3: A prompt will appear asking for the reference name of the scheme that you wish to create. Answer this with a name which is 6 letters or less long. This is name you use in all future references to the scheme you have created.

4: Answer the next question with a more descriptive title on what the scheme really does. This is a good idea, as it allows you, in future periods, to identify one scheme from another. At the end of this title put at least 3 characters to distinguish who created the scheme (i.e. your initials) (see fig. 2.2).

```
Section 1 - Scheme Identification

Enter Scheme name (6 letters)
or <CR> to end :— Demo
```

Figure 2.1

```
Section 1 - Scheme Identification

Scheme title: Demonstration scheme (not to be used in field).
R.J.S
```

Figure 2.2

5: The next prompt asks if you are using the site identification option. The answer to this is NO, so just press the Return button (see fig. 2.2*a*)

```
Are you using the model 6103E site identification option (y/n)
:— N <CR>
```

Figure 2.2*a*

6: To set up communications to the logger the default settings are given; a simple carriage return is all that is required (see fig. 2.3).

```
Section 2—Logger Communications

Default com port is 1 (com1:)
Enter communication port number (1,2,*) :— 1 <CR>

You have 3 types of logger access available:

1. Direct connection (this is the default)
2. Remote connection (via telephone dial up)
3. Canon X-07 FTU transfers

Enter logger access form : 1 <CR>
```

Figure 2.3

7: The memory size of the loggers we use is 8K (don't worry what this means); just enter the number 8 then carriage return and this will set the correct size. When the return key is pushed the number appearing will be 82. Ignore this as the number is really just 8 (see fig. 2.4*a*).

8: Logger cycle time is set by the manufacturer and is something we do not change, so a simple carriage return for this prompt is all that is required (see fig 2.4*b*).

9: Log interval is the length of time between recordings and is set in units of minutes (e.g. 1 hour interval—type 60; 2 hours and 30 minutes—type 150; 30 second interval—type 0.5, etc.). Now type carriage return <CR> (see fig. 2.4*c*).

```
Section 3—Logger definition

Logger sizes: 8K,16K,24K,32K etc. default 32K
enter logger size :32 *—default setting

(before entering size)

Logger sizes: 8K,16K,24K,32K etc. default 32K
enter logger size :82 *—do not enter 2, just enter 8 and <CR>

Data buffer is 6656 bytes long. *—confirmation of correct
size.

(after entering size)
```

```
Enter logger cycle rate (1–15) : 5 <CR>
```

Figure 2.4*b*

```
Enter log interval (in minutes) :— 60 <CR> (i.e. 60 minutes )
```

Figure 2.4*c*

10: All data retrieved from the logger is to be stored on floppy disks. To enable this you have to enter the letter *a* followed by a carriage return to the prompt "enter drive letter" (see fig. 2.5*a*).

11: No comments should be put on the data file. Therefore to answer the next question just hit carriage return (see fig. 2.5*b*).

```
Section 4—Log file definitions

Disk drive to store data files ( a, b or c),
Default is current drive
Enter drive letter :— a <CR>
```

Figure 2.5*a*

```
Do you want to put a comment on the data file (Y/N):— N
<CR>
```

12: The logger has to know what transducers are connected to which channels. All transducers are defined and have model numbers to distinguish them from one another. A prompt will appear asking for the transducers which are attached to the logger. If you are unsure of the model number just hit carriage return and a list of available transducers and their codes will appear to help you (see Appendix A).

13: Type in the transducer model number as in Figure 2.6*a*.

14: You will be given a brief description of what the transducer does and be asked to confirm whether this was the transducer that was intended to be used. If this is correct, type <CR>. If this is incorrect type N <CR> and re-enter the code (see fig. 2.6*b*).

```
Section 5—Instrument definition

Enter catalog code of instrument: List

(to see list type <CR>)
```

Figure 2.6*a*

```
Enter catalog code of instrument: 6508d
Instrument measures water depth 10 m
is this correct (Y/N) :— Y      <-- type <CR> if correct
                                <-- if not correct type N <CR>
```

Figure 2.6*b*

15: So that the logger knows where to look to find the data to be stored, we have to specify which channel the transducer is connected to. This is done by the following procedure. A brief description is given and the default channel on which the transducer works is displayed. In cases where only one transducer is connected it is okay to accept the default by just typing <CR> (see fig. 2.7*a*). In cases where a number of transducers are connected it is important that no two transducers are assigned to the same channel, i.e.

transducer 1	a0
transducer 2	a1
transducer 3	a1 (this is not allowed)

16: Types of transducers and channels they are connected to:

Channels with the prefix a:

Water probe	No. 6508d
Displacement	No. 2222
Volt meter	No. 2223
Conductivity	No. 6802a
Strain	No. 2224

Channels with the prefix c:

Rain gauge	No. 6506a
Water flow	No. 6800a

It is important that the correct prefix appears for each transducer.

It is important that no more than 8 channels appear with the prefix a: and no more than 2 appear with the prefix c:. If multiple transducers of the same type are used then the number following the prefix should be in an ascending order.

e.g	water level 1	a0
	water level 2	a1
	conductivity 1	a2
	etc.	
	water flow	c0
	rain gauge	c1

17: Data from each transducer can be collected a number of different ways (see fig. 2.5*a*). To answer the next prompt it is important to know two things:

(a) data collected from channels with the prefix a: are averaged over a period of time. This is done to obtain a higher degree of accuracy over the time period for logging, and:

(b) data collected from channels with the prefix c: are total accumulations over a period of time.

Therefore the answer to this prompt is 2 for channels with the prefix a:, and 4 for the channels with the prefix c:.

18: The answer to the next prompt (do you wish to perform any other operations on this channel) is always "No". So the response is to accept the default by typing <CR>.

19: If more than one transducer is attached, then the the next prompt [Any more instruments are attached (Y/N)] should be answered by typing a Y followed by a <CR>. Then steps 11 to 18 must be repeated until the logger has no more transducers to be informed about. At this stage the default for this question can be accepted by typing <CR>. (See example 1:).

Example 1:

A scheme where two, 10 m water probes and two water-flow meters are connected to the logger.

```
****** Water probe 1 *******

Enter catalog code of instrument: 6508d Instrument
Instrument measures water depth 10 m is this correct (Y/N)
:— Y

Transducer 1 of 6508d is depth 10 m
Standard (default) channel is a0
Enter channel number: a0—7,c0—5,s0—3 a0

Operations on depth 10 m (a0)

Select 1 of the following: (default is 1)
    1 log raw data
    2 log average over whole log interval
    3 log average over last n seconds of log interval
    4 log accumulated total over log interval
    5 log maximum (over log interval)
    6 log minimum (over log interval)
    7 do not log this channel

Enter option number: 2

Do you want to perform any other operations on this channel
(Y/N):— N

Any more instruments attached (Y/N):— Y

******* Water probe 2 *******

Enter catalog code of instrument: 6508d
Instrument measures water depth 10 m is this correct (Y/N)
:— Y
```

Transducer 2 of 6508d is depth 10 m
Standard (default) channel is a0
Enter channel number: a0—7,c0—5,s0—3 a1

Operations on depth 10 m (a1)

Select 1 of the following : (default is 1)
1 log raw data
2 log average over whole log interval
3 log average over last n seconds of log interval
4 log accumulated total over log interval
5 log maximum (over log interval)
6 log minimum (over log interval)
7 do not log this channel

Enter option number: 2

Do you want to perform any other operations on this channel (Y/N):— N

Any more instruments attached (Y/N):— Y

******* Water flow 1 *******

Enter catalog code of instrument: 6800a
Instrument measures water flow is this correct (Y/N):— Y

Transducer 3 of 6800a is flow
Standard (default) channel is c0
Enter channel number: a0—7,c0—5,s0—3 c0

Operations on flow (c0)

Select 1 of the following: (default is 1)
1 log raw data
2 log average over whole log interval
3 log average over last n seconds of log interval
4 log accumulated total over log interval
5 log maximum (over log interval)
6 log minimum (over log interval)
7 do not log this channel

Enter option number: 4

Do you want to perform any other operations on this channel (Y/N):— N

Any more instruments attached (Y/N):— Y

******* Water flow 2 *******

Enter catalog code of instrument: 6800a

Instrument measures water flow is this correct (Y/N):— Y

Transducer 4 of 6800a is flow
Standard (default) channel is c0
Enter channel number: a0—7,c0—5,s0—3 c1

Operations on flow (c1)

Select 1 of the following: (default is 1)
1 log raw data
2 log average over whole log interval
3 log average over last n seconds of log interval
4 log accumulated total over log interval
5 log maximum (over log interval)
6 log minimum (over log interval)
7 do not log this channel

Enter option number: 4

Do you want to perform any other operations on this channel (Y/N):— N

Any more instruments attached (Y/N):— N

20: Print out title is the title given to the report of the scheme, the default can be changed but is best just to press <CR>.

21: The time format is selected as the default, so a <CR> is all that is required with this prompt.

Enter any new time format,
or <CR> for default :} hh:mm dd/mo/yy <CR>

Figure 2.6

22: To view the data once they have been collected, a number of formats have to be set. These are as follows:

a: Do you want an ASCII file (Y/N) :— N (the default should be accepted i.e. press <CR>)

b: Do you want a LOTUS file (Y/N) :— N (this should be changed to a Y then press <CR>
(see fig. 2.7*a*)

23: You want the data collected to be displayed on the screen so the answer to this prompt should be Y <CR>.

You do not at this stage require a written report of the data collected, as no printer is connected to the Toshiba laptop computer. So type a 'N' <CR> to the next prompt (see fig. 2.7*b*).

Printout to any other disk file or device should not be used at all, so the default setting should be used. Just press <CR> (see fig. 2.7*c*).

A plotted graph is very important for data to be represented. The default for this prompt is 'Y' so <CR> is all that is required (see fig. 2.7*d*).

Do you want a ASCII file (Y/N) :— N <CR>

Do you want a LOTUS file (Y/N) :— Y <CR>

Figure 2.7*a*

Do a print-out on the screen (Y/N) :— Y <CR>

Do a print-out on the printer (Y/N) :— N <CR>

Figure 2.7*b*

Print-out to any other disk file or device (Y/N) :— N <CR>

Figure 2.7*c*

Do you want any plotting done (Y/N) :— Y <CR>

Figure 2.7*d*

24: All plots are relative to time, so all that is required is to specify which data are to be plotted. The next stage allows you to set this parameter. All transducers are displayed with a number in front of them. To get a plot you need only specify the prefix number. It is not a good idea to get a plot of '1' as this will produce a graph of time versus time, which is not very useful. If you require more then one plot per axis then type in the prefix of one transducer, then separate it from the next by typing 'and' and then the prefix of the next transducer. This can be done to any

number of transducers. When you know that no more graphs are to be plotted leave the prompt unanswered and press <CR>. This will exit you from this section (see example 2).

Example 2:

You have the following log entries defined:

1 time
2 depth 1
3 depth 2
4 water flow

Enter entry number(s) to plot,
or <CR> for no more :— 2 <--- plots time v depth 1
Enter entry number(s) to plot,
or <CR> for no more :— 3 <--- plots time v depth 2
Enter entry number(s) to plot,
or <CR> for no more :— 4 <--- plots time v flow
Enter entry number(s) to plot,
or <CR> for no more :— 2 and 3 <-- plots time v depth 1 and depth 2
Enter entry number(s) to plot,
or <CR> for no more :— 2 and 4 <-- plots time v depth 1 and flow
Enter entry number(s) to plot,
or <CR> for no more :— 3 and 4 <-- plots time v depth 2 and flow
Enter entry number(s) to plot,
or <CR> for no more :— 2 and 3 and 4 <- plots time v all three
Enter entry number(s) to plot,
or <CR> for no more :—

25: No data display is required using PDLOUT, so the default should be accepted by typing <CR> only.

26: Your scheme definition has now been completed and the computer will produce all the relevant data. After a period of time the definition that you have created will appear on the screen. This information contains the maximum logging time before the internal memory runs out of space to store data. A copy of this is required, so make sure the printer is switched on. Press the screen print button and a hardcopy of the scheme definition will be made for future reference. After this just press the space bar and you will be returned to the main menu.

REMOVING A SCHEME

A scheme (program) should only be removed if:

(1) A scheme is defined incorrectly and a new one is to replace it.

(2) The scheme and all relevant data are no longer required and never will be.

(3) The scheme and all relevant data have been copied onto another disk, and have become redundant.

If one of the above applies then it is all right to continue.

When the main menu is waiting for a command type 2 <CR> to remove a scheme. Then enter the name of the scheme to be removed on the next line, type <CR>. As a safeguard against removing the wrong scheme, you are asked to confirm this removal. If it is the wrong scheme just press <CR> and you will be returned to the main menu. To confirm a removal, type Y <CR> and all information relevant to that scheme will be removed, including all data retrieved (see fig. 3.1). Now you will be returned to the main menu.

UNIDATA Portable Data Logger Version 1.8

Time: 15:38:31 Date: 04/06/88

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7—QUIT Return to DOS (normal operating system)
8—TIME Check and reset date/time
9—SHOW list all available scheme
10—EXAMINE a scheme definition

Enter command number :— 2 <CR>
Name of scheme to use :— Demo

Warning: this will *DESTROY* all information related to scheme Demo

confirm deletion (Y/N) :— Y
so be it.....

Figure 3.1

LOADING A LOGGER FOR FIELD OPERATION

For a data logger to collect data in the field it must be loaded with a suitable program (scheme). Therefore a scheme must be defined to begin with (see generating a scheme). If a scheme has been generated it can be used many times over in the field.

To load a data logger you will require a logger (referred to as a Brick). When the main menu is waiting for a command, type 3 <CR> to load the Brick. Then enter the scheme name to be loaded (if you are unsure of the name see the section on displaying available schemes). A prompt will appear to tell you to connect logger now. This is done by connecting the cable at the back of the Toshiba into the plug marked computer on the Brick. Now the brick is connected. To continue the loading process hit the space bar and the Toshiba will perform some self tests on the logger, then proceed to load the brick (see fig. 4.1) (refer to Unpublished Report 1988/22).

After loading has been completed you will be returned to the main menu, and the cable should now be removed from the Brick.

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8—TIME Check and reset date/time
9—SHOW list all available schemes
10—EXAMINE a scheme definition

Enter command number :— 3 <CR>
Name of scheme to use :— Demo

PDLIO version 1.8 by J. von Perger

*** Connect logger now ***
Hit a key to continue :—

Figure 4.1

UNLOADING A LOGGER AFTER FIELD OPERATION

To unload a data logger you will require a logger (referred to as a Brick). You will also require the floppy disk entitled 'LOGGER DUMPS ver 1.8' in drive A on the Toshiba laptop computer. Type in the words PDLGO <CR>. When the main menu is waiting for a command, type 4 <CR> to unload the Brick. Then enter the scheme name to be unloaded (if you are unsure of the name, see the section on displaying available schemes). A prompt will appear to tell you to connect logger now. This is done by connecting the cable which is connected to the back of the Toshiba laptop to the plug marked computer on the Brick. Now the Brick is connected. To continue the unloading process hit the space bar and the Toshiba will perform some self tests on the logger, then proceed to unload it (see fig. 4.1).

After unloading has been completed you will be returned to the main menu, and the cable should now be removed from the Brick.

To obtain a detailed printout and graphs of the results see the section on DISPLAY print/plot data from logger.

```
UNIDATA Portable Data Logger Version 1.8

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7—QUIT Return to DOS (normal operating system)
8—TIME Check and reset date/time
9—SHOW list all available schemes
10—EXAMINE a scheme definition

Enter command number :— 4 <CR>
Name of scheme to use :— Demo
```

```
PDLIO version 1.8 by J. von Perger

*** Connect logger now ***
Hit a key to continue :—
```

DISPLAY, PRINT/PLOT

To obtain a detailed screen dump and graph of data collected, you require the floppy disk onto which the data has been unloaded. This disk should be inserted into the disk drive marked A on the Toshiba laptop computer.

(1) To retrieve data to display/plot you press 5 <CR> when the main menu is in front of you. You will then be asked for the scheme name (this is the name you gave the scheme when you created it—if you are unsure of the name see the section 'SHOW LIST OF SCHEMES'). Type in the name.

You will then be asked to Enter the unload number to display. If you wish to display the most recent data just type <CR>. If however you want to display some previously collected data type in the number of that Dump (if you are unsure of the number see the section on CATALOG OF UNLOADED DATA FILES). The format is as follows: if you require the first set of data enter the number 01 <CR>, or say for the third set of data type 03 <CR> etc. (see fig. 5.1). The screen in front of you will now show some irrelevant information; just ignore this. After a period of time a screen full of data will be presented to you. To continue viewing data press the SPACE bar for the next screen of data. Do not keep pressing the space bar or hold it down continuously as you may miss the graphs displayed at the end.

(2) After the detailed screen dump has finished, the graphed data will appear on the screen before you. After you have examined the graph, press the space bar and if any other graphs are to be plotted another graph will appear.

(3) When the last graph has been displayed you will be returned to the main menu.

```
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8—TIME Check and reset date/time
9—SHOW list all available schemes
10—EXAMINE a scheme definition

Enter command number :— 5 <CR>
Name of scheme to use :— Demo

Enter unload number to display,
or <CR> for latest : # 02
```

Figure 5.1

Example 3:

Scheme DEMO—Water level and rainfall, data from 12:00 14/04/87 to 12:00 15/06/87

Time		Depth (m)	Tot rain (mm)
12:00	14/04/87	7.02	0.0
15:00	14/04/87	7.02	0.0
18:00	14/04/87	7.06	0.0
21:00	14/04/87	7.06	0.0
00:00	15/04/87	7.10	0.0
03:00	15/04/87	7.06	0.0
06:00	15/04/87	7.10	0.0
	<press any key to continue		
	etc.		
06:00	15/06/87	9.48	0.2
09:00	15/06/87	9.52	0.0
12:00	15/06/87	9.52	0.0
	<press any key to continue		

An example of graphed output is shown in Appendix C.

CATALOGUE OF UNLOADED DATA FILES

If you want to know how many times data have been unloaded, by typing in 6 when the main menu is in front of you, a list of data dumps will appear with the dump numbers. The list also shows when the dumps took place, so relevant data can be retrieved by accessing these using DISPLAY print/plot option (see fig. 6.1) (see fig. 6.2 for example list of dumps). To exit from this display just press the space bar and you will be returned to the main menu .

```
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7—QUIT Return to DOS (normal operating system)
8—TIME Check and reset date/time
9—SHOW list all available schemes
10—EXAMINE a scheme definition

Enter command number :— 6 <CR>
Name of scheme to use :— Demo
```

Figure 6.1

```
Unload record of scheme DEMO

   Unload no.    Unload time/date      Comment

   01            09:56:22  01/04/87
   02            14:44:10  16/04/87
   03            11:29:27  19/06/87
```

Figure 6.2

QUIT

When all is said and done, to exit this program type in 7 <CR> when the main menu is in front of you. This will return you to the normal disk operating system (DOS) (see fig. 7.1).

```
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7—QUIT Return to DOS (normal operating system)
8—TIME Check and reset date/time
9—SHOW list all available schemes
10—EXAMINE a scheme definition

Enter command number :— 7 <CR>
```

Figure 7.1

TIME

This section is not to be used at all. Do not type in the number 8.

SHOW LIST OF AVAILABLE SCHEMES

To obtain a list of schemes available to you type in 9 <CR> when the main menu is in front of you. A list of created schemes will appear on the screen. They will show the scheme title and a brief description of what they do (see fig. 9.1 for main menu option, see fig. 9.2 for example of list). To exit from this display press the space bar and you will be returned to the main menu.

```
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2—REMOVE an old scheme
3—LOAD a logger for field operation (setup)
4—UNLOAD data from logger
5—DISPLAY print/plot data from a logger

6—CATALOG of unloaded data files
7—QUIT Return to DOS (normal operating system)
8—TIME Check and reset date/time
9—SHOW list all available schemes
10—EXAMINE a scheme definition

Enter command number :— 9 <CR>
```

Figure 9.1

```
List of schemes on this disk :

Scheme name     Title

Demo            Demonstration scheme
Rob1            Water level and rainfall
Rib221          Water level and flow
Grooms          Grooms slip (water level and rainfall)
```

Figure 9.2

EXAMINE A SCHEME DEFINITION

If a scheme definition has to be examined, for example to find out what the scheme does, you should type 10 <CR>. Now type the name of the scheme you wish to examine. A display will now appear giving the details of the scheme. These details include what transducers are attached, how long the logger can run without being changed, the log interval and what transducer data is to be plotted (see fig. 10.1 for main menu and fig. 10.2 for example display). To return to the main menu just press the space bar.

```
UNIDATA Portable Data Logger Version 1.8

Time: 15:38:31 Date: 04/06/87

1—GENERATE a new scheme definition
2—REMOVE an old scheme
3—LOAD a logger for field operation (setup)
4—UNLOAD data from logger
5—DISPLAY print/plot data from a logger

6—CATALOG of unloaded data files
7—QUIT Return to DOS (normal operating system)
8—TIME Check and reset date/time
9—SHOW list all available schemes
10—EXAMINE a scheme definition

Enter command number :—10 <CR>
Name of scheme to use :— Demo
```

Figure 10.1

Scheme DEMO, Title : Demonstration scheme
Communication port 1
Access form : Direct
Logger size 8k
Logger cycle rate 5 seconds
Log interval 60 minutes
Instrument 6508d measuring depth 10 m
Log a0 as Av. depth, being Av. water depth
Instrument 6508d measuring depth 10 m
Log a1 as Av. depth, being Av. water depth
Instrument 6800a measuring flow
Log c0 as tot flow, being total water flow
Instrument 6800a measuring flow
Log c1 as tot flow, being total water flow
giving a max logging time of 92 days, 9 hours.
Lotus file generated
Detailed printout to scrn:
plot 2
plot 3
plot 4
plot 5
plot 2 and 3
plot 2 and 4
plot 3 and 5
plot 2 and 3 and 4 and 5

Figure 10.2

LOTUS FILES.

Lotus files are generated by the Starlog data and can be directly imported into Lotus 1-2-3. However these files have to be transfered on to a system supporting Lotus. This way it is possible to obtain a hard copy of the results and graphs obtained. If you are unfamiliar with these techniques talk to someone who is familiar with Lotus.

[7 December 1988]

APPENDIX A

Catalogue number	Name
6504a	Wind speed/direction
6504b	Wind speed and direction, temperature
6504c	Wind speed and direction, temperature, radiation
6504d	Wind speed and direction, temperature, radiation, humidity
6504e	Wind speed and direction, temperature, humidity
6505b	Ambient temperature
6505c	Temperature, global radiation
6505e	Temperature, humidity
6506a	Rainfall gauge 0.2 mm
6506b	Rainfall gauge 0.5 mm
6507a	Temperature (red thermistor 15k ref)
6507b	Temperature (yellow thermistor 15k ref)
6507c	Temperature (violet thermistor 15k ref)
6508a	Water depth 1 m 6508c Water depth 5 m
6508d	Water depth 10 m
6508e	Water depth 20 m
6509b	Water level
6512N	Pressure instrument - 10 kPa gauge
6512D	Pressure instrument - 50 kPa gauge
6512E	Pressure instrument - 100 kPa gauge
6512F	Pressure instrument - 200 kPa gauge
6512H	Pressure instrument - 50 kPa differential
1111	Level
2222	Displacement
2223	Volt meter
6800a	Water flow
6802a	Conductivity

APPENDIX B

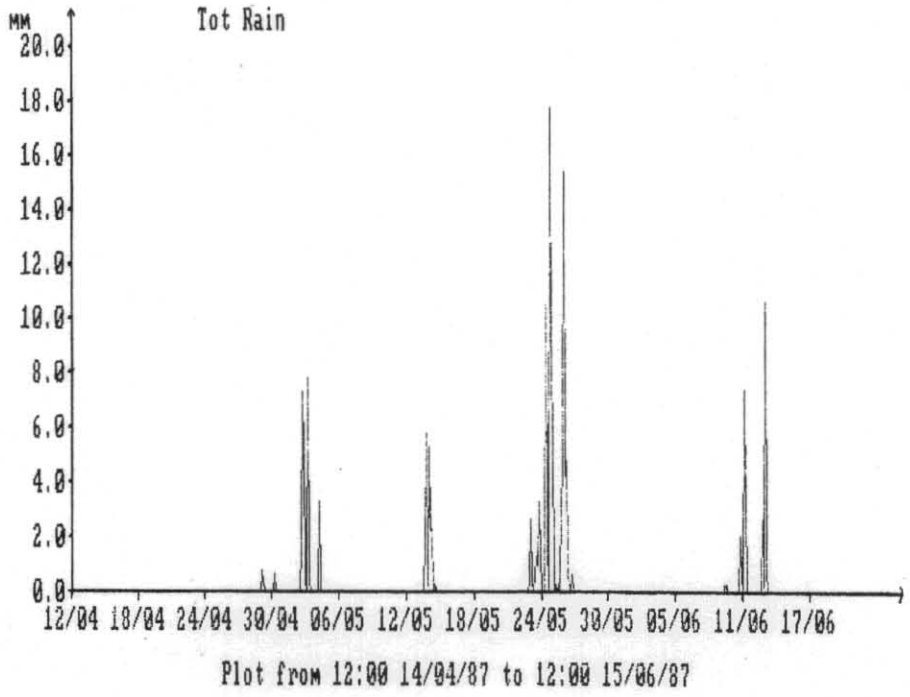
Input signals

The data logger can be connected to 16 signal channels.

8	Analog voltage inputs (0–2.55 volts)
4	Pulse counting inputs (2* 8 bit or 4* 4 bit)
2	Digital inputs (on/off sensing)
1	Digital output (on/off pulses)
1	Serial I/O bi-directional high speed data bus

APPENDIX C

Example of graph output
(see Example 3, page 6)



5 cm