

SMS Monitor and Logger

Models SMS85, SMSlog, SMScount, SMSflow and PETlog

User Manual

Supplied by:

EDAC Electronics Australia Pty Ltd

Suite 6, 173 Boronia Rd

Boronia

VIC 3155

Ph: +613 9762-6244

Fax: +613 9762-6255

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Important Note

The SMSlog program requires that the PC be set to 24-hour time (HH:mm:ss) and a date format of d/MM/yyyy. You can set these properties in the Regional Settings of the Control Panel. Setting the time to a 12-hour format will result in the inability to download logged data. Note that for Windows NT, 2000 and XP you must be the system administrator to adjust these settings.

Differences between the SMSlog and SMScount

The SMScount has all the analogue features of the SMSlog but it replaces the functions associated with the digital inputs with a counter function.

Associated with each digital input is a 32 bit counter which is incremented every time the input is pulled to ground. You can selectively enable or disable the debouncing of the inputs as for the SMSlog. The maximum counting speed is 15 pulses/second with a minimum high and low times for a pulse of 50mS, with input debouncing turned on and 20mS with input debouncing turned off. The counts are maintained in battery backed memory.

No logging of the digital inputs occurs and no alarms can be generated from the digital inputs. All parameters associated with digital inputs on the configuration screens are ignored by the SMScount.

The alternate use of digital outputs 2 through 5 to display the output state of the logic functions is also not supported by the SMScount.

The current state of the counters can be read by using the Current Status tab.

Differences between the PETlog and SMSlog

The PETlog uses a standard modem to communicate with a telephone service. Alarms are sent using the PET (or TAP) protocol and resent by the network as a SMS message to a mobile phone or possibly to a pager.

You cannot send SMS messages to a PETlog but in all other respects there is no difference between a SMSlog and a PETlog.

Quick Start – this section only applies to SMS based products

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

- **Install the configuration software on a PC**

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

- **Connect the SMSlog to the PC and configure it**

Remove the RS232 cable from the cellular modem and plug it instead into a null modem cable connected to a PC Comm Port. Connect a 12 Volt DC supply to the SMSlog and power it up. Launch the configuration software and follow the instructions. All configuration fields must be filled in. The phone number for the destination phone is important, as is the PIN if output control is required.

- **Connect the cellular model to the PC and configure it**

Put the SIM card into a GSM phone and follow the manufacturer's and service provider's instructions for setting up the SMS. You will need the Voice number associated with the SIM card NOT the data number as the destination when you configure the SMSlog dialer.

Connect the cellular modem to the PC using an RS232 straight-through cable, NOT a null modem cable. There are 2 ways to configure the modem. The preferred method is to use the configuration software as detailed in the following paragraph and later in this manual.

Launch the configuration software, select the Com port the modem is connected to and then select the modem configuration 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. Then click the *Configure modem* button.

Alternatively, use a terminal emulation program set to 9600 Baud, 8 bits, and no parity to communicate with the modem. Send the AT commands listed later in this manual.

- **Reconnect the cellular modem to the SMSlog**

Plug the RS232 cable back into the modem, connect the power cable from the modem to the SMSlog board. Connect an antenna to the cellular modem then reconnect the 12Volt DC supply to the SMSlog. The green LED on the M20 will flash several times as the modem searches for a GSM cell. When the modem is registered, the green LED will stay steadily on.

- **Ensure the mobile phone is configured for SMS**

Repeat the SMS setup with the destination cellular phone with the phone SIM card installed.

- **Test the Inputs and Outputs**

When the green LED on the M20 cellular modem is on steadily, the system is ready for testing. Join an input connector (I1, I2, I3 .. I8) to a GD connector on the SMSlog. 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, followed by "ON". No further activity on this input will be reported until the connection has been removed for greater than two seconds then reconnected for greater than two seconds.

Connect a 12-Volt load (less than 1 Amp) between the power supply +12Volt connection and the O4 output connection. By following the instructions appropriate to the GSM mobile phone, send an SMS message to the cellular modem. The format must be as specified in this manual, ie:

PIN_APIN4E (assuming APIN is the PIN stored in the SMSlog).

After the message is delivered, the load should be activated. If problems are encountered, read the manual section on troubleshooting.

Install the SMSlog and the cellular modem in the field

When successful operation has been demonstrated, connect the field wiring to the SMSlog.

- **Done!**

PC-based System Configuration

Install the configuration software

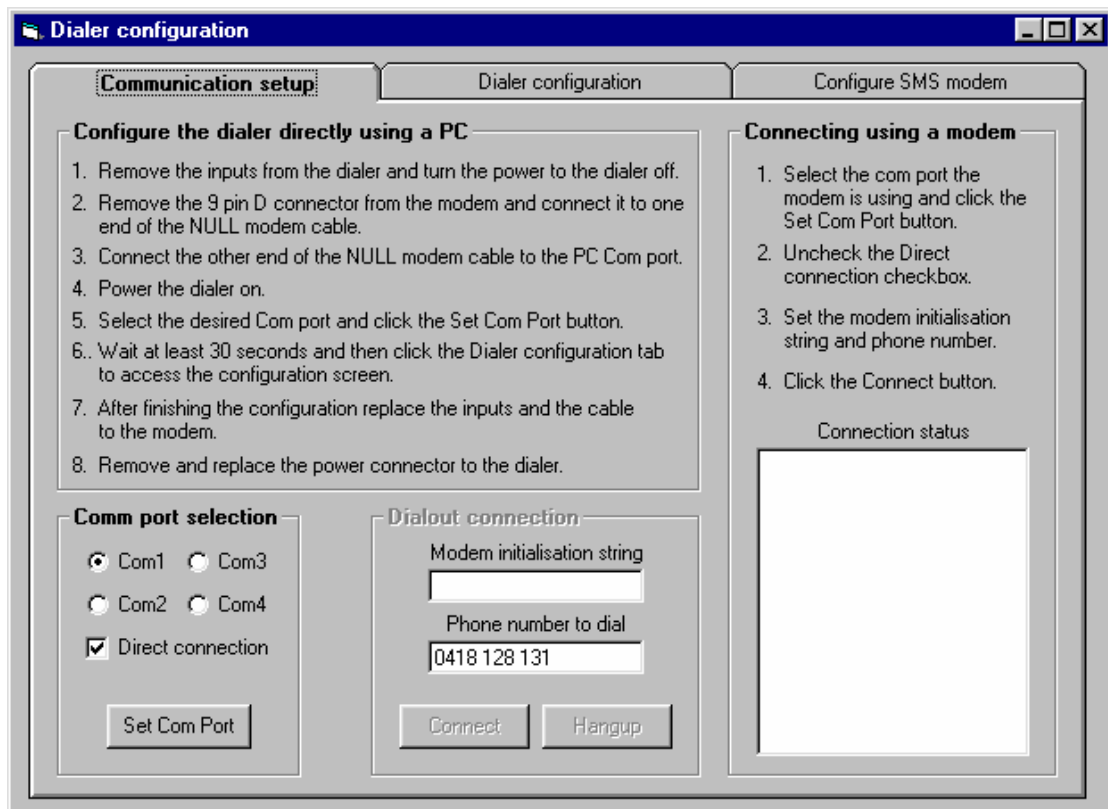
The configuration software is supplied on a CD-ROM. With the CD-ROM in the drive, open the SMSlog folder and double click on the Setup icon. This will launch a standard Windows setup program that will lead the user through the installation process.

Connect to the SMSlog via a PC

To configure the SMSlog it must be connected to a PC running the configuration software. A null modem cable is required between the PC communications port and the 9-pin RS232 cable to the SMSlog. Unplug the cable from the cellular modem and plug the cable into the null modem cable to the PC.

Run the configuration software

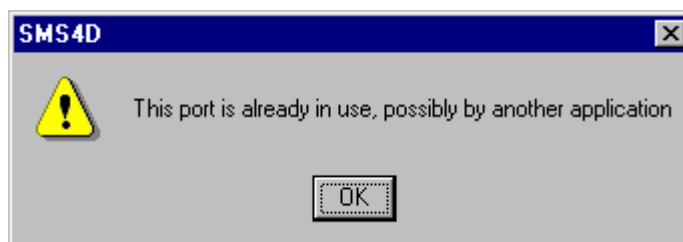
When launched, a configuration screen with three selection tabs is displayed.



Check the radio button to select that port which is connected to the null modem cable. Click “Set Com Port”.

The Direct connection checkbox is used to determine whether the PC will communicate directly with the dialer (checkbox is checked) or via a modem (checkbox unchecked). If you are communicating with the logger via a modem the com port chosen should be the com port the modem is connected to.

If the comm port cannot be opened, a warning screen is displayed.



When connecting using a modem you will need to enter the phone number of the modem connected to the logger. In general, the modem initialisation 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 phone number and modem initialisation string click the Connect button and the program will attempt to connect to the remote logger.

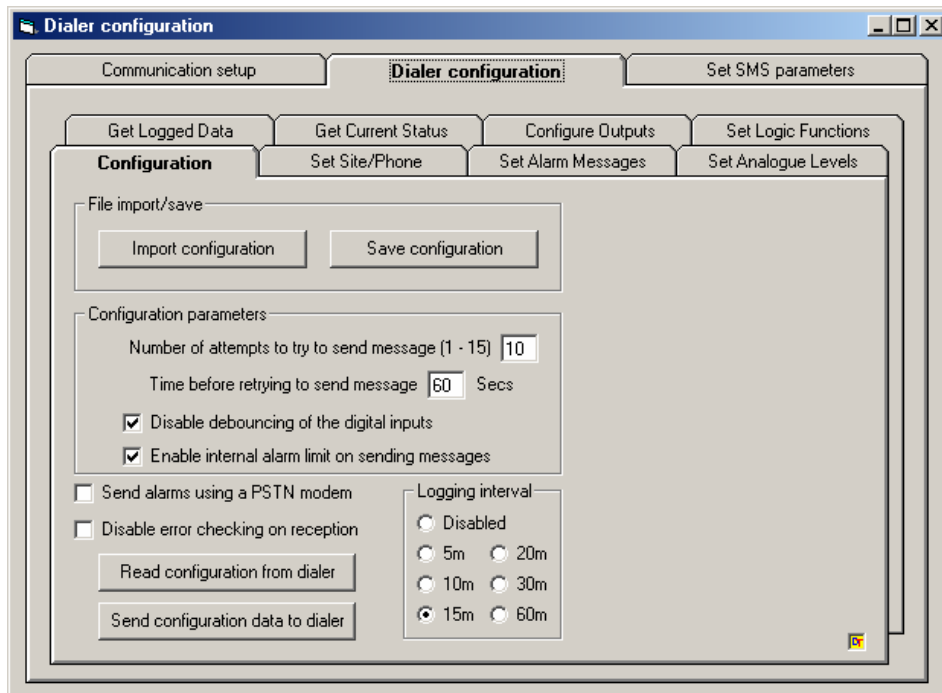
NOTE: the remote modem must be configured to auto-answer otherwise you will not be able to contact it. This is done by ensuring that the parameter s0 has been set to something other than 0 (usually 2).

The program will initialise the 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 this software.

NOTE: You must return to this tab and click the Hang-up button to disconnect the modem, the program **will NOT** otherwise disconnect the modem!!!

SMSlog configuration

This screen allows you to read and save a configuration file to the hard disk, set some configuration parameters, select a SMS model and configure a SMSlog dialer or read a SMSlog configuration from a dialer.



Save a Configuration in a File

After the fields have been set, a configuration can be saved to a text file. The file consists of one line for each of the fields described above. No checking is performed on the format of the file.

Import a Configuration from a File

A configuration from a previously saved file or generated by another application can be imported.

Send Configuration to Dialer

This button causes the configuration data to be loaded into the SMS Digital Monitor.

Read Configuration from Dialer

This button reads-back configuration data from an SMS Digital Monitor. Note that for security reasons the PIN is not read back.

Configuration parameters

You can configure some general properties of the SMSlog. If the SMSlog 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 SMSlog 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 SMSlog 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

If this box is checked, you are expected to be configuring a PETlog device. If you connect any other sort of logger this box will automatically become clear when attempting to either configure or read the configuration from the logger. The PETlog device uses the PET (or TAP) protocol to send alarm messages using the normal switched telephone line and a normal modem. The telephone company receives the message and retransmits it as a SMS message to a mobile phone or to a pager. Note that in Australia this service is usually only offered by Telstra. When you click this box the *Set Site/Phone* tab contains setup parameters which you must configure to be able to dial out.

Enable internal alarm limit on sending messages

Most of the SMS85 family of devices have the option to enable an internal alarm counter which can be used to prevent the SMS85 device 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. The alarm system status can be determined by sending the "S" command to the SMS85. The alarm counter can be reset at any time by either re-programming the logger or by sending the "A" command. In the case of all devices other than the SMS85, the alarm counter is also automatically reset at midnight. The SMS85 requires the user to send a command to reset the counter. To enable the counter, check the box. It is recommended that this feature be used especially for all devices other than the SMS85. In particular, 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. While commissioning a system it is also recommended that this feature be used.

Disable error checking on reception

All communications with the logger 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 this box.

Setting the logging interval

Select an option in this box to determine how often the unit should log data. 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. This parameter is downloaded when configuring the SMSlog and should be selected before downloading the configuration. It is not possible to update this information without reconfiguring the logger but as reconfiguring the logger does not affect the operation of the logger this is not a problem.

Site/phone number configuration

This screen, and the following screens, have a number of fields which will be downloaded to the SMS Digital Monitor to configure it.

Site Message for all Alarms

This string is used to identify the SMS Digital Monitor in SMS messages. Although the sender's telephone number is displayed with a received message, this string provides a more descriptive identification.

PIN Number for Enabling SMS commands – SMS based products only

A PIN number must be set to prevent unauthorised activation of the output feature of the Digital Monitor. 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. This gives a total number of possible pin numbers as in excess of 40,000,000.

Phone Numbers

The SMSlog can send a message to up to 4 cellular phones or cellular modems. SMS message delivery may not be supported between different service providers or between GSM and CDMA services for a particular provider. Check that the SMS service is available between the SMS Digital Monitor and the destination telephone. Note that SMS delivery cannot be made to a PSTN service. If a telephone number is blank it is considered not used and no dial out attempts will be made to that number.

To enter a number you must check the *Enable number* checkbox. If this box is not checked then the telephone number will be greyed out and cannot be changed.

Phone numbers must be less than 16 digits.

PET protocol configuration – only applies to the PETlog device

This panel only appears when the *Send alarms using a PSTN modem* checkbox is checked in the Configuration tab. It allows the entry of telephone number to dial and the password the network operator requires or assigns to you. For Telstra the phone number is 018018767 and the password is mnmail. The Modem init string box is normally left blank as the modem is automatically configured by the software inside the PETlog device. If a different modem from that supplied is used, then you can type any additional commands that the modem might require in this field.

Setting the alarm messages

The screenshot shows the 'Dialer configuration' window with the 'Set Alarm Messages' tab selected. The window contains a table for configuring alarm messages for eight digital inputs. Each input has a text field for the message and a grid of checkboxes for selecting which of four phone numbers to dial.

Messages to send when an input becomes activated	Phone numbers to dial			
	1	2	3	4
Message for input 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Message for input 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Message for input 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Message for input 4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Message for input 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Message for input 6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Message for input 7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Message for input 8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Message to send when an input is activated

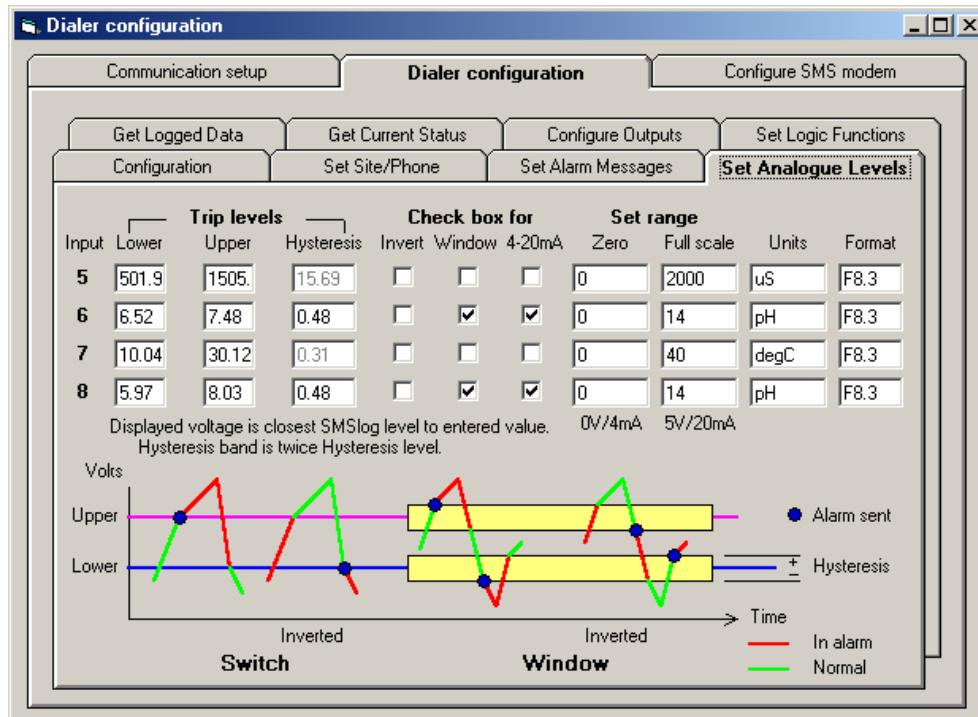
This is a group of text strings to identify the eight digital inputs to the SMS Digital Monitor. You can type any string for each message. Note that the message is limited to 24 characters.

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

Note that when the logic functions are enabled 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.

Analogue channel configuration

Channels 5-8 on the SMSlog-AN are configured as 8 bit resolution analogue inputs. An input signal on these channels is treated as a variable signal level and alarms can be generated depending on the level of the signal. Alarms can be generated in 4 different ways:



The diagram above illustrates the different configurations. The check boxes match the 4 different configurations in the diagram working from left to right.

The hysteresis value should be chosen to stop continually 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). **NOTE:** The hysteresis band is specified as \pm the value specified thus the total hysteresis is **TWICE** the value entered.

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. The format field is not used by this program so should be left at the default value. Note that the Upper and Lower trip points and the Hysteresis level should all be specified in terms of engineering units.

NOTE: If you want to use an input for 4-20mA you have to connect a 250ohm resistor from the input to ground.

SMSlog jumpers

The SMSlog must have several jumpers installed.

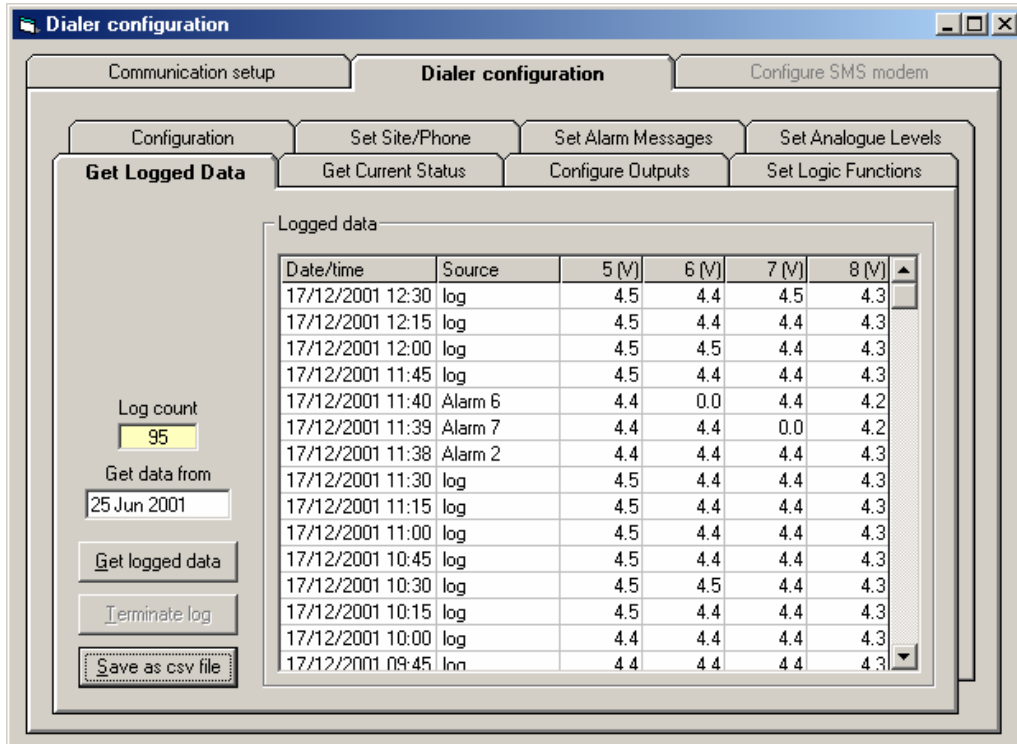
All 4 jumpers on J9 (located next to the input connector block) must be removed.

All 4 jumpers on the AD connector block in the middle of the board must be placed in the A position.

The lights corresponding to inputs 5-8 are not operative.

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

Getting the logged data



Reading the log

Clicking the *Get logged data* button will start downloading the logged data from the SMSlog. 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 displays the number of logs currently read out.

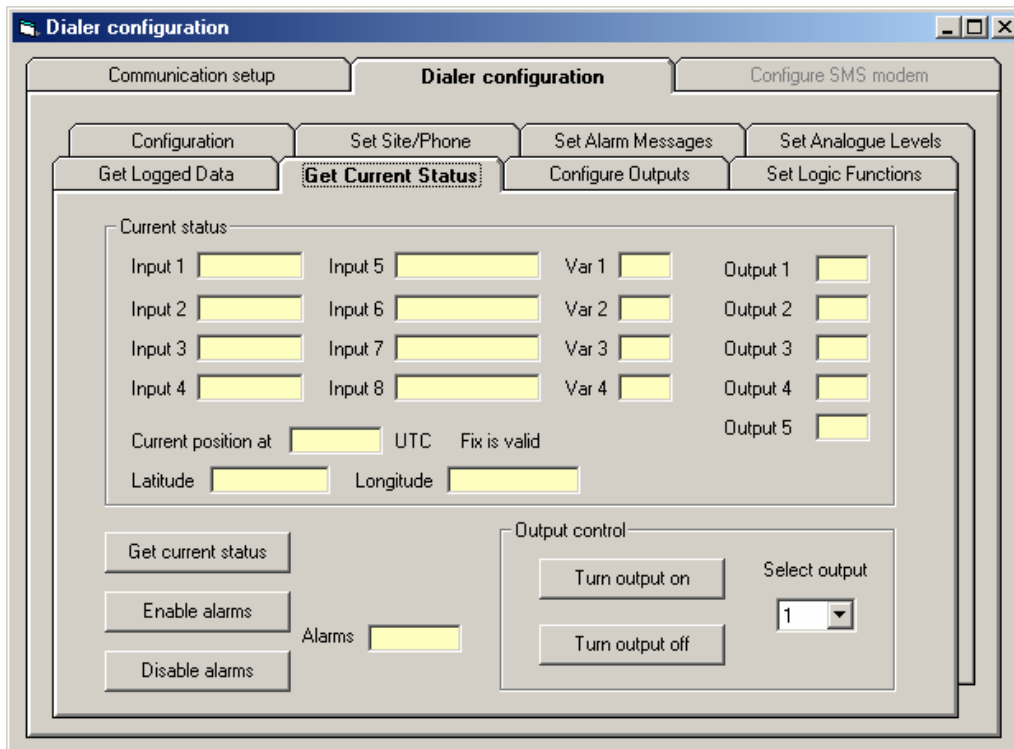
The value for each channel is displayed in the engineering units which are currently stored in the logger.

Alarms are listed together with logged data. The name specified for the alarm is taken from the appropriate entry in the *Input messages* tab. To ensure that this reflects the actual message for the alarm you should import the configuration for the SMSlog 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 output to a file with and *-alarm* added to it. 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*.

Retrieving the system status

The *Get Current Status* tab allows you to get the current status from the logger.



The *Get current status* button will retrieve the current inputs, digital variables, outputs and alarm enabled state and display them. Note that the displayed values are shown in engineering units.

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

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.

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

The GPS position information is only available for the SMSgps unit.

Setting the configuration of the outputs

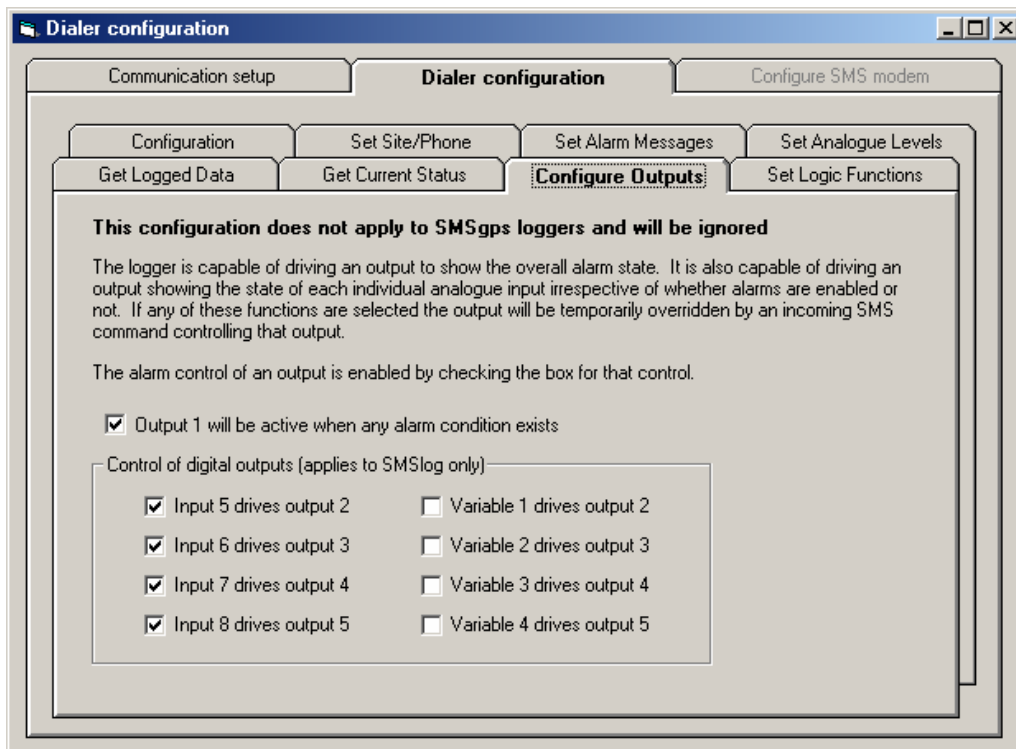
The 5 digital outputs on the SMSlog can be assigned multiple, mutually exclusive roles. The standard condition of each output is to be a non-committed output which can be driven by SMS commands or via commands through the serial port. The alternate use of each of these outputs reflects internal conditions within the SMSlog 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 as detailed below.

Digital output 1 can display the current alarm status of the SMSlog. This is the status of any alarms to be sent so it is inoperative if the alarm system is disabled either by command or because the SMSlog carrier detect line is driven.

Digital outputs 2 through 4 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:

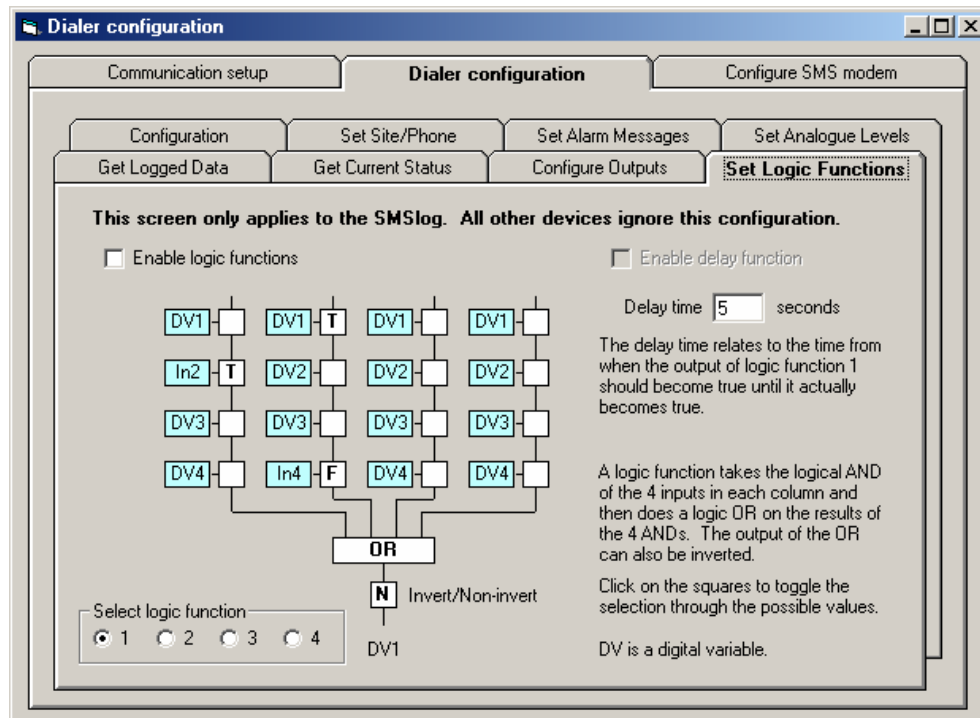


Note that you are only able to select a single function for digital outputs 2 through 5. If the checkbox(es) for any output are all unchecked then that output is controlled only by SMS commands or via commands given through the serial port.

Logic and delay functions

The SMSlog has 4 logic functions and a single delay function, which operates on the output of logic function 1.

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 is by clicking the blue box next to the input and the unused, true or false state of that input is selected by clicking the 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 pulled to ground). The output of the second AND function is true when digital variable 1 is true and digital input 4 is false. If when the output of the function is true and Input 4 is left open.



The output of the logic function 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. These internal digital points are called **digital variables**. When logic functions are enabled the alarms which are normally associated with the digital inputs 1 through 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:

$$DV1 = In2 \text{ OR } (DV1 \text{ AND NOT } In4)$$

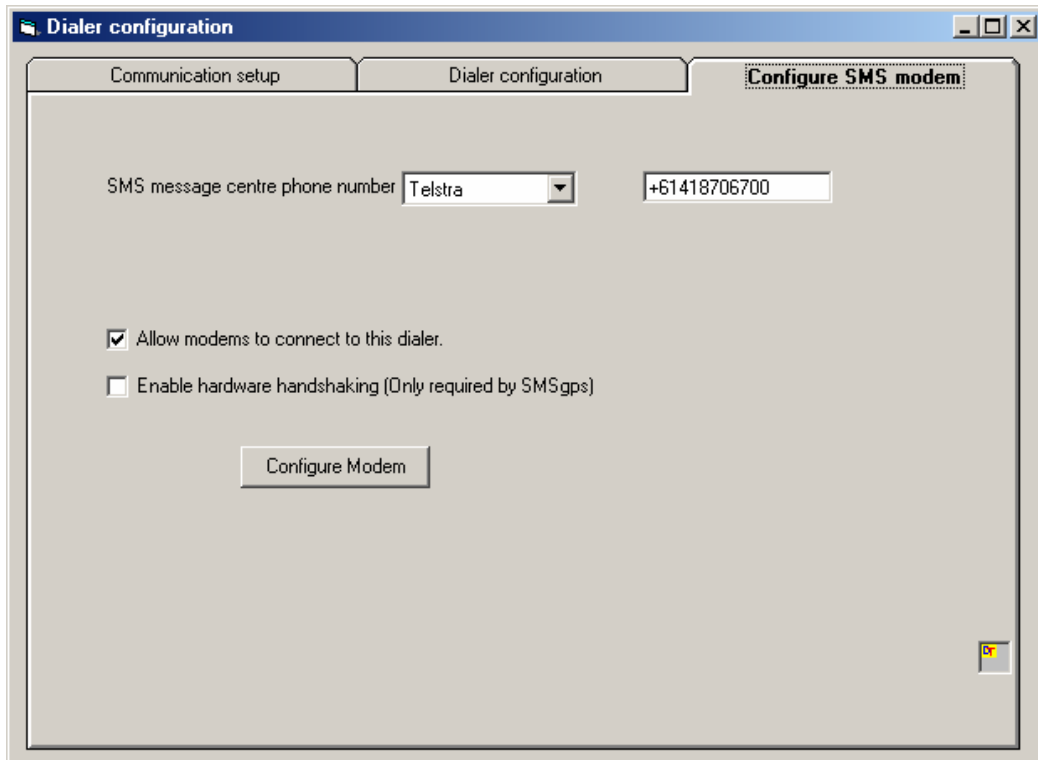
This function captures any contact closure on Input 1 and latches it while Input 4 is inactive. For the function to work Input 1 must go low (active) long enough for it to be recognised. This is typically 1 second if debouncing is disabled or 2-3 secs if it is enabled.

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 and digital variable 1 (DV1). When the output of the function 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.

Configuring the Cellular Modem

The cellular modem must be correctly configured to operate with the SMS Digital Monitor. The third tab provides the capability to automatically configure the modem.



You can either use this screen to configure the modem or follow the instructions in the following section.

Insert the SIM card into the modem.

Connect a standard modem cable (NOT a null modem cable) from the PC com port to the modem.

Select the SMS message provider linked to the SIM card inserted into the modem. You use the dropdown list to select one of the major telecom companies and the relevant provider number will appear. If the provider is not listed or the service number has changed then you must enter the new number in the right-hand box.

Click the *Configure Modem* button to configure the modem.

Remove the modem cable and reconnect the modem to the SMSlog card.

If you wish to be able to dial into this SMSlog then you must check the *Allow modems to connect to the dialer* to configure the modem to auto answer.

The *Enable hardware handshaking* checkbox should only be checked for the SMSgps logger. Leave this box unchecked for all other types of logger.

GSM AT Commands

To configure the modem to make it compatible with the SMSlog, it must be connected to a PC and the following AT commands sent:

ATS0=0	No auto answer
AT+IPR=9600	Lock at 9600 Baud
AT+IFC=0,0	No handshaking
AT+ICF=1,1	8 bits, 2 stop, no parity
AT+CMGF=1	Set SMS Text Mode
AT+CNMI=2,1 AT+\Q0	Send unsolicited messages has been changed to the lower value in the M35/ETM9200 modems
ATQ1	Set quiet mode
ATE0	No local echo
AT&W	Store settings

SMS Service Provider Configuration

Note that in Australia most telecommunication companies do not allow this parameter to be changed. It is locked into the SIM card on purchase.

The most straightforward method of configuring the cellular modem for SMS operation is to place the SIM card into a GSM phone and follow the phone manufacturer's instructions.

The first requirement is to store the SMS Message Centre number, which will be provided by the service provider. For example, Telstra's message centre number is +614 1870 6700.

The configuration program looks for a file with the name **SMSservice.txt** in the directory where the configuration software is located. If this file exists, the program uses this file to display the SMS Message Centre number otherwise it uses the built in defaults. The format of the SMSservice.txt file is a series of names and associated numbers with one entry per line. A comma is used to separate the name and the number. This file can be created with a standard, non-formatting word processor such as **Notepad**. A typical file would look like:

```
Telstra,+61418706700  
Optus,+61411000991  
Vodaphone,+61415011501
```

The next step is to set the message format. The SMSlog expects the SMS messages to be sent in text format, not PDU format.

The SMS allows for the validity period of the message to be set. The validity period is the time the message will be held by the message centre until it can be delivered. Messages which cannot be delivered with the validity period because, for example, the destination telephone was not in a mobile service area or was turned off.

The SIM card can then be placed back in the cellular modem.

Running the SMSautolog program

This program can be run either using the Start menu **Run** command or run from the **Task Scheduler** on an automatic basis. The program accepts a command line argument, which specifies a file name.

To run this program from the **Start menu**, click the **Start** button and then click the **Run** menu item. In the window which opens type the following command: `c:\path\smsautolog.exe "file.txt"` where you replace the **c:\path** with the actual folder name. The **file.txt** can be any file name but it must be enclosed in double quotes. To actually run the program click the **OK** button.

To run this program from the **Task Scheduler** follow the windows instructions for entering a new program into the schedule. You include the **"file.txt"** command line argument when you set the properties for the program. You can also access this by just including the file name itself in the schedule and then right clicking the file name in the list of schedules and then click the **Properties** entry in the popup menu.

The file **file.txt** contains the list of loggers to contact, the file name for the output data (minus any extension) and a tag specifying how far to read back in time. Each line entry in this file has the following format:

PhoneNumber FileName Date

For example:

0412123456 Library daily

0409111222 Office weekly

Each of these three fields **MUST** be separated by at least one space and there must **NOT** be any spaces in a field.

The **PhoneNumber** field specifies the phone number to ring to contact a logger.

The **FileName** field specifies the name of the file where the logged data should be saved. Note that this name should not include any extension as the extension **.csv** will be added to the name.

Logged data is saved to the file **FileName.csv** and the alarm log will be saved to the file **FileNamearm.csv**.

The **Date** field can specify either an actual date in the form of **d mmm yyyy** (note that spaces are allowed in this field) or the word **daily** if you only want to recover data from midnight on the current day, or **weekly** if you want to recover data for the last week.

The program will close down automatically after having read data from all loggers in the list.

Accessing the SMSlog through the SMS

SMS Control Message Format

The SMSlog accepts SMS messages to control the digital output. These control messages can be sent from any SMS-enabled telephone. The message format for controlling the digital output of the SMSlog is as follows:

PIN_nnnnC

Where:

_ Is a space character

nnnn is the four digit PIN - the default pin number which is programmed into the dialer is APIN (all capitals).

C is the control character and is replaced by

- A enables inputs to send alarms
- I disables inputs from sending alarms
- En to enable output **n** (turn it on)
- Dn to disable output **n** (turn it off)
- Tn enables output **n** for 10 seconds then disables it
- S 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 names. The unit is ARMED when inputs can send messages and DISARMED when they cannot send messages.
- R 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.
- U returns the list of the 4 internal telephone numbers. Phone number 1 is sent first. An unused phone number is sent as an N.
- L **SMS85GPS only.** Sends the current location in latitude and longitude.
- Pnxxx# allows the changing of a telephone number. **n** is the position in the list, **xxx** is the new telephone number. The # character must be present to terminate the phone number. On receipt of this message the SMSlog will respond by returning the list of telephone numbers. To remove a phone number send **Pn#**.

NOTE: For the SMSlog-CDMA you MUST NOT include the # at the end of the phone number. To set a new phone number the command is Pnxxxx and to clear a phone number the command is Pn.

The control character must be sent as upper case, the four-character lead-in string PIN_ can be upper or lower case. Characters after the control character are ignored.

Note: The SMSlog 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.

PIN_APINT3	will toggle digital output 3 on for 10 seconds and send a reply: Output 3 On.
PIN_APINU	will list the existing telephone numbers. For example the reply will be 0427123456 0409888777 N N. Where phone numbers 3 and 4 are unused.
PIN_APINP30402123#	will replace the existing telephone number 3 with 0402123. The SMSlog will send the message 0427123456 0409888777 0402123 N in reply.
PIN_APINS	might send the reply: ARM I1=Off I2=Off I3=Off I4=On I6=29.3% 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.

SMSlog Acknowledgement

When the SMSlog 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 telephone numbers is not used for this acknowledgment.

Field Installation

IMPORTANT NOTICE

THIS INFORMATION SHEET CONTAINS INSTRUCTIONS FOR INSTALLING THE SMSLOG SMS DIGITAL MONITOR. FAILURE TO COMPLY WITH THESE MAY RESULT IN EQUIPMENT DAMAGE AND MAY PREJUDICE WARRANTY PROTECTION.

EDAC ELECTRONICS AUSTRALIA PTY LTD CANNOT ACCEPT RESPONSIBILITY FOR INCORRECTLY INSTALLED EQUIPMENT AND MAY, AT ITS OPTION, CHARGE A SERVICE FEE FOR PROBLEMS RELATED TO INCORRECT INSTALLATIONS.

1. Mechanical & Environmental

The SMSlog is to be installed in 3.25" wide snap track fixed inside metal enclosures. Individual modules are snapped into place and can be removed by using the screwdriver cutouts along both edges of each board. Care must be taken not to apply excessive twist to the board during installation or removal. The printed circuit board may be mounted in any plane. The allowable operating temperature range is from -10C to +45C, non-condensing.

2. Power Supply

The SMSlog will accept a range of input voltages between 7V and 15V DC and is designed to be compatible with 12-Volt negative ground vehicle electrical systems. It can also be powered by alternative power supplies.

Voltages in excess of 15 Volt will trigger the internal over-voltage protection. The SMSlog will not function when the protection is in operation. If the M20 is powered via the SMSlog, the minimum input voltage is determined by the voltage requirements of the M20. For protection purposes there is a single diode drop between the power supply positive input and the power to the M20.

NOTE: The power supply ground is connected to the input grounds and may be jumpered to the output ground via J11.

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

3. Cellular Modem Connections

3.1 RS232

The RS232 connected allows the SMSlog to be connected to a cellular 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. The wire connected to pin 10 of the PCB header is cut back leaving 9 wires to be crimped to the DE9 female connector.

3.2 Modem

The RJ45 Modem connector is compatible with the Power Connector on the Siemens M20 Cellular Modem. The cable to the M20 must be constructed so that Pin 1 connects to Pin 1 etc.

RJ45 6 pin	Modem RJ45 6 Pin
1	1 Ground
2	2 Ignition
3	3 Power

4. Connections for Field Wiring

Relay Outputs

The SMSlog Digital Output is designed to switch a low power 12-volt DC relay. The external connections O1 through O5 are switched to DG 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.

The recommended relay is a Matsushita JS series relay (or equivalent from other manufacturers) or an OMRON G2R1E. The maximum sink current per relay is 100mA.

The SMSlog can switch higher-powered relays. **It is absolutely essential that reverse-biased diodes be fitted** across any inductive loads connected to the digital outputs. These diodes must be located as close as possible to the loads (within 10cm).

Connections for Digital Inputs

The input terminals accept voltage-free switch closures to ground.

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 do require correct polarity and colour-coded wire may assist 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

Electrostatic Discharge

The SMSlog 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 lightning-induced surges may occur. Damage caused through surges is not covered by the manufacturers warranty.

Questions

If you are unsure about the compatibility or the connection details of any field equipment with the SMSlog, contact EDAC Electronics prior to risking damage to any equipment.

Ph: +613 9762-6244

Fax: +613 9762-6255

Email: billk@edac.com.

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

SMSlog PCB Jumpers & Connectors:

The jumpers on J9 are used to de-activate inputs I5 through I8 from digital operation. This feature does not exist on the SMSlog and the jumpers should not be removed.

The jumpers on the block labeled AD should not be removed and should be located across the D position for all 4 jumpers.

The jumper on J15 should not be removed.

The connections are as follows:

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

Troubleshooting

Unable to connect to the SMSlog from a PC

Ensure that the SMSlog is powered-up, check the polarity of the supply, and check that the supply is turned on. (Hint: connect a wire from I1 to GD – L1 should be alight, if so, power is probably OK)

Check that a Null Modem cable has been used to connect to the SMSlog. (Hint: use an RS232 breakout box with LED indicators, the Rx and Tx LEDs should be alight. If only one is alight it is probable that a Null Modem cable has not been used.

Check that the PC comm port is correctly chosen and set to 9600, 8 bit no parity.

Remove power from the SMSlog and repower.

Unable to connect to the cellular modem

Check that the green LED on the modem is steadily on (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 a straight through cable has been used (Hint: use the breakout box)

Check the port speed (Hint: try setting port speed to 38.4 Kbaud, cycling the modem power and typing Enter or carriage return characters– it may not have recognised the PC speed. Try other Baud rates, it may have been locked to some other speed)

Check that the terminal program (HyperTerminal, Terminal or similar) is working. (Hint: unplug the modem and short together pins 2 & 3 on the end of the cable – this should result in typed characters being echoed or try another modem, even a PSTN modem).

Unable to receive SMS messages

Check that the SMS is properly configured, refer to the GSM phone instructions or the service provider's instructions (Hint: try sending an SMS message from the phone to the phone's number, ie to yourself, try sending and receiving SMS messages to and from other GSM mobiles.

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.

Not able to send control messages

If input status messages are received but the SMSlog 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 same phone number as the input status messages, NOT to the originator of the control message.

No response from SMSlog

If nothing happens, ie no SMS status messages are sent or control messages are actioned, and all the relevant checks above seem ok, ensure that the jumpers on the board are in the factory settings. Do not experiment with jumper settings, this manual refers only to the use of the SMSlog in this configuration. Return the jumpers to their factory settings remove the power for several seconds and reapply.