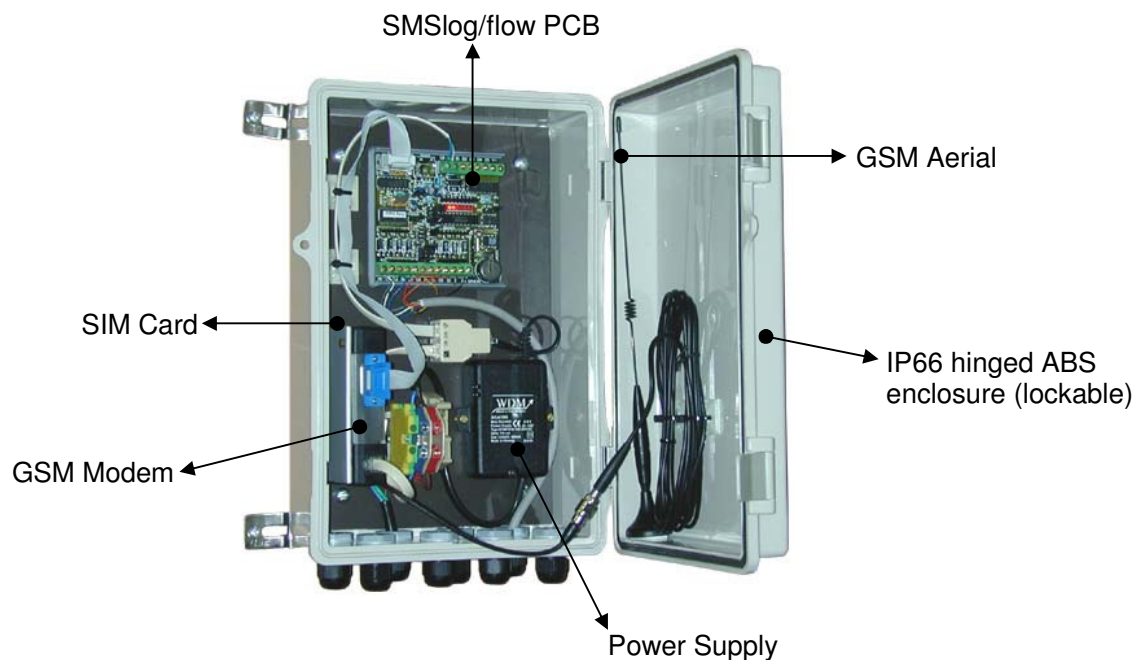


## Instruction **Manual**

- **RSD-GSM-L: *Remote SMSlog Dialler***
- **RSD-GSM-F: *Remote SMSflow Dialler***

### **Includes software on CD:**

- **CWC RSD Interface & Configuration**
- **CWC RSD Configuration Display**
- **CWC RSD Logged Data Analysis**



### **Supplied by:**

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### 1.1 RSD-GSM-L with SMSlog PCB

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The RSD-GSM-L Remote SMSlog Dialler with SMSlog PCB (printed circuit board) & GSM modem, provides the capability to monitor and control remote equipment via a cellular mobile telephone and the Small Message Service (SMS). Analogue inputs and alarm conditions are logged to non-volatile memory and can be downloaded in CSV format via a PC dial-up. The SMSlog can be configured using a PC with either a direct connection or a dial-up connection. Key operational parameters can be configured via SMS. An alphanumeric PIN provides security from unauthorised accesses. A dial-up data connection can be made using a standard modem attached to a PC. A GUI provides a simple and intuitive way to configure the SMSlog.

The SMSlog has 4 digital inputs, 4 mixed signal inputs and 5 digital outputs including local alarm indication. Control algorithms can be implemented using the in-built logic functions and delay timer. Alarms can be reported using the SMS system.

### 1.2 RSD-GSM-F with SMSflow PCB

---

The RSD-GSM-F Remote SMSflow Dialler with SMSflow PCB (printed circuit board) & GSM modem, provides the capability to monitor and control remote equipment via a cellular mobile telephone and the Small Message Service (SMS). It has support for monitoring fluid flow in response to valve or pump commands and will generate alarms if flow signals and valve or pump control signals are not correlated. Alarm 1 is generated if there is no flow after the pump starts and while the pump is running. Alarm 2 is generated if there is still flow after the pump stops. The delay time is user selectable. Data is logged to non-volatile memory and can be downloaded in CSV format via a PC dial-up. The SMSflow PCB can be configured using a PC with either a direct connection or a dial-up connection. Key operational parameters can be configured via SMS. An alphanumeric PIN provides security from unauthorised accesses. Dial-up data connection can be made using a standard modem attached to a PC. A GUI provides a simple and intuitive way to configure the SMSflow.

The SMSflow has 1 pump input, 1 flow switch input, 2 more digital inputs, 4 mixed signal inputs and 5 digital outputs including local alarm indication. Alarms can be reported using the SMS system.

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## 2. Hardware

### 2.1 What is supplied with your RSD?

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You should have all of the following before you commence set-up of your RSD.

- SMSlog/flow PCB, power supply & GSM modem & antenna, in hinged IP66 cabinet
- Multicore lead to connect inputs from external devices
- RS232 straight through serial cable to connect GSM modem directly to your PC's serial port to configure before installation
- Null modem cable to connect SMSlog/flow PCB directly to your PC's serial port to configure directly.
- Software on CD

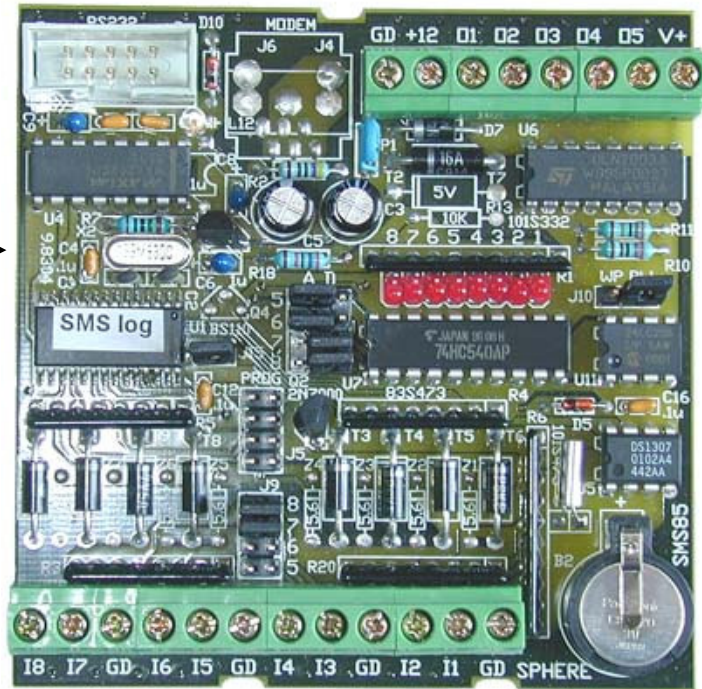
## 2.2 What else will I need?

You will also need the following before you commence set-up of your RSD:

- GSM SIM card connected to Telstra, Optus or Vodafone, with both a voice number and a dial-up data number. (The voice number is used by the RSD to SMS alarm messages. The dial-up data number is used as the number to dial when connecting to the RSD remotely from a PC).
- PC/laptop with serial port and modem, running Windows 95/98/2000/NT/XP



SMSlog/flow PCB, power supply, GSM Modem & antenna, in hinged IP66 cabinet.



SMSlog PCB



Null Modem Cable



RS232 Straight Through Serial Cable

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## 3. Quick Setup

### (Software Installation & RSD Configuration)

Follow these steps to configure, install and operate the RSD. For more details on any step, refer to the appropriate section of the manual.

#### 1. Check time format on your PC

For the RSD to work properly, the PC MUST be set to 24 hour time (Time setting of H:mm:ss in Regional settings in Control Panel). PCs set to a 12 hour clock will NOT be able to read data back from the logger.

#### 2. Install the configuration software on your PC

Insert the installation CD-ROM into the drive, and click Setup. Follow the instructions.

#### 3. Connect the GSM modem to the PC and configure it

If not set up for SMS, insert the SIM card (with voice & dial-up data numbers) into any GSM mobile phone and follow the manufacturer's and service provider's instructions for setting up the SMS. Also ensure that the PIN request on power up is disabled (ie. when switching the phone on, it doesn't ask you to enter a PIN). Once complete, test that the mobile phone can send an SMS message. If successful, remove the SIM card from the phone, remove power from the RSD and insert the SIM card into the GSM modem. Remove the 9 pin D connector from the GSM modem and plug the one end of the RS232 serial straight-through cable into the GSM modem and the other end into the serial port of your pc.

Launch the RSD Interface & Configuration software, select the Com port the GSM modem is connected to and then click on the "Set SMS Parameters" tab. Select the SMS service provider from the dropdown list. The phone number listed was correct at the time the program was created but if it is not, you can change it by typing in the desired phone number. (However, note that this number is a fixed number, provided by Telstra, Optus or Vodafone, and usually does not have to be changed.) Then click the Configure Modem button. Wait until configured.

#### 4. Connect the SMSlog/flow PCB to the PC and configure it directly

Remove the RS232 straight through cable from both the GSM modem and the pc. Then plug the one end of the Null Modem cable into the 9 pin D connector from the SMSlog/flow PCB and the other end into the serial port of your pc. Apply power to the RSD. Continue with, or launch the configuration software (ie RSD Interface & Configuration) and follow the instructions. All configuration fields must be filled in. The configuration should be saved for future reference and/or modification. The configuration should also be uploaded to the RSD before exiting from the program.

#### 5. Reconnect the GSM modem to the SMSlog/flow PCB, ready for testing & installation

Once the configuration is uploaded to the SMSlog/flow PCB, remove power then remove the Null modem cable and plug the RS232 cable from the SMSlog/flow PCB (ie. 9 pin D connector) back into the GSM modem. Apply power to the RSD. The green LED on the GSM modem will cycle ON and OFF as the modem searches for a GSM cell. When the modem is registered, the green LED will pulse ON every few seconds.

## **6. Ensure the destination GSM mobile phone is configured for SMS**

If the SMS feature is not set-up in the destination phone (ie the phone to which SMS event triggered messages (eg. alarms) will be sent to), follow the manufacturer's and service provider's instructions for setting up the SMS. Once complete, test that the phone can receive an SMS message.

## **7. Test the Inputs**

When the green LED on the GSM modem is pulsing, the system is ready for testing. Join an input connector (I1, I2, I3 .. I8) to a GD connector on the RSD. This connection will be recognised in two seconds and an SMS message sent. It may take several seconds for the message to be delivered to the mobile phone. The message received will contain the Site Message followed by the Input Message programmed for that input. No further activity on this input will be reported until the connection has been removed for greater than 2 to 3 seconds then reconnected for greater than two seconds. This assumes that input debouncing is enabled on the digital inputs. (Without debouncing the inputs these times are reduced to 1 second each).

Install the RSD in the field

After successful operation has been demonstrated, remove power if applied, and connect the field wiring to the RSD.



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## 4. Detailed Setup

### (Software Installation & RSD Configuration)

---

#### 4.1 Check the time format on your PC

For the RSD to work properly, the PC MUST be set to 24 hour time (Time setting of H:mm:ss in Regional settings in Control Panel). PCs set to a 12 hour clock will NOT be able to read data back from the logger.

---

#### 4.2 Install the software

The software is supplied on a CD-ROM. With the CD-ROM in the drive, double click on the Setup icon. This will launch a standard Windows setup program which will lead you through the installation process.

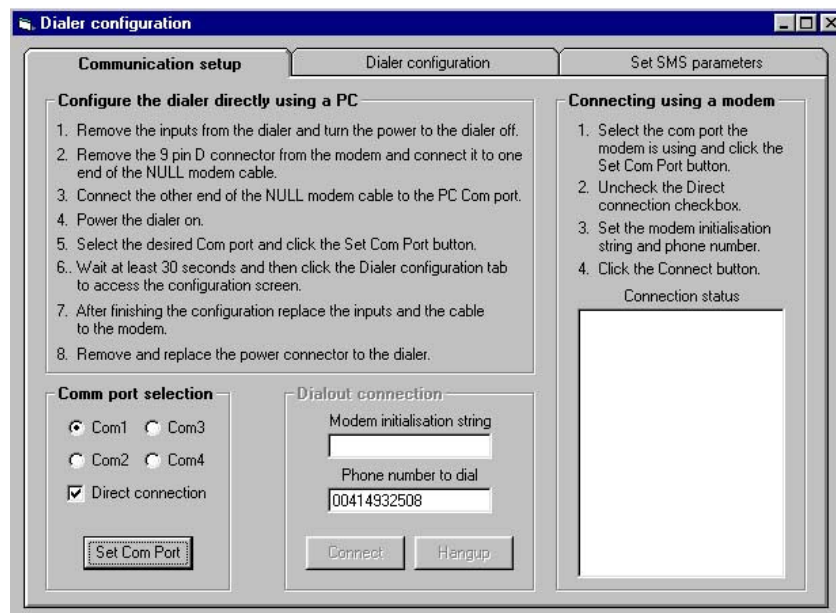
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#### 4.3 Run the configuration software

Launch the software by clicking Start/Programs/CWC RSD/CWC RSD Interface & Configuration. The following Welcome Screen will appear.



Click the “Start” button and a configuration screen with three selection tabs is displayed, ie. “Communication Setup”, “Dialer configuration” & “Set SMS parameters”.



## 4.4 Configuring the GSM Modem

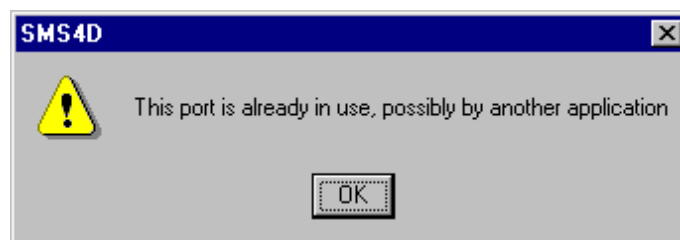
If the GSM modem has already been configured, proceed directly to the next section.

If not set up for SMS, insert the SIM card (with voice & dial-up data numbers) into any GSM mobile phone and follow the manufacturer's and service provider's instructions for setting up the SMS. Also ensure that the PIN request on power up is disabled (ie. when switching the phone on, it doesn't ask you to enter a PIN). Once complete, test that the mobile phone can send an SMS message to another mobile phone.

If successful, remove the SIM card from the phone, remove power from the RSD and insert the SIM card into the GSM modem. Remove the 9 pin D connector from the GSM modem and plug the one end of the RS232 serial straight-through cable into the GSM modem and the other end into the serial (com) port of your pc.

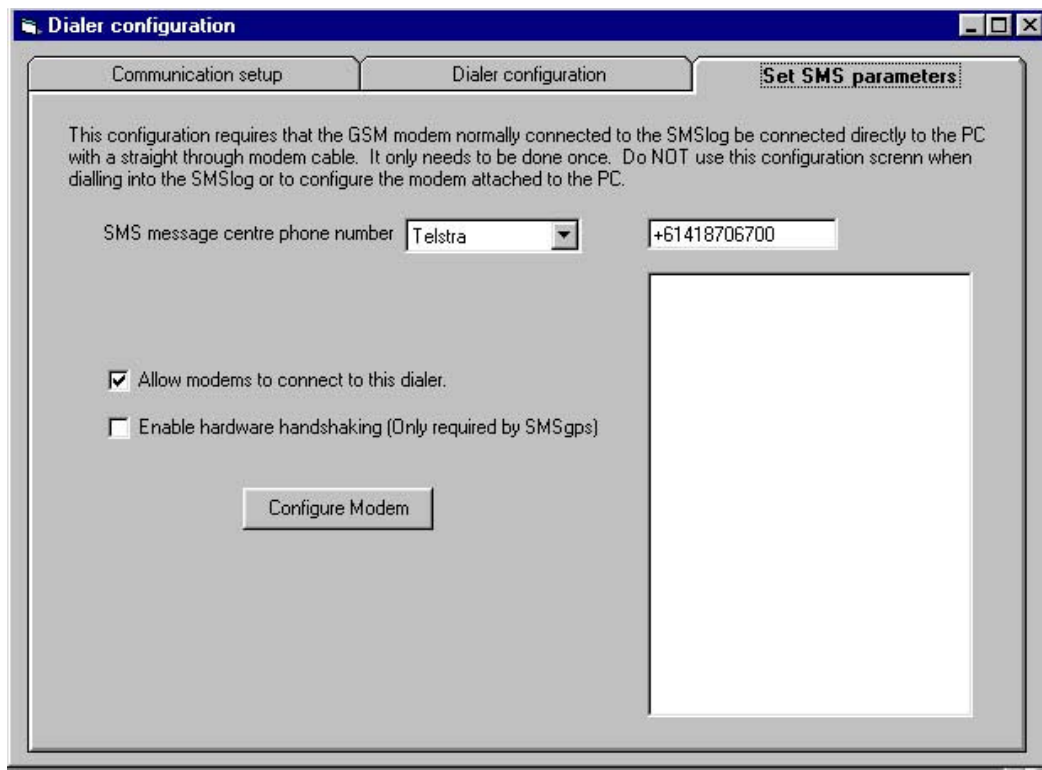
In the software, select the com port that is connected to the RS232 serial straight-through cable. The Direct connection checkbox should also be checked.

Click the “Set Com Port” button and the Com port should be set. If the com port cannot be opened, the following warning screen is displayed.



If this occurs, close all other programs and/or re-start your pc and try again, or try another com port.

The GSM modem must be correctly configured to operate with the SMSlog/flow PCB. The third tab “*Set SMS Parameters*” provides the capability to automatically configure the modem.



Click on the “*Set SMS Parameters*” tab. Select the SMS service provider from the dropdown list. The phone number listed was correct at the time this version of the software was released but if it is not, you can change it by typing in the desired phone number. (However, note that this number is a fixed number, provided by Telstra, Optus or Vodafone, and usually does not have to be changed.)

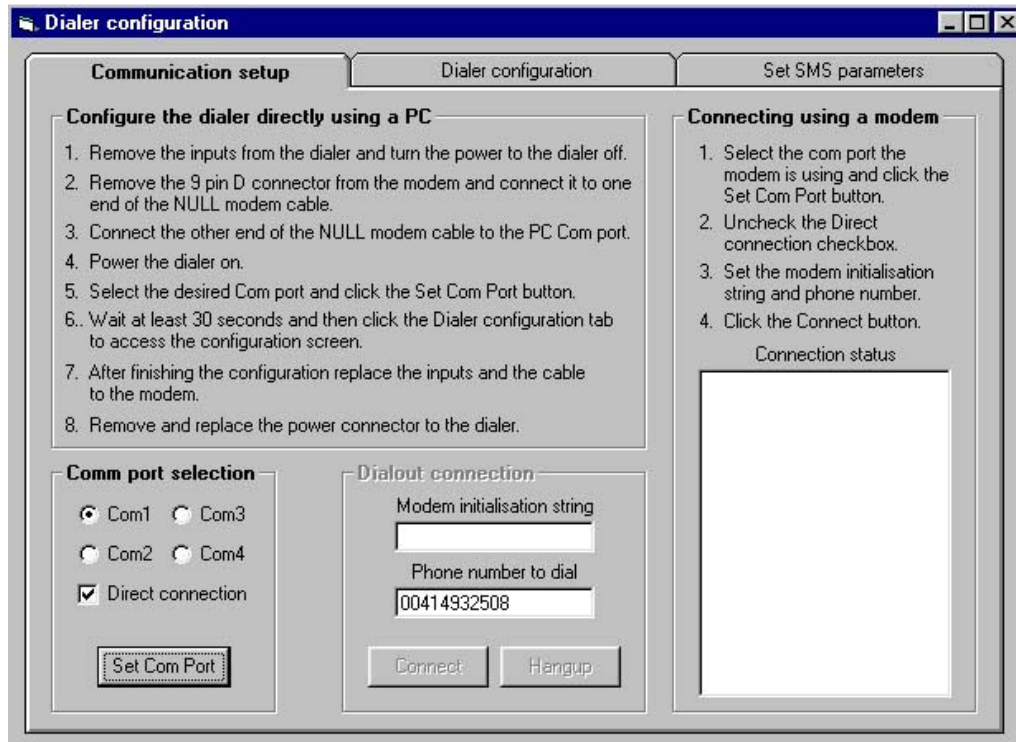
If you wish to be able to remotely dial into the RSD (Remote SMSlog/flow dialler), then you must check the *Allow modems to connect to this dialler*. This enables the GSM modem in the RSD to auto-answer when called.

Then click the *Configure modem* button. A message will appear once the modem is configured.

Remove the RS232 serial straight-through cable.

## 4.5 Connecting to and Configuring the SMSlog/flow PCB

To configure the PCB (printed circuit board) run the RSD Interface & Configuration software again and Click the “Start” button, or if already running, click on the Communication setup” tab.



### 4.5.1 Connect to the RSD directly via your PC

To configure the RSD directly, it must be connected to a PC running the RSD Interface & Configuration software. A null modem cable is required between the PC communications (serial) port and the 9 pin RS232 cable to the RSD PCB. Unplug the cable from the GSM modem and plug this cable into the one end of the null modem cable. The other end of the null modem cable plugs into the pc's serial port.

In the software, select the com port that is connected to the null modem cable. The Direct connection checkbox should also be checked. Click on the “Set Com Port” button and the port should be set.

If the com port cannot be opened, close all other programs and/or re-start your pc and try again, or try another com port.

### 4.5.2 Connect to the RSD remotely via your PC's Modem

To configure the RSD remotely (ie if it is installed in the field), simply run the RSD Interface & Configuration software and dial out via your pc's internal or external modem to the RSD. The number the modem will dial will be the RSD SIM card's Dial-up data number and NOT the VOICE number.

Select the com port which your pc's modem is connected to. The Direct connection checkbox should be **unchecked**. Click on the “Set Com Port” button and the Comm port should be set.

If the comm port cannot be opened, close all other programs and/or re-start your pc and try again, or try another com port.

In the box labelled “Phone number to dial”, enter the Dial-up data number of the SIM card in the GSM modem connected to SMSlog/flow PCB. (In general, the Modem initialisation string box should be left empty as the program already knows the normal command string required for modems. This box is provided if your modem requires a different initialisation string.)

After you have entered the Dial-up data number, click the “Connect” button and the program will attempt to connect to the remote logger. (However, to save on mobile phone costs, it is recommended to first enter the configuration settings before connecting).

The program will initialise the pc’s modem and then dial. The current modem status is displayed in the “Connection status” panel to the right of the screen. If a connection has been successfully established the text CONNECT 9600 followed by Connected to dialer will be displayed. At this time you are connected and can proceed to any other function allowed by the software program.

**VERY IMPORTANT: You must return to this tab and click the Hangup button to disconnect the modem. Otherwise, the program will NOT disconnect the modem!!!**

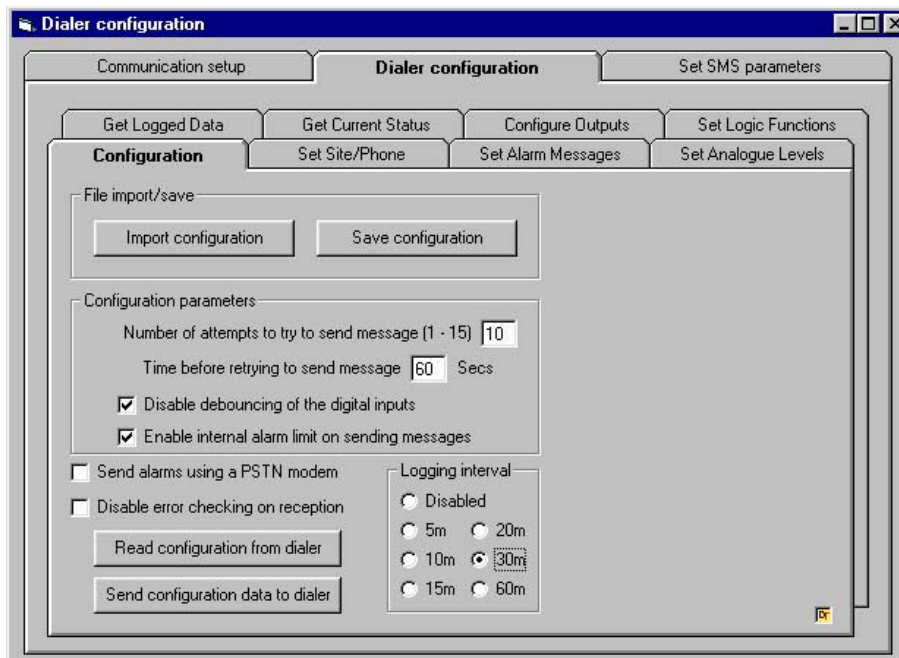
## 4.6 RSD (Remote SMSlog/flow Dialer) configuration

Whether directly or remotely connected to the RSD, the process of configuring the RSD, viewing the current status, or downloading the logged data, is exactly the same.

Click on the “Dialer configuration” tab.

### 4.6.1 General Configuration Settings

Click on the “Configuration” tab.



This screen allows you to read a configuration file from your hard-drive and save a new configuration file to your hard-drive. You can also send a new configuration to an RSD or read a configuration from an RSD.

### ***Save a Configuration in a File***

After the fields have been set, a configuration can be saved to a text file by clicking on the "Save configuration" button. If you wish to view the configuration on one screen, and/or print the configuration, run the RSD Configuration Display software.

### ***Import a Configuration from a File***

A configuration from a previously saved file can be imported by clicking on the "Import configuration" button.

### ***Send New Configuration to an RSD***

Once changes have been made to the configuration, upload the new settings to the RSD by clicking on "Send configuration data to dialer". (You must be connected directly or remotely to perform this).

### ***Read Configuration from an RSD***

To obtain the settings already in an RSD, you can read them (whether connected directly or remotely) by clicking on the "Read configuration from dialer" button. (Note that for security reasons the PIN is not read back.)

### ***Configuration parameters***

You can configure some general properties of the RSD. If the RSD fails to send an SMS message because the network was busy, it will attempt to send the message to the next phone number in the list. It will wait for the number of seconds specified in the *Time before retrying to send SMS message* before sending the message. After going through the sequence of phone numbers the RSD will wait for 60 seconds and then repeat trying to send the message to the first phone number. This sequence will continue for the number of times specified in the *Number of attempts to try to send SMS message*. (The number of retries can range from 1 to 15.)

The time between retries can be set between 20 and 255 seconds. It is not recommended that this time be reduced from about 60 seconds as if the time is too short another retry might be attempted before an acknowledgement is received that a message has been accepted. This can result in numerous duplicate messages being sent.

### ***Debouncing of digital inputs***

When a mechanical switch changes state (ie changes from OFF to ON or vice versa) the spring action together with the flexibility in the contacts results in the contacts making and breaking contact several times before reaching their stable positions. This bouncing action causes the switch to close and open rapidly for a short period of time, typically 10-20mS. This gives the effect of repeated opening and closing the switch. Debouncing eliminates this effect by requiring several

samples of the switch, taken at intervals greater than the switch bounce time, all to have the same state. The RSD contains a debouncing algorithm to eliminate this potential problem. The net result of debouncing is that digital inputs closing will not generate an alarm for between 2-3 seconds after the switch is closed (ie the input is connected to ground). By turning debouncing off a digital closure to ground will be recognised within 1 second. If any closure to ground, no matter how short, should cause an alarm condition then you can safely turn debouncing off.

### ***Send alarms using a PSTN modem***

The checkbox for this should be unchecked for all RSD units with GSM modems.

### ***Enable internal alarm limit on sending messages***

If you check the “Enable internal alarm limit on sending messages” checkbox, the software enables the RSD’s internal alarm counter which is used to prevent the RSD from sending more than 50 alarms in a day. Each time a new alarm is sent, this counter is incremented (sending the same alarm to a number of different telephone numbers counts as sending a single alarm). When this counter reaches 50, the alarm system is disabled and no further alarms will be generated or logged, until the unit is manually reset. It is recommended that this feature be used. For instance, if the analogue inputs are used and the hysteresis level is set too low and the input is changing quickly over a substantial range, it is possible to send a lot of SMS messages and thus run up a significant telephone bill. It is also recommended to make the hysteresis level as wide as possible to avoid sending too many messages (See section 4.6.4). While commissioning a system it is also recommended that this feature be used.

### ***Disable error checking on reception***

All communications with the internal data logger of the RSD use a 16 bit cyclic redundancy check. Any incoming message has its validity checked and is discarded if the computer crc does not match that in the message. Checking this box disables this checking. Note that you cannot disable crc checking on messages sent to the logger. **Under normal circumstances you should never check the “Disable error checking on reception” checkbox.**

### ***Setting the logging interval***

The interval between successive logs of the data is set by selecting one of the time settings under “Logging interval”. The options available are 5m, 10m, 15m, 20m, 30m or 60m. You can also disable logging by selecting “Disabled”.

**Note:**      **Disabling logging will stop all logging from occurring BUT the time each alarm is raised will still result an event being added to the log.**

## 4.6.2 Site & Phone number configuration

Click on the “Set Site/Phone” tab.

The screenshot shows a software window titled "Dialer configuration" with a standard Windows-style title bar. Inside the window, there are several tabs: "Communication setup", "Dialer configuration" (which is active), and "Set SMS parameters". Under the "Dialer configuration" tab, there are four sub-tabs: "Get Logged Data", "Get Current Status", "Configure Outputs", and "Set Logic Functions". The "Set Site/Phone" sub-tab is selected. This sub-tab contains the following fields and controls:

- "Site message for all alarms": A text input field containing "100 George St T1".
- "PIN code for SMS messages": A text input field containing "1234".
- "Phone numbers" section: A container with four rows, each for a phone number to contact.
  - Row 1: "Phone number 1 to contact" with input field "0402555777" and a checked "Enable number" checkbox.
  - Row 2: "Phone number 2 to contact" with input field "0402555111" and a checked "Enable number" checkbox.
  - Row 3: "Phone number 3 to contact" with an empty input field and an unchecked "Enable number" checkbox.
  - Row 4: "Phone number 4 to contact" with an empty input field and an unchecked "Enable number" checkbox.

This screen, and the following screens, have a number of fields which will be uploaded to the RSD to configure it.

### ***Site Message for all Alarms (limited to 16 characters, including spaces)***

This message is used to identify the RSD in SMS messages (ie. Which RSD installed in the field is sending the SMS). Even though the sender's telephone number (ie the Number of the SIM card in the RSD) is displayed with a received message, this message tells at which physical site or location the RSD is installed.

### ***PIN Number for Enabling SMS commands***

If any of the outputs of the RSD are connected to devices to activate remotely (eg. a dosing pump), a PIN number must be set to prevent unauthorised activation of the output feature of the RSD. This is a four digit string which must be sent in the prescribed format in an SMS message to control the output function. The string can include any numeric or alphabetic key and is case sensitive. (You can also include control characters such as . , / ~ ; : ' " ! @ \$ % ^ & \* ( ) - \_ + = as pin characters).

### ***Phone Numbers***

The RSD can send a message to up to 4 GSM mobile phones or GSM modems. To enter a number you must check the *Enable number* checkbox. If this box is not checked then the telephone number will be greyed. If a telephone number is blank it is considered not used and no dial out attempts will be made to that number. **Remember not to have any spaces in the phone no.**



### 4.6.3 Setting the alarm messages

Click on the “Set Alarm Messages” tab.

Messages to send when an input becomes activated		Phone numbers to dial			
		1	2	3	4
Message for input 1	Pump Faulty	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Message for input 2	Flow Sw faulty	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Message for input 3	Biocide A ON	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Message for input 4	Biocide B ON	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Message for input 5	Power Failure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Message for input 6	Alarm Activated	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Message for input 7	High or Low ORP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Message for input 8	High TDS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### **Message to send when an input becomes activated**

The RSD has 8 inputs which can generate alarms when activated. Inputs 1 to 4 are purely digital. Inputs 5 to 8 can be analogue or digital. An alarm on an analogue input is only generated if the analogue variable goes above or below the programmable setpoint. For further information, see the next section.

The message to be sent via SMS for each alarm is set here (max 16 characters, including spaces).

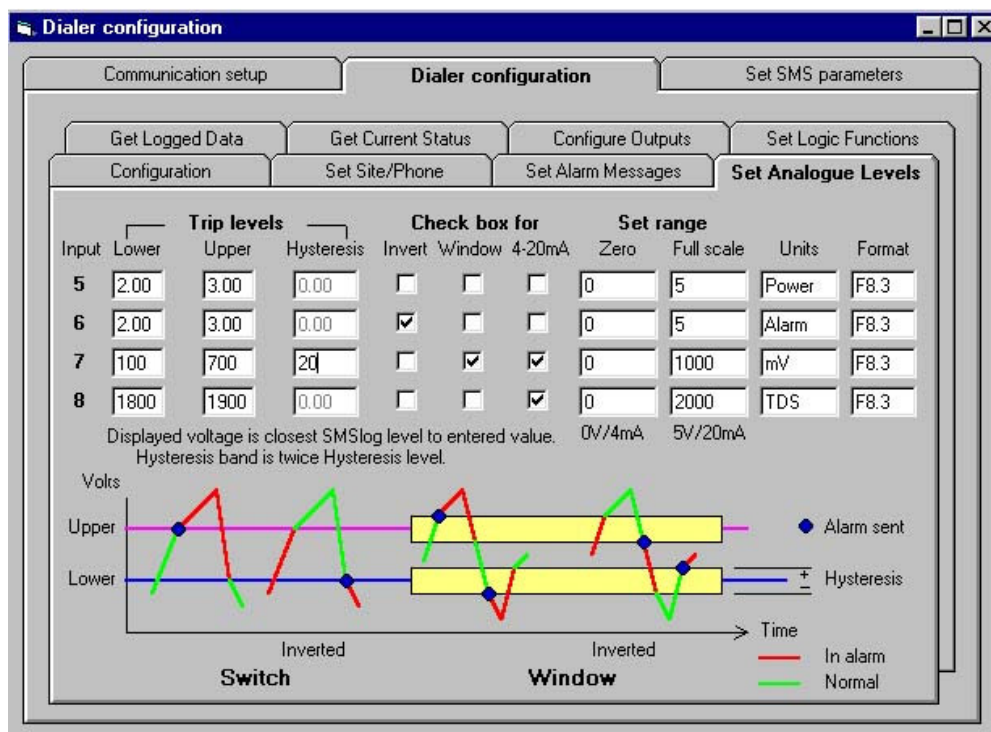
You can also select which combination of mobile phones each alarm will be SMS'd to. A check in the box means the alarm will be sent to that telephone number. The dialout always starts with phone number 1, then 2, 3 and 4. A blank telephone number is skipped.

**Note:** when the logic functions are enabled (RSD-GSM-L only), the alarms for inputs 1 through 4 are not triggered by the actual inputs but rather by the outputs of the logic functions (ie the digital variables). For further information see the section on logic functions later in this manual.

#### 4.6.4 Analogue channel (ie. Inputs 5 – 8) configuration

Inputs 5 to 8 on the RSD, if set to analogue, are configured as 8 bit resolution analogue inputs. An input signal on each channel is treated as a variable signal level and alarms can be generated depending on the level of the signal. As well as being able to data log all these variables, alarms can also be generated:

Click on the “Set Analogue Levels” tab



The diagram above illustrates the different alarm configurations, ie. upper trip, lower trip, upper & lower trip (outside window) and upper & lower trip (inside window).

The hysteresis value should be chosen to stop continual alarm triggering with a signal level near one of the threshold points. The level depends on the type of input being measured but a typical level would be a few percent of full scale (ie about 0.1 volts on the 0-5V inputs). **NOTE:** The hysteresis band is specified as  $\pm$  the value specified thus the total hysteresis is **TWICE** the value entered.

**NOTE:** If you want to use an input for 4-20mA you need to connect a 250ohm resistor (249ohm, or 100 + 150 ohm in series) from the input to ground. This converts the 4-20mA current to a 1-5V voltage signal. The “4-20mA” checkbox should also be checked so that the RSD knows to span the measuring range from 1-5V, rather than 0-5V.

The logged data is displayed in engineering units. You specify the conversions from internal units to engineering units by telling the system the values at each end of the scale (ie the 0V/4mA point and the 5V/20mA point). You also specify the name for the units. This should be less than 6 characters. An example is 1 to 5 volts spanning 0 to 14 pH, or 1-5V spanning 0-2000TDS.

The format field is not used by this program so should be left at the default value of F8.3.

Note that the Upper and Lower trip points and the Hysteresis level should all be specified in terms of engineering units (eg. Lower = 5pH, Upper = 9 pH, Hysteresis = 0.5pH, or Lower = 100mV, Upper = 700mV, Hysteresis = 20mV).

### Using Analogue Inputs as Digital Inputs

If any of the inputs 5 to 8 are used as digital inputs, ie. to register an alarm or event, the following settings should be set for that input, and the physical jumpers should be installed as detailed below:

**Lower trip level = 2**

**Upper trip level = 3**

**Zero = 0**

**Full scale = 5**

**Units = “the event”, eg. Pump ON**

The “Invert” checkbox should be selected if you want the event to be registered when the input is activated, ie the 5V is pulled to ground by the contact closing across the input. (Note that when getting the current status of the input, the activated state (contact closed) = approx 0.7 (V) and the de-activated state (contact open) = approx 4.1 (V)).

**Pump ON = contact closed = input activated = 0.7V on input, or**

**Pump OFF = contact open = input de-activated = 4.1V on input**

### SMSlog/flow PCB jumpers

The SMSlog/flow PCB must have several jumpers installed for correct operation. Each input 5 to 8 is independent and can be used as an analogue input, or as a digital input with a dry contact switch (or an NPN open collector transistor).

The 4 jumpers on J9 (located next to the input connector block) supply a pullup voltage to the inputs 5 to 8:

- Leave the appropriate jumper in place if you are using the input with a dry contact switch or an NPN transistor.
- Remove the jumper if the input is being used as an analogue input.

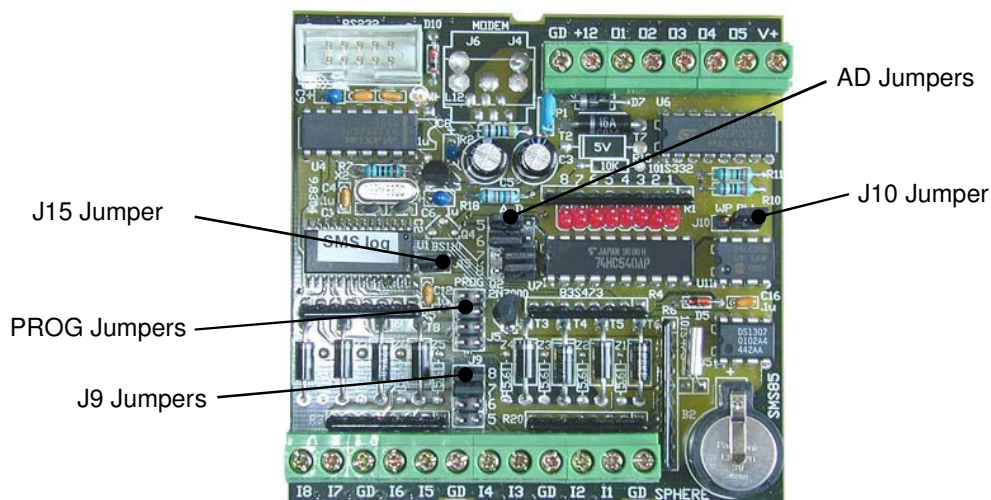
All jumpers on the AD connector block in the middle of the PCB must be placed in the A position for those inputs which are used as analogue and in the D position if used as digital.

The lights (LEDs) corresponding to inputs 5-8 are not operative if the input is set to analogue.

The **WP/RW** jumper (J10) should be left in the **RW** position. (It is used to disable the onboard memory. If this jumper is incorrectly placed in the **WP** position then no logging will take place and it will not be possible to configure the RSD).

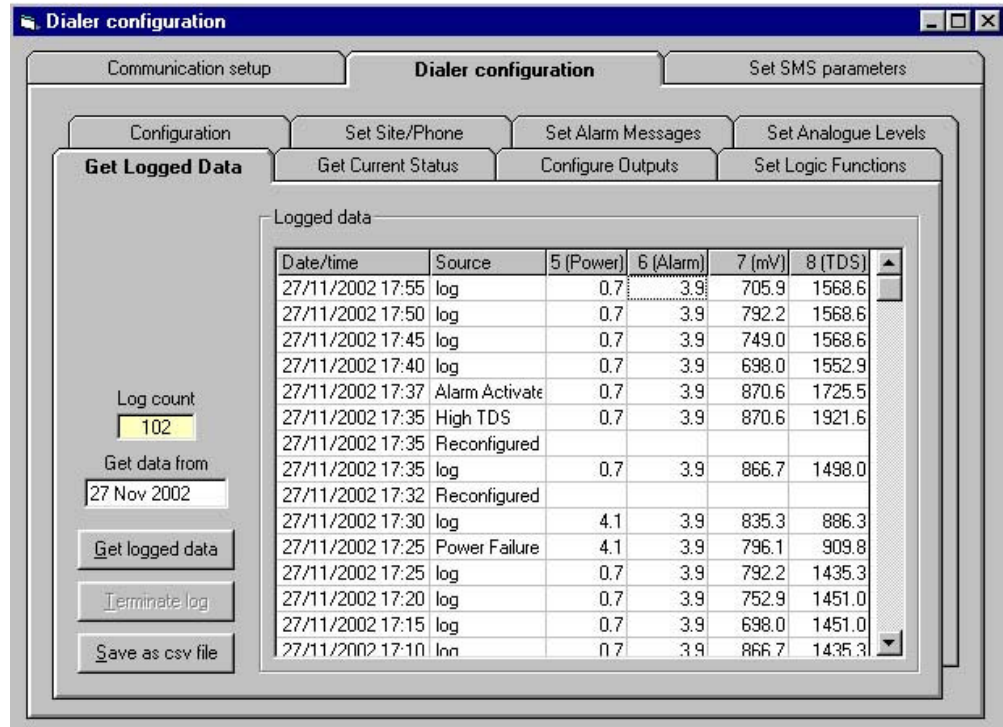
**The J15 jumper should be inserted at all times.**

**The PROG jumpers should not be inserted.**



### 4.6.5 Downloading the logged data

Click on the “Get Logged Data” tab



#### Reading the log

Clicking the *Get logged data* button will start downloading the logged data from the RSD. Data is read out backwards from the most recent sample. The readout will stop when an invalid time is detected or when the time specified in the *Get data from* box has been reached. You can stop the readout at any time by clicking the *Terminate log* button. The *Log count* box displays the number of logs currently read out.

The value for each channel is displayed in the engineering units which are currently stored in the logger, eg. Power Status, Alarm Status, mV, TDS.

Alarms are listed together with logged data. The name specified for the alarm is taken from the appropriate entry in the “*Set Alarm Messages*” tab.

**IMPORTANT:** To ensure that this reflects the actual message for the alarm you should import the configuration, or even better, download the configuration of the RSD from the RSD before accessing the logged data.

You can save the logged data (after reading it out) to a Microsoft Excel compatible .csv file by clicking the *Save as csv file* button. This will prompt you for a file name. All the logged data is written to this file. Alarm messages are written to a separate file with the same name but with “-alarm” added to the filename. For example, if the logged data is written to a file logged.csv the alarms will be written to a file called logged-alarms.csv.

Run the RSD Logged Data Analysis software to view and analyse the logged data.

### 4.6.6 Retrieving the system status

Click on the “Get Current Status” tab

The screenshot shows the 'Dialer configuration' window with the 'Get Current Status' tab selected. The window has a blue title bar and several tabs: 'Communication setup', 'Dialer configuration', and 'Set SMS parameters'. Under 'Dialer configuration', there are sub-tabs: 'Configuration', 'Set Site/Phone', 'Set Alarm Messages', 'Set Analogue Levels', 'Get Logged Data', 'Get Current Status' (active), 'Configure Outputs', and 'Set Logic Functions'. The 'Current status' section displays the following data:

Input	Value	Var	Output
Input 1	Off	Var 1	Off
Input 2	Off	Var 2	Off
Input 3	Off	Var 3	Off
Input 4	Off	Var 4	Off
Input 5	0.7 Power		
Input 6	3.9 Alarm		
Input 7	709.8 mV		
Input 8	1458.8 TDS		

Below the inputs, it shows 'Current position at' with 'UTC' and 'No GPS' selected. 'Latitude' and 'Longitude' are both 'N/A'. At the bottom, there are buttons for 'Get current status', 'Enable alarms', 'Disable alarms', 'Zero counters', and an 'Output control' section with 'Turn output on', 'Turn output off', and a 'Select output' dropdown set to '1'.

Clicking on the *Get Current Status* tab allows you to get the current status of the following:

- The inputs of the RSD
- The outputs of the RSD
- The digital variables
- The alarm enabled state

The status of these items are displayed in the fields shown above.

**Note that the displayed values of the analogue inputs are shown in engineering units, eg. mV or TDS. If the input is used as a digital input, the status is shown as a low or high no in the 0-5V range (eg. 0.7 Power = Power ON, 3.9 = Alarm OFF).**

The *Enable alarms* and *Disable alarms* buttons can be used to enable and disable the alarms in the RSD.

#### Output Control

If outputs are used, the *Output control* panel can be used to turn an output on or off. You select the output in the dropdown box and then click the *Turn output on* or *Turn output off* buttons.

#### Digital Variables (RSD-GSM-L only)

The *Var1* – *Var4* fields are only applicable to RSDs where logic functions are enabled. They report the current state of the digital variables.



#### 4.6.7 Setting the configuration of the outputs

If there are no devices connected to the RSD outputs, you can skip this section.

The 5 digital outputs on the RSD can be assigned multiple, mutually exclusive roles.

The standard condition of each output is to be a non-committed output which can be driven by SMS commands or via commands through the serial port.

The alternate use of each of these outputs reflects internal conditions within the RSD unit. If an SMS command is sent to change an output, which has been configured to an alternate function, then that command will temporarily override the alternate function for up to 1 second.

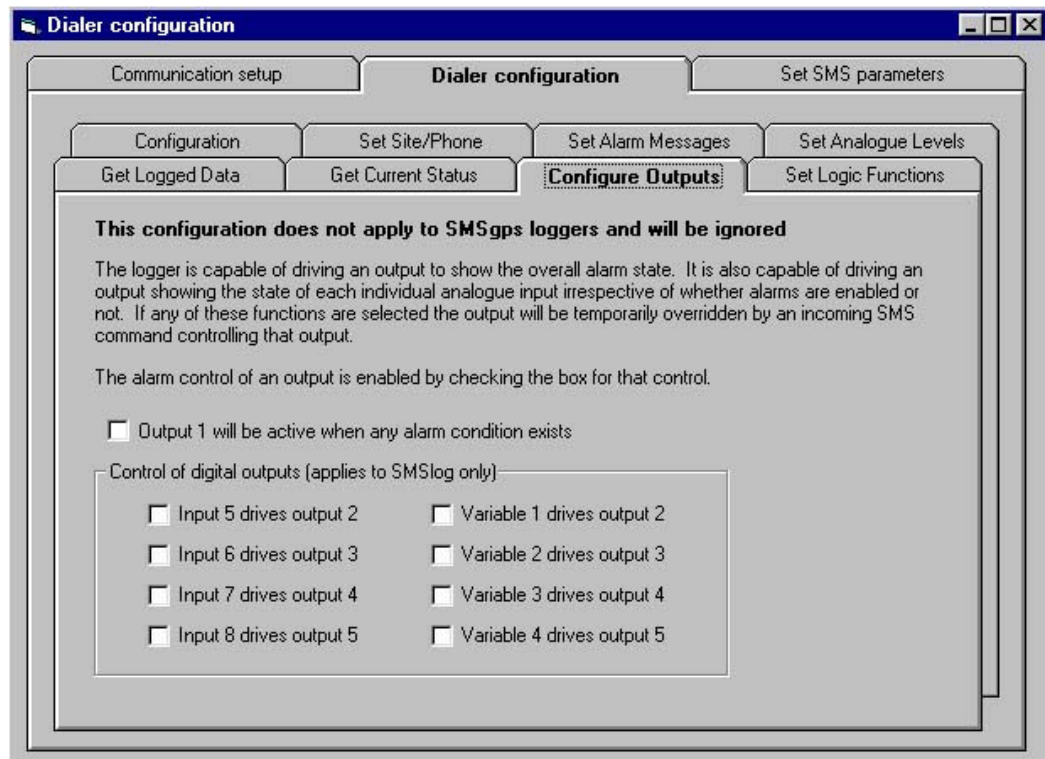
The alternate function of these outputs are detailed below.

Digital output 1 can display the current alarm status of the RSD. This is the status of any alarms to be sent, so it is inoperative if the alarm system is disabled.

Digital outputs 2 - 5 all have 2 different alternative functions:

One of these is to monitor the output of the analogue trigger processing associated with each of the analogue inputs (Inputs 5 through 8). These outputs will turn on whenever the analogue trigger processing detects what would be an alarm condition. Note that this function works independently of the alarms being enabled or disabled. The alternative function of these 4 outputs is to reflect the state of each of the 4 digital variables.

The control of what the outputs do is done by the following screen:



Note that you are only able to select a single function for digital outputs 2 - 5. If the 2 checkboxes for any output are both unchecked then that output is controlled only by SMS commands from a GSM mobile phone or via this software, when either directly or remotely connected to the RSD.

#### 4.6.8 Logic and delay functions: RSD-GSM-L (Remote SMSlog Dialler)

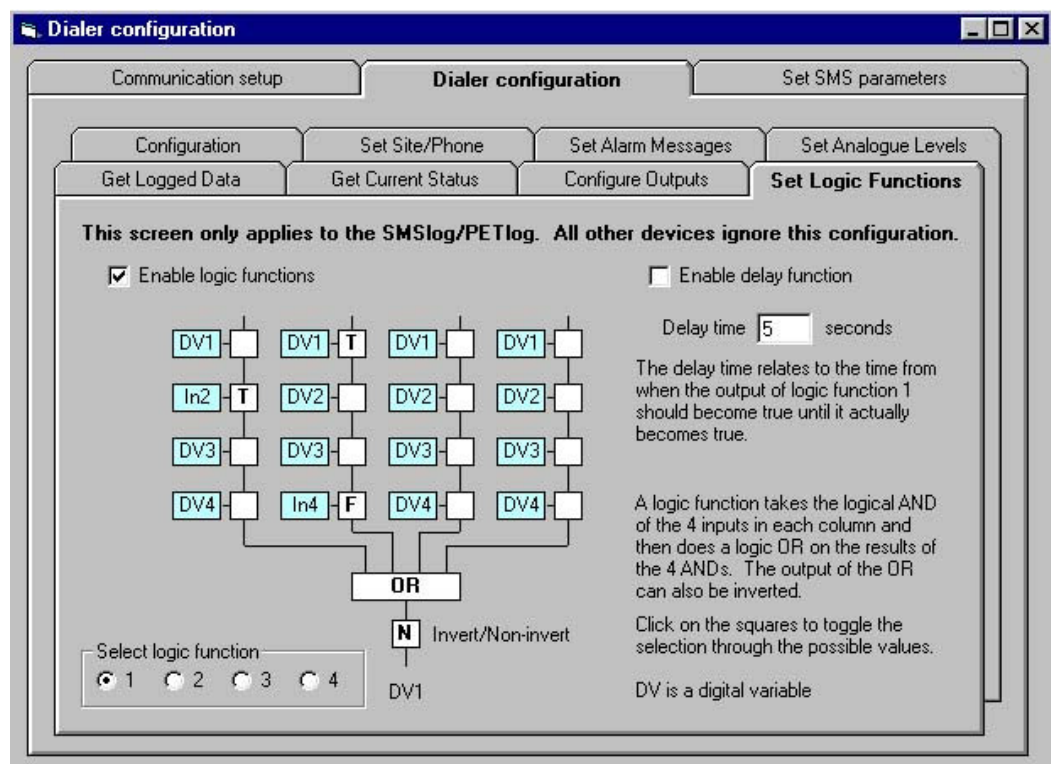
The RSD-GSM-L has 4 logic functions and a single delay function which operates on the output of logic function 1 only.

Skip this section if logic functions are not being used.

The logic functions are implemented as an AND/OR array. Each AND function takes up to 4 inputs which can be either digital inputs or digital variables and does the logical AND on these 4 function inputs. Each term in the AND function can be set to be IGNORED, TRUE or FALSE.

The selection of the inputs, ie Input (In) or Digital Variable (DV), is done by clicking each blue box.

The unused, true or false state of that input (or DV) is selected by clicking the adjacent white box. This will display a blank (unused) or T or F. For example, for the first column of the screen shot below, the only term used is Input 2 and the selected state of that is true (ie the input is activated). The output of the second AND function is true when digital variable 1 (DV1) is true and digital input (In4) 4 is false, ie not activated.



The output of the logic function DV1 is the logical OR of all four AND functions. When one or more of these functions becomes true then the output of the logical function becomes true. You can invert the function output by clicking the box below the OR. If this displays a **N** then the output is not inverted, if it displays a **I** then it is inverted.

The output of a logical function goes to a point internal to the SMSlog PCB within the RSD. These internal digital points are called **digital variables**. When logic functions are enabled, the alarms which are normally associated with the digital inputs 1 - 4 are not driven directly by these inputs but rather by the 4 digital variables driven by the outputs of the logic functions.

Getting back to the previous example, the logic function for this is:

DV1 = In2 **OR** (DV1 **AND NOT** In4)

This function captures any contact closure on Input 2 and latches it while Input 4 is inactive. For the function to work, Input 2 must go low (active) long enough for it to be

recognised. This is typically 1 second if debouncing is disabled or 2-3 secs if debouncing is enabled.

Note that the logic functions are updated once per second and there is an additional 1 second delay between the function changing state until this appears on the output. If an alarm is triggered by the function, then this additional 1 second delay does not apply to the alarm.

The **DELAY** function works by intercepting the output of logic function 1 (DV1) only. DV2, DV3 & DV4 are not affected by the delay.

When the output of function 1 becomes true, a delay timer is started. The time associated with this timer is programmed as the Delay time in the above screen. This can be anything from 1 to 255 seconds. After the delay time has expired DV1 will be set true irrespective of the state of the input. DV1 will remain true while the function output is true. If the function output becomes false before the delay has expired then DV1 will be driven true for 1 second at the end of the delay period. DV1 can be used as the input to other logic functions.

#### ***4.6.9 Logic and delay functions: RSD-GSM-F (Remote SMSflow Dialler) eg. for Pump Fault Monitoring***

The RSD-GSM-F is the same as the RSD-GSM-L, except that it uses the SMSflow PCB rather than the SMSlog PCB. The SMSflow PCB has the logic functions disabled, but has 2 internal fixed logic functions associated with determining whether a pump and/or its flow switch has gone faulty. Even though the logic functions are not implemented in the RSD-GSM-F, the delay time is, however, used to time out flow switch/water meter pulses. This delay time should be set to 255 seconds but can be reduced if necessary. For instance if the dosing pump only doses for 5 minutes, the delay time should be set at about 10 to 20% of the dose time, say 30 sec to 60 sec.

As an example, if the delay time is set to 60 seconds, the following occurs:

**Alarm 1** is sent if at any time when the pump is on, no flow is detected for more than 60 seconds (ie. the pump is faulty or has lost prime).

**Alarm 2** is sent if the flow switch is still switched on 60 seconds after the pump turns off (ie flow switch faulty).

**Alarm 3** is sent if input 3 is activated (independent of pump & flow switch)

**Alarm 4** is sent if input 4 is activated (independent of pump & flow switch)

#### ***Hardware configuration***

Some specific inputs are required for the RSD-GSM-F:

**Input 1** should be connected to the normally open (NO) terminal of the **flow switch**.

**Input 2** should be connected to a NO relay contact (or NPN transistor's open collector) which connects input 2 to ground (ie activates input 2) when the **pump** is ON.

The relay contact common (or ground connected to the transistor) and the common of the flow switch should be connected to ground (GD).

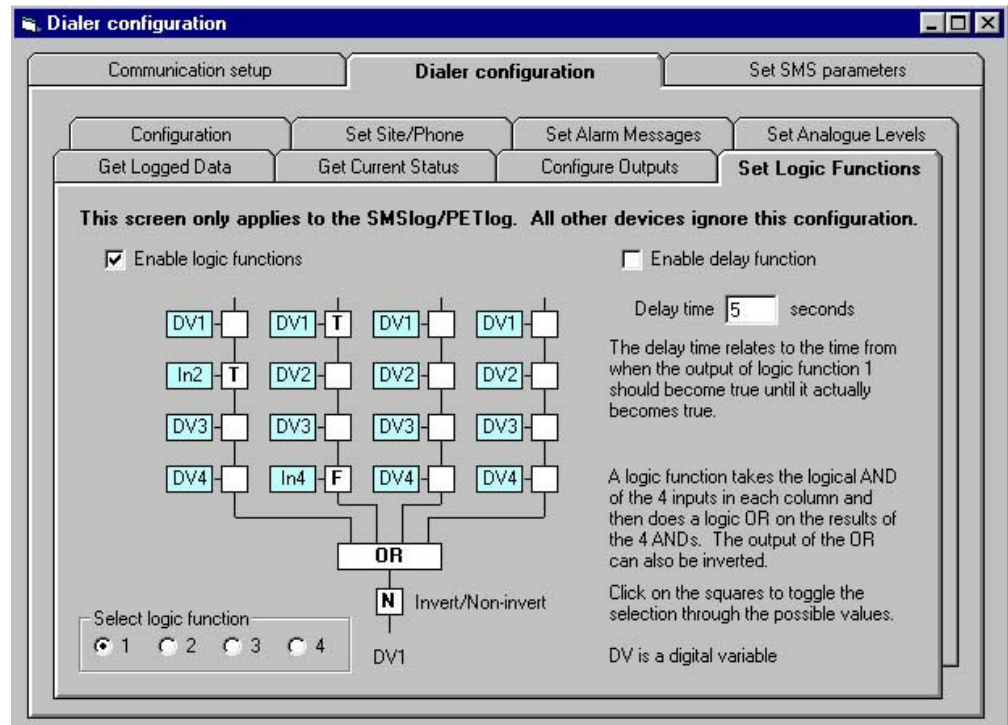
All other inputs and outputs work as in the standard SMSlog PCB except that logic functions are not implemented.

For 4-20mA operation on inputs 5, 6, 7 or 8, a 249ohm resistor should be connected from the appropriate input(s) to ground.



### Algorithm details

The time delay is set by entering the delay time in the “Set Logic Functions” tab.



The system works by setting a time delay when the pump starts. If during the time the pump is on, if one or more closures of the flow switch are detected, then the delay is reset to the programmed value (eg. 60 seconds). Every time the flow switch opens, the delay count is decremented. If this count ever reaches 0 while the pump is on then alarm 1 will be sent (ie. pump faulty).

It is possible that alarm 1 will be sent several times while the pump is running. This will happen if the time between pulses exceeds the programmed delay time. This indicates a fault with either the pumping system or the flow switch, or too short a delay time.

Once the pump turns off, if the flow switch is still closed after the programmed delay (eg. 60 seconds), then alarm 2 will be sent (ie. Flow switch faulty).

*This page has been left blank intentionally*

## 5. Viewing & Printing the Configuration of each RSD

When the “Save configuration” button is pressed on the “Configuration” tab, the configuration/setup of the RSD is saved on the hard-drive as a text file (ie. filename.txt).

To view and print the configuration, run the RSD Configuration Display software, enable macros, and load this text file (Click *Start/Programs/CWC RSD/CWC RSD Configuration Display*). It is recommended to name the file as the site where the RSD is installed (eg. “100 George St T1”, for Cooling Tower 1 at 100 George St). It is also necessary that Microsoft Excel is installed on your pc.

The following shows what the *CWC RSD Configuration Display* software interface looks like.

Microsoft Excel - SMSCfg.xls

File Edit View Insert Format Tools Data Window Help Acrobat

R38C34

Convergent Water Controls

\* Excel version 10.0 running on Windows (32-bit) NT 5.01

Configuration

Number of attempts to try to send message: 60

Time before retrying to send message: 2 sec.

☐ Disable debouncing of digital inputs

☐ Enable internal alarm limit on sending messages

☐ Send alarms using PSTN modem

☐ Disable error checking on reception

Logging Interval:

<input type="checkbox"/> Disabled
<input checked="" type="checkbox"/> 5m
<input type="checkbox"/> 10m
<input type="checkbox"/> 15m
<input type="checkbox"/> 20m
<input type="checkbox"/> 30m
<input type="checkbox"/> 60m

Clear Form

Load...

Print

Site Phone

Site message for all alarms: 100 George St T1

PIN code for SMS messages: 2222

Ready NUM

Click on the “Clear Form” button to erase any existing settings from the Configuration Sheet.

Click on the “Load” button to import the text file of the site you wish to view and/or print the settings of. When you do this, all the settings are filled automatically in the correct fields and are viewable/printable on one or two screens/pages. If you suspect that any changes may have been made to the configuration of the RSD, it is recommended to Read the Configuration from the RSD itself and re-save the configuration, before importing the text file.

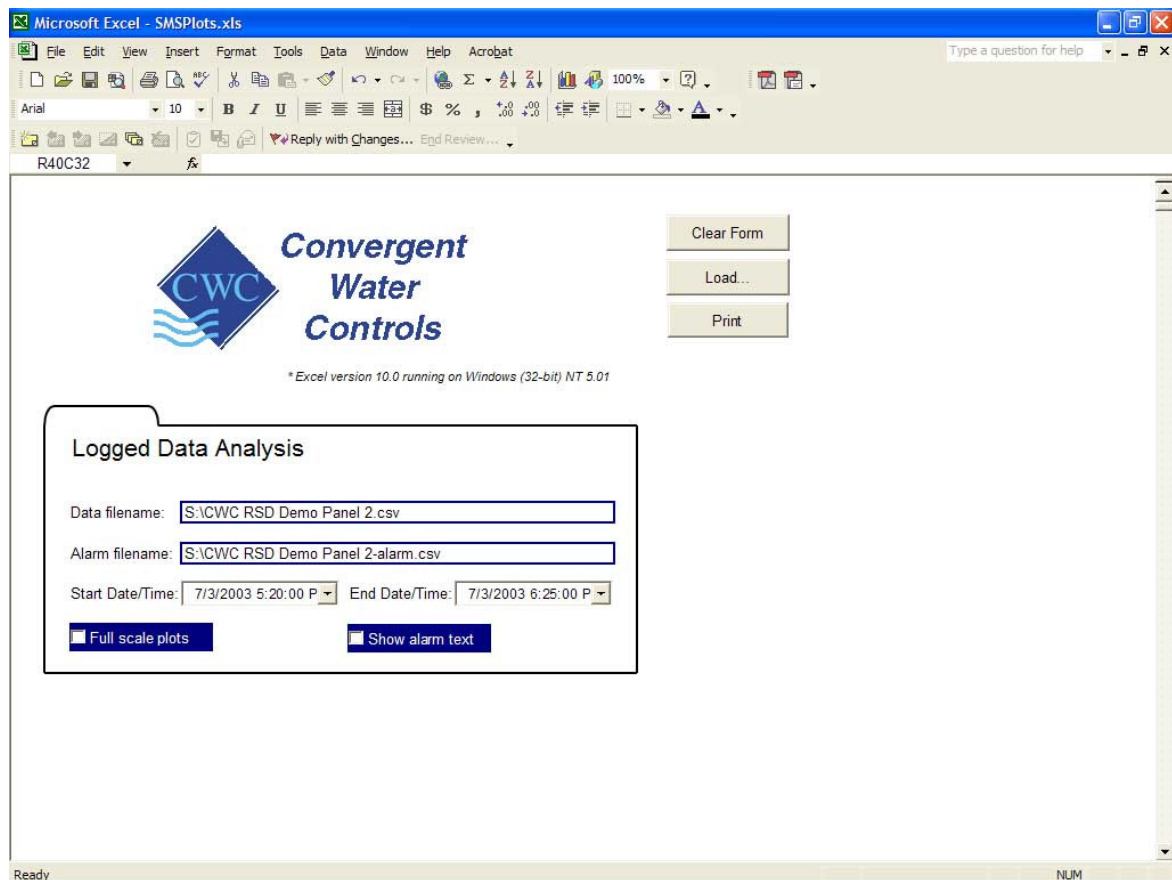
Click on the “Print” button to print the configuration.

## 6. Analysis & Printing the Logged Data & Logged Alarms

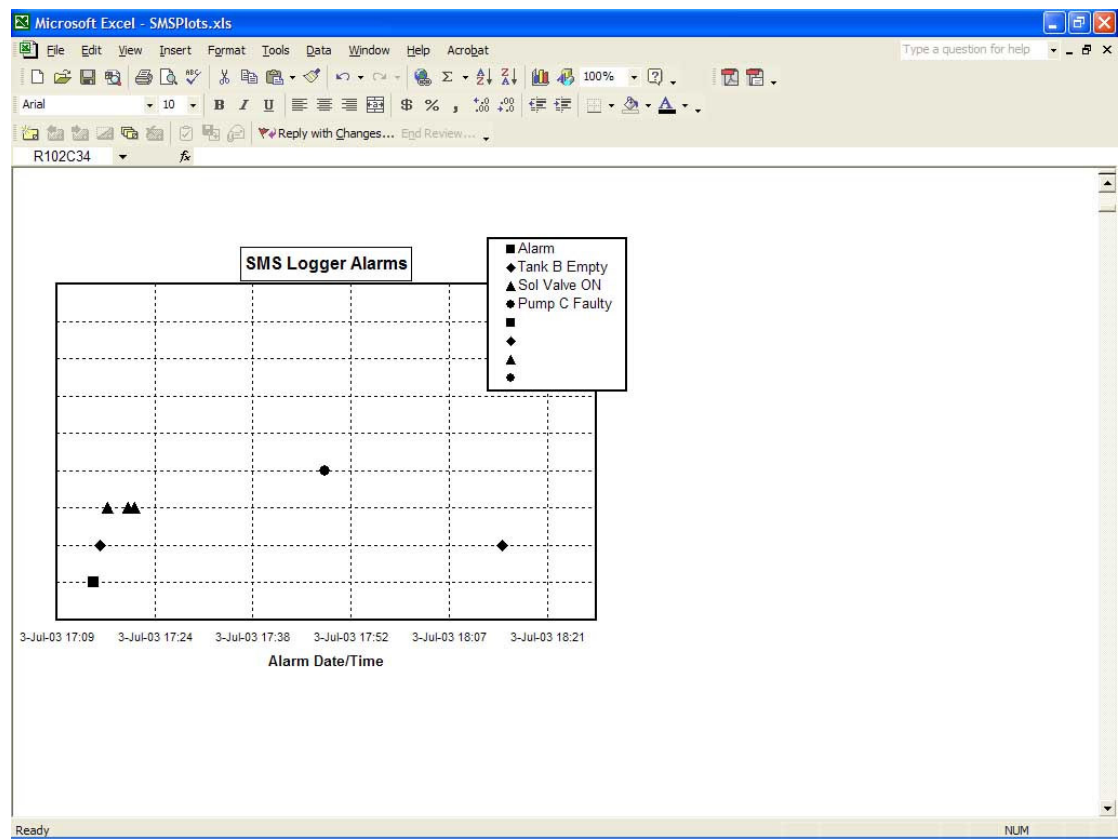
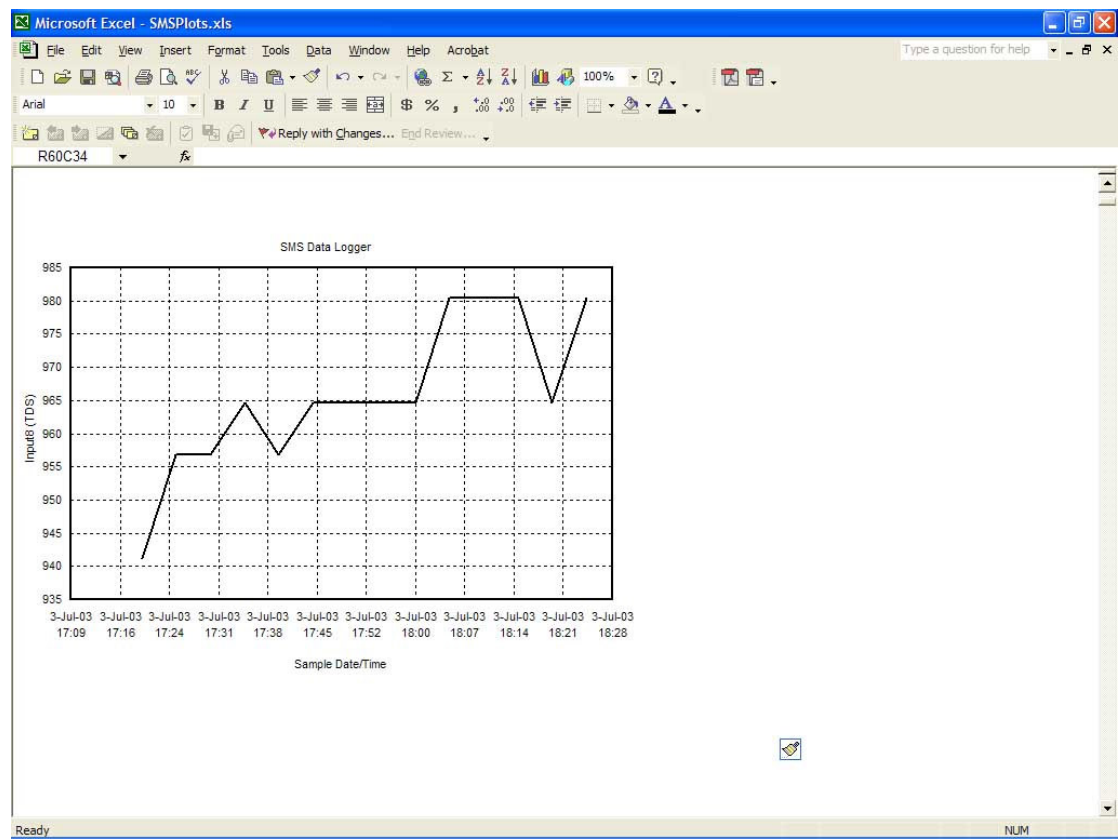
When clicking on the *Save as csv file* button on the “*Get logged data*” tab, the logged data & logged alarms which have been downloaded from the RSD, are saved on the hard-drive as two csv files.

The configuration can be viewed and printed by running the *RSD Logged Data Analysis* software (Click *Start/Programs/CWC RSD/CWC RSD Logged Data Analysis*), enabling macros, and loading either of the 2 csv files. It is recommended to name the logged data file as the site where the RSD is installed. The alarm file will automatically be created from the data file.csv. The alarm filename will be data file-alarm.csv. It is also necessary that Microsoft Excel is installed on your PC. (Examples of file-names could be “100 George St T1.csv” and “100 George St T1-alarm.csv”)

The following shows what the *CWC RSD Logged Data Analysis* software interface looks like.



Four graphs are displayed for inputs 5 to 8 (only one shown below), as well as a separate graph for the alarms. (also shown below).



Click on the load button to import the data in order for the data to be viewed.

The location for the data filename and the alarm filename are automatically placed in the correct fields.

The start and end time (ie the span across the X-axis) or the time period to view, can also be selected.

Check the “Full scale plots” checkbox if you want the graph to span the full range of the variable being measured, eg (0-14pH). However, if the pH only varied between 5 and 8, it will be better to zoom in. This can be done by unchecking the box, which will only show the graph between about 4pH and 9pH.

The “Show alarm text” checkbox can also be de-selected if there is too much information on the graph, ie. Too many alarms activated within a short space of time.

Click on the “*Print*” button to print the data.

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## 7. Accessing the RSD via SMS from a Mobile Phone

### 7.1 SMS Control Message Format

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The RSD accepts SMS messages to:

- **Control the digital outputs**
- **Interrogate the RSD setup**
- **Get the current status of the inputs, outputs & analogue variables.**

These control messages can be sent from any SMS-enabled mobile phone.

The message format for controlling the digital output of the RSD is as follows:

**PIN\_nnnnC**

Where: \_ = a space character

**nnnn** = the four digit PIN programmed under the “Set Site/Phone” tab in the RSD Interface & Configuration software  
(The default pin number which is programmed into the RSD is APIN (all caps))

**C** = control character and is replaced by one of the following in the table below:

<b>A</b>	enables inputs to send alarms
<b>I</b>	disables inputs from sending alarms
<b>En</b>	to enable output <b>n</b> (ie. turn it on)
<b>Dn</b>	to disable output <b>n</b> (ie. turn it off)
<b>Tn</b>	enables output <b>n</b> for 10 seconds & then disables it
<b>S</b>	returns the ARMED/DISARMED status of the unit and the status of all 4 digital inputs and 5 outputs. The message is returned without the use of the input and output message alarm text. The unit is ARMED when inputs can send messages and DISARMED when they cannot send messages.
<b>R</b>	The analogue channels are shown as a percentage of full scale. In the case of 4-20mA inputs 4mA corresponds to 0% and 20mA corresponds to 100%. Input currents of less than 4mA will be recognised as 4mA. The zero and full-scale points of the range and the units are displayed in brackets after the reading.
<b>U</b>	returns the list of the 4 internal telephone numbers to which SMS messages are sent from the RSD. Phone number 1 is sent first. An unused phone number is sent as an N.
<b>Pnxxx#</b>	allows the changing of a telephone number. <b>n</b> is the position in the list, <b>xxx</b> is the new telephone number. The <b>#</b> character must be present to terminate the phone number. On receipt of this message the RSD will respond by returning the list of telephone numbers. To remove a phone number send <b>Pn#</b> .

The control character **C** must be sent as upper case, the four character lead-in string “PIN\_” can be upper or lower case. Characters after the control character **C** are ignored.

**Note:** The RSD is designed to accept incoming SMS messages with a time interval of a few seconds between messages. You should always wait for the reply to a message before sending a new message. If a reply is not received within about 2 minutes it is advisable to resend the message.

**Note:** The four character lead-in string can be any four character sequence but the use of “PIN\_” is recommended for compatibility with future and enhanced products.

#### ***Examples of SMS commands***

Note that all replies to SMS commands are prefixed with the site message. This has been omitted from the following examples.

<b>PIN_APINT3</b>	will toggle digital output 3 on for 10 seconds and send a reply: Output 3 On.
<b>PIN_APINU</b>	will list the existing telephone numbers. For example the reply will be 0402555777 0402555111 N N. Where phone numbers 3 and 4 are unused.
<b>PIN_APINP30402888999#</b>	will replace the existing telephone number 3 with 0402888999. The RSD will send the message 0402555777 0402555111 0402888999 N in reply.
<b>PIN_APINS</b>	might send the reply: ARM I1=Off I2=Off I3=Off I4=On O1=Off O2=On O3=Off O4=Off O5=Off where input 4 and output 2 are on and all the other inputs and outputs are turned off.

## **7.2 RSD Acknowledgement**

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When the RSD receives a valid SMS control message with the correct PIN, it performs the required action and then replies with an SMS message confirming the action. Note that this message is sent to the number from which the SMS control message was received. The list of internal mobile phone numbers is not used for this acknowledgment.



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## 8. RSD Hardware Notes

### 8.1 Mechanical & Environmental

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The RSD SMSlog or SMSflow PCB is fitted in a 3.25" wide snap track fixed inside the RSD IP66 weatherproof enclosure. The PCB is powered from the power supply of the GSM modem, which is also housed inside the RSD enclosure. Cable glands are provided at the bottom of the enclosure for wiring in leads from inputs and output devices. The enclosure can be locked with an optional padlock and is suitable for mounting outside.

### 8.2 Power Supply

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The RSD SMSlog or SMSflow PCBs will accept a range of input voltages between 7V and 15V DC and is designed to be compatible with 12 Volt negative ground electrical systems.

Voltages in excess of 15 Volt will trigger the internal over-voltage protection. The SMSlog and SMSflow PCBs will not function when the protection is in operation.

NOTE: The power supply ground is connected to the input grounds.

IMPORTANT: All power must be removed from the system during field wiring connections.

### 8.3 GSM Modem Connections

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#### ***8.3.1 RS232***

The RS232 port on the SMSlog or SMSflow PCB allows the PCB to be connected to a GSM modem for normal operation and a PC for configuration. The communication parameters are 9600 baud, 8 data bits, one stop bit and no parity. The RS232 connection is via a 10 pin ribbon cable. It is pin compatible with a PC 9 pin COM1 connector. The matching connector is a female type allowing the use of standard extension cables. When extending this cable, the RS232 specification should be followed and the cable length should be kept to below 15 metres. Longer lengths may work but are not guaranteed to work.

PC 9 pin connections are as follows:

Pin number	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	NC
7	DTR
8	NC
9	NC

The signal mapping on the RS232 10 pin header is as follows:

Header 10 pin	RS232 Connections 9 Pin
1	Carrier Detect
2	NC
3	Rx Data
4	DTR
5	Tx Data
6	NC
7	DTR
8	NC
9	Ground
10	NC

This mapping allows a connecting cable to be constructed using 10 conductor flat cable and insulation displacement connectors (IDCs). The wire connected to pin 10 of the PCB header is cut back leaving 9 wires to be crimped to the DE9 female connector.

## 8.4 Connections for Field Wiring

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### ***8.4.1 Relay Outputs***

Each RSD Digital Output is designed to switch a low power 12 volt DC relay. The external connections O1 - O5 are switched to GD via a relay driver and the output is diode-protected against reverse voltages and protected by internal diode clamps to the V+ terminal. This terminal **MUST** be connected to the positive relay supply voltage which can be either the +12 input supply or another external supply no greater than 30V DC.

Recommended relays are:

Matsushita JS series relay, OMRON G2R1E.

Other brands of relays as long as the maximum sink current per relay is < 100mA.

**It is absolutely essential that reverse-biased diodes be fitted** across any inductive loads connected to the digital outputs, eg relay coils. These diodes must be located as close as possible to the loads (within 10cm).

### ***8.4.2 Connections for Digital Inputs***

The input terminals accept voltage-free switch closures to ground or switching open collector NPN transistors.

An external switch from an input to ground will be recognised as ON when the switch is closed and OFF when it is open. Mechanical switches do not have polarity associated with them. Electronic switches, eg. NPN open collector transistors do require correct polarity and colour-coded wire usually assists in maintaining polarity.

The inputs are debounced and expect an input closure in excess of two seconds to be recognised. The LEDs monitoring the inputs are illuminated when the input is switched to ground

### ***8.4.3 Electrostatic Discharge***

The RSD is protected against ESD but where high energy surges are possible the connections should be further protected using surge diverters such as units manufactured by Critec. This is particularly important where lighting-induced surges may occur. Damage caused through surges is not covered by the manufacturers warranty.

### ***8.4.4 Questions***

If you are unsure about the compatibility or the connection details of any field equipment with the RSD, contact Convergent Water Controls Pty Ltd prior to risking damage to any equipment.

Ph: (02) 9667 1944 Fax: (02) 9667 1955

Email: [support@cw.com.au](mailto:support@cw.com.au)

<http://www.cw.com.au>

### ***8.4.5 RSD PCB Jumpers & Connectors:***

The jumpers inserted on J9 are used to activate inputs I5 through I8 for digital operation, and should be removed for analogue operation.

The jumpers on the block labeled AD should not be removed but should be located across the D position when an input is used for a digital input and A when used for an analogue input.

The jumper on J15 should not be removed.

The connections are as follows:

I1	Digital input 1		
I2	Digital input 2		
I3	Digital input 3	O1	Digital output 1
I4	Digital input 4	O2	Digital output 2
I5	Digital input 5	O3	Digital output 3
I6	Digital input 6	O4	Digital output 4
I7	Digital input 7	O5	Digital output 5
I8	Digital input 8		
GD	Ground connection		
+12	12 volts positive DC input		
V+	Relay positive supply		

### 8.4.6 SMSlog & SMSflow PCB Interfacing

The diagram shows the wiring required for a typical installation with inputs and outputs:

#### Notes:

The GSM modem has a signal connector which attaches to the SMSlog/flow PCB via a 9pin D connector in the modem and a 10pin flat ribbon connector in the RS232 socket on the SMSlog/flow PCB.

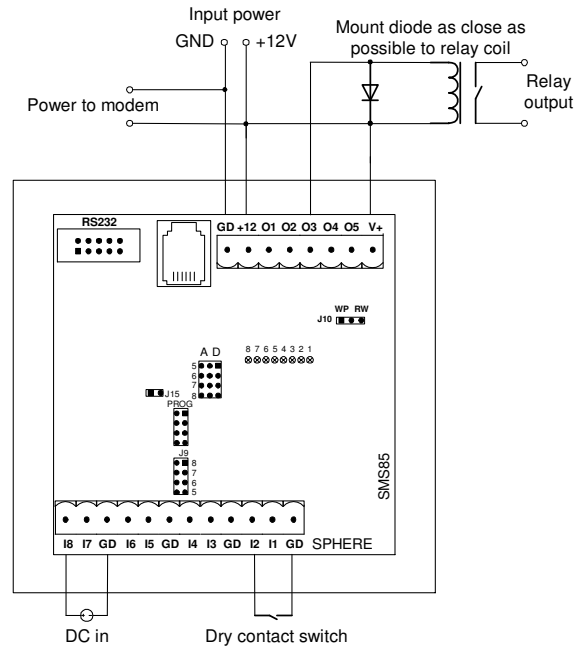
The GSM modem has a power connector which is also connected to the +12V supply and ground of the PCB.

Inputs I1 through I4 are digital inputs and require a dry contact closure to ground to make the input active.

Inputs I5 through I8 are analogue inputs and can handle a 0-5V dc voltage or, if a 249ohm resistor (or 100ohm + 150ohm in series) is placed across the input to ground, a 4-20mA input is converted to a 1-5V input.

O1 through O5 are the output pins and are open collector to ground. This means that the load must be connected between the output pin and the +12V supply. Precautions should be taken to ensure that the current into the connector pin is limited to less than 100mA per output, otherwise the output driver can be destroyed.

If an inductive load, such as a relay coil, is to be driven by the output, then precautions have to be taken to ensure that the inductive kickback when the circuit opens, is quenched. This is best achieved by placing a diode, as shown in the diagram, as close to the coil as possible. Note the correct polarity. The power for the relay should also be connected to the V+ terminal to activate the quenching diode internal to the SMSlog/flow PCB.



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## 9. Troubleshooting

### 9.1 Unable to connect to the RSD PCB directly from a PC

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- Ensure that the RSD is powered-up. (Hint: connect a wire from I1 to GD – L1 red LED should illuminate, and if it does, power is probably OK)
- Check that a Null Modem cable has been used to connect to the RSD PCB.
- Check that the PC comm port is correctly chosen (and set to 9600, 8 bit, no parity).
- Remove power from the RSD and re-power.

### 9.2 Unable to connect to the GSM modem directly from a PC

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- Check that the green LED on the modem is pulsing every few seconds and not cycling ON and OFF. (some AT commands don't work unless the modem is registered on the network), check that the antenna is connected and has sufficient signal strength (indicated by a steady LED).
- Check that any PIN numbers are disabled on the SIM card. This can be checked by removing the SIM card from the GSM modem and inserting in a mobile phone. When switching the phone on, there should be no request to enter a PIN before the phone recognises a network (i.e Telstra, Optus or Vodafone). If the phone asks for a PIN, this feature must be disabled from the phone menu.
- Check that a straight through RS232 serial cable has been used.
- Check the port speed (Hint: try setting port speed to 38.4 Kbaud)
- Check that the terminal program (HyperTerminal, Terminal or similar) is working.

### 9.3 Unable to receive SMS messages from the RSD

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- Check that the SMS is properly configured (Hint: Remove the SIM card from the GSM modem, insert in a GSM mobile phone and try and send a test SMS to another mobile phone).
- Check that the service providers for the SIM cards allow SMS messages between themselves. Some service providers will not send or receive SMS messages to other providers or between GSM and CDMA services.

### 9.4 Not able to send control messages

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If input status messages are received but the RSD will not respond to control messages, check the format of the control message. Badly formed messages or messages with the wrong PIN are quietly discarded. Ensure that the control character is upper case, ie 'E' not 'e'. Note that control confirmation messages are sent to the phone of the originator of the control message.

### 9.5 No response from the RSD

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If nothing happens, ie no SMS status messages are sent or control messages are not actioned, and all the relevant checks above seem ok, ensure that the jumpers on the board are correct. If unsure, return the jumpers to their factory settings, remove the power for several seconds and reapply.

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## 10. Specifications

### 10.1 SMSlog PCB Specifications

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Mobile Network Connection	GSM
Protocols Supported	SMS and 9600 Baud data ( with dial-up data number enabled on SIM card)
Firmware	SMS85log-GSM
Digital Inputs	4 switch closure inputs
Mixed Signal Inputs	4 digital switch closure or 8 bit analogue
Analogue Input Range	0-5VDC or 0-20mA with 250 Ohm shunt (4-20mA compatible)
Analogue Input Impedance	47kOhm
Analogue Input Units	Engineering units can be specified for each input
Analogue Scaling	Full scale and zero offset parameters for each input
Analogue Alarms	Level or window with selectable hysteresis, selectable inversion
Input Detection Time	< 1 second with debouncing disabled, 3 seconds with debounce
Digital Outputs	5 (open-collector, switched to ground when enabled)
Digital Output Switch Rating	50VDC Max, 100mA max (all outputs active) 500mA Max (1 active)
Inductive Loads	Outputs have clamping diodes, additional diode at load recommended
Log Memory Capacity	4000 time-stamped samples
Log Memory Retention	200 years in absence of power
Log Acquisition Rate	5, 10,15, 20, 30 or 60 minute intervals between samples
Wiring Connectors	Screw terminal
Configuration	SMS, dial-up or direct connection to PC
Phone Number Capacity	4 mobile numbers, 14 digits long
Alarm Number Mapping	Each alarm can be sent to any combination of the 4 phone numbers
Retry Count	1 to 15 retries for each alarm if network unreachable
Time between retries	20 to 255 seconds
Site Message	Up to 16 characters prefixed to all alarms
Alarm Message	Up to 16 characters for each alarm
RS232 Interface	Rx, Tx, CD & DTR via a 10 pin header (compatible with DE9)
Form Factor	OEM PCB (W 82.5mm , L 82.5mm, H 20mm)
Power Requirements	9 to 15VDC, 30 mA (Absolute maximum applied voltage 70VDC)
Environmental	0°C to 55°C, 5% to 95% RH, non-condensing

### 10.2 Other components of RSD-GSM-L

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Standard Antenna	Small adhesive mount antenna with 3 metre cable, FEM connector
Power Supply	ETM 110 - 264 VAC 50 - 60 Hz input, 13.6VDC regulated output
Cellular Modem	ETM 9200 GSM Cellular Modem (Siemens M20 engine)
Hinged Plastic Enclosure	ABS - IP66

## 10.3 SMSflow PCB Specifications

Mobile Network Connection	GSM
Protocols Supported	SMS and 9600 Baud data ( with dial-up data number enabled on SIM card)
Firmware	SMSflow-GSM
Digital Signal Inputs	2 dedicated to pump and flow inputs, 2 switch closure inputs
Mixed Signal Inputs	4 digital switch closure or 8 bit analogue
Analogue Input Range	0-5VDC or 0-20mA with 250 Ohm shunt (4-20mA compatible)
Analogue Input Impedance	47kOhm
Analogue Input Units	Engineering units can be specified for each input
Analogue Scaling	Full scale and zero offset parameters for each input
Analogue Alarms	Level or window with selectable hysteresis, selectable inversion
Input Detection Time	< 1 second with debouncing disabled, 3 seconds with debounce
Digital Outputs	5 (open-collector, switched to ground when enabled)
Digital Output Switch Rating	50VDC Max, 100mA max (all outputs active) 500mA Max (1 active)
Inductive Loads	Outputs have clamping diodes, additional diode at load recommended
Log Memory Capacity	4000 time-stamped samples
Log Memory Retention	200 years in absence of power
Log Acquisition Rate	5, 10,15, 20, 30 or 60 minute intervals between samples
Wiring Connectors	Screw terminal
Configuration	SMS, dial-up or direct connection to PC
Phone Number Capacity	4 mobile numbers, 14 digits long
Alarm Number Mapping	Each alarm can be sent to any combination of the 4 phone numbers
Retry Count	1 to 15 retries for each alarm if network unreachable
Time between retries	20 to 255 seconds
Site Message	Up to 16 characters prefixed to all alarms
Alarm Message	Up to 16 characters for each alarm
RS232 Interface	Rx, Tx, CD & DTR via a 10 pin header (compatible with DE9)
Form Factor	OEM PCB (W 82.5mm , L 82.5mm, H 20mm)
Power Requirements	9 to 15VDC, 30 mA (Absolute maximum applied voltage 70VDC)
Environmental	0°C to 55°C, 5% to 95% RH, non-condensing

## 10.4 Other components of RSD-GSM-F

Standard Antenna	Small adhesive mount antenna with 3 metre cable, FEM connector
Power Supply	ETM 110 - 264 VAC 50 - 60 Hz input, 13.6VDC regulated output
Cellular Modem	ETM 9200 GSM Cellular Modem (Siemens M20 engine)
Hinged Plastic Enclosure	ABS - IP66