RADCOM TECHNOLOGIES LTD

MULTILOG

DATA LOGGER

USER MANUAL

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Record of Amendments

Keep this record in the front of the User Manual. When the document has been amended write the amendment number, the date, the paragraph numbers affected by the amendment and your initials in the table below.

AMENDMENT NUMBER	AMENDMENT DATE	REASON FOR RE-ISSUE (PARAGRAPH NUMBER (S) AMENDED)	AMENDED BY
1.0	24 Jan 2006	Released for MultiLog with RadWin v3.36	MLF

WARNINGS AND CAUTIONS

WARNING

The MultiLog data logger contains Lithium-ion batteries. The used batteries must be disposed of in accordance with Local Environmental Regulations.

Radcom Technologies Ltd offers the service of equipment and battery disposal.

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1 Abbreviations and Definitions

BAUD RATE	Measurement of Data speed between instruments using serial communication
DMA	District Metering Area
GPRS	Global Packet Radio Service
GSM	Global Service for Mobile Communications
LAN	Local Area Network
PDA	Personal Digital Assistant
PDU	Packet Data Unit
PIT	Pulse Interval Time
PSTN	Public Switched Telephone Network
RADLINK	Keypad unit for setting Radcom Loggers & Downloading data
RADLOG FOR WINDOWS	Industry standard software for data trending, reporting, analysing and archiving
RADWIN (LITE)	Simple RadWin Software for configuring Data Loggers
RAM	Random Access Memory
SIM	Security Identity Module
SIMM	Single Inline Memory Module
SMS	Short Messaging Service
WAN	Wide Area Network

2 Introduction

This manual has been produced as an Informative User Guide to the MultiLog Range of Data Loggers, designed and manufactured by Radcom Technologies Ltd.

The manual provides an introduction to the data loggers, presenting the essential information required for the user to gain a clear understanding of the equipment and its uses.

The manual includes an overview of the MultiLog Data logger, including:

- Physical Construction
- Functional Operations
- User Applications.

and contains instructions on how to:

- Install the Hardware
- Obtain and Install the necessary Software
- Configure the MultiLog with the Software
- Interact with the MultiLog to gain the data required.

3 The MultiLog Data Logger

The Radcom (Technologies) Ltd MultiLog Data Loggers have been designed as high specification telemetry or portable data loggers, incorporating the latest technology and data compression techniques to make them the most cost effective, advanced and flexible data loggers yet.

The MultiLog Data Loggers are used for the monitoring and control of water distribution pipe networks and leakage reduction, the monitoring of dirty water and effluent discharges, river level monitoring and flood plain warning solutions.

The logger can be supplied with up to four inputs to monitor any combination of digital or analogue signals. Each input has a primary recording channel and secondary (fast sampling) channel that are independently programmable. This enables, for example, the primary channel to be used for normal recording and reporting purposes and the secondary channel to be used for diagnostic purposes. The logger also has a pseudo recording channel that can be programmed to store summary data.

The logger can be supplied in portable mode or with a telemetry link provided by a telephone line using an internal PSTN modem or by using the cellular communications network with an internal GSM modem.

All of Radcom's Data Loggers and Controllers are compatible with RadLog for Windows, the industry standard software for data trending, reporting, analysing and archiving.

Main features of the MultiLog Data Logger include:

New and fast data communications protocol
Count and Event logging modes
PSTN Modem speed up to 2400 baud
RS232 communications at 19,200 baud
Normal Configuration 2 Digital and 2 pressures complete with hoses
Second recording for fast sampling, step testing or detailed analysis
Pseudo recording for accurate MNF measurement and/or for pressure surge detection
Waterproof and fully submersible to IP68
Lithium-ion cell battery for >5 year continuous operation.

The RDL600 Series MultiLog Data Logger is available in several different configurations (See Table 1).

Figure 1 shows a typical 4 Channel MultiLog Data Logger. Figure 2 shows a MultiLog Data Logger connected to a portable device transferring data from one to the other.

Table 1 – RDL600 Series MultiLog Data Logger

MultiLog Type	Series	Image	Input Channel options	Case Size	Manual Download	PSTN integral modem	Cellular integral modem	Typical Cellular Power Window/Day
MultiLog	RDL 600		1 to 4 channels	Small Case	10 pin Local Military connector	PSTN	SMS/ GSM	0, 2 hour Time Window
MultiLog	RDL 600		1 to 2 channels	Middle Case	10 pin Local Military connector	n/a	SMS/ GSM	2, 4 hour Time Window
MultiLog	RDL 600		1 to 4 channels --------- 16 ch also available	Large Case	10 pin Local Military connector	n/a	SMS/ GSM	4, 10 hour Time Window

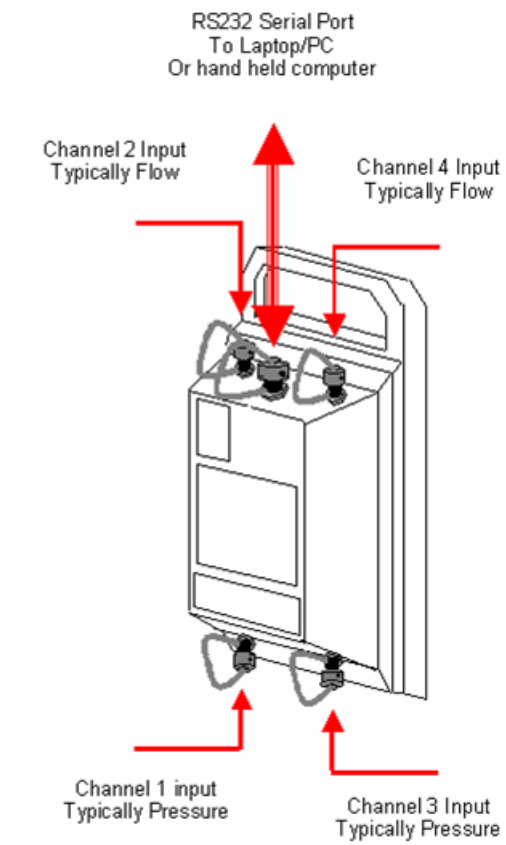


Figure 1 – Typical 4 Channel Radcom MultiLog Data Logger

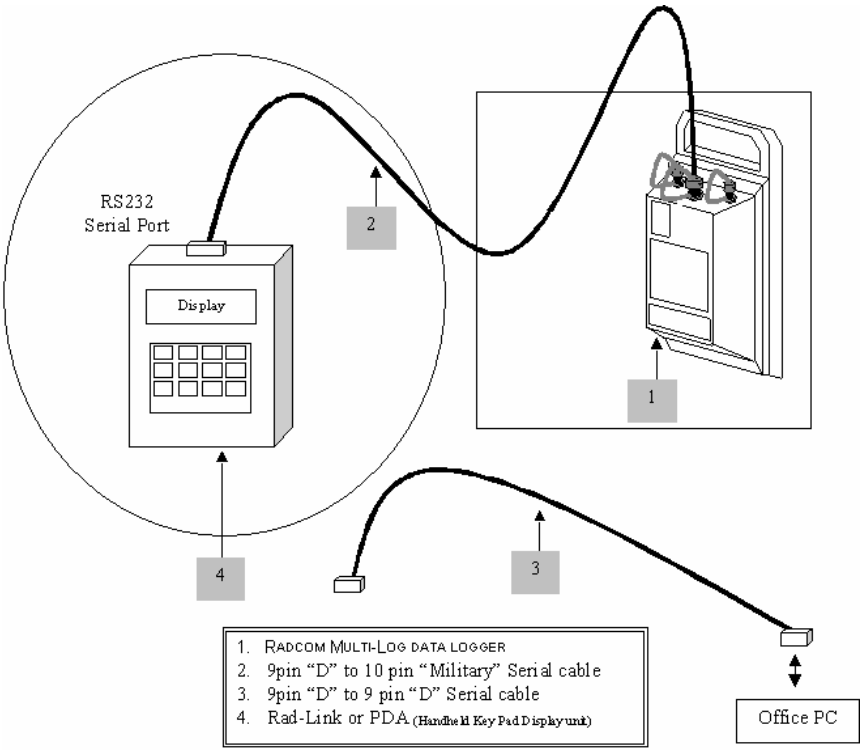


Figure 2 – MultiLog Data Logger connected to Portable Device

The MultiLog Data Logger can be ordered using the following matrix:

Table 2 – MultiLog Ordering Matrix

R	D	L	6			LF	/	i/p 1	i/p 2	i/p 3	i/p 4	/	

1= Portable
2= PSTN Telemetry
6= Cellular Telemetry
SMS/GSM

1= 1 input
2= 2 inputs
3= 3 inputs
4= 4 inputs

1= digital pulse input
2= 0-1 volt input
3= external pressure
5= 4-20mA
6= internal pressure

Blank = No Telemetry
RCI = GSM, Office call during 2 Hour Power Window
RCI 2 = GSM, Office call during 4 Hour Power Window
RCI 4 = GSM, Office call during 10 Hour Power Window
RCIP = Pager wakeup, call any time
SMS = SMS, (No Power Windows are required)

4 Applications

Radcom battery powered data loggers and controllers are operating in countries worldwide. They are being used in the monitoring and reporting of flow, level and water quality in Potable Water and Environmental applications.

The data logger can collect information from a wide variety of sensors, connected to the logger, including digital flow, pressure, depth and many others with analogue 4-20mA or Voltage signals.

4.1 Potable Water Monitoring Applications

- DMA, General and Domestic Survey Flow Logging
- Meter Sizing
- Critical Pressure Monitoring
- Water Hammer Investigations
- Reservoir / Tank Depth Monitoring.

4.2 Potable Water Leakage Reduction Applications

- Minimum Night Line Flow Logging
- Step Testing.

4.3 Environmental Monitoring Applications

- External Pressure (Depth) Monitoring Systems
- Ultrasonic Level Sensor Monitoring Systems
- Open Channel Flow Measurement
- Chemical and Quality Monitoring.

5 MultiLog Installation

5.1 Positioning

An initial signal check should be carried out on location to ensure that there is sufficient signal available for reliable communications. The logger should then be positioned, if possible, inside a pit/chamber and out of the water allowing for easier access.

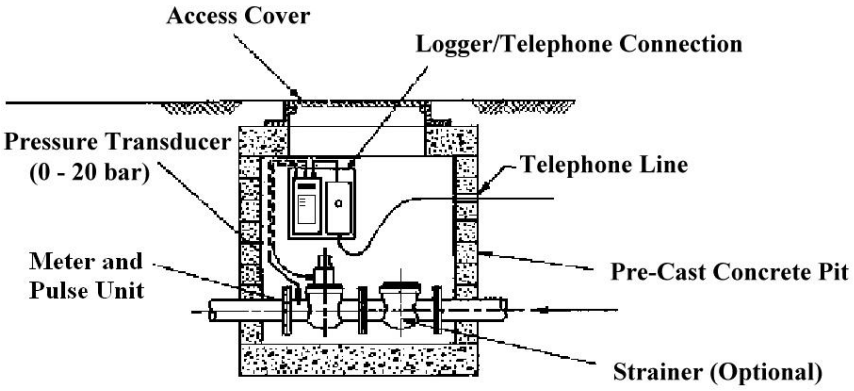


Figure 3 – Standard Installation of MultiLog with PSTN connection.

Notes

1) If PSTN is supplied via overhead lines the Radcom recommend the installation of a Lightning arrestor box to protect the logger from electric of static shocks.
2) Suitable earthing provision is required when a Lightning arrestor box is used.

5.2 Earthing

All telemetry loggers should be earthed to a good ground point. Good ground points that can be used include a flowmeter or metal water pipes. If no suitable grounding points are available, it is recommended that an earth stake be used.

All data loggers are supplied with an earth wire screwed onto the logger case for connecting to a ground point.

Note

For a data logger housed in an above ground cabinet, the loggers should also be connected to the cabinet ground point.

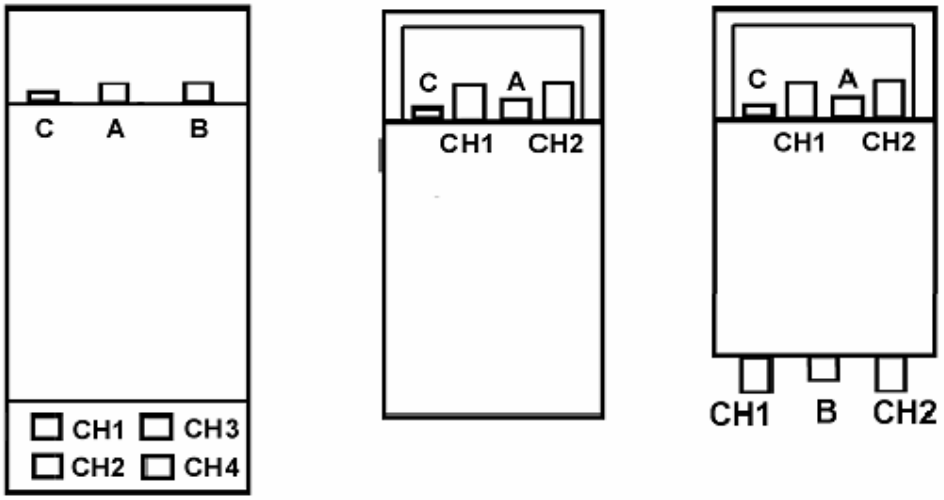
5.3 Aerial Positioning

The antenna should be positioned in an optimal position to gain maximum signal strength. The optimal antenna position can be found when installing the logger by using the Signal Strength Test (See Annex D).

Note

The minimum signal strengths required for successful telemetry communications are as follows:
SMS communications signal strength should be at least 6.
GSM data communications signal strength should be at least 13.

5.4 Connections



A	=	RS232 communication – 10 pin
B	=	Telemetry connection – 6 pin for GSM or gland for PSTN
CH1	=	)
CH2	=	) Refer to Note.
CH3	=	)
CH4	=	)
C	=	Earth Lead

Note
Channels CH1 to Ch4 can be one of the following:

- Digital Flow – 4 pin for connecting to reed switches or open collector output flow sensors.
- Analogue 4-20mA – 4 pin
- Analogue Pressure – 6 pin for external pressure sensors
- Internal Pressure sensor – quick release connector

Figure 4 – Common Data Logger Connections

Refer to Annex A for detailed information about Pin Configuration and Input Circuitry.

Notes

1) For sites subject to large pressure surges it is recommended that a snubber is used between the logger and pressure point.

2) For PSTN loggers it is recommended that a surge barrier be fitted between the logger and the telephone line connection to prevent any power surges caused by electrical storms or electrical machinery or long telephone cables from the exchange causing electrical damage to the logger electronics (see Figure 5 below).

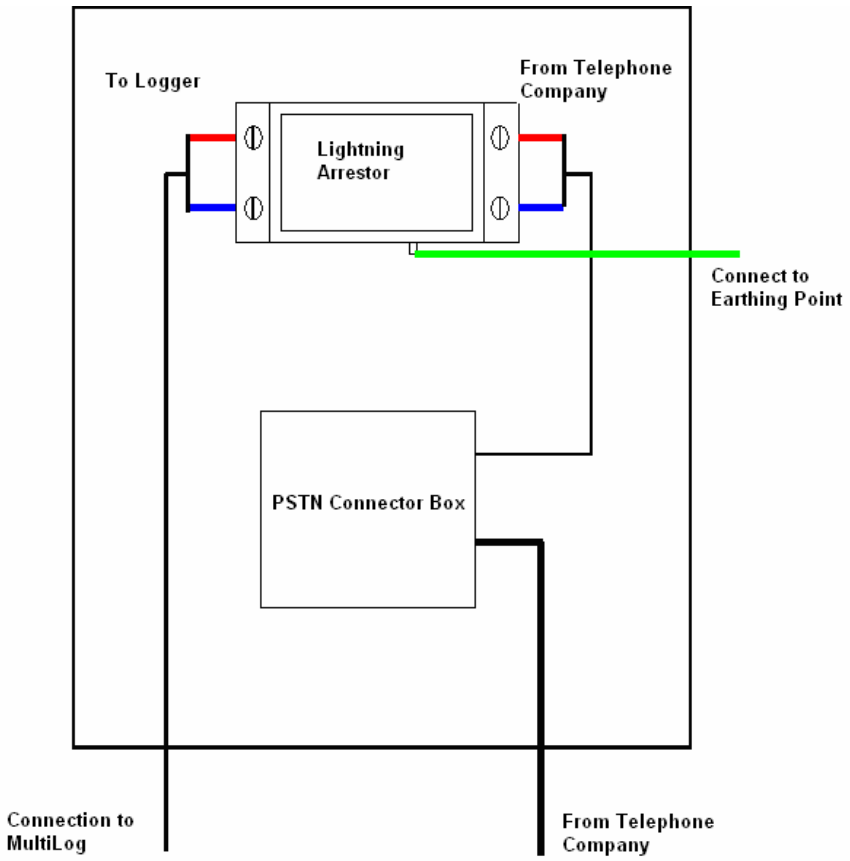


Figure 5 – Connections Inside PSTN Barrier Box/Lightning Arrestor Box

6 Logger Operation

Each input on the logger has a primary recording channel and secondary (fast sampling) channel, both of which are independently programmable. This enables, for example, the primary channel to be used for normal recording and reporting purposes and the secondary channel to be used for diagnostic purposes.

For each input the logger can also store data in a pseudo channel, recording the summarized values based on the primary and secondary recordings.

6.1 Analogue Inputs

The logger samples the analogue channel every 30 seconds or at any recording sample rate, whichever is the faster. The data stored in memory for a given channel is the average of all of the samples measured over the logging/sampling intervals.

6.2 Digital Inputs

The logger can record the digital flow data, either by counting pulses during the sampling period or by measuring the pulse interval time (PIT). Data recorded using PIT (Event mode) gives a higher resolution of data readings compared to the counting pulse method. The logger can be configured to record in either count pulse or event mode (PIT).

It is recommended that event mode should only be used when the pulse rate is less than 2Hz, otherwise the logger register will overflow resulting in negative numbers being stored in the memory.

The maximum input frequency for the digital input is limited to 64Hz. The minimum pulse width of the input pulses must be more than 8 milliseconds.

Each flow input records data in both directions from bi-direction flowmeters. The logger uses a flow direction signal present on the 4-pin flow connector. The flowmeter must be configured to output pulses on the flow input, and the status signal to the direction input of the logger.

Main Recording, Secondary Channels and Pseudo Channels

The pseudo channel can be configured to store the minimum or maximum readings of the secondary recording channel at the same sampling rate as the main recording.

Example:
Main recording sampling rate = 15 minutes
Secondary Recording Sample rate = 1 Second

The Secondary Recording Sample rate will take 900 readings during the 15-minute sampling period of the main recording. These 900 readings are sorted by highest and lowest values. The highest, lowest or average value of any of the 900 readings can be stored in the pseudo channel.

In the case of pressure input it is possible to detect the presence of pressure surges by storing the maximum and for digital flow inputs it is possible to give an accurate measurement of Minimum Night Flow by storing the minimum.

7 RadLog for Windows Software

"RadLog for Windows" is a software package used with the full range of Radcom portable and telemetry linked data loggers.

The software offers icon driven communications, data storage and graphing for the acquisition of data from data loggers and controllers.

The software can be used on Server based systems, where the downloaded data is available for multiple users across the Local Area Network (LAN) or Wide Area Networks (WAN). Radcom has adopted a continuous review and update philosophy based on the feedback from operational users resulting in regular updates of the software.

The RadLog for Windows software comprises of four main operational programs:

Setup
Download/Upload
View
Autocall

The **Setup** program configures the PC hardware, data storage database, file management & access control.

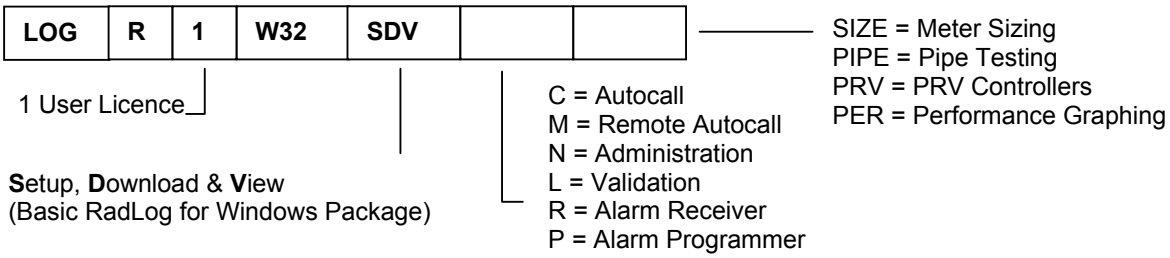
The **Download/Upload** program configures the logger for the collection and storage of data (direct &/or telemetry linked). It can also be used to transfer data from logger to PC.

The **View** program selects the data to be viewed, displays & manipulates graphs/tabular data and prints &/or exports data to other packages.

The **Autocall** program controls the automatic telemetry communications (if using Telemetry Data loggers)

From a user's perspective, "RadWin", the main User program within the RadLog for Windows software, is provided to simplify the configuration and interaction of the operational programs. This program provides discrete Modules, which are selected when choosing the software using the matrix below.

Table 3 – Radlog for Windows software Order Matrix



A wizard within the **Manual Call** module further simplifies the basic configuration settings. The software utilizes the use of toolbars and/or drop down menus to simplify the selection of available options. On-Line Help and instant Help are readily available.

The typical applications of RadLog for Windows are:

- **Logger setup & data download**
- **Data Analysis**
- **GIS interface**

The **Logger Setup & Data Download** application is ideal for setting up and downloading data from any Radcom data logger on site using a Laptop PC or similar portable device, in the office using a Desktop PC, or via PSTN or GSM telemetry links.

The **Data Analysis** application provides a simple to use extensive graphing package for data analysis with windowing and zooming functionality. Data can also be examined in table format on screen, or exported into other packages.

The **GIS Interface** application can be linked to proprietary GIS Graphical Information Systems, or can be used with Radcom's Easy GIS software.

The RadLog for Windows software is available on CD, Web download or E-Mail and can be ordered using the matrix shown in Table 3.

The Minimum Hardware Requirements for installing the software are:

- IBM PC or compatible — 400MHz or greater
- Hard Disk — 20 Mb
- CD Drive — 8 x ROM
- Environment — Microsoft Windows 3.1, 3.11 (32 bit Software), '95, '98 NT4, Windows 2000, Me, XP
- PC Comms Port — RS 232 "9 pin D" Serial Port.

Certain communications procedures supported by the software require the following items:

- Radcom Data logger with suitable PC connection
- Hayes compatible Modem for telephone or GSM Cellular communications

8 How to Install the Radlog for Windows Software

RadLog for Windows is supplied with an installation program that installs the Setup, Download/Upload and View programs. The other available modules can be installed if required and/or purchased from the main screen.

The flow chart below highlights the procedures required for installing the RadLog for Windows software.

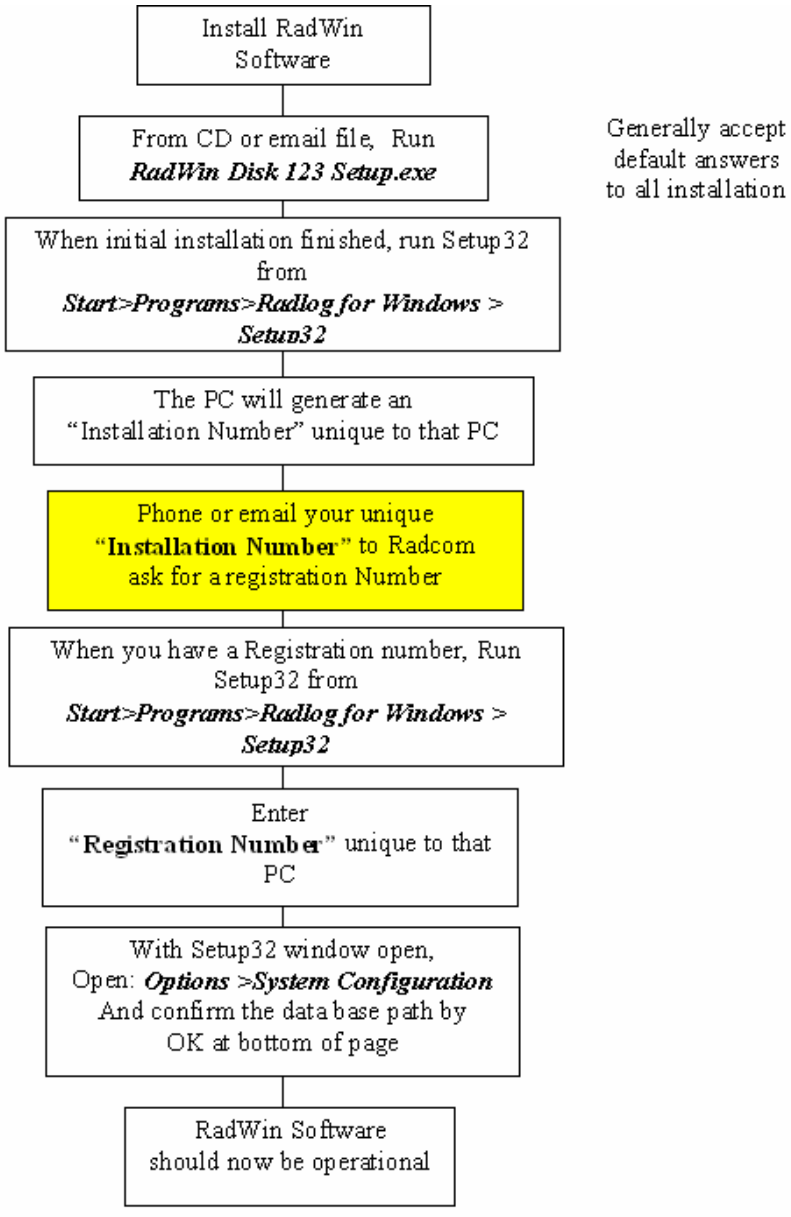


Figure 6 – Software Installation Flow Chart

8.1 Initial Installation

For initial installation, use RadWin installer software to install “RadWin”, “Autocall” and “Manual Wizard” modules. These two modules will be enough to start using RadWin software with the data loggers. Other software modules may be installed as and when required.

To install the RadLog for Windows software, proceed as follows:

1. Confirm the License Agreement – By removing the packaging or starting the installation you are accepting the terms of the agreement.
2. Insert the CD into drive and wait for the RadWin installer software screen.
3. Select the module to install (“RadWin”).
4. Specify the destination directory – C:\RadWin is the default destination directory, but a new path can be specified if required.
5. Enter the Registration Number – Contact Radcom at the address given on the software and quote your Serial and Installation Number. You will be given a Registration Number unique to the computer running the software.
6. If other modules are supplied on your CD, click on the relevant icon to download.

8.2 Initial Configuration

As an initial activity, the associated Database Path and Communications Port configuration must be carried out as described below.

It is important that the software is correctly configured before running the program for the first time. This ensures that the Database Path and Communication Ports are correct, as well as establishing the required file structure.

After the installation of the RadWin Software and required modules have been successfully completed, run the **Setup** program and select **System Configuration** from the drop down menu or icon.

Database Path Configuration

The Database Path configuration options are displayed on the **System** tab of the **System Configuration** screen (see Figure 7).

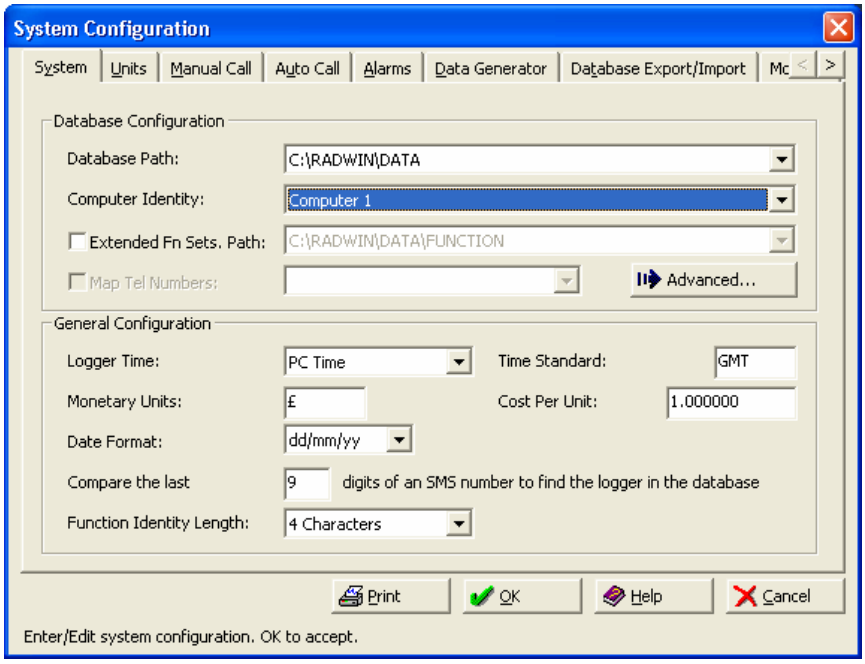


Figure 7 – System Configuration Screen

The database path specifies where the logger database will be stored, and where the software will look to find its data files. Multiple databases may be created on a system by specifying different paths in the database path entry field.

If the database specified exists, it will be used throughout the software; otherwise a new database will be created.

To amend or add a new Database path click on the **Advanced** button to display the **Advanced Configuration** screen, and input the path into the **New Database Path** field (see Figure 8).

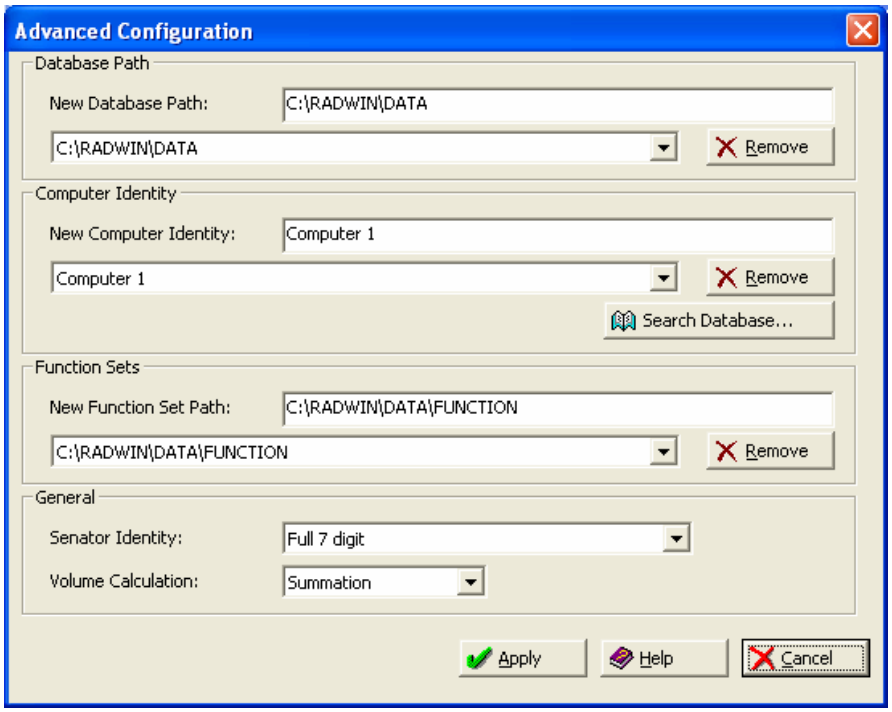


Figure 8 – Advanced Configuration screen

Communications Port Configuration

The Communication Port configuration options are found under the **Manual Call** tab of the **System Configuration** screen (see Figure 9).

This option allows the user to select the communication ports and baud rate for manually communicating with the loggers connected directly to the PC, or via a modem.

If only one Serial Port is available on the PC for both local and telemetry communications, the same COM port can be selected in system configuration, connecting a local download lead, or modem, to that same port as and when required.

For MultiLog Select:-

Direct RS232 Port	baud rate = 19,200 baud	MultiLog local download
Land Line Modem	baud rate = 2,400 baud	MultiLog PSTN Telemetry
Cellular Modem	baud rate = 9,600 baud	MultiLog GSM /SMS Telemetry
Paknet Modem	baud rate = 4,800 baud	MultiLog Paknet Telemetry

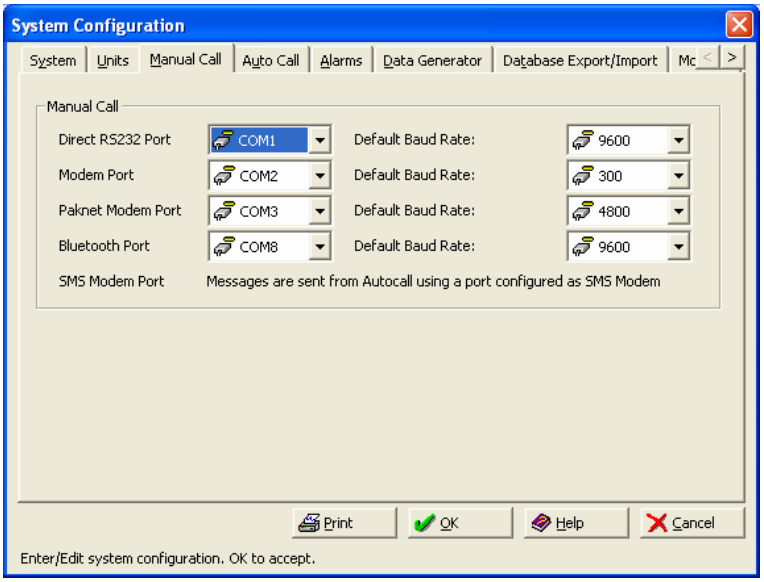


Figure 9 – Communication Port configuration

The Communication Port configuration options for “Autocall” module are carried out in the same way as above.

Note

SMS Modem Port baud rate = 9,600 baud

After completing the Database Path and Communication Port configurations, click on the **OK** button at the bottom of the **System Configuration** screen.

A **Create Database Path** pop-up screen will appear (see Figure 10).

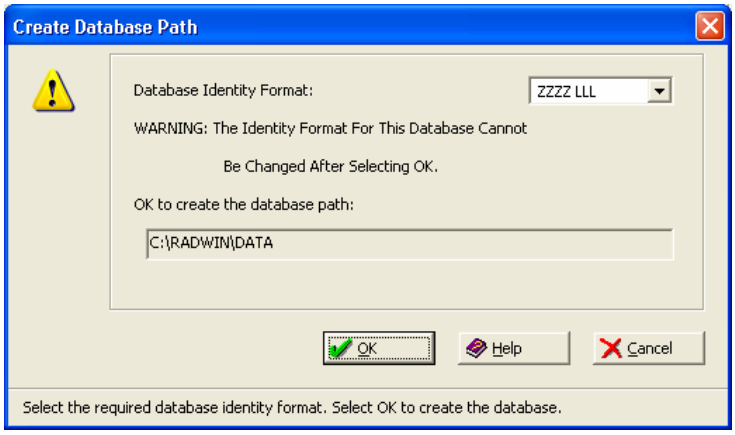


Figure 10 – Create Database Path screen

Select the required format for the Zone and Location from the **Database Identity Format** field drop-down menu.

If the Database Path shown is correct, click the **OK** button to complete the initial configuration. The software is now ready for configuring the data logger before installation.

The more experienced operator may configure the logger manually, whilst an operator who is new to the software should use the available software modules.

9 Communicating With The MultiLog Data logger

A selection of communication options, suitable for automatically or manually downloading data from remote Data Loggers and returning the data back to the office PC or server, are available.

Communicationscommands can be sent and received by the data logger by connecting directly with a PC or Portable device or via GSM or SMS telemetry using a mobile phone or modem connected to a PC.

The data logger must be configured, using the RadWin software, to automatically send and receive data to the WorkstationPC/Server when using telemetry options.

10 How To Configure The MultiLog GSM or SMS Data Logger Using The Manual Call Wizard

The Manual Call Wizard will help to configure the Logger Identity, channel configuration, modem call-out numbers and times, and the Power Window settings. The other available modules, if installed, can be used to aid in the configuration of the Alarm, AutoCall and Data Generator features.

The flow chart below highlights the procedures for configuring a data logger using the Manual call Wizard.

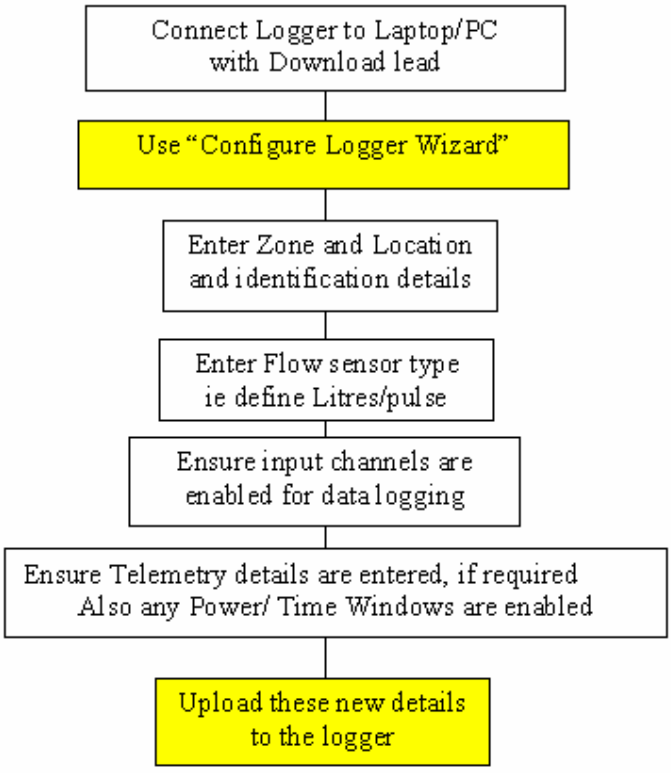


Figure 11 – Data Logger Configuration Flow Chart

The following procedures show how to configure a MultiLog GSM/SMS Data Logger using the **Manual Call Wizard**.

Select the **Radcom Manual Call** icon from the Windows Start menu (see Figure 12).

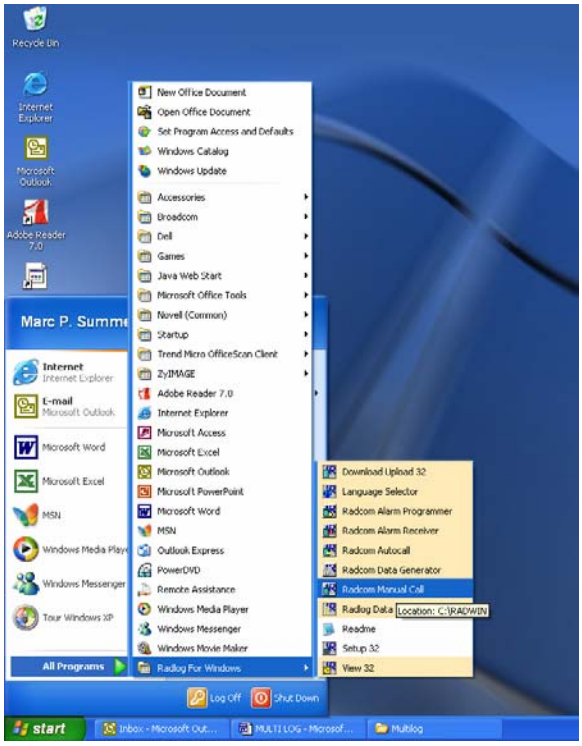


Figure 12 – Windows Start Menu

From the **Manual Call Wizard** screen select the **Configure Logger Wizard** using the icon or drop-down menu under the **Options** tab.

Follow the wizard and proceed after each option by clicking on the **Next** button.

Note

All of the configuration information can be seen on the left side of the screen of the **Configuration Summary** box of the Configure Logger Wizard screen (See Figure 13).

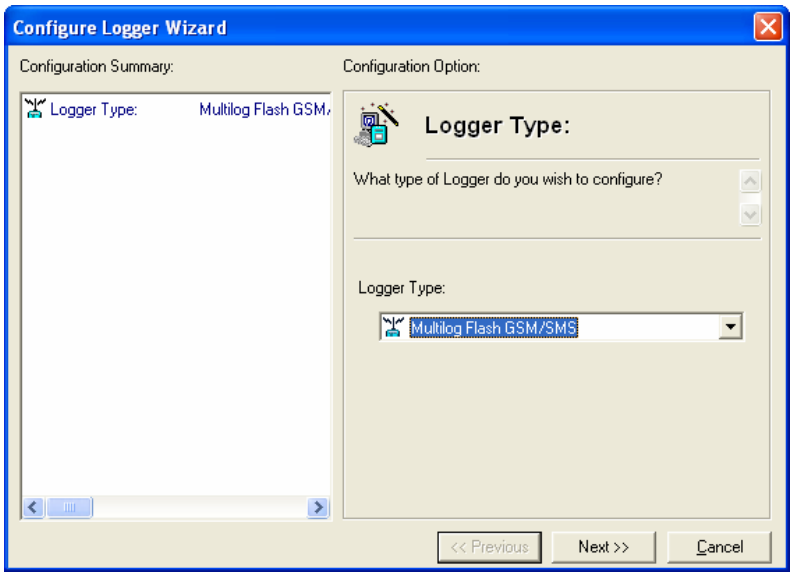


Figure 13 – Configure Logger Wizard

Logger Type

What type of Logger do you wish to configure?

At the **Logger Type** field, select the **MultiLog Flash GSM/SMS** from the drop-down menu.

Connection Type

How is the logger currently connected to the computer?

At the **Connection Type** field, select the appropriate connection type from the drop-down menu (Direct, Modem or Bluetooth).

Baud Rate

What baud rate should be used to talk to the logger? Direct connection is generally 19200,Telephone line logger Modem connection is 2400, GSM connection is 9600, and Paknet connection is 4800.

At the **Baud Rate** field, select the appropriate baud rate from the drop-down menu options

Analyse Logger

The logger parameters will now be downloaded. If the download fails, check the logger is connected to the computer as specified and the connection configuration is correct.

Click the **Next** button for the software to download the logger parameters.

Logger Identity (Zone and Location)

The Zone is the first part of the logger identity, and is used for grouping loggers within the software. The Location is the second part of the logger identity, and identifies a logger within a Zone.

In the **Zone Identity**, **Location Identity** and **Name** fields, enter the logger identities and names, or click the **Select** button to select them from an existing database (see Figure 14).

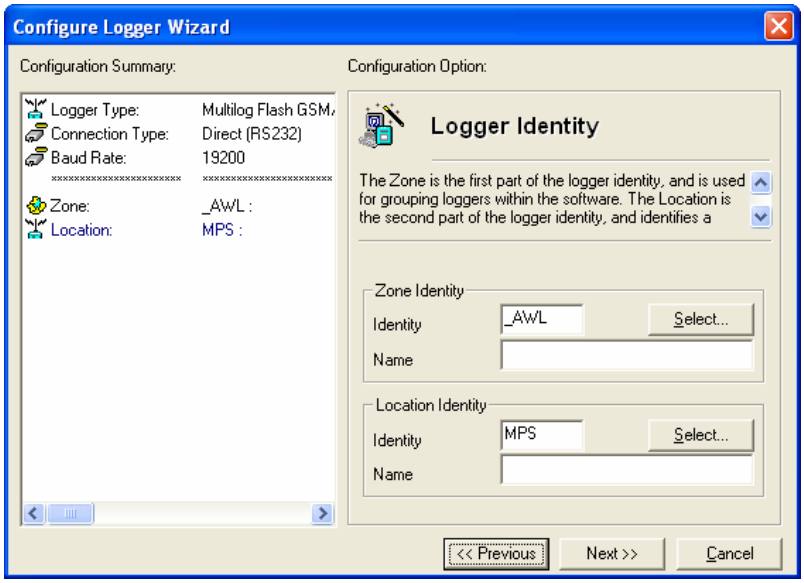


Figure 14 – Logger Zone and Location Identity Screen

Connection Type

How will the logger be downloaded when it has been installed?

At the **Connection Type** field, select the **SMS modem** connection type from the drop-down menu options (Direct, Modem, SMS modem or Bluetooth).

Telephone Number

Enter the full telephone number (including international dialling code) of the logger; this is normally displayed on the front of the logger.

In the **Telephone Number** field enter the telephone number of the logger (i.e.+441234123456).

Channel 01 Configuration

Enable the channel, if required, and set the logging mode for digital channels.

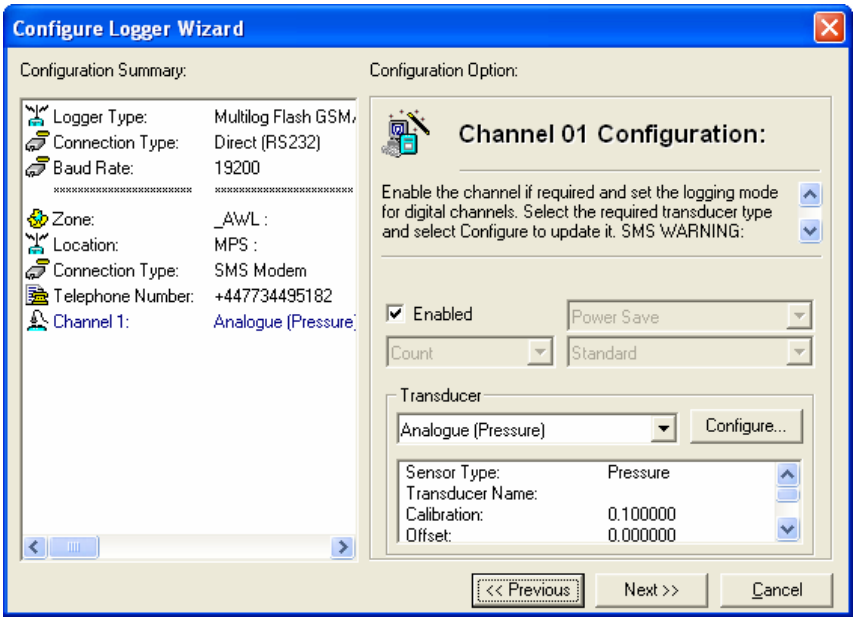


Figure 15 – Channel 01 Configuration Screen

Click in the **Enable** field to activate the channel (see Figure 15).

In the **Transducer** field, select the Transducer Type from the drop-down menu.

Click the **Configure** button to update the channel information.

Select the Sensor type to be connected to Channel 01 from the drop-down menu in the **Sensor Type** field, (see Figure 16).

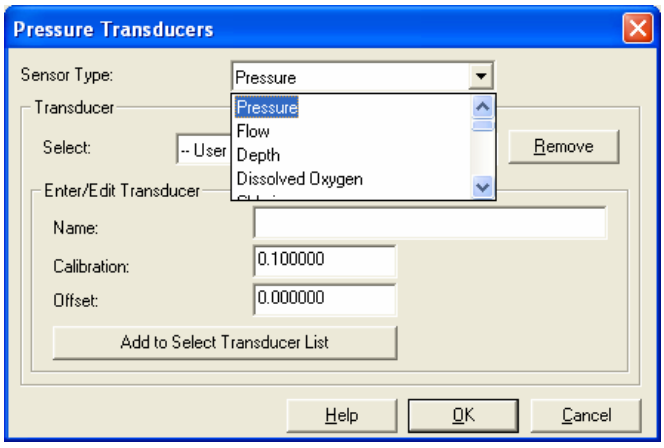


Figure 16 – Transducer Configuration Screen

Select the required Transducer type from the drop-down menu in the **Select Transducer** field.

The name, calibration and offset values can be entered into the **Enter/Edit Information** fields. Click on the **Add to the Select Transducer List** button to add the new transducer information to the database.

Channel 02 Configuration

Enable the channel if required and set the logging mode for digital channels.

Note

SMS WARNING - Logging modes other than 'Standard' will require the transducer to be configured with the units per pulse multiplied by n, where n is 'Every nth Pulse'.

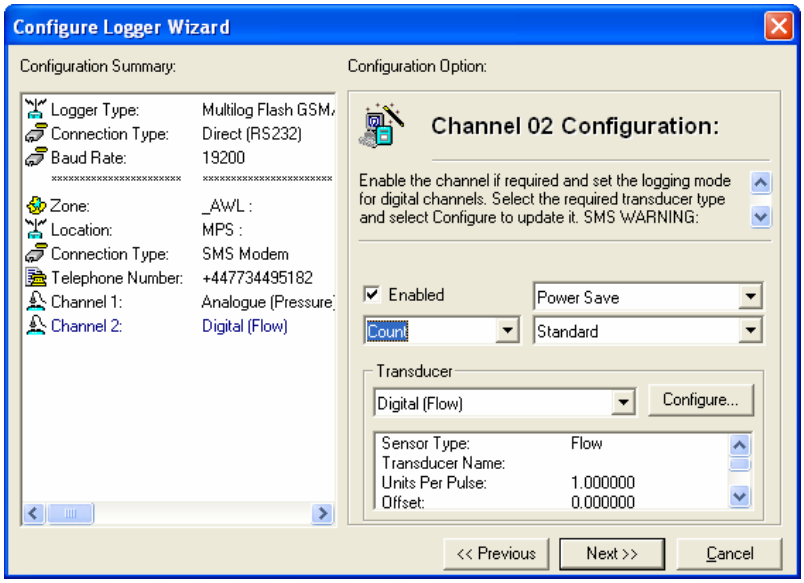


Figure 17 – Channel 02 Configuration Screen

Click in the **Enable** field to activate the channel (see Figure 17).

Select the required power options from the drop-down menu in the **Power Options** field, (*Power Save, Continuous Power or No Power*).

From the **Count** field drop-down menu, select the required option (*Count or Event*).

Note

Presently SMS loggers only support Count mode.

From the **Standard** field drop-down menu, select the required option (*Standard or Every x nd/th pulse*).

Select the Transducer Type from the **Transducer** field drop-down menu (*Digital (Flow)*).

Click on the **Configure** button to update the channel information.

Select the Sensor type to be connected to Channel 02 from the drop-down menu in the **Sensor Type** field.

Select the required Transducer type from the drop-down menu in the **Select Transducer** field.

The name, calibration and offset values can be entered into the **Enter/Edit Information** fields. Click on the **Add to the Select Transducer List** button to add the new transducer information to the database.

GSM Callout Numbers

GSM Callout Numbers are the telephone numbers the logger may dial to send data. Only one number is usually required, with a maximum of four numbers allowed. These numbers will be the telephone numbers of the modems being used by the Autocall module

A telephone number can be entered here, or selected from a list of telephone numbers that exist in the Database Telephone Directory.

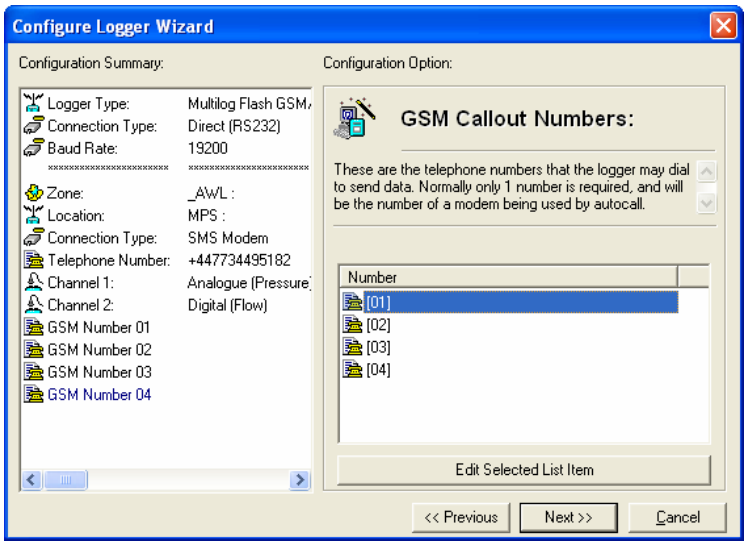


Figure 18 – GSM Callout Number Screen

Highlight **Line 01** and click on the **Edit Selected List Item** button (see Figure 18).

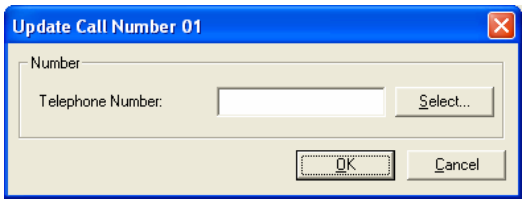


Figure 19 – GSM Telephone Number Screen

Enter the telephone number in the **Telephone Number** field, using international format, or click on the **Select** button to choose a telephone number from the database Telephone Directory (See Figure 19).

To add more GSM telephone numbers, highlight the next line and follow the above procedures.

GSM Callout Times

The GSM Callout times specify when the logger will call or send data via SMS to the GSM Callout Numbers specified. Up to eight callout times can be specified.

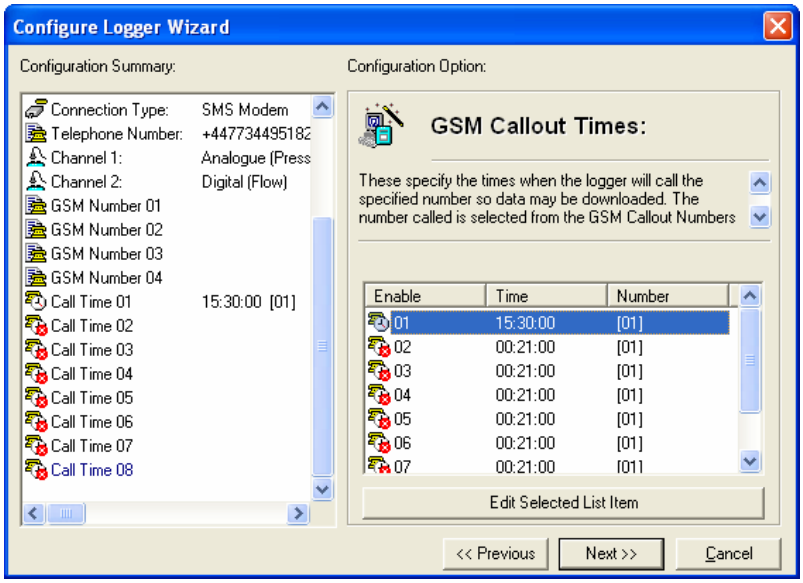


Figure 20 – GSM Callout Times Screen

Highlight **Line 01** and click on the **Edit Selected List Item** button (see Figure 20).

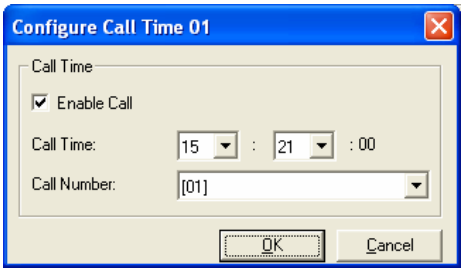


Figure 21 – Call-Out Time Configuration Screen

Click into the **Enable Call** field to enable the Call Time. In the **Call Time** and **Call Number** fields, select the time (hours & minutes) that the logger is to call, and the telephone number to be called (See Figure 21).

To add more Callout Times, highlight the next line and follow the above procedures.

GSM Power Windows

The GSM Power Window specifies the time periods when the GSM module in the logger is turned on. During these periods the logger will answer incoming calls and/or receive SMS messages for data download or upload. Up to eight power windows are allowed.

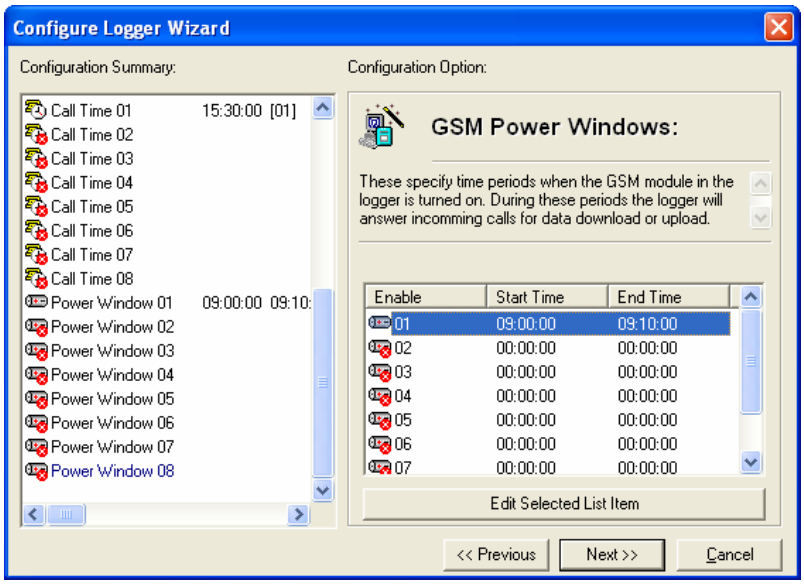


Figure 22 – GSM Power Window Screen

Highlight **Line 01** and click the **Edit Selected List Item** button (see Figure 22).

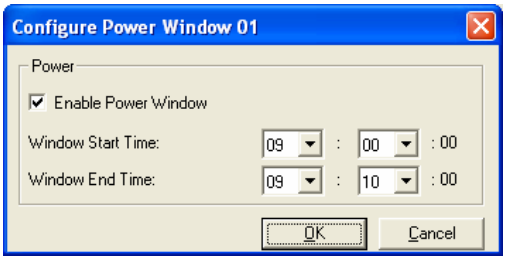


Figure 23 – Power Window configuration screen

Click into the **Enable Power Window** field to enable the Power Window. In the **Window Start Time** and **Window End Time** fields, select the time (hours & minutes) the logger is to '**Power Up**' and '**Power Down**' (see Figure 23).

To add more Power Windows, highlight the next line and follow the above procedures.

Upload Logger

The logger will be uploaded with the entered parameters and will start data logging. The information will be entered into the database under the entered zone/location identity.

Click on the **Next** button to download the logger parameters.

Finished

The logger parameters have been uploaded and data logging has started. The location information has been entered in the database.

Click the **Finish** button to exit the Configure Logger Wizard.

Select **Exit** from the **File** drop-down menu.

11 MultiLog Configuration Options

11.1 Manual Data Download

The flow chart below highlights the procedures for manual logger data download.

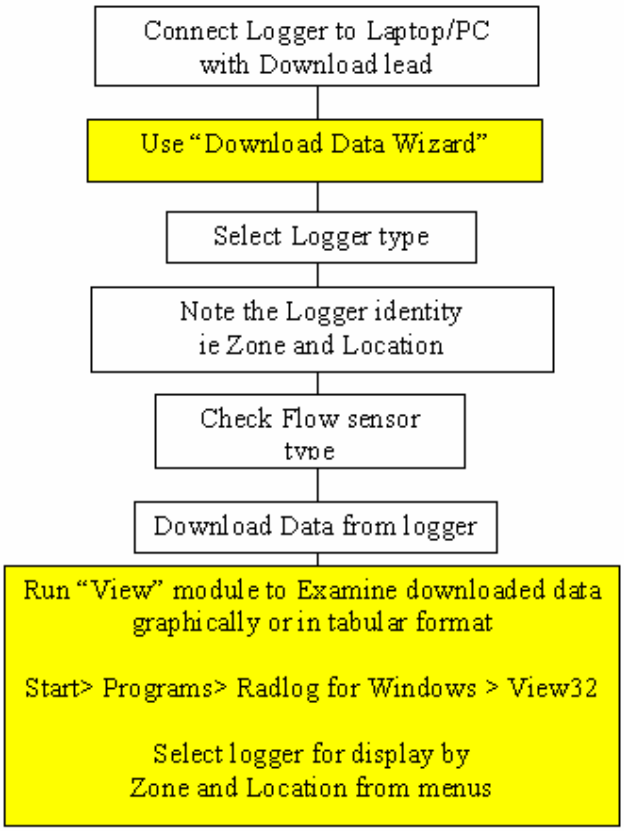


Figure 24 – Manual Data Download Flow Chart

11.2 Requesting data from Data Logger to Receive Data Via SMS

It is possible to request data via SMS or via data connection. The GSM modem inside the logger must be switched **ON** at the time of requesting data. To request data, proceed as follows:

Select the **Radcom Autocall** icon from the Windows Start menu.

Select **Call List** from the **Options** drop-down menu.

Select the **SMS Modem Connection** tab on the **Autocall List** screen to display the loggers in the list (See Figure 25).

Click and highlight the appropriate logger to select it from the list.

Click the **Selected Loggers** button under the **Force Download** heading.

Click the **Download Type** button on the **Force Download Completion** screen and click and highlight the appropriate selection.

Click on the **OK** button to start.

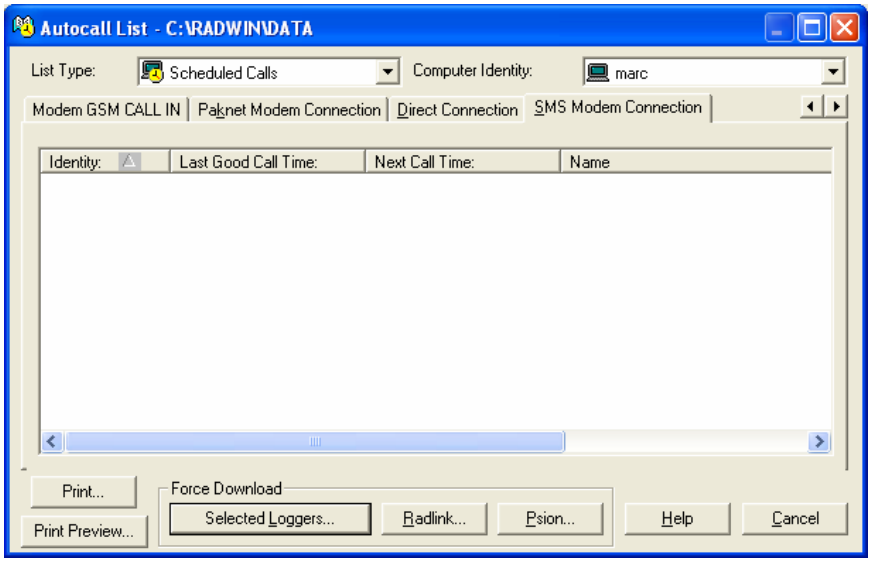


Figure 25 – AutoCall List screen

The software will dial the data number and send the relevant messages requesting data.

11.3 Requesting data from Data Logger Via GSM

It is possible to request data via GSM/PSTN data connection. The GSM modem inside the logger must be switched **ON** at the time of requesting data. The SIMM card inside the logger should also be enabled for Data connection. To request data, proceed as follows:

The modem will be switched ON during a power window, or while external power is plugged in. It will switch ON for 30-minutes after plugging a 10-pin commissioning connector into the logger for at least 5 seconds.

Select the **Setup 32** icon from the Windows Start menu.

Select **Update Zone** from the **File** drop-down menu or by clicking the **Update Zone** icon on the **Radcom Setup** screen.

Click on and highlight the appropriate **Location Identity** and click the **Edit** button on the **Location Select** screen (see Figure 26).

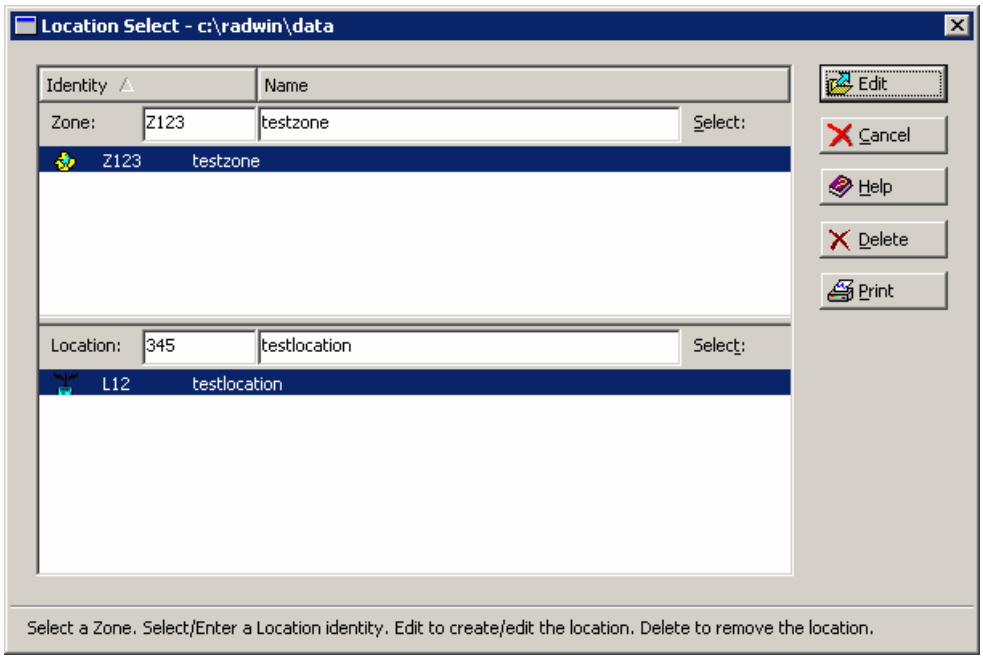


Figure 26 – Location Select Screen

Select the **Logger** tab from the **Location Configuration** screen (see Figure 27).

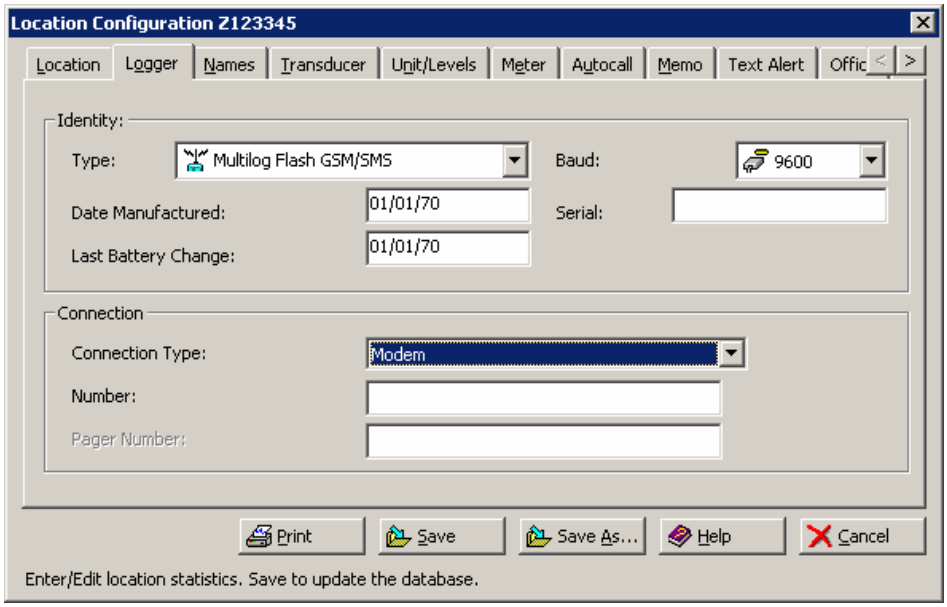


Figure 27 – Logger Tab, Location Configuration Screen

Select the logger type as **MultiLog GSM/SMS** from the drop-down menu in the **Type** field under the **Identity** heading.

Check that the Baud rate is set to **9600** in the **Baud** field.

Check that the Connection type is set to **Modem** under the Connection heading.

Enter the telephone number of the logger into the **Number** field.

Select the **Autocall** tab (See Figure 28).

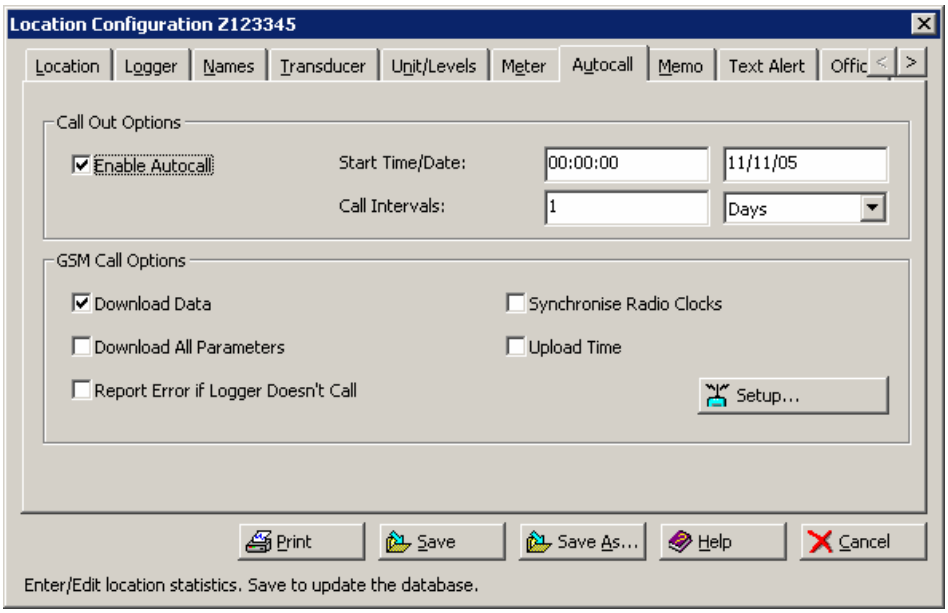


Figure 28 – Autocall Tab, Location Configuration Screen

Click in the **Enable Autocall** box under the **Call Out Options** heading to enable Autocall.

Enter the time to call the logger (hours & minutes) in the **Start Time/Date** field to coincide with the Power Window.

Enter the Call Interval times into the **Call Intervals** fields, entering the frequency of calls in the first box and the periodicity of the calls from the drop-down menu in the second box.

Click the **Save** button to store the settings.

Run the **Autocall** module and wait for the software to configure the modem.

The Autocall will automatically call the logger at the predetermined time and intervals set above.

It is possible to force a call to the logger as follows:

Display the call list of all loggers
Select the Modem connection page to display the logger in the list
Select the logger from the list and click to highlight
Press the **Selected Logger** button followed by the **OK** button.

11.4 Communicating with a "SMS" Data Logger using a Mobile Phone

It is possible to send messages and request data from the data logger using a mobile telephone.
To send a SMS message to the Logger from a mobile telephone, proceed as follows:
Make sure the GSM modem inside the logger is switched ON

The modem will be switched ON during a power window or while external power is plugged in. It will switch ON for 15-minutes after plugging a 10-pin commissioning connector into the logger for at least 5 seconds.

Example:

Use the **mobile phone to send** the following **SMS text message** to the logger : **TTTT#**

The logger will respond with a reply message within 2-minutes.
The message will be **CSQ xx**
Ch1 yyyyy.y
Ch2 zzzzz.z

Where **xx** = signal strength. This must be between **08** and **30**.
yyyyy.y = Channel 1 reading in metres
zzzzz.z = Channel 2 reading in Litres/second
Assuming Channel 1 is pressure and Channel 2 is flow

The logger will ONLY check for incoming SMS messages during the pre-configured Power Windows.

SMS Message Command Descriptions

The characters that compose the SMS messages are case sensitive. Each text message sent to the logger is to be terminated with the # (hash) character. A summary of the SMS text messages serviced by the logger can be found in Table 4 below.

Table 4 – SMS Text Message Command Descriptions

Text	Message Description
TTTT	Signal Strength & Latest data values in raw units
Stat	Latest data values in SI units
SigN	Signal Strength test
config	Logger configuration in database
MinN	Minimum flow/pressure for last "n" days
MaxN	Maximum flow/pressure for last "n" days
SumN	Data summary for last "n" days
Win	First two enabled SMS parameters
Totl	Total volume (meter reading) for all flow channels

A complete guide to the SMS Message Descriptions can be found in Annex B.

12 Data Collection Methods

The data collated and stored in the data logger can be transferred directly to the Workstation PC via a portable device, or by Data logger/Office initiated telemetry.

12.1 Local Data Collection Methods

The logger must be connected directly to a Portable device to receive the stored data from the data logger. Local Data Collections can be made using the following portable devices:

- Laptop/PC
- RadLink hand held computer
- Psion Workabout hand held computer
- PDA hand held computer.

After the data has been transferred from the logger to the portable device, the operator returns to the office and transfers the data from the portable device to the Workstation PC/Server.

12.2 Logger Initiated Telemetry Methods

The following methods can be used to transfer data from a logger to a Workstation PC/Server via communications networks:

- SMS
- GSM
- Email.

Logger Initiated SMS Telemetry

The SMS text messages are received by the Cellular Modem, connected to the Workstation PC/Server. SMS messages may queue up on the cellular network, finally received when the office modem is not busy. Radcom's special data compression techniques enable two channels of data to be sent within a single daily SMS message, for 15-minute sample rate recordings.

Logger Initiated GSM Telemetry

The GSM call is received on the Cellular or PSTN Modem connected to the Workstation PC/Server. The receiving PC/Server can have several modems connected simultaneously. A single PC/Server can then accommodate hundreds of loggers and download data each night. Radcom recommend allocating at least 2 minutes per logger for each data download into the same office modem.

Logger Initiated Email Telemetry

The Email is received directly from a Data logger via any Outlook client configured on a Workstation PC/Server. Alternatively, the RadWin software can configure the Workstation PC/Server to collect Email directly from an Email Exchange server. This system does not require any Radcom dedicated modem in the office.

12.3 Office Initiated Telemetry Methods

The following methods enable data transfer between a logger and the Workstation PC/Server, at the request of the PC/server:

- PSTN
- GSM.

The Workstation PC/Server initiates a data call to a PSTN or GSM logger, via either a **PSTN** or **GSM modem attached to the PC/Server**. The logger then returns the data during the real time call. Further loggers can be downloaded from a scheduled calling list using RadWin Autocall software. In some countries GSM to GSM communications (and using the same network provider) may minimise call costs.

It is possible to contact a GSM logger using a PSTN modem connected to the Office PC/Server, or a PSTN logger from a GSM modem on the Office PC/Server.

Advantages of Office Initiated Telemetry

Office initiated Telemetry has the following advantages over Logger initiated telemetry:

The server is in control - Time settings within the loggers are less critical.
Greater numbers of loggers can be downloaded in less time.
Any missing data from earlier days when the logger could not be contacted will be automatically recovered during the next successful call from the office.
The Logger clocks can be synchronised to the Server's clock.
Real time handshaking between server and logger provides greater confidence when resetting logger parameters remotely.

13 Alarms

The logger has the capability of sending alarms to the Workstation PC/Server to alert the operator to readings that are higher or lower than a pre-configured value. The alarms are initiated from the logger and sent to the Workstation PC/Server and can be accessed at that point, or can be re-directed to a mobile phone, e-mail or accessed by another PC.

Data loggers are configured to send alarms by using the Radcom Alarm Programmer module within the Radlog for Windows Software.

The methods in which the alarms are received and re-directed are configured using the Radcom Alarm Receiver module within the software.

It is recommended that data be collected from the site for a few weeks before configuring alarms into the logger. This will enable the operator to work out sensible alarm parameters.

13.1 Programming Level Alarm

To configure a data logger with the Radcom Alarm Programmer module, proceed as follows:

Select the **Radcall Alarm Programmer** icon from the Windows Start menu.

Select **Alarm Parameters** from the **View** drop-down menu.

Select the **Levels** tab in the **Alarm Parameters** screen (see Figure 29).

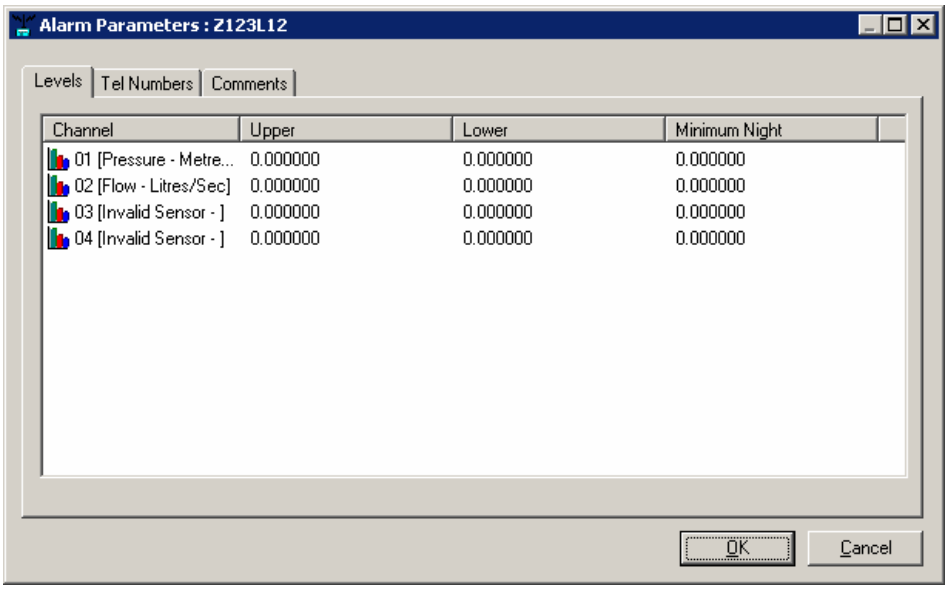


Figure 29 – Level tab, Alarm Parameters Screen

Double click on the required channel to amend the alarm values.

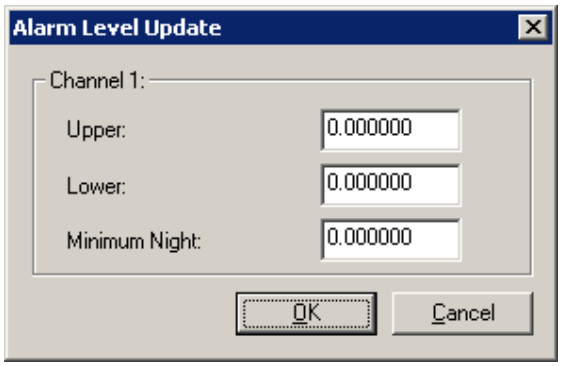


Figure 30 – Alarm Level Update Screen

Input the alarm level values required into the **Upper**, **Lower** and **Minimum Night** fields on the **Alarm Level Update** screen (see Figure 30) using the units displayed in Figure 29.

Click on the **OK** button.

Select the **Tel Numbers** tab on the **Alarm Parameters** screen (see Figure 31).

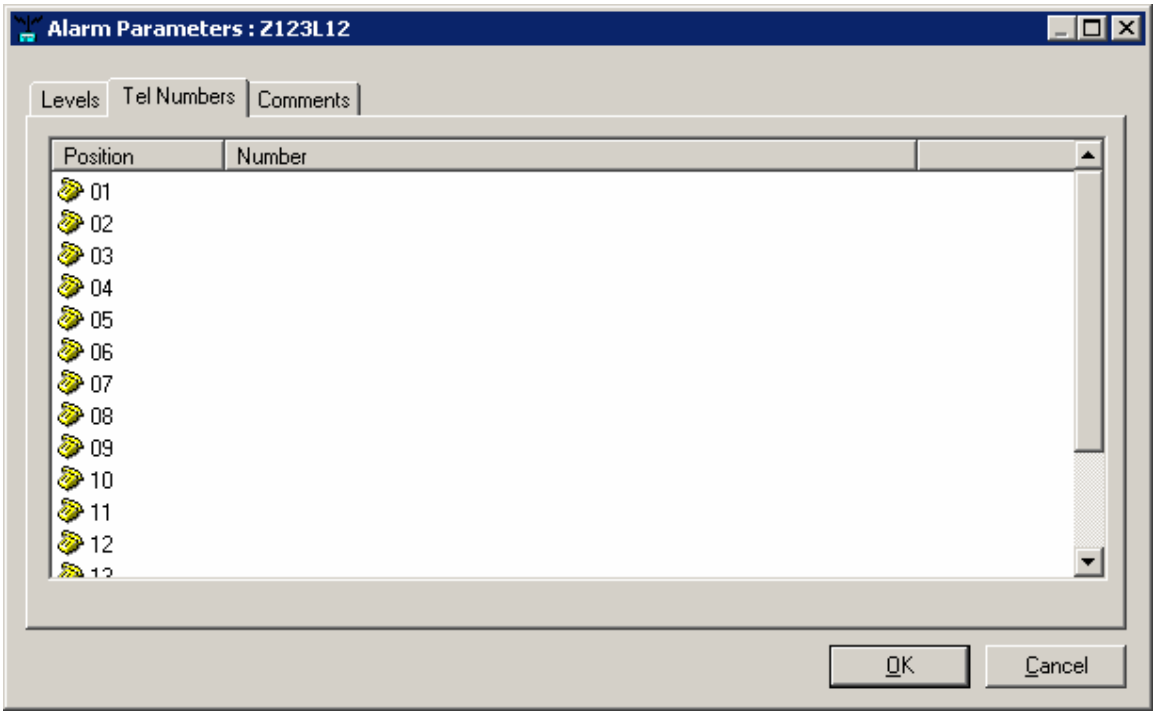


Figure 31 – Tel Numbers tab, Alarm Parameters Screen

Double click on the required Tel Number position to amend the telephone number to which the logger will send the alarm. Up to 16 telephone numbers can be selected, (only 4 tel numbers for SMS loggers).

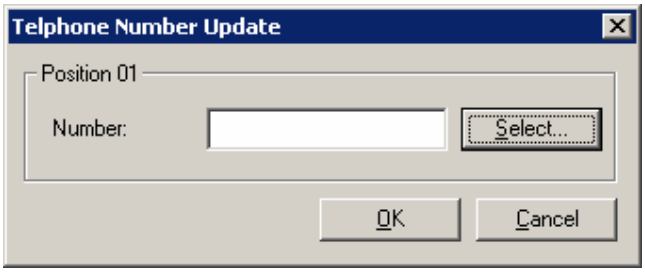


Figure 32 – Telephone Number Update Screen

Enter the telephone number of the modem receiving the alarms into the **Number** field in the **Telephone Number Update** screen (see Figure 32) or click **Select** to choose a telephone number from the Database Telephone Directory.

Note
A maximum of 12 digits are allowed for telephone numbers. Use local number format if necessary.

Click on the **OK** button.

Select the **Comments** tab in the **Alarm Parameters** screen (see Figure 33).

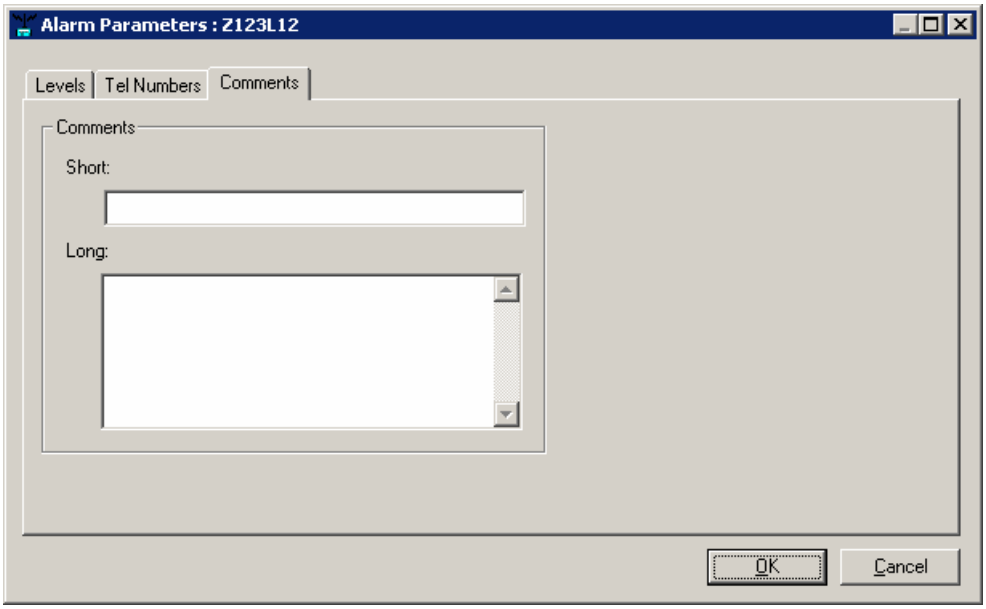


Figure 33 – Comments Tab, Alarm Parameters Screen

Enter up to 16 characters of text into the **Short** field. The text typed into this field is used by the logger when reporting an alarm.

The **Long** field is for information only and can be used to describe the location of the logger.

13.2 Programming Profile Alarm

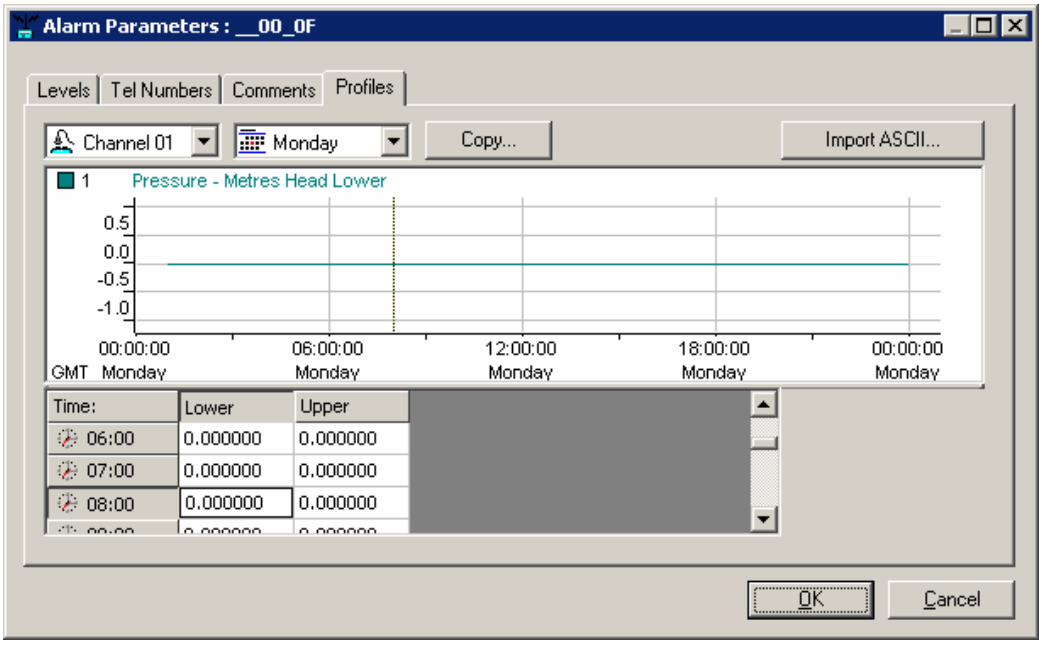


Figure 34 – Profile Tab, Alarm Parameters Screen

It is possible to enter 24 hourly values, which define a diurnal profile. The logger will interpolate between consecutive values to compute the 15-minute profile.

Note

The profile tab will only appear on the **Alarm Parameter** screen if the Alarm Programmer has already communicated with a logger supporting Profile Alarms (see Figure 34).

To amend the profile, proceed as follows:

Select the required **Channel** from the drop-down menu.

Select a **Day of the Week** from the drop-down menu.

Input the required values into the **Lower** and **Upper** fields to define the profile for the above selection. It is possible to import an existing ASCII file containing the hourly values to create a profile.

The **Copy** button allows the user to copy the displayed profile to other days of the week.

Click the **Copy** button to move to the Copy Profile screen (see Figure 35 below).

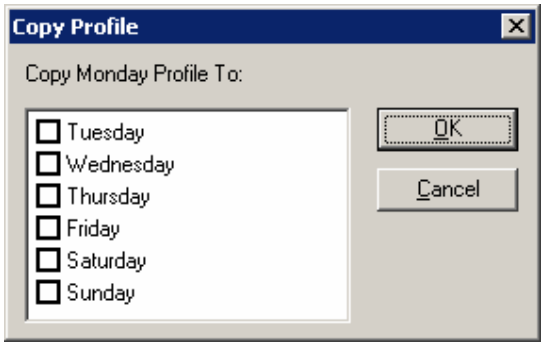


Figure 35 – Copy Profile Screen

Click in to the required **Days of the Week** fields to select them for copying.

Click on the **OK** button.

Select the **Alarm Configuration** screen from **View** drop-down menu.

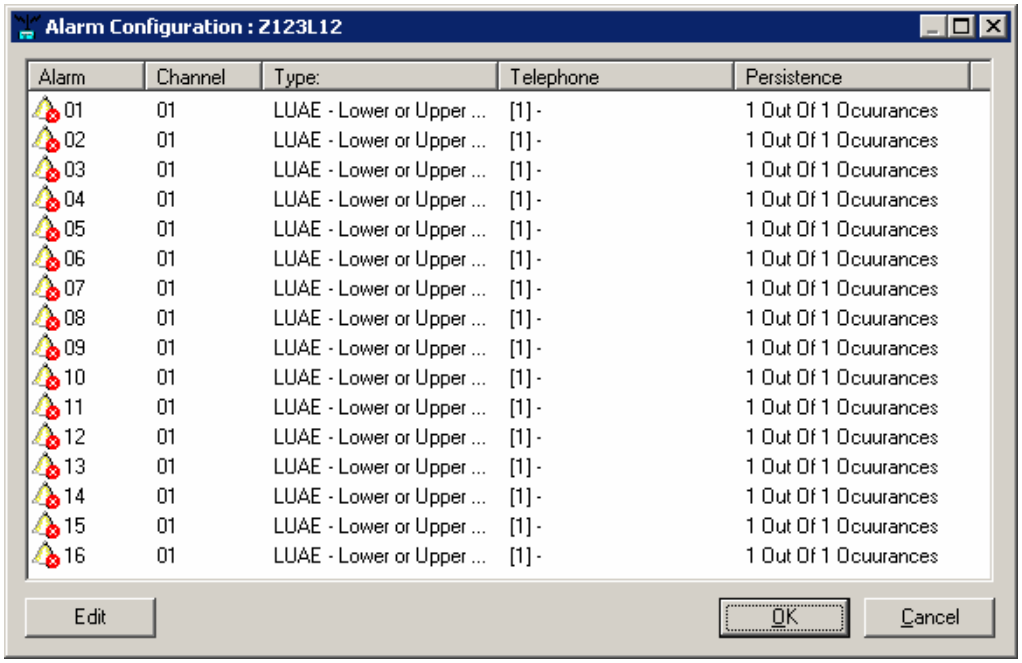


Figure 36 – Alarm Configuration Screen

Double click on the required **Alarm condition** in the **Alarm Configuration** screen to edit the Alarm details (see Figure 36). Up to 16 separate alarm conditions can be configured.

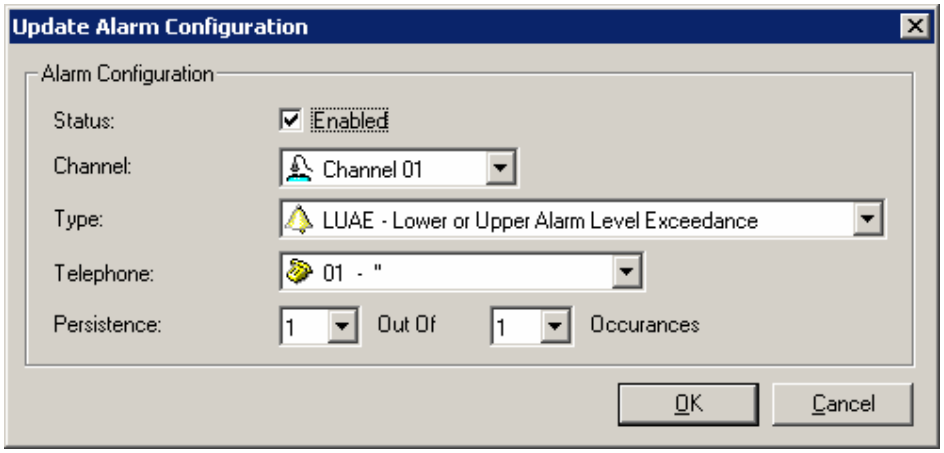


Figure 37 – Update Alarm Configuration Screen

Click in the **Status** field on the **Update Alarm Configuration** screen to enable the Alarm (see Figure 37).

Choose the required channel number from the **Channel** drop-down menu.

Select the required alarm type from the **Type** drop-down menu.

Select the telephone number to call from the **Telephone** drop-down menu.

Select the persistence and occurrences from the **Persistence** and **Occurrences** drop-down menus.

Click on the **OK** button.

Select **Upload** from the **Communications** drop-down menu to open the **Upload Configuration** screen (see Figure 38).

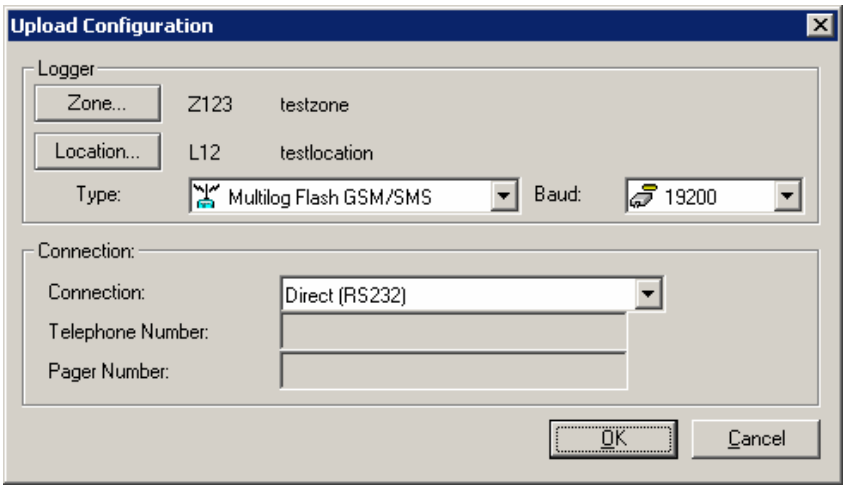


Figure 38 – Upload Configuration Screen

Select the logger type as **MultiLog Flash GSM/SMS** from the **Type** drop-down menu.

Select the Baud Rate to the required rate using the **Baud** drop-down menu.

Select the required Connection type from the **Connection** drop-down menu.

Click on the **OK** button.

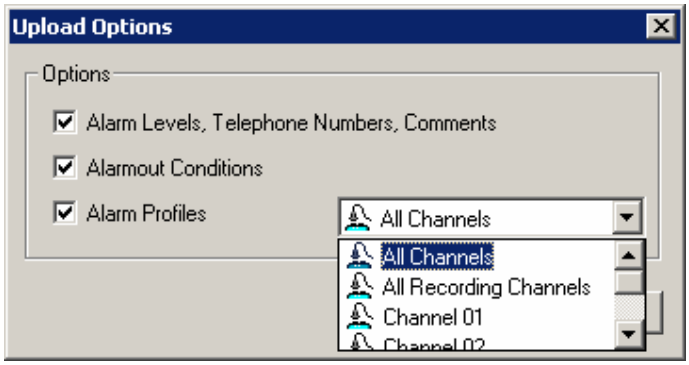


Figure 39 – Upload Options Screen

Click in the required **Options** boxes on the **Upload Options** screen (see Figure 39) to select the option for Uploading to the logger. Select the Alarm Profiles from the drop-down menu as required.

Click on the **OK** button.

The **Uploading** screen should appear to confirm that the Alarm conditions are being transferred to the logger (see Figure 40).

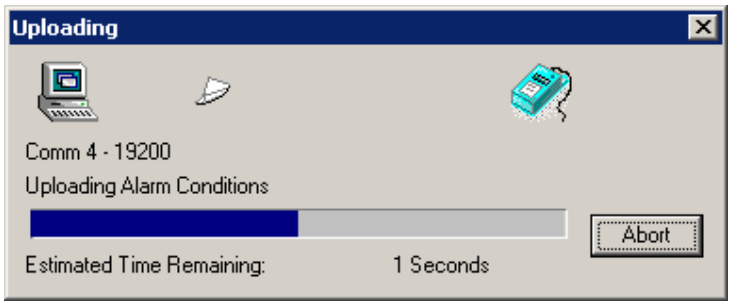


Figure 40 – Uploading Information Screen

13.3 Receiving and Acknowledging the Alarms

The RadWin software must be configured to receive, acknowledge and re-direct alarms. The Radcom Alarm Receiver module allows the operator to configure the software to enable these functions.

To configure the software, proceed as follows:

Select the **Radcall Alarm Receiver** icon from the Windows Start menu.

Note

Make sure the Alarm Receiver communications ports are set correctly. The settings can be checked in the **Alarm Receiver Port** tab under the **System Configuration** menu (see Figure 41).

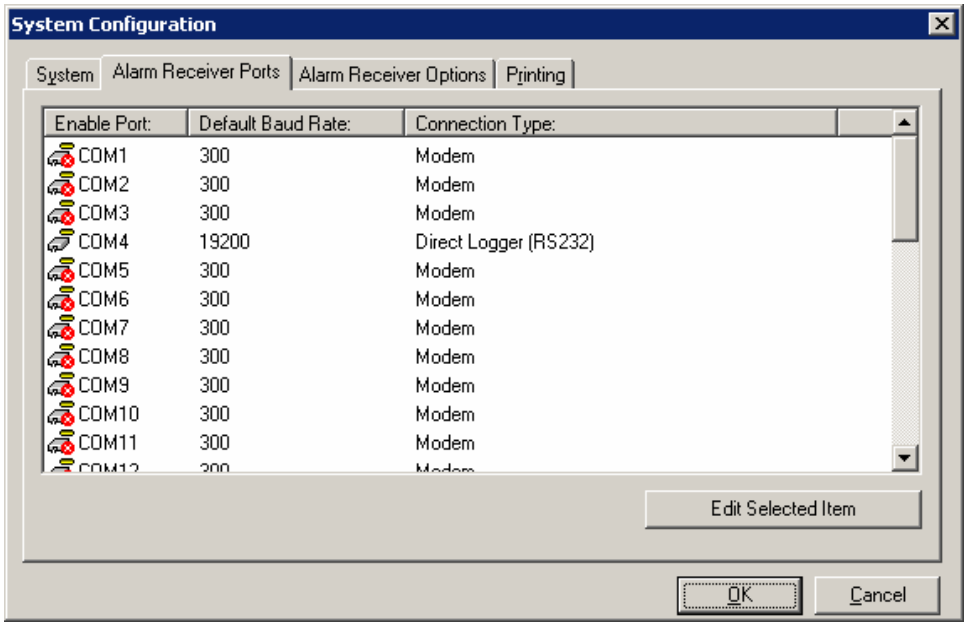


Figure 41 – Alarm Receiver Ports Screen

All alarms from SMS loggers are reported via the “Autocall” module receiving/sending SMS messages via. the “SMS Modem” connection. The “Autocall” module must also be running to receive alarms from GSM/SMS data loggers.

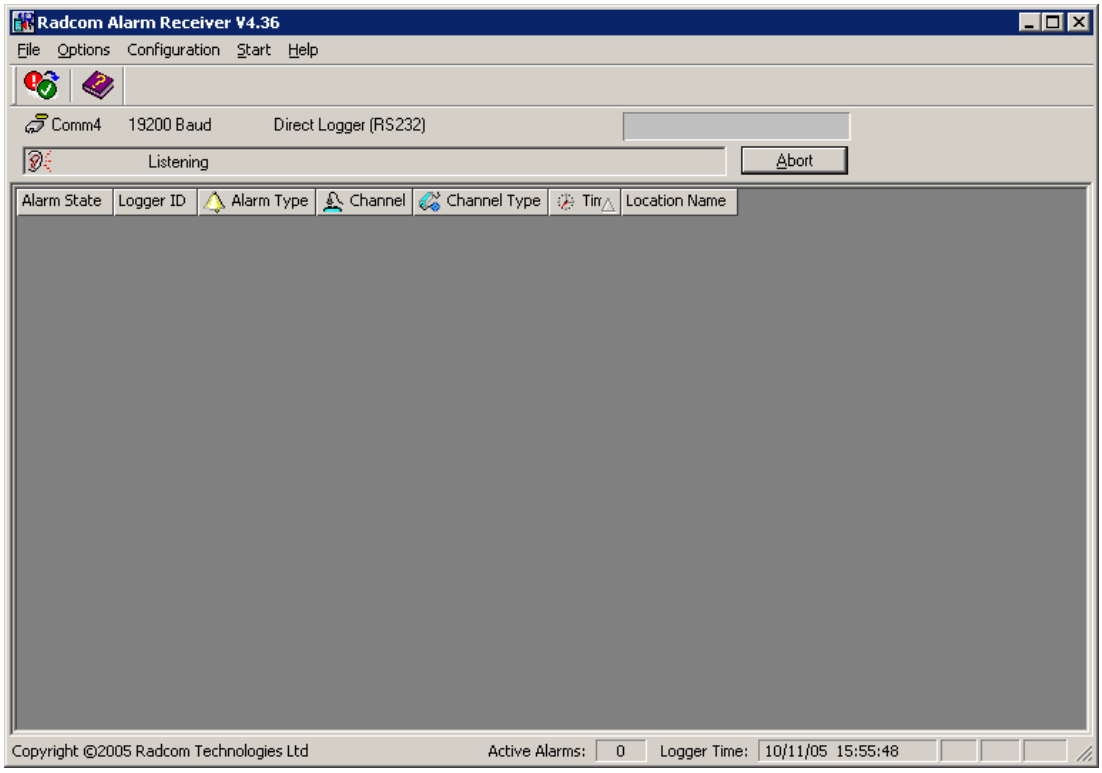


Figure 42 – Radcom Alarm Receiver screen without alarms

If no alarms have been received the Radcom Alarm Receiver screen will be blank (See Figure 42).

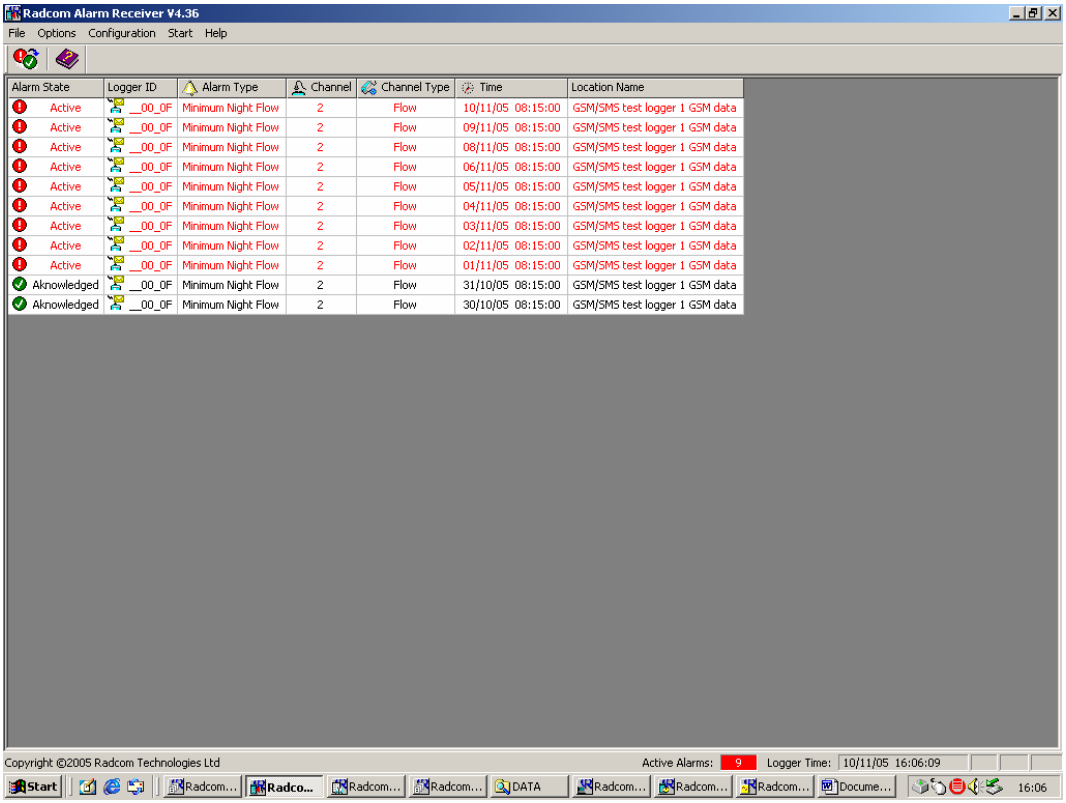


Figure 43 – Radcom Alarm Receiver Screen with Alarms

If any alarms have been received the Radcom Alarm Receiver screen will have the Alarms listed (see Figure 43).

To acknowledge the alarms, highlight the alarms by clicking on the appropriate line(s) and select **Acknowledge Selected Alarms** from the **Options** drop-down menu.

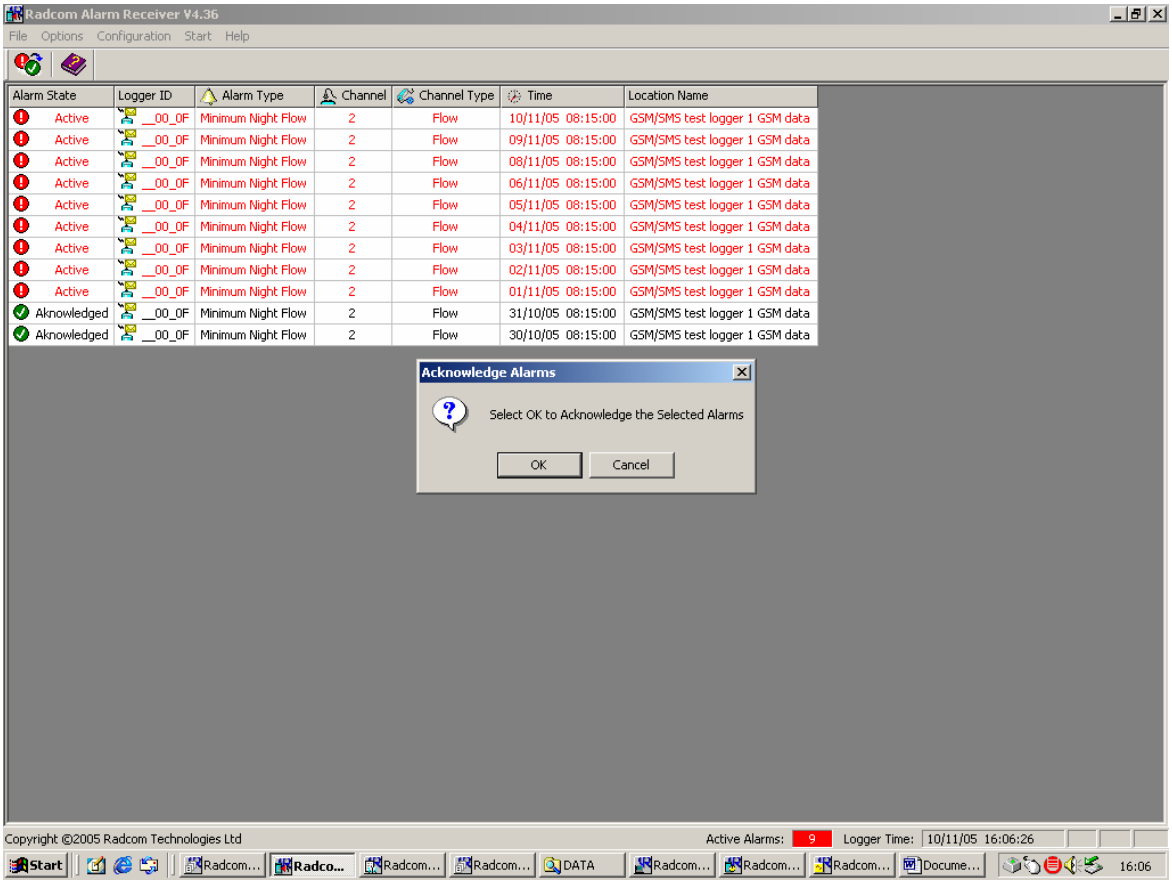


Figure 44 – Acknowledge Selected Alarms Confirmation Screen

Click the **OK** button to confirm the acknowledgment of the selected alarms (see Figure 44).

Alarms Initiated from Logger Types

The following logger types can alarm out to a Workstation/PC:

PSTN – Data connection
SMS – Text messages
GSM – Data Connection
E-Mail - Internet

PSTN Alarms

Data Loggers fitted with a PSTN modem, connected to a telephone line, are only capable of sending Alarms by PSTN. This alarm can be sent to a different telephone number from that of the main data download PC. The only way of receiving such PSTN alarms is via a Workstation PC/Server. Radcom recommend that a

separate PSTN modem is setup for receiving alarms to avoid conflicts if alarms are triggered whilst data downloads are active with other loggers.

SMS Alarms

Data Loggers set up for sending data by SMS are only capable of sending alarms by SMS. This alarm can be sent to a different telephone number from that of the main data download PC. SMS Alarms can also be sent directly from the Radcom SMS logger to any mobile phone.

GSM Alarms

Data Loggers set up for sending data by GSM are only capable of sending alarms by GSM. This alarm can be sent to a different telephone number from that of the main data download PC. The only way of receiving such GSM Alarms is via a Workstation PC/Server. Radcom recommend that a separate cellular or PSTN modem is configured for receiving alarms to avoid conflicts if alarms are triggered whilst data downloads are active with other loggers.

E-MAIL Alarms

Data Loggers set up for sending download data by E-mail are capable of sending alarms by E-mail to any valid e-mail address or by sending an SMS message to a mobile phone or Workstation PC/Server.

Notes

1) It is recommended that all alarms from loggers are directed to a PC/Server to collate all Alarm messages, and if necessary those Alarm messages can be re-transmitted by RadWin software via SMS to a Mobile phone or via email to any valid email address for investigation or action.
2) Alarm persistence parameters can be setup within the Radcom data logger. Alarms can be sent immediately upon reaching a pre-set limit. Alternatively, the Alarm can be delayed until the abnormal condition has been present for a pre-set time.

Alarms Re-Transmitted from PC/Server

The RadWin software can forward the received alarms to a mobile telephone or e-mail address:

SMS Re-Transmitted Alarms

The Alarm Receiver can forward any incoming alarm from PSTN, SMS, GSM or E-mail loggers by sending an SMS Alarm message to any Mobile phone. For this to be possible the Workstation PC/Server requires a SMS modem.

E-MAIL Re-Transmitted Alarms

The Alarm Receiver module can, alternatively, forward any incoming alarm from PSTN, SMS, GSM or E-mail loggers by sending an E-mail Alarm message to any valid e-mail address for investigation or action. For this to be possible the PC/Server will require connection to an operational e-mail account.

14 Trouble Shooting

The following table contains the solutions to general problems that may occur during the installation, configuration and operation of the data logger.

Please contact the Radcom Help Desk for assistance in fixing any problems that are not covered in this section.

Problem	Solution

Table 5 – Troubleshooting Guide

15 Diagnostics & Maintenance

15.1 Built in Test Facility

The data logger has a built-in test facility to carry out the following automatic checks on power up:

Internal RAM
Comparing the Real Time Clock (RTC) with the micro-controller crystal clock
Communications with the RTC chip
Communications with the A/D converter
Watch dog timer.

15.2 Battery Usage

The data logger constantly monitors the following parameters of battery usage:

Battery life remaining in percent
Average battery voltage and usage recorded every 2 days. Usage data can be downloaded and viewed graphically
Watchdog occurrence and details.

15.3 Audit Trail

The data logger keeps an audit trail of any alteration of parameters for each of the following:

Details of the last N calibration, including the calibrators' initials, the calibration type, the range and the dates etc
Header parameters changed for the Last N recordings. (E.g., start time, stop time, identification, sample rate etc.)
The last N time/date of communications command, communication duration, data length, start address, recording number and communication re-tries.

Annex A – Connection Details

A1. Cables For Use With The MultiLog Data Loggers

Table A 1 – Cable Details For MultiLog Data logger

Logger Type	Part Number	Cable description
MultiLog Sentry SentinelPlus Pegasus to PC lead	COM AE	10 Pin Military plug to 9 pin D plug
RadNet to MultiLog lead	COM EE	10 Pin Military plug to 10 Pin Military plug
RadLink to PC lead	COM AA	9 pin D plug to 9 pin D plug

A2. Pin Configuration For MultiLog To PC Cable

Communications Connector Details

Table A 2 – 10 Pin Connector Type 62GB57A-12-10

Pin No.	Title	Description
A	Audit/Modem Detect	Audit enable for GSM/SMS loggers
B	Reserved	
C	Batt -VE	Battery connection
D	V+	External power input (9 to 12 volts)
E	Reset	External reset
F	GND (0V)	Ground (0 volts)
G	NC	Not used
H	NC	Not used
J	RXD	RS232 input
K	TXD	RS232 output

External Pressure Input

Table A 3 – 6 Pin Connector Type 62GB57A-10-6

Pin No.	Title	Description
A	V+ (5 volt)	Stabilised power supply
B	+VE signal	Positive input signal
C	GND (0V)	Ground (0 volts)
D	-VE signal	Negative input signal
E	Screen	Screen to chassis
F		

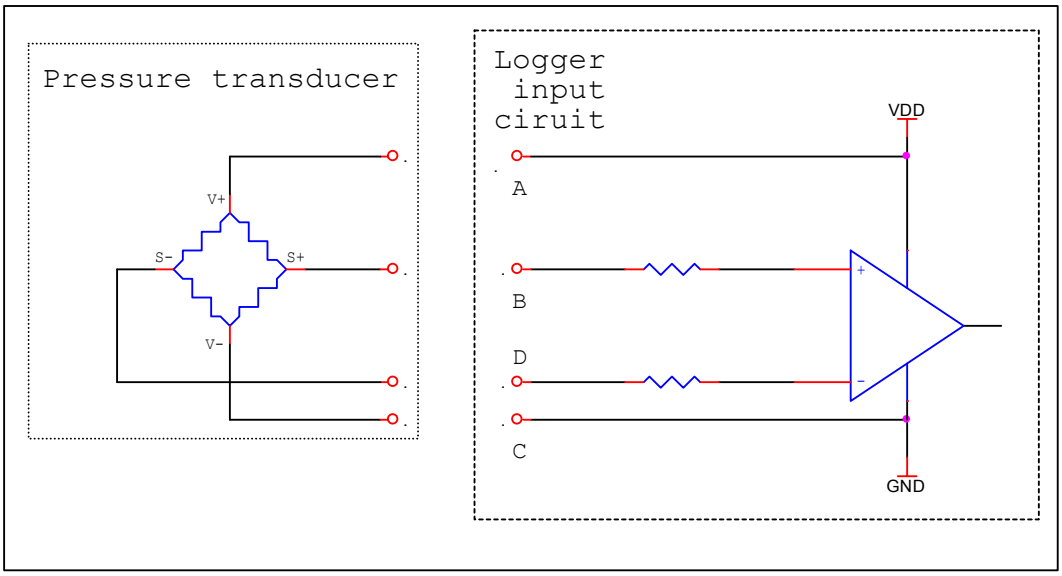


Figure A 1 – External Pressure Sensor Input Circuit

Flow Input

Table A 4 – 4 Pin Connector Type 62GB57A-10-4

Pin No.	Title	Description
A	V+	Switched Power supply
B	Flow	Flow input signal (pulses)
C	GND (0V)	Ground (0 volts)
D	Direction	Direction input signal 0V = -VE direction

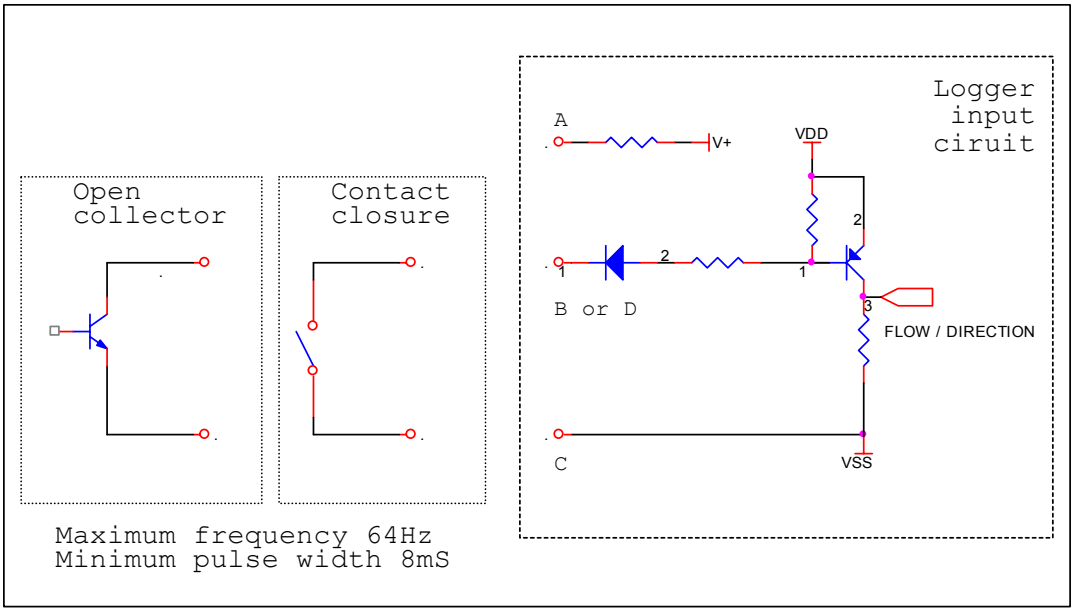


Figure A 2 – Digital Flow Input Circuit

Typical colour coding used by Radcom loggers flow input cables:

Pin A - Red
Pin B - Blue
Pin C - Green
Pin D - Yellow.

MilliAmp Input

Table A 5 – Pin Connector Type 62GB57A-10-4

Pin No.	Title	Description
A		
B	+VE signal	Positive mA input signal
C		
D	-VE signal	Negative mA input signal

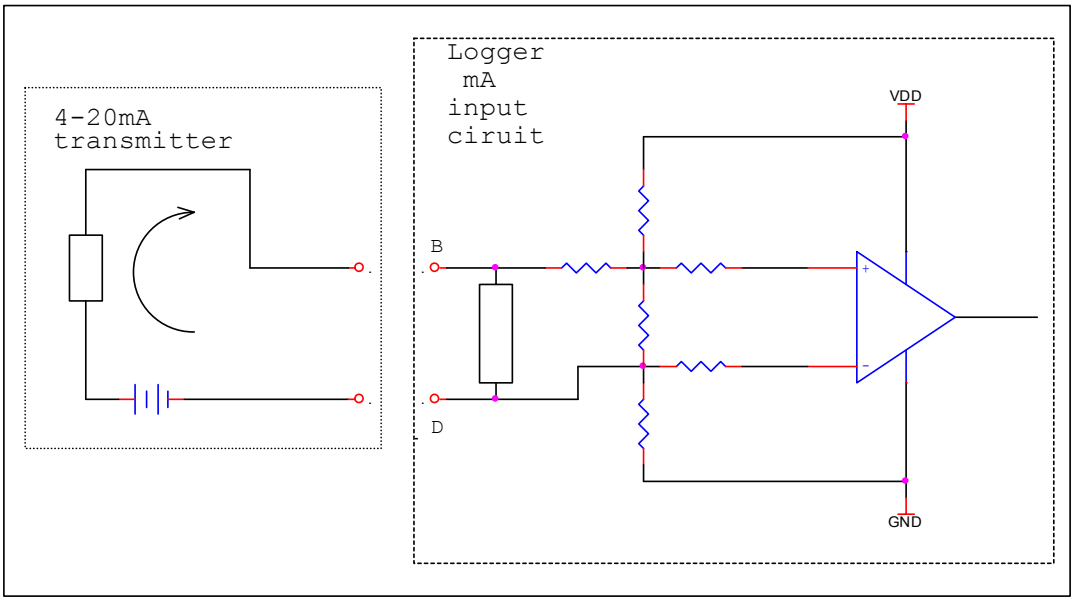


Figure A 3 – MilliAmp Input Circuit

Annex B – SMS Message Command Descriptions

B1. SMS Message Descriptions

The Data logger can receive two types of messages. These are either Installation and Commissioning messages or Status messages.

During Installation & Commissioning a special 10-pin military connector is plugged into the 10-pin connector fitted on the logger, switching ON the GSM modem. If the connector is plugged in for more than five seconds the logger will switch ON power to the GSM modem and listen for incoming messages. After the connector is removed the logger starts an half hour time-out counter. The power to the GSM modem is switched OFF after the half hour timer has expired.

Installation & Commissioning Messages

"Stat#" Latest data values in SI units

When the logger receives the SMS text message "**Stat#**" from a telephone number it replies with the following message.

Table B 1 – Stat# SMS Text Message

Message	Description
Stat	Original command text without #
V 01.00	Firmware version in Logger.
+CSQ: nn	Signal strength nn (nn = 6 to 30)
cccccc	Message counter (Total no. Of messages sent by logger)
LBat.=PP.P x%	% Logger battery Remaining (Not GSM battery)
ZZZZLLL	Zone/Location details
RDL634LF/3131	Logger part number describing input configuration.
Ch1 0056.8	Channel 1 - Latest Pressure reading in metres
P0.100	P = Pressure calibration value
Ch2 015620	Channel 2 - Latest Flow reading in litres/hour
F010.0	F = Flow Litres/pulse
Ch3 0056.8	Channel 3 - Latest Pressure reading in metres
P0.100	P = Pressure calibration value
Ch4 151200	Channel 4 - Latest Flow reading in litre/hour
F100.0	F = Flow Litres/pulse
High Street	Test Comment in logger

“SigN#” Signal Strength test

When the logger receives the SMS text message “**SigN#**” from a telephone number it replies with the following message. This message should be sent after the logger is installed in the final position in the meter pit and all pit covers are in place.

Table B 2 – SigN# SMS Text Message

Message	Description
SigN	Original command text without #
V 01.00	Firmware version in Logger.
+CSQ nn	Signal strength nn (nn = 6 to 30)
cccccc	Message counter (Total no. Of messages sent by logger)
CSQ Min = nn	Minimum GSM Signal strength level
CSQ Max = nn	Maximum GSM Signal strength level
CSQ Avr = nn	Average GSM Signal strength level
CSQ Stdv = nn.n	Standard Deviation of GSM Signal strength level
ZZZZLLL	Zone/Location details
High Street	Test Comment in logger

The logger starts logging the GSM signal strength after receipt of this message. The logger measures and records the GSM signal every 15 seconds for “N” minutes to calculate the Minimum, Maximum, Average and Standard Deviation of signal levels. It will take at least n minutes before the logger replies to the above message. The range for n is from 1 to 9 minutes.

“Config#” Logger configuration in Database

Before sending this message to the logger, it is important that the logger has been configured with a telephone number in call number position 01. The Autocall module should be running, listening for SMS messages on the configured telephone number.

When the logger receives the SMS text message “**Config#**” from a mobile telephone number, it sends the following message to the first telephone number (office PC) in the callout list.

Table B 3 – Config# SMS Text Message

Message	Description
Config	Original command text without #
+44776411111	Telephone number of original caller
V 01.00	Firmware version in Logger.
+CSQ: nn	Signal strength nn (nn = 6 to 30)
cccccc	Message counter (Total no. Of messages sent by logger)
ZZZZLLL	Zone/Location details
RDL634LF/3131	Logger part number describing input configuration.
P000.1	Channel 1 – calibration value (P = Pressure)
F010.0	Channel 2 – Litres/pulse (F = Flow)
P000.1	Channel 3 - calibration value (P = Pressure)
F100.0	Channel 4 - Litres/pulse (F = Flow)
Sno 00123	Serial number of data logger
Dom 03-04-04	Date of manufacture of data logger (dd-mm-yy)
High Street	Test Comment in logger

Upon receipt of the above message, the computer running Autocall will create a new zone/location in the Database, as per details above, provided this zone/location does not already exist or the logger telephone number is not used by another zone/location already in the existing database.

If the zone/location has been created successfully in the database, Autocall will send the following message to the originator of the “Config” message.

Table B 4 – Zone Created Successful SMS Text Message

Message	Description
CREATED	
+44776411111	Telephone number of original caller
V 01.00	Firmware version in Logger.
+CSQ: nn	Signal strength nn (nn = 6 to 30)
cccccc	Message counter (Total no. Of messages sent by logger)
ZZZZLLL	Zone/Location details
RDL634LF/3131	Logger part number
P000.1	Channel 1 – calibration value (P = Pressure)
F010.0	Channel 2 – Litres/pulse (F = Flow)
P000.1	Channel 3 - calibration value (P = Pressure)
F100.0	Channel 4 - Litres/pulse (F = Flow)
Sno 00123	Serial number of data logger
Dom 03-04-04	Date of manufacture of data logger (dd-mm-yy)
High Street	Test Comment in logger

If the zone/location already exists in the Database or the telephone number has already been used by another zone/location Autocall will send one of the following messages to the originator of the “Config” message.

Table B 5 – Zone Location Exists SMS Text Message

Message	Description
FAILED	
+44776411111	Telephone number of original caller
V 01.00	Firmware version in Logger.
+CSQ: nn	Signal strength nn (nn = 6 to 30)
ZZZZLLL	Zone/Location details
RDL634LF/3131	Logger part number
Sno 00123	Serial number of data logger
Location ZZZ/LLLL already exists in the database	

Table B 6 – Zone Telephone No. Exists SMS Text Message

Message	Description
FAILED	
+44776411111	Telephone number of original caller
V 01.00	Firmware version in Logger.
+CSQ: nn	Signal strength nn (nn = 6 to 30)
ZZZZLLL	Zone/Location details
RDL634LF/3131	Logger part number
sno 00123	Serial number of data logger
Tel number already exists in the database for location zzz/llll	

Logger Status Message

"MinN#" Minimum Flow/Pressure for channel N

When the logger receives the SMS text message "**MinN#**", where N = 1 to 4 indicating the channel number, from a telephone number, it replies with following message.

Table B 7 – MinN# SMS Text Message

Message	Description
Min	Original command text without #
V 01.00	Firmware version in Logger.
+CSQ nn	Signal strength nn (nn = 6 to 30)
cccccc	Message counter (Total no. Of messages sent by logger)
High Street	Test Comment in logger
Chx – Flow	Channel type is Flow or Pressure (Litres/hour or Metres)
25-12-04	Date of Day 1 (Today)
1 dddddd	Day1 - Minimum (Part of day – since midnight)
2 dddddd	Day2 - Minimum
3 dddddd	Day3 - Minimum (Litres/hour or Metres)
7 dddddd	Day7 - Minimum Flow in Litres/hour

- Day 1 is 24 hours long starting at midnight.
- Day 2 = previous day to day 1
- Day 3 = previous day to day 2 etc.

“MaxN#” Maximum Flow/Pressure for channel N

When the logger receives the SMS text message “**MaxN#**”, where N = 1 to 4 indicating the channel number, from a telephone number, it replies with Maximum values in the same format as the “**MinN#**” above (See Table B 7).

“SumN#” Data summary for a flow channel N

When the logger receives the SMS text message “**SumN#**”, where N = 1 to 4 indicating the channel number, from a telephone number, it replies with following message.

Table B 8– SumN# SMS Text Message

Message	Description
Sum	Original command text without #
V 01.00	Firmware version in Logger.
+CSQ nn	Signal strength nn (nn = 6 to 30)
cccccc	Message counter (Total no. Of messages sent by logger)
High Street	Test Comment in logger
Chx - Flow	Channel type is Flow only (Not for pressure)
25-12-04	Date of Day 1 (Today)
1 dddd.dd	Day1 - Flow in Cubic Metres (Part of day – since midnight)
2 dddd.dd	Day2 - Total Daily Flow in Cubic Metres
3 dddd.dd	Day3 - Total Daily Flow in Cubic Metres
7 dddd.dd	Day7 - Total Daily Flow in Cubic Metres

- Day 1 is 24 hours long starting at midnight
- Day 2 = previous day to day 1
- Day 3 = previous day to day 2 etc.

The “SumN#” message only applies to a flow type channel. It does not apply to a pressure type channel. If this message is sent to a logger where channel N is a pressure channel, the logger will respond with a message replacing the summary data with nothing.

"Win#" SMS parameters

When the logger receives a SMS text message "Win#", from a telephone number, it replies with the following message.

Table B 9 – Win# SMS Text Message

Message	Description
Win	Original command text without #
V 01.00	Firmware version in Logger.
+CSQ nn	Signal strength nn (nn = 6 to 30)
cccccc	Message counter
High Street	Test Comment in logger
+447766222222 (10:22)	1st. Enabled - Telephone Number & call out time. (Last 14 – digits)
+447766333333 (06:22)	2nd. Enabled - Telephone Number & call out time. (Last 14 – digits)
W1(06:00–08:00)	1st Enabled - Window times
W3(11:30–18:45)	2nd Enabled - Window times

"Totl#" Total volume for all flow channels

When the logger receives a SMS text message "Totl#", from a telephone number, it replies with the following message.

Table B 10 – Totl# SMS Text Message

Message	Description
Totl	Original command text without #
V 01.00	Firmware version in Logger.
+CSQ: nn	Signal strength nn (nn = 6 to 30)
cccccc	Message counter (Total no. Of messages sent by logger)
ZZZZLLL	Zone/Location details
RDL634LF/3131	Logger part number describing input configuration.
High Street	Test Comment in logger
15:15 -24/12/04	Time & date of Total Volume
Ch2-Flow	Channel Type = Flow
00000279.11	Total volume (meter reading) in cubic metres.
Ch4-Flow	Channel Type = Flow
00002711.10	Total volume (meter reading) in cubic metres.

If there are NO flow channels fitted to the logger it will return blanks in place of the total volumes.
Meter reading resolution is 10 litres.

Annex C – MultiLog Calibration

This annex provides the information needed to calibrate Radcom data loggers with infra-red or serial communication ports (e.g. Lo-log, Multi-log, Centurion etc.). The annex provides a detailed description on the usage of the commands to calibrate, re-zero and check the individual channels of the loggers. It also explains how the loggers will respond to each command.

WARNING
The calibration procedure must be carried out with great care, as it is possible to lose the existing calibration details stored inside the logger. It is recommended that only an experienced operator should carry out this operation.

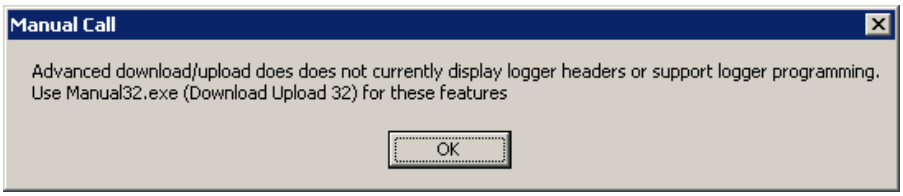
C1. Logger Calibration

Select **Radcom Manual Call** from the start menu.

Make sure the communications port is configured correctly by selecting **Basic Configuration** from the **Configuration** drop-down menu

Select Advanced Download/Upload/Utilities from the Options drop-down menu

Click on the **OK** button if the following message appears



Check/change the Logger Type is set to **MultiLog Flash GSM/SMS** on the **Advanced Download/Upload/Utilities** screen (See below).

Change the Baud Rate to the required setting using the **Baud** drop-down menu.

Check/change the Connection type required using the **Connection** drop-down menu (see Figure C 1 below).

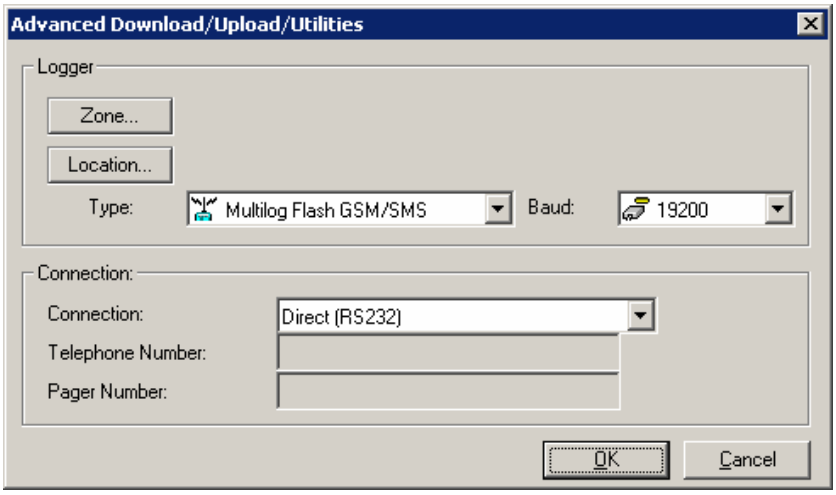


Figure C 1 – Advanced Download/Upload/Utilities screen

Click on the **OK** button.

Select the **Utilities** tab now shown on the **Advanced Download/Upload/Utilities** screen and click in the **Calibrate Logger** box (See below).

Click on the **OK** button.

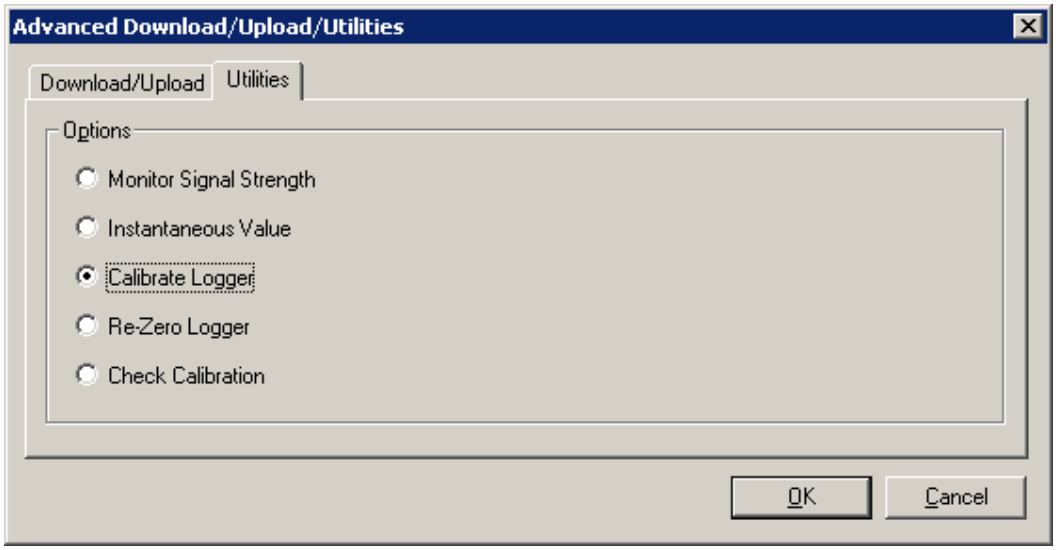


Figure C 2 – Calibrate Logger, Utilities Tab, Advanced Download/Upload/Utilities

If the logger is fitted with more than one analogue channel (pressure/milliAmp) an option screen for choosing the required channel will appear (see Figure C 3 below).

Select the required channel number from the drop-down menu and click on the **OK** button.

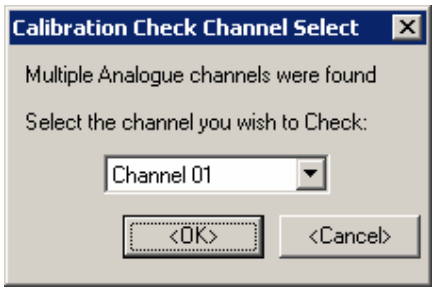


Figure C 3 – Calibration Channel Select Screen

Apply a pressure of **0 Bar** to the data logger (equivalent to the transducer being open to the atmosphere).

The **Calibrate Logger** Screen opens (see Figure C 4) and a flow of values will start to appear in the **Low** column. Allow the raw Numbers in the **Low** column to stabilize.

Click on the **Accept this LOW VALUE** button when the low figure values are acceptable.

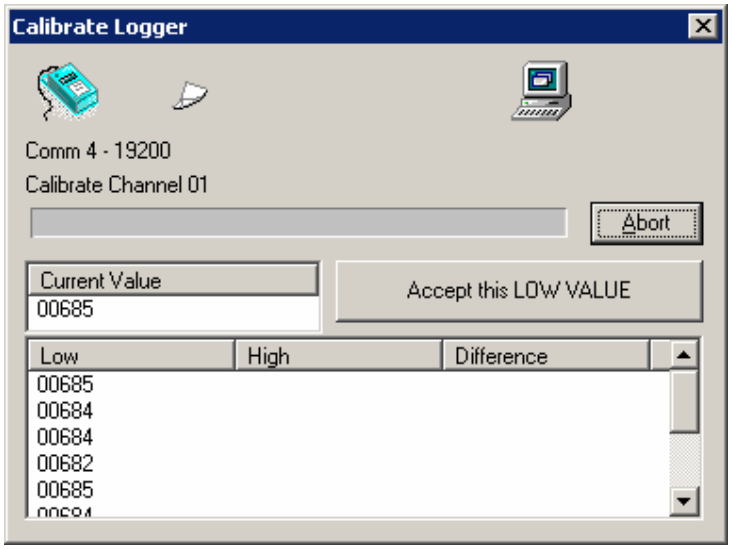


Figure C 4 – Low Value, Calibrate Logger Screen

Apply a pressure of **10 Bar** to the Logger (assuming that the high pressure is set at 10 bar).

A flow of values will now appear in the High column of the **Calibrate Logger** screen (see Figure C 5 below). The Raw values in the **High** columns should increase and be higher than the values in the **Low** column.

Click on the **Accept this HIGH VALUE** button when high figure values are acceptable.

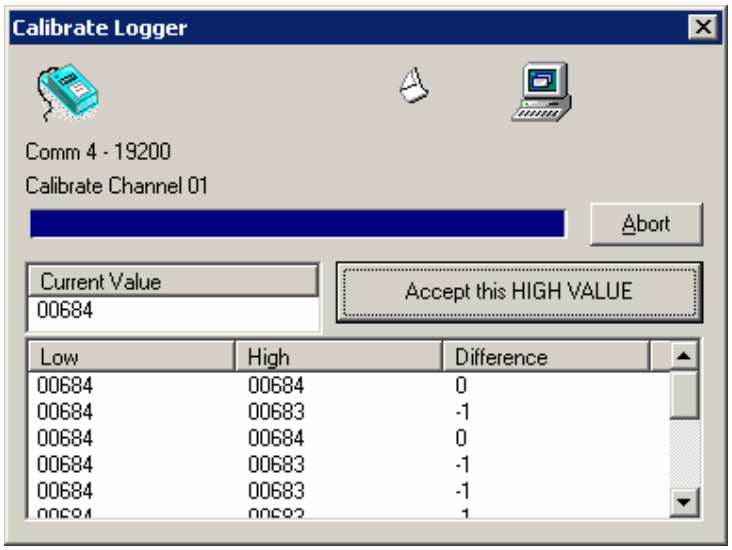


Figure C 5 – High Value, Calibrate Logger Screen

The **Calibration Options** screen will then appear (see Figure C 6) allowing the operator the choice of either storing, re-calibrating or aborting the logger calibration by clicking into the required **Channel Options** box and clicking on the **OK** button.

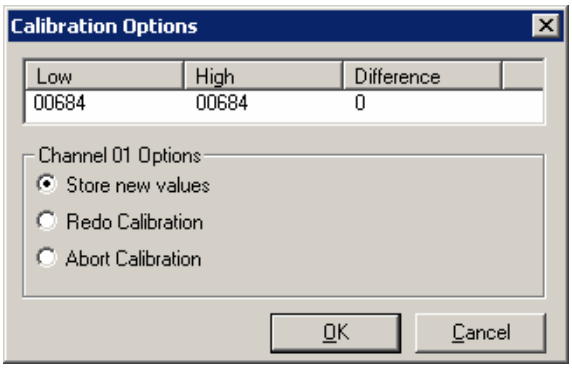
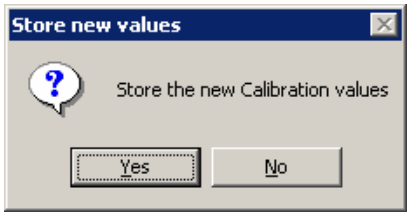


Figure C 6 – Calibration Options Screen

If the **Store New Values** box is checked the **Store the new Calibration Values** screen appears. Click on the **YES** button to store the values.



C2. Re-Zero

Open the **Advanced Download/Upload/Utilites** screen using the procedures from the **Logger Calibration** section (see Clause C.1).

Click in the **Re-Zero Logger** box and click on the **OK** button.

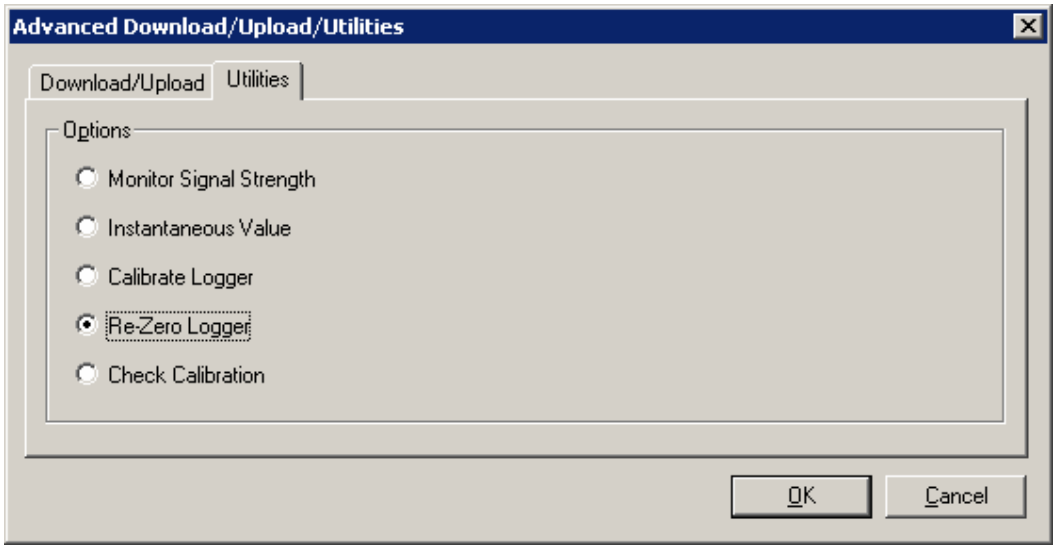


Figure C 7 – Re-Zero Logger, Utilities Tab, Advanced Download/Upload/Utilities

If the logger is fitted with more than one analogue channel (pressure/milliAmp) an option screen for choosing the required channel will appear (see Figure C 3 below).

Select the required channel number from the drop-down menu and click on the **OK** button.

Figure C 8 – Re-Zero Channel Select Screen

A flow of values will then appear in the **Zero** column of the **Re-Zero Logger** screen. Allow the raw Numbers in the **Zero** column to stabilize (see Figure C 9 below).

Click on the **Accept this ZERO VALUE** button when the Zero figure values are acceptable.

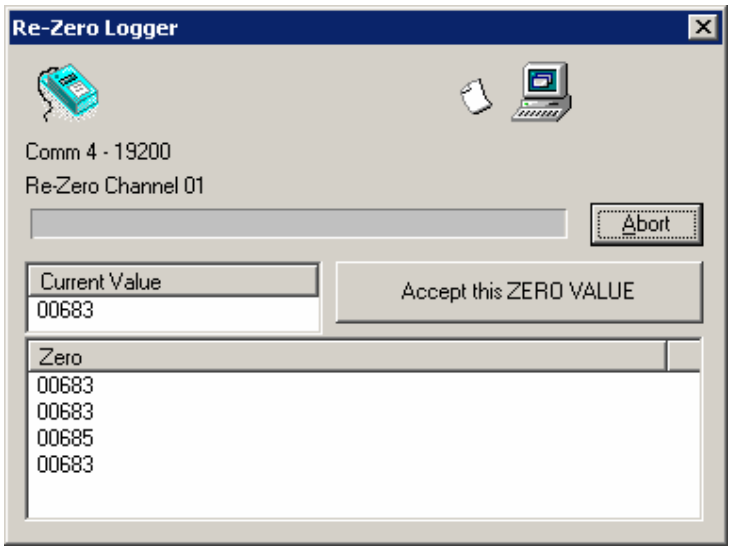


Figure C 9 – Re-Zero Logger Screen

The **Re-Zero Options** screen will then appear (see Figure C 10 below) allowing the operator the choice of either storing, re-zeroing or aborting the Re-Zero by clicking into the **Channel Options** box and clicking on the **OK** button.

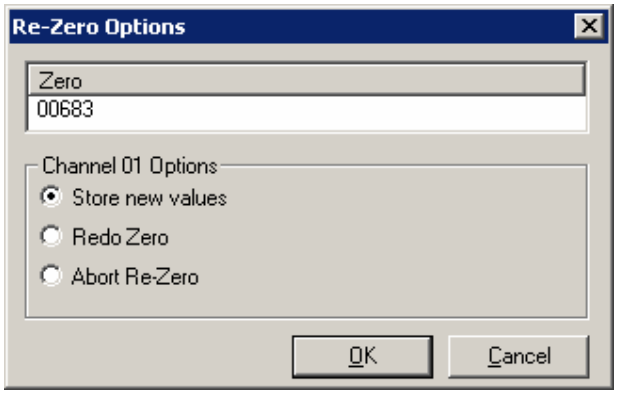
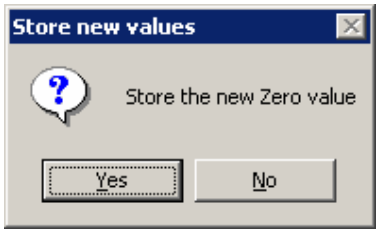


Figure C 10 – Re-Zero Options Screen

If the **Store New Values** box is checked the **Store the new Zero Value** screen appears. Click on the **YES** button to store the values.



C3. Check Calibration

Open the **Advanced Download/Upload/Utilites** screen using the procedures from the **Logger Calibration** section (see Clause C.1).

Click in the **Check Calibration** box and then click on the **OK** button (see Figure C 11).

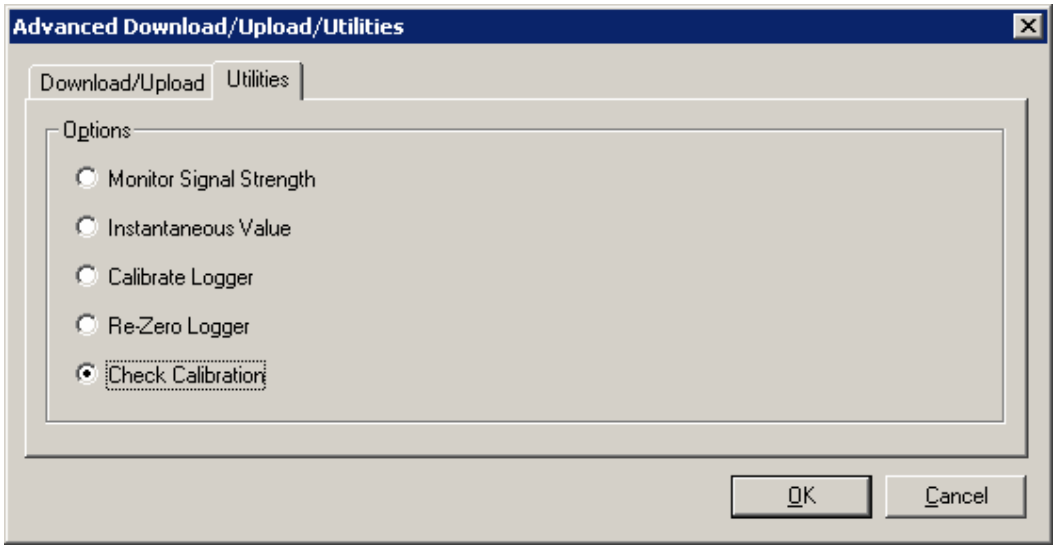


Figure C 11 – Check Calibration, Utilities Tab, Advanced Download/Upload/Utilities

If logger is fitted with more than one analogue channel (pressure/milliamp) an option screen for choosing the required channel will appear (see Figure C 12 below).

Select the required channel number from the drop-down menu and Click **OK**.

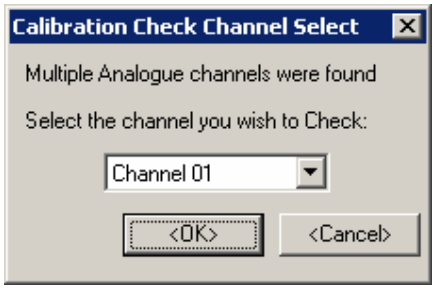


Figure C 12 – Calibration Check Channel Select Screen

A flow of values will then appear in the **Time** and **Value** columns of the **Check Calibration** screen. Allow the raw Numbers in the **Value** column to stabilize (see Figure C 13 below).

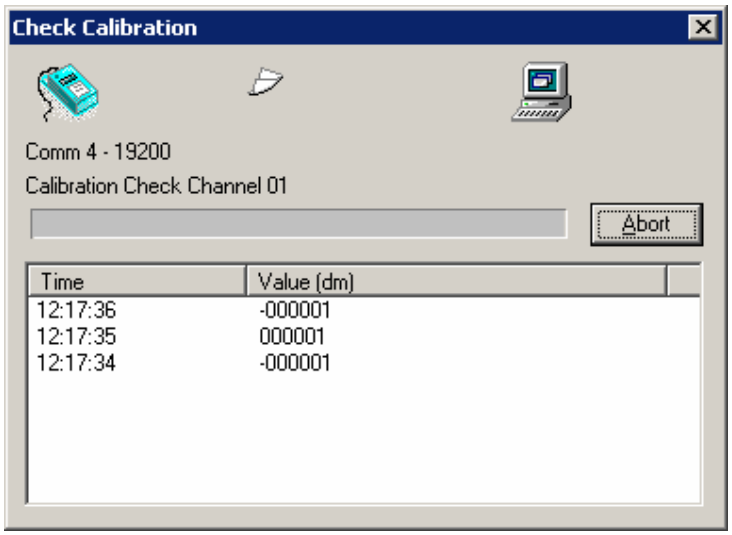


Figure C 13 – Check Calibration Screen

If the test is left to run the following **Comms Timed Out** error screen will eventually appear.

If the operator clicks on the **Abort button** the following **Comms Aborted by User** error screen will appear.

Click on the **OK** button to return to the **Utilities** tab on the **Advanced Download/Upload/Utilities** screen.

The operator can then re-calibrate or Re-Zero if the values are unacceptable.

Annex D – GSM Signal Strength Measurement

It is possible to utilize the logger to measure the signal strength of the GSM network. This measurement can be taken during the installation of the logger, to position the antenna for optimal signal strength, or as a diagnostic check if the operator experiences any problems with telemetry data transfer.

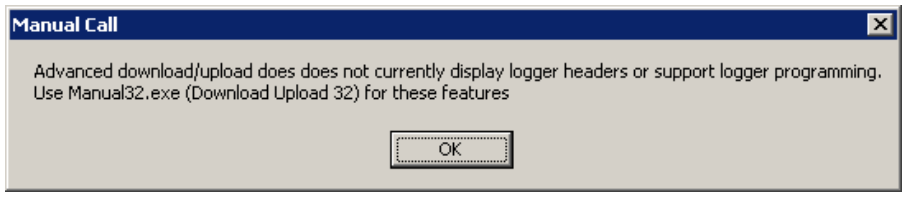
To check the GSM signal strength, proceed as follows:

Select **Radcom Manual Call** from the start menu.

Make sure the communications port is configured correctly by selecting **Basic Configuration** from the **Configuration** drop-down menu.

Select Advanced Download/Upload/Utilities from the Options drop-down menu.

Click on the **OK** button if the following message appears;



Check/change the Logger Type is set to **MultiLog Flash GSM/SMS** on the **Advanced Download/Upload/Utilities** screen (see Figure D 1 below).

Change the Baud Rate to the required setting using the **Baud** drop-down menu.

Check/change the Connection type using the **Connection** drop-down menu.

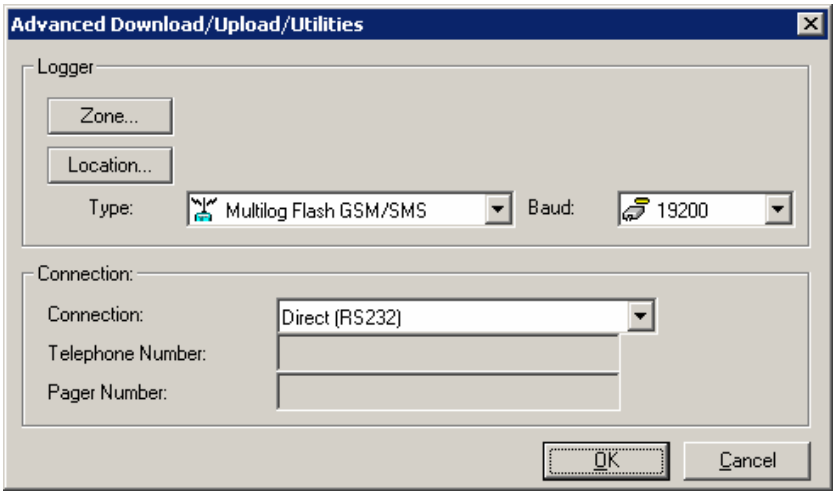


Figure D 1 – Advanced Download/Upload/Utilities screen

Click on the **OK** button.

Select the **Utilities** tab now shown on the **Advanced Download/Upload/Utilities** screen and click in the **Monitor Signal Strength** box (see Figure D 2 below).

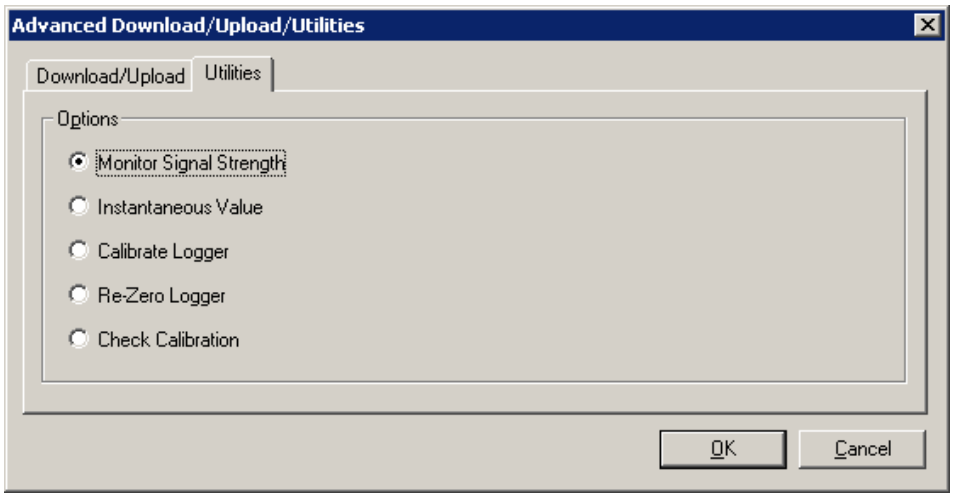


Figure D 2 – Monitor Signal Strength, Utilities Tab, Advanced Download/Upload/Utilities screen

Click on the **OK** button.

The **Monitor Signal Strength** screen will now appear showing the values of the test in the **Signal** and **Quality** columns (see Figure D 3 below).

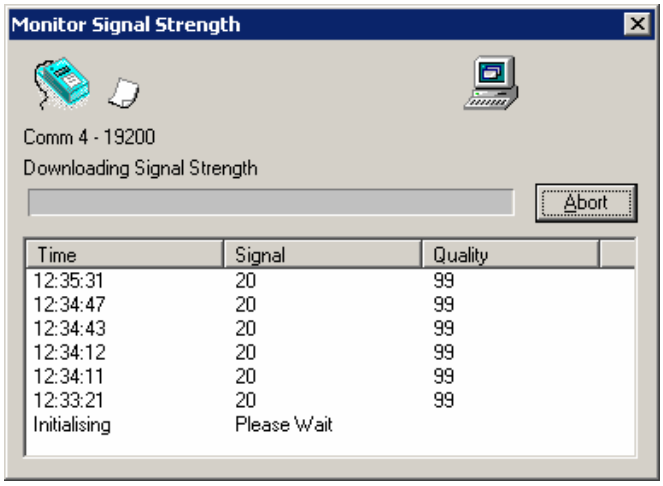


Figure D 3 – Monitor Signal Strength screen

Note

Please wait for the logger to initialise. It may take up to two minutes for the logger to register with the network and display the signal strength values.

The antenna can be moved around to achieve optimal signal strength while checking the signal strength.

The minimum signal strengths required for successful telemetry communications are as follows:

SMS communications signal strength should be at least 6.
GSM data communications signal strength should be at least 13.

If the test is left to run the following **Comms Timed Out** error screen will eventually appear.

If the operator clicks on the **Abort button** the following **Comms Aborted by User** error screen will appear.

Click on the **OK** button to return to the **Utilities** tab on the **Advanced Download/Upload/Utilities** screen

Annex E – Instantaneous Values of the Logger Input

Measurements being taken by the data logger can be viewed in real time using the Radcom Manual Call software.

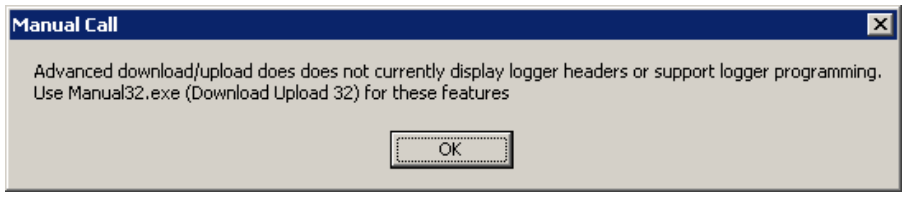
To view Instantaneous Values from the logger, proceed as follows:

Select **Radcom Manual Call** from the start menu.

Make sure the communications port is configured correctly by selecting **Basic Configuration** from the **Configuration** drop-down menu

Select Advanced Download/Upload/Utilities from the Options drop-down menu

Click on the **OK** button if the following message appears:



Check/change the Logger Type is set to **MultiLog Flash GSM/SMS** on the **Advanced Download/Upload/Utilities** screen (see Figure E 1 below).

Change the Baud Rate to the required setting using the **Baud** drop-down menu.

Check/change the Connection type using the **Connection** drop-down menu.

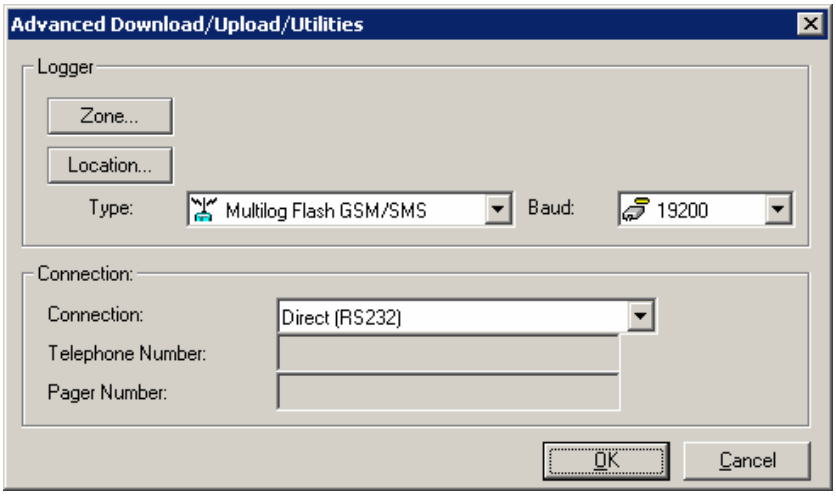


Figure E 1 – Advanced Download/Upload/Utilities screen

Click on the **OK** button.

Select the **Utilities** tab now shown on the **Advanced Download/Upload/Utilities** screen and click in the **Instantaneous Value** box (see Figure E 2 below).

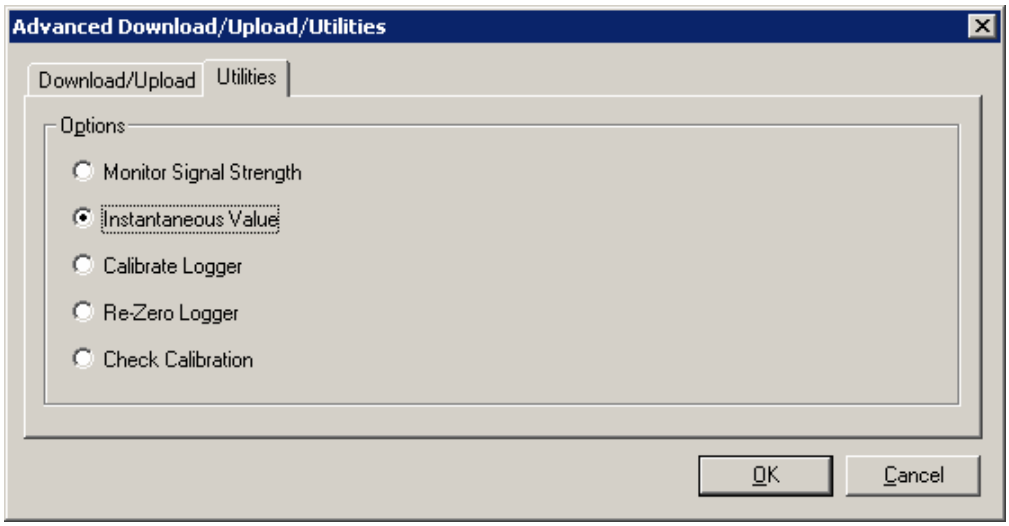


Figure E 2 – Instantaneous Values, Utilities Tab, Advanced Download/Upload/Utilities screen

Click on the **OK** button.

The **Instantaneous Value** screen will now appear showing the channel values being read by the logger (see Figure E 3 below).

Note

The readings for the channels shown are *Metres Head* and *Litres per second*, normal readings will depend on the input signal type and transducer configuration details.

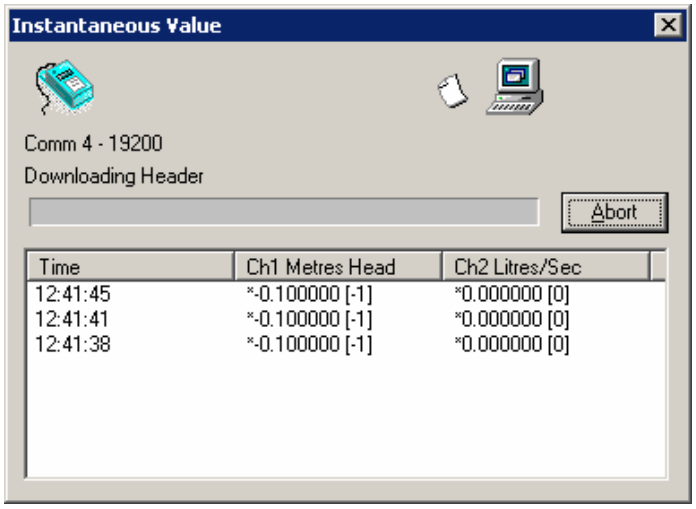


Figure E 3 – Instantaneous Value screen

If the readings are left to run the following **Comms Timed Out** error screen will eventually appear.

If the operator clicks on the **Abort button** the following **Comms Aborted by User** error screen will appear.

Click on the **OK** button to return to the **Utilities** tab on the **Advanced Download/Upload/Utilities** screen