# Computer

# Safeguard*Pro* RM

## *Systems User Guide*



**Computer Support Systems Pty Limited**

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## 1. COMPUTER SAFEGUARDPRO:- An Introduction

The Computer SafeguardPro is a state-of-the-art electronic system designed to monitor all vital atmospheric and power supply conditions required for safe operation of a computer facility. Its range of custom designed sensors accurately measures such quantities as Temperature, Humidity, Fluid and Voltage and warns the user of any breach of specified limits.

The SafeguardPro is fitted with an intelligent Auto-Dialler to contact key personnel if a failure occurs while the computer room is not attended. An in-built recorded voice dialler informs the user of the type of alert allowing the problem to be quickly resolved preventing equipment damage.

## 2. USING THIS MANUAL

The Computer SafeguardPro is a complex system with a large range of facilities and options. It has been designed to operate in most applications with little or no manual intervention. The user however needs to become familiar with two aspects of the SafeguardPro in order to obtain the full benefit of its extensive features.

To provide as much protection as possible from environmental failure the SafeguardPro has a multistage alert system. Section 3.1 "Alerts" describes the alert sequence and it is strongly recommended that all staff concerned read this section as a minimum prerequisite.

During normal monitoring mode there are several display features, which allow viewing of both current and past SafeguardPro alerts, as well as control of the analogue-input display. Section 3.2 "Monitoring" gives an overview of the various facilities available and their usage.

Section 5 "System Reference" is a dictionary-like listing of SafeguardPro terms and features. To obtain a detailed description of any item look under the appropriate heading in this manual. Each entry consists of a brief "Description" of the item's meaning or usage for quick reference. A more detailed explanation of the use and interpretation of the item is given under "Operation", followed by a list of related System Reference entries for "Further Information".

Appendix A "Quick Reference Guide" is a single sheet, which summarises the SafeguardPro front panel keys and their usage. It is suggested that a copy of this sheet be kept near each SafeguardPro installation to assist staff in becoming familiar with its operation.

## 3. BASIC OPERATION:- An Overview.

The SafeguardPro checks all input channels each second and generates an Alert if any variable departs from its pre-set limits. While monitoring, relevant input information can be displayed on the front panel LCD or to a connected PC using Windows for SafeguardPro software. This section describes the basic functionality of each of these areas.

### 3.1 Alerts

The Computer SafeguardPro is principally designed to protect electronic installations during periods where the facility may be operating unattended. It provides a three-tiered system of alerts to give the maximum possible warning of an environmental failure.

To describe the system's alert operation take the example of a typical air-conditioned computer room. Assume that the computer is running and the air conditioning unit stops due to an internal fault. The temperature in the room fairly quickly begins to rise.

The SafeguardPro has individual limits allocated to each analogue sensor. If the room temperature reaches the 'WARNING' limit the buzzers will emit a slow-pulsed tone and a message will appear on the display. This stage is purely designed as a local alarm and no other action is taken. If the room is attended the Warning should be Mute'd and appropriate action taken to remedy the air conditioner fault.

Note that digital-type sensors such as Fluid, Fire, etc. are single-stage inputs with no warning limit and can start Alarm or Shutdown sequences directly.

If no one is present to take action on or at the warning, the room temperature will continue to rise until an 'ALARM' limit is exceeded. The buzzers will emit a fast-pulsed tone (mute will be released) and an alarm message will be displayed.

If an auto-dialler is enabled a 3 minute timer will commence. During this period personnel in attendance can press the 'ABORT' key and postpone the countdown. If the timer expires uninterrupted the Dialler will activate. Up to 6 numbers can be stored in SafeguardPro memory and can call either private phones, automatic or manual pagers.

If no action is taken to abort the SafeguardPro or repair the air conditioner the temperature will continue to rise until the 'Shutdown' limit is reached. Again a 3-minute timer is started. This timer can be manually aborted if required, but if allowed to expire the SafeguardPro will initiate a shutdown sequence and power down the host CPU and peripherals to prevent damage. Once Shutdown has completed, the system can only be restarted by activating the RESET switch.

The 'ABORT' key will prevent the Dialler and Shutdown functions operating for a period of 10 minutes, after which the SafeguardPro will reset. If the alerts are still present at this time the alarm sequence will recommence. It should be noted that the 'ABORT' facility can only be used once each alert session (until all alerts are cleared). SafeguardPro alerts can only be indefinitely cancelled by key access to the DISABLE.

### 3.2    Monitoring

During normal operation the SafeguardPro system requires no manual intervention to perform its primary function of environmental monitoring and control. The front panel should normally have no lights flashing or buzzers operating. The SafeguardPro and the monitored variables can effectively be 'forgotten about' until such times as the audible alarms sound. There is however a wide range of display options available using the front panel keyboard.

### 3.2.1 Analogue Sensors.

The bottom line of the front panel LCD is used to display the readings from any of the analogue sensors connected to the SafeguardPro. Using the SCAN key a list of available inputs is used to select those required for display.

### 3.2.2 Digital Detectors.

These inputs are only capable of being in either an ON or OFF state and therefore are not displayed on the bottom LCD line. Similarly, they have no associated limits and no Warning can be generated. A tripped input will put the SafeguardPro directly into an Alarm state. If the input has dialling enabled the Dialler timer will start. If shutdown is also enabled the shutdown timer will commence and dialling will be performed immediately.

Any alarm generated by a digital detector will cause an appropriate message to scroll on the top line of the display. Therefore the "No Alerts All's Well" message on the top line indicates that all inputs are in their normal state and no alerts are active.

### 3.2.3 The Alert Queue.

As each SafeguardPro alert occurs the description and date/time of occurrence is stored in an internal non-volatile queue. Up to 20 alerts are held and the queue memory is filled on a first-in-first-out basis. This facility allows the history of alerts to be displayed at any time. As the queue does not erase if SafeguardPro suffers a complete power failure the circumstances leading to the fault can be quickly determined once power is restored.

## 4.    SYSTEM COMPONENTS

The Computer SafeguardPro is a complete Monitoring/Control system. It is designed to contain almost all facilities needed to adequately fill a wide variety of applications including Computer Rooms, Refrigerated Stores and Agricultural uses.

This section briefly describes each hardware item offered and their major features.

This equipment is usually available from stock. The features listed are those that best describe the major purpose of the item concerned. In the interests of product improvement, CSS has a continuous review policy therefore some changes to these specifications may have occurred since printing.

### 4.1    Computer SafeguardPro Main Unit



This is the central processing and display module for the entire SafeguardPro system.  It is equipped with a large range of standard features as well as the ability to expand to all SafeguardPro system options.

*Features:*

- ▪  32 Sensor/Detector inputs.

- ▪  No limit on ratio of analogue to digital (32 of either, or any combination in between)

- ▪  All CSS Sensor/Detectors powered from main unit: no external supplies required.

- ▪  Front panel touch-sensitive keyboard.

- ▪  2 line x 40 characters Liquid Crystal Display.

- ▪  Internal Piezo buzzer for key click and alerts.

- ▪  Internal battery-backed power supply (UPS) providing up to 8 hours operation.
   (Depending on configuration).

- ▪  Entire monitoring system self-contained. All inputs continue operation during mains supply failures.

- ▪  Outputs for both internally-powered buzzer and externally-powered siren.

- ▪  Real Time Clock maintains Date/Time, even after battery back up expires.

- ▪  Mains Failure and Low Battery Alerts with full access to Dialler and Shutdown.

- •  Internal periodical self-testing raises alert if fault detected.

- •  Non-volatile queue stores last 20 events and their start/stop times.

- •  Input configuration data visible from front panel

- •  Selectable display scanning of Analogue inputs.

- Once-only front panel Abort of Dialler or Shutdown sequences.

- 3-minute timer provides warning of imminent Dialler or Shutdown activation.

- Partial disable of sensors with SafeguardPro for Windows software enabled

- Entire configuration set-up on site in non-volatile memory. No need to return unit formodification if configuration alters.

- Shutdown of external equipment initiated by extreme environmental variations.

- Watchdog timer producing an automatic system reset in the unlikely event of asoftware failure.

## 4.2 CSS Temperature and Humidity Sensors.

These sensors are specifically designed for use with the SafeguardPro system.

*Features*:

- Small physical size allows mounting in standard wall plate in single or dual configurations.

- Temperature and Humidity sensors can be combined in single wall plate.

- High accuracy and long term reliability.

- Can be run up to 500m from the SafeguardPro using a single low-cost, UTP cable.

- Gold-plated plug-in connectors for fast installation.

- Excellent noise immunity.

- Robust, sealed construction.

- Self-testing; SafeguardPro raises an alert if sensor is faulty.

- Immune to most airborne/industrial contaminants.

## 4.3 CSS Fluid Detectors.

These units are intended for use in computer room applications but can be utilised anywhere a danger of surface water intrusion exists.

*Features:*

- Exclusive Mat design for detecting surface water on floors, cabinet bases, etc.

- Small physical size for ease of mounting.

- Mat is isolated to prevent failure due to earthing.

- Self-resetting once fluid is removed.

- Excellent electrical noise immunity and long term reliability.

- Multiple detectors can be "daisy-chained" on a single SafeguardPro input.

- Internal low frequency buzzer to indicate fluid presence (useful when detectors are daisy-chained).

- Adapters can be used to extend mats.

## 4.4   Intelligent Auto-Dialler.

This feature allows the SafeguardPro to access a dedicated Telecom line to inform remote personnel of an existing alert.

***Features:***

- Can be programmed with up to 6 numbers.

- Each number can be set to dial when activated or only if no previous call has been successful.

- Service Tone Detection allows engaged or not answering numbers to be skipped over.

- Can access either beeper or numeric pager services.

- Non-volatile Number memory. (Not erased if power fails).

- Recorded voice message describes alert type allowing necessary action to be initiated.

## 4.5   External Relays

To allow control of installed equipment this unit can be fitted with up to 8 double-pole changeover relays, installed in a matching 1RU External Enclosure.

***Features:***

- Completely powered from SafeguardPro.

- Available in 4 or 8 relay configurations.

- Each contact set rated at 240VAC 5A.

- Relays are individually configurable from SafeguardPro for use as Thermostats,Fluid detector switches, Timer switches, etc.

## 5.    SYSTEM REFERENCE

The System Reference section describes all facilities, terms and features of the Computer SafeguardPro system. To gain full benefit from this section first read Sections 2 & 3 "Using This Manual" and " Basic Operation".

To familiarise yourself with any specific area of SafeguardPro simply look up the required term in this section. All listings are presented alphabetically under a general heading.

Each entry consists of a brief overview of the item for quick reference. A more detailed description follows, with specific examples of the commands usage where necessary. Finally, a list of additional System Reference entries is provided to be used if further information is required.

If your queries cannot be adequately resolved after SEVERAL readings of this manual contact either Computer Support Systems or their distributors and they will be pleased to provide assistance.

### 5.1    Abort

***Description:***        Front panel key used to prevent activation of either the Dialler or Shutdown facilities of the SafeguardPro.

***Operation:***

Whenever Dialler of Shutdown conditions exist a 3-minute countdown begins. If this timer is allowed to expire uninterrupted the appropriate feature will activate. If however the area is attended and the user wishes to temporarily cancel the timer, pushing the 'ABORT' key will stop progression of the countdown sequence.

Once aborted the SafeguardPro will continue monitoring and issuing alerts but will not allow either the Dialler or Shutdown sequences to start for a 10-minute period. The display will read  (Bottom line and time are examples only);

        ABORTED, will reset in 9 min. 25 sec.
        Temperature in Computer Room = 21.8°C

Note that this feature can only be used once during a series of alerts and cannot bere-used until after the "No Alerts All's Well" message appears on the screen.

If the ABORT key is pressed a second time the relevant timer will resume immediately.

The ABORT function is mainly useful in two situations. If a temporary fault occurs (e.g.drops of water from the humidifier fall onto a Fluid Detector) the ABORT key can be pressed giving the user 10 minutes to correct the problem. Secondly, as the only method of permanently stopping either Dialler or Shutdown sequences is by pressing the DISABLE switch, the Abort facility gives the user 10 minutes to access the SafeguardPro

***Further Information:***        ALARM
                                  Dialler
                                  DISABLE
                                  SHUTDOWN

### 5.2    Air Conditioner Inputs

***Description:***        Single-stage input indicating Air Conditioning or Chiller equipment failure.

***Operation:***

The Air Conditioner input format is one of five categories of relay-type input. An Alarm will be raised if the equipment connected to this line switches to an off-normal status signalling a fault requiring attention.

Air conditioner inputs can be used for such items as:

Compressor Overloads
High/Low Pressure Switches
Filter-Blocked Switches

As for all forms of SafeguardPro input, the Air Conditioner category can be configured to activate Shutdown and/or Dialler sequences. Note that as this is a single-stage input  (either ON or OFF) there is no Warning state and the SafeguardPro will issue an Alarm immediately. If Dialling is enabled from the input the 3-minute countdown will operate. If Shutdown is also enabled, the Dialler will activate immediately the Shutdown timer starts.

Note that to prevent nuisance alerts, air conditioner inputs must remain in alert  condition for at least 10 seconds before an alarm will be raised.

Air Conditioner inputs can be set to activate on either a Normally Open or Normally Closed contact. Note that only an isolated contact may be used, i.e. no voltage applied to the SafeguardPro input.

A SafeguardPro relay can be controlled from Air Conditioner input/s connected to fault light/s to perform such functions as powering up backup cooling units during failure of main refrigeration equipment.

*Further Information:*           ABORT
                                 ALARM
                                 Dialler
                                 SHUTDOWN

## 5.3   Alarm

*Description:*        Internal High-Priority Alert Level used to initiate the Dialler option if fitted.

### *Operation:*

When any SafeguardPro input changes to a level that requires immediate action an Alarm is issued. This state is higher in priority than Warning alerts and is used to inform personnel of a serious environmental disturbance.

The Alarm state can be used to initiate the Dialler and can be enabled independently from each input so that only those that are monitoring critical variables are permitted access.

When an Alarm is issued a message will be placed on the top line of the front-panel display. If there is more than one alert open at a time messages will be scrolled. Each line describes the alert type and location label of the sensor concerned.

As well as the display message, any attached buzzers will issue a fast pulsing tone. The buzzers can be silenced using the front panel MUTE key.

An Alarm usually indicates that a serious fault exists requiring immediate attention. Therefore simply muting the buzzers and forgetting about the problem is not the  recommended approach.

For this reason, each time the SafeguardPro senses a worsening of alert status (a new alert opening or an increase of level) the Mute will be released and the buzzers will sound. If an existing alert closes or falls to a lower level ( e.g. Alarm to Warning) the Mute will be released for 1 second only. The new dominant alert level can be determined by recognising the fast or slow pulse rates (Alarm and Warning respectively) emitted during this periods.

*Further Information*:          ALERT
                                DIALLER
                                SHUTDOWN
                                WARNING

**5.4    Alert**

***Description:***                    Internal Monitoring Level.

***Operation:***

The SafeguardPro is capable of producing three different types of out-of-limits signals during its normal monitoring mode of operation. The signals are termed Alerts and each is   designed  to  bring  attention  to  a  fault occurring within the monitored site.

The Warning alert is raised by analogue sensors only; such as Temperature and Humidity, if the variable moves slightly out of the specified limits. Warnings are an indication that a possible fault exists requiring action but is purely a local alert.

An Alarm is produced by any SafeguardPro input that breaches its pre-set limits. This alert level is tripped when immediate action is required to prevent damage to the protected equipment. If required, this alert can be used to activate an auto-Dialler to contact key personnel when the facility is unattended.

Shutdown is the final alert level and indicates that the environment is too far out of limits for the plant to operate without risking damage. This is the point at which SafeguardPro will take control to stop operation and remove power from critical equipment preventing expensive failures occurring due to poor operating conditions.

***Further Information:***            ALARM
                                      DIALLER
                                      SHUTDOWN
                                      WARNING

**5.5    Arrows**

***Description:***                    Front panel keys used to move the cursor on the front panel display.

***Operation:***

The left and right arrow keys are used to move the cursor to the desired position
in many SafeguardPro functions.  The left arrow key will move the cursor one position to the left and therefore also has the function of a Backspace key used to correct erroneous entries. Pressing the right arrow key allows selections to the right of the current cursor position to be used.

For example when the SCAN key is pressed the message below appears;

                Analogue Inputs, SCAN: A̲ll/Select

Note that the cursor is under the "All" inputs function. To "Select" the sensors to be scanned press the right arrow key. The cursor will move from the "All" field to the "Select" field. By pressing ENTER the desired function will be enabled.

***Further Information:***            CLOCK
                                      SCAN
                                      PRINT

**5.6    Clock**

***Description:***          Maintains Date and Time information for use in alert queue and display on monitor mode screen.

***Operation:***

The SafeguardPro contains an internal Real Time Clock (RTC) for displaying messagesand internal timing.

The clock normally operates from the SafeguardPro power supply, but should the mains power be removed for several hours until the batteries run low and the power supply shuts down, a separate Lithium primary cell is included to maintain RTC data (approximately 80 days Backup).

This facility allows the exact length of the power outage to be determined and eliminates the need for the clock to be re-programmed.

The user can easily perform setting the clock. Select the front panel TIME key and the display should read:

```
Set date/time:  27/10/02  11:21.18am TUE
0.9 (set) SCAN (am/pm,day) ENTER (exit)
```

By moving the cursor under the digit to be altered using the left and right arrow keys  the new digit can be typed over the existing character. Note that the new value is not transferred into the RTC circuitry until the key is released, therefore by typing 00 into the seconds area and holding down the "0" key the clock can be synchronised with a reference source such as the Telecom Time Service. Pressing ENTER will return the normal display.

While in clock set mode SafeguardPro continuously checks all registers. If an invalid  date or time digit is typed the message;

```
--+*+-- Invalid Date/Time --+*+--
```

will be displayed on the bottom line. The data as it exists on the screen has already been    placed in the clock and the message is purely a warning. The bottom line will return to it's    normal display when the error is corrected.

Under some conditions illegal data may be stored in the RTC registers which will hamper setting the correct date/time. Pressing MUTE, while in clock set mode will return all    registers to "01" allowing the correct data to be entered.

If the SafeguardPro power supply shuts down, usually due to extended operation without mains supply, the clock accuracy will alter slightly due to the lower voltage of the Lithium cell. In this case, as well as daylight savings, it will be necessary to re-adjust the RTC time.

***Further Information:***          QUEUE
                                     MENU

## 5.7   Dialler

***Description:***       Hardware allowing SafeguardPro to dial remote personnel
                         when the facility is unattended.

***Operation***:

If an Alarm is raised and the initiating input has Dialling enabled a 3 minute countdown will start. During this time the ABORT key can be pressed to cancel the dialling function. If the timer is allowed to expire the Dialling sequence will be activated.

*         Note that once activated the Dialling sequence will continue until completion and cannot be interrupted.*

Up to 6 numbers can be programmed into the Dialler and are selected sequentially. Dialler circuitry can monitor both dial and engaged tones allowing busy or not answering calls to be quickly detected. If an unsuccessful call occurs the unit will automatically try the next number.

Each number can be programmed to be called each time the Dialler is activated('ALWAYS') or only if a previous backup number has not been successful ('BACKUP'). All numbers can be up to 10 digits long.

\*        *Note that due to Telstra regulations a maximum of 3 successful calls can be made in a total of 6 attempts. Therefore depending of the accessibility of each     number when called, some numbers may be missed in any dialling sequence.*

Although the Dialler can be programmed to send a leading digit followed by a     pre-dial delay to suit PABX applications (e.g. Dial 0 and wait 5 seconds), the installation of a direct line is necessary. It is recommended that a dedicated line with an unlisted number be ordered from Telecom to prevent the service being used when SafeguardPro requires access. The PABX option is purely designed for on-site demonstrations and will not be permanently connected on purchased units.

The Dialler also has the ability to access pager services. Automatic beepers, where the pager identification is encoded in the phone number, are treated much the same as private phone numbers. This configuration mode is also used to access Answering Machines, where the voice message sequence must account for the recorded outgoing announcement and also give site and date/time information.

For manual (operator controlled) beepers the Dialler will call the required number and announce a 5 digit pager ID number followed by a 7 digit message. Due to the enormous variations involved alphanumeric messages cannot be given.

If a phone number is configured as a private service the type of alert will be announced once the call has been answered. The alert message will repeat 3 times before the call is terminated. To maintain security, the location of the SafeguardPro is not given.

The messages announced by the dialler begin with the header:

### "Computer Safeguard Alert"

followed by a short pause. The Dialler will then read out the alert messages as they appear on the display with the exception that the location label of each input will be replaced with the SafeguardPro input number. For example a temperature sensor connected to input number 17 with the label "in Computer Room" will be announces as "on Input Number 17".

In the majority of cases the type of alert is more important than the location of the sensor. If the location label is required from a remote site, a description of the position of each sensor should be kept where necessary.

All alerts open at the time the Dialler was activated will be spoken at each call to ensure all personnel receive the same message. The header and alert list will be repeated three times. Approximately five seconds after the last alert is announced the call will be     terminated.

Once an input has started the Dialler it cannot re-activate a Dialler countdown until the input has returned to normal, e.g. a Temperature sensor that has initiated dialling on an Alarm limit cannot start the Dialler again if a Shutdown limit is reached. A more detailed description of the Diallers operation when activated is given in Appendix D "Notes on the Auto Dialler".

<u>**Further Information:**</u>          ABORT
                                        ALARM
                                        ALERT
                                        DISABLE
                                        SHUTDOWN

## 5.8   Disable - Total

*<u>Description:</u>*        Button used to stop generation of Alerts, Dialler and Shutdown sequences.

*<u>Operation:</u>*

If it is required to permanently stop SafeguardPro generating alerts, and therefore also Dialler and Shutdown sequences, the DISABLE should be selected.

*\* Note   that while the DISABLE key is held down ALL SafeguardPro functions are suspended.*

To prevent the SafeguardPro being unintentionally left in Disable mode a pulse burst (sounds a lot like a cricket!) will emit from all internal and external buzzers each minute. The front panel will display (Bottom line and date/time examples only);

```
            # TOTALLY DISABLED  # 25/2/86    11:15.27am
            Temperature in Computer Room =   21.8°C
```

During Manual Disable alert monitoring only is stopped therefore the bottom LCD
line will continue to scan analogue sensors. All open alerts are closed when Manual Disable    is selected.

To return to the Monitor Mode the DISABLE button should be selected again.

> *Note that Manual Disable removes all protection of monitored equipment offered by the SafeguardPro and implies that the person initiating the function has taken responsibility for the plants operation. It should therefore only be used when the protected equipment is not operating or during supervised maintenance.*

**Further Information:**        ABORT
                                ALARM
                                ALERT
                                SHUTDOWN
                                DISABLE - Partial

### 5.9    Enter

**Description:**        Front Panel Key used to store altered data into SafeguardPro memory. Also temporarily returns the analogue display during Shutdown and Dialler countdowns.

**Operation:**

Many SafeguardPro functions require a number or other data to be typed from the front panel. The ENTER key is used to inform the system that the data is correct and can be used by the appropriate function (similar to "Return" key on most computer terminals).

The ENTER key can also be used to temporarily return the analogue sensor display to the bottom line during Shutdown or Dialler countdowns. While the timer is operating from these facilities, the bottom LCD line is used to display the time remaining before activation. By holding down the ENTER key the analogue sensor display will be returned. The countdown message will be replaced immediately the ENTER key is released.

**Further Information:**        CLOCK
                                LIMITS
                                MENU
                                SCAN

### 5.10   External Inputs

**Description:**        Single-stage input indicating an active signal from External (miscellaneous) detection equipment.

**Operation:**

The External input format is one of five categories of relay-type input. An Alarm will be raised if the equipment connected to this line switches to an off-normal status-signalling fault requiring attention.

As for all forms of SafeguardPro input, the External category can be configured to activate Shutdown and/or Dialler sequences. Note that as this is a single-stage input (either ON or OFF) there is no Warning state and the SafeguardPro will issue an Alarm immediately. If Dialling is enabled from the input the 3-minute countdown will operate. If Shutdown is also enabled, the Dialler will activate immediately the Shutdown timer starts.

External inputs can be set to activate on either a Normally Open or Normally Closed contact. Note that only an isolated contact may be used, i.e. no voltage applied to the SafeguardPro input.

***Further Information***:     ABORT
                               ALARM
                               Dialler
                               LIMITS
                               SHUTDOWN

## 5.12  Fire Inputs

***Description:***     Single-stage input indicating an active signal from fire
                       detection equipment.

***Operation:***

The Fire input format is one of five categories of relay-type input. An Alarm will be raised if the equipment connected to this line switches to an off-normal status signalling a fault requiring attention.

Fire inputs can be used for such items as:

> Smoke or Thermal Detectors
> Outputs from existing fire systems
> Pressure switches on sprinkler systems

As for all forms of SafeguardPro input, the Fire category can be configured to activate Shutdown and/or Dialler sequences. Note that as this is a single-stage input (either ON or OFF) there is no Warning state and the SafeguardPro will issue an Alarm immediately. If Dialling is enabled from the input the 3-minute countdown will operate. If Shutdown is also enabled, the Dialler will activate immediately the Shutdown timer starts.

Fire inputs can be set to activate on either a Normally Open or Normally Closed contact. Note that only an isolated contact may be used, i.e. no voltage applied to the SafeguardPro input.

***Further Information:***     ABORT
                               ALARM
                               Dialler
                               LIMITS
                               SHUTDOWN

## 5.13  Fluid Inputs

***Description:***     Single-stage input attached to CSS Fluid Detectors to
                       sense unwanted water presence.

***Operation:***

The Fluid input format is specifically designed to interface with CSS Fluid Detectors. An Alarm will be raised if detectors attached to this input signal Fluid presence.

Fluid Detectors can be used in such areas as:

> Water-cooled Air Conditioners
> Chilled Water Units
> Sinks and collection sumps
> Humidifiers
> Water-cooled CPUs.

As for all SafeguardPro input types, Fluid inputs can be configured to activate Shutdown and/or Dialler sequences. Note that as this is a single-stage input (either ON or OFF) there is no Warning state and the SafeguardPro will issue an Alarm immediately. If Dialling is enabled from the input the 3-minute countdown will operate. If Shutdown is also enabled, the Dialler will activate immediately the Shutdown timer starts.

Note that to prevent nuisance alerts the fluid detectors must issue an active signal to SafeguardPro for at least 10 seconds before an Alarm will be raised. Similarly the fluid must be clear for at least 10 seconds before the fluid alarm will be removed.

Fluid inputs are preset to operate with CSS Detectors and therefore, unlike most other single-stage inputs, do not require a contact configuration.

***Further Information***:                    ABORT
                                              ALARM
                                              Dialler
                                              LIMITS
                                              SHUTDOWN


## 5.14   Humidity Inputs

***Description:***          Analogue input used to monitor ambient Humidity.
                            Have three-stage alert facilities.


***Operation:***

The Humidity input type is specifically designed to interface with CSS Humidity Sensors. It is capable of generating all three SafeguardPro Alert levels and can be configured to activate Shutdown and/or Dialler options.

The three sets (upper and lower) of Humidity limits are stored in the SafeguardPro during installation and, unless special arrangements are made, require a CSS technician to alter any configuration.

Most applications require at least one sensor measuring room Humidity. If required additional sensors can be added to monitor Humidity near particularly sensitive equipment.

        Note that this input format can only be used with CSS sensors.

The readings obtained from this input can be scanned on the bottom line of the front panel display using the SCAN key.

SafeguardPro also checks the condition of each attached Humidity sensor and issues a fault Alarm if any problem is detected. If the faulty sensor is selected to scan on the display, the reading will be blanked to a series of "?", ">" or "<" characters depending on the type of fault. Additional facilities such as Thermostat switches and shutdown of individual equipment from a particular input are also available.


***Further Information:***                    ALARM
                                              ALERT
                                              SHUTDOWN
                                              WARNING


## 5.15   Menu

***Description:***          Front panel key used to view the alert queue on
                            the display.

## Operation:

By pressing the MENU key the front panel LCD will display the first stored alert message. For Example:

        >Temperature Warning in Printer Room
        21/11/85  12:05.26pm--21/11/85  12:25.18pm

Shows that the Printer Room sensor generated a Temperature Warning on the 21st. November 1985, at 12:05.26 in the afternoon and the alert lasted approximately 20 minutes.

The normal display can be returned by pressing MENU a second time.

Pressing ENTER will sequentially display all queue entries starting with the most current open alert.

If an alert has not been closed the message "still open......." will be displayed in place of a closed date/time entry.


***Further Information***:                    ALERT
                                              ENTER
                                              QUEUE

### 5.16   Mute

***Description:-***        Front panel key used to silence both external and internal buzzers and sirens.

***Operation:***

When the SafeguardPro opens a new alert it will turn on any buzzers or sirens connected. By pressing the MUTE key all audible alarms will be silenced and the LED will illuminate to show that mute is in operation. Pressing the key again will release the function.

If MUTE is on and the alert situation worsens (i.e. a new alert opens or a current one increases status) the function will automatically be released, i.e. the LED will extinguish and all audible alarms will re-sound. Press the key again to silence the alert.

If an existing alert either closes or falls to a lower level (e.g. Alarm to Warning), Mute will be released for 1 second only. By recognising the fast or slow pulse rate of the buzzers (Alarm and Warning respectively) during this period the new overall alert status can be determined without observing the SafeguardPro display. MUTE will reset automatically when all alerts are cleared.

***Further Information:***            ALARM
                                     ALERTS
                                     DISABLE
                                     SHUTDOWN
                                     WARNING

### 5.17   Number Keys

***Description:***        Front panel keys used to enter numerical data into SafeguardPro functions. Also causes the voice synthesiser to announce the unit serial number.

***Operation:***

The number keys (0 to 9) on the SafeguardPro front panel are primarily used to enter data into those functions that require numerical input.

### 5.18   Power Inputs

***Description:***        Single-stage input indicating an active fault output from power supply equipment.

***Operation:***

The Power input format is one of five categories of relay-type input. An Alarm will be raised if the equipment connected to this line switches to an off-normal status signalling a fault requiring attention.

Fire inputs can be used for such items as:

          Generator, Line conditioner or UPS
          Overheat lights
          Generator Set fault lights
          Phase failure relays
          UPS changeover lights
          Low fuel or Low Gas Pressure lights on Generator Sets.

As for all forms of SafeguardPro input, the Power category can be configured to activate Shutdown and/or Dialler sequences. Note that as this is a single-stage input (either ON or OFF) there is no Warning state and the SafeguardPro will issue an Alarm immediately. If Dialling is enabled from the input the 3-minute countdown will operate. If Shutdown is also enabled, the Dialler will activate immediately the Shutdown timer starts.

Power inputs can be set to activate on either a Normally Open or Normally Closed contact. Note that only an isolated contact may be used, i.e. no voltage applied to the SafeguardPro input.

***Further Information:***          ABORT
                                    ALARM
                                    Dialler
                                    SHUTDOWN


### 5.19  Power Supply

***Description:***          Hardware system used to supply electrical power to
                            SafeguardPro circuits and peripherals.


***Operation:***

The SafeguardPro contains an internal battery backed power supply. The
system maintains power to SafeguardPro internal circuits, sensors and
peripherals and will automatically switch to battery backup if the normal
mains supply fails.

The SafeguardPro can issue two levels of alert initiated by the power
supply. If the mains voltage falls below the level required to maintain
battery charge the SafeguardPro will issue an alert. All power supply alerts
are effectively treated the same as an Alarm as issued from any standard
input, with access to Dialler and Shutdown facilities if required. The mains
failure alert will be cleared automatically when the voltage returns to a
satisfactory level.

While backup power is being used the battery voltage is continuously
monitored. When capacity falls to a level that a minimum of one hour's
operation remains, a low battery alert will be raised. As is the case with
all alerts, mute will be released indicating that further  deterioration of
power supply status has occurred. If the mains supply does not return with
in the specified time the power supply will automatically shut down to
protect battery life and prevent circuit damage due to poor operating
voltages. The SafeguardPro will not resume operation until full mains
voltage is returned.

*Note that in order to prevent monitored equipment operating unprotected, all*
*shutdown relays will be released when the internal power supply shuts down.*
*It is therefore advisable to manually disable the SafeguardPro if the room*
*is attended and shutdown on power supply failure is not required.*

Power supply alerts are entered into the alert queue and will automatically
close
when operating conditions return to normal.

***Further Information:***          ABORT
                                    ALARM
                                    Dialler
                                    SHUTDOWN


### 5.20  Queue

***Description:***          Memory store used to retain the last 20 Alerts and their
                            start and stop date/time for later retrieval.


***Operation:***

As each alert occurs its display message and starting date/time are stored
in the alert queue. If all 20 queue positions are full the oldest closed
alert will be removed.

As each existing alert is closed, i.e. the sensor returns to normal
conditions, the corresponding date and time is stored in its previous queue
position.

Additional operations such as Manual Disable and System Faults are also
entered in the queue. Queue information can be displayed at any time using
the MENU key.

To prevent accidental erasure by unqualified personnel the queue cannot be
cleared from the front panel.

## 5.21   Reset

***Description:***          Returns all SafeguardPro circuitry, outputs and relays
                            to initial setting after completion of Shutdown
                            sequences.

***Operation:***

The SafeguardPro has several relay outputs used to turn off/on external
equipment during Temperature Shutdown, Fluid leakage, Security breach, etc.
In most cases the powered down equipment cannot be returned to its original
state until the SafeguardPro has been manually reset.

To reset all outputs and relays the rear of SafeguardPro case must be
accessed and the RESET switch pressed. The display should respond with a
Software version number.

***Further Information:***          ABORT
                                    SHUTDOWN
                                    TEMPERATURE INPUTS

## 5.22   Scan

***Description:***          Front panel key used to select analogue sensors to be
                            scanned on the bottom line of the front panel display.

***Operation:***

By pressing the SCAN key the message;

                Analogue inputs, SCAN:   <u>A</u>ll/Select

will appear on the bottom line of the display. By using the two arrow keys
to position the cursor and pressing ENTER, either of the two options can be
selected. Pressing SCAN again at any time will return the normal display.

     If "All" is selected by pressing ENTER with the cursor under this
field the message:

                Scanning all Analogue inputs.....

will appear, after which all sensors will be displayed on the bottom line of
the LCD giving both the sensor type and location label as well as the
current recorded value. Sensors are scanned sequentially with the display
being updated at 3 second intervals.

Enabling the 'Select' option will display the input number, type and
location label of the first analogue sensor as well as its Scan status (ON
or OFF). Pressing any key, other than ENTER, will toggle the scan status
from its present value. Pressing ENTER will move to the next analogue input.
Once all inputs have been displayed, pressing ENTER will produce the
message:

                ***Scanning Selected Analogue Inputs.....***

after which the normal monitor mode screen will return.

***Further Information:***          ARROWS
                                    ENTER
                                    HUMIDITY INPUTS
                                    TEMPERATURE INPUTS

### 5.23  Security Inputs

***Description:***      Single-stage input indicating an active output from security sensors.

***Operation:***

The Security format is one of five categories of relay-type input. An Alarm will be raised if the equipment connected to this line switches to an off-normal status signalling a fault requiring attention.

Security inputs can be used for such items as:

>           Passive infrared or Microwave Motion detectors
>           Floor switches
>           Door switches
>           Outputs from existing security systems
>           Window Tapes or Vibration Sensors.

As for all forms of SafeguardPro input, the Security category can be configured to activate Shutdown and/or Dialler sequences.

      *Note that as this is a single-stage input (either ON or OFF) there is no Warning state and the SafeguardPro will issue an Alarm immediately. If Dialling is enabled from the input the 3-minute countdown will operate. If Shutdown is also enabled, the Dialler will activate immediately the Shutdown timer starts.

Security inputs can be set to activate on either a Normally Open or Normally Closed contact. Note that only an isolated contact may be used, i.e. no voltage applied to the SafeguardPro input.

***Further Information***:            ABORT
                                     ALARM
                                     Dialler
                                     SHUTDOWN

### 5.24  Shutdown

***Description:***      Sequence of powering down equipment controlled by the SafeguardPro. Also the term used to describe analogue sensor limits at which Shutdown occurs.

***Operation:***

Every SafeguardPro input has the capability of initiating a Shutdown sequence.

With single-stage inputs such as Fire, Fluid, etc. , the Shutdown timer will begin as soon as a not-normal state is detected. Analogue inputs (e.g. Temperature and Humidity) can only start a Shutdown when the measured variable has reached its pre-set Shutdown limit.

Once initiated a 3 minute Shutdown timer starts and the following message appears on the front panel display (Top line example only);

>           >TEMPERATURE SHUTDOWN in Computer Room
>           SHUTDOWN will commence in 175 Seconds

When the timer count reaches zero the actual shutting down method programmed at installation will activate and cannot be halted.

      * Note that, as with the Dialler, either the ABORT or DISABLE keys can stop the countdown.

The actual method used to ultimately remove power from the protected equipment
can be as simple as a single relay contact or a complex sequence of communications between the SafeguardPro Shutdown port and the host system.

Details of the approach used usually requires discussions between CSS, the user and/or the equipment supplier. A step-by-step description will be supplied to the supplier on completion of the job.

In almost all cases the equipment shutdown cannot be restarted until the SafeguardPro has been reset. This approach is taken to prevent unauthorised personnel attempting to restore system operation. Pressing the RESET switch located on the rear of the unit resets SafeguardPro.

       \*         <u>Note:</u>         If returning power to equipment turned off by SafeguardPro using Shunt-trip type circuit breakers, these units will have their actuation lever in a central position to indicate that the automatic trip has operated.

To return power to the system the lever must first be placed fully in the 'OFF' position before the breaker can be turned 'ON' again. The breaker will re-trip immediately if the SafeguardPro has not been reset first!

***Further Information:***         ABORT
                    ALERT
                    DISABLE
                    LIMITS
                    RESET

## 5.25   Temperature Inputs

***Description:***         Analogue temperature sensor

***Operation:***

The temperature input is specifically designed to interface with CSS Temperature Sensors. It is capable of generating all three SafeguardPro Alert Levels and can be configured to activate Shutdown and/or Dialler options.

The three sets (upper and lower) of Temperature limits are stored in the SafeguardPro during installation and, unless special arrangements are made, require CSS technician to alter any configuration.

Most applications require at least one sensor measuring room temperature. If required additional sensors can be added to monitor temperature near particularly sensitive equipment.

      Note that this input format can only be used with CSS sensors.

The reading obtained from this input can be scanned on the bottom line of the front panel display using the SCAN key.

To prevent nuisance alerts caused by the Temperature temporarily breaching one of its pre-set limits a series of time delays applies. The particular input must breach a Warning limit for 60 seconds before the alert will be raised. Similarly it must fall below the limit for the same time before the alert will clear. As Alarm and Shutdown limits are more critical a 10second time applies to these.

SafeguardPro also checks the condition of each attached Temperature sensor and issues a fault Alarm if any problem is detected.

If the faulty sensor is selected to scan on the display, the reading will be blanked to a series of "?" ">" or "<" characters. If a Dialler is installed it will be automatically activated from any SafeguardPro fault.

Additional facilities such as Thermostat switches and shutdown of individual equipment from a particular input are also available.

***Further Information***:         ALARM
                    ALERT
                    SHUTDOWN
                    WARNING

## 5.25 Warning

**Description:**             Internal Local Alert Level

**Operation:**

When any SafeguardPro analogue input (e.g. Temperature or Humidity) departs from its normal conditions, a Warning is issued. This is the lowest priority alert and is used to inform personnel that there has possibly been a failure in the environment control.

As the Warning alert can only be raised from a multistage sensor it is not available for digital detectors such as Fluid. The Warning is intended only as a local alert and consequently cannot activate either the Dialler or Shutdown options. It can also be generated by non-critical internal faults.

If a Warning is issued a message will be placed on the top line of the front panel display. If there is more than one alert open at a time messages will be scrolled. Each line describes the alert type and location of each sensor concerned.

As well as the display message, any attached buzzer will issue a slow pulsing tone. The buzzers can be silenced using the MUTE key.

If MUTE is on and the situation worsens (i.e. a new alert opens or a current one increases status) the function will automatically be released, i.e. all audible alarms will re-sound. Press the key again to silence the alert.

If an existing alert either closes or falls to a lower level (e.g. Alarm to Warning), Mute will be released for 1 second only. By recognising the fast or slow pulse rate of the buzzers (Alarm and Warning respectively) during this period the new overall alert status can be determined without observing the SafeguardPro display.

If a Warning occurs it should be noted that there may be a problem with the environment control equipment causing the disturbance. Although this particular alert is a preliminary level and may only indicate a temporary deviation, the problem may also be afore warning of an impending Alarm. In the case of a temporary deviation the Warning may indicate a loss of efficiency or need for maintenance of control equipment.

**Further Information:**          ALARM
                                 ALERT
                                 Dialler
                                 SHUTDOWN

## 6.    ALARM & ERROR MESSAGES

### 6.1  OVERVIEW

### Safeguard Pro Software Version 1.0

The CSS Computer Safeguard Pro has a sophisticated error-checking system capable of locating a wide range of internal and external faults or operating problems.

Errors are split into two sections:

- ❑ **SYSTEM ERRORS** are produced by faulty operation of **Hardware**, **Software** or **Configuration** problems.

- ❑ **HARDWARE ERRORS** are caused by faulty devices or other hardware problems.

Most errors are cleared automatically when the fault situation is corrected. All errors are cleared by reset or removing the power. The only exception to this rule is "SYSTEM ERROR #8000". Reset LED is ON which can only be cleared by removing the power.

Possible solutions are included with some error descriptions following. These are an indication of some of the simple causes only. **UNDER NO CIRCUMSTANCES SHOULD ANY BOARD REPAIRING BE ATTEMPTED ON-SITE!!!.** All repairs must be done on a board replacement basis. Similarly, analogue sensors calibration should be performed at the factory. C.S.S. will not warranty any sensor adjusted on-site by either distributors or clients.

### 6.2  SYSTEM ERRORS.

#0001.....................................................**DIALER NUMBER ERROR**

> Dialler has detected an illegal character when dialling a programmed number. Usually means the particular number was turned on in set-up but no phone number was programmed.

#0002.......................................................**REMOTE LOOP ERROR**

> The Remote Loop is short-circuited or a device on the loop has had a catastrophic failure.

#0004....................................................**ALERT QUEUE CORRUPTED**

> The internal Alert Queue is used to store all data on current and post alerts. This error is issued when a corrupt entry is found usually indicating a power supply or memory problem. When this message appears the queue is cleared automatically to rectify the problem.

#0008.............................................**TIMER OUTPUT COMPARE INTERRUPT**

> A C.P.U. feature not used by Safeguard and therefore should never occur during normal operation. Usually indicates hardware problem.

#0010.............................................**SERIAL COMMUNICATION INTERRUPT**

> A C.P.U. feature not used by Safeguard and therefore should never occur during normal operation. Usually indicates hardware problem.

#0020....................................................**REMOTE MESSAGE ERROR**

> Communications error has occurred on the Remote Loop. Possible fault in Safeguard or a device on the loop.

#0040.........................................................**SECURITY KEY**

Communications error has occurred on the Remote Loop. Possible fault in Safeguard or a device on the loop.

#0080...........................................................**UNASSIGNED**

#0100...........................................................**UNASSIGNED**

#0200...........................................................**UNASSIGNED**

#0400...........................................................**UNASSIGNED**

#0800...............................................**FAULTY BATTERY – BACKED RAM**

#1000.........................................................**SOFTWARE ERROR**

## Software Error. Notify C.S.S. R&D if this error occurs.

#2000........................................**UNRECOGNISED INTERRUPT REQUEST**

CPU received interrupt and could not find the source. Most likely hardware problem on Processor Board, or mains/RF noise.

#4000.......................................................**INTERNAL FAULT TRAP**

A C.P.U. trap indicating an illegal instruction execution has been attempted. If regular may mean a hardware problem exists. If once only, may be caused by mains/RF noise.

#8000.........................................................**RESET LED IN ON**

One possible cause is memory has been corrupt (check). The Safeguard has a hardware watchdog, timer that monitors software operation. If the software wanders off the track the LED within the RESET switch will turn on and latch. This is a serious fault and requires thorough investigation. NOTE: - The LED will not extinguish until power has been removed from the system. Last resort try replacing the PIA U332.

### *6.3 HARDWARE ERRORS.*

#0001...........................................................**NO DIALER TONE**

The Safeguard has performed its 2 hourly check of the phone line and not detected a dial tone. This error will clear when tested again 2 hours later, if the line has been repaired.

#0002.................................................**REAL TIME CLOCK BATTERY LOW**

The Lithium battery maintaining clock data is low and should be changed. This test is only performed on power up and will not clear until reset.

#0004................................................**SMART SOCKET CLOCK BATTERY LOW**

The internal Lithium battery within the non-volatile memory socket is low and the entire socket should be replaced. This test is only performed on power up and will not clear until reset.

#0008...............................................................**REMOTE LOOP**

The hardware driving the remote loop is not operating correctly. Error will not clear until reset.

#0010...........................................................**UNASSIGNED**

**#0020**..................................................................**PC COMMUNICATIONS**

The PC serial communications link is not operating. No data received from PC for more than 5 minutes.

**#0040**.........................................................................**TERMINAL PORT**

The hardware driving the serial terminal port is not operating correctly.

**#0080**.........................................................................**SHUTDOWN PORT**

The hardware driving the serial shutdown port is not operating correctly.

**#0200 UNASSIGNED**

**#0400**...............................................................................................**PIA 2**

The Parallel Interface circuit driving the LED's, Relays, etc, is faulty.

**#1000**......................................................................**REAL TIME CLOCK**

The clock circuitry is not functioning correctly. This error can be caused by the clock battery jumper on the processor board being in the OFF position.

**#2000**.......................................................................**NON-VOLATILE RAM**

The battery – back RAM circuit is faulty.

**#4000**...............................................................................**VOLATILE RAM**

The standard RAM circuit is faulty.

**#8000**.......................................................................................**UNASSIGNED**

**Appendix A QUICK REFERENCE GUIDE**

With most of the functions below, the normal display will return automatically if no   keys are pressed within 60 seconds.

| | |
|---|---|
| **ABORT** | Temporarily cancels Dialler or Shutdown countdown timers. Will re-arm in 10 minutes if pressed once, or immediately if pressed again. Can only be used once per alert session. |
| **DISABLE** | Permanently stops generation of alerts, Dialler and Shutdown timers. Press again to return to Monitor. Mode. No time-out. |
| **ENTER** | Returns analogue sensor display during countdowns. Operates only while key is held down. Also selects items pointed to by cursor during some functions. |
| **MENU** | Displays alert queue. Press ENTER to move to next position. Press MENU to return to normal display. Time-Out applies. |
| **MUTE** | Stops all buzzers and sirens. Press again to release. Will release automatically if alert status alters. |
| **RESET** | On the rear of the case. Returns SafeguardPro to initial operating state. Must be pressed to restart equipment after shutdown. |
| **SCAN** | Selects analogue sensors scanned on the bottom LCD line. Use arrow keys to make selection and press ENTER. Exits when all sensors are prompted. Time-Out applies. |
| **<-    ->** | Used to make selection in some functions. Left arrow also functions as a backspace key. |
| **0.....9** | Used to enter number into some functions. |

## Appendix B          DISPLAY MESSAGES.

This section lists some of the messages which appear on the SafeguardPro front panel display

### ABORT

' #  ABORTED, will reset in 9 min. 20 sec. '

Indicates time remaining before Dialler and Shutdown timers can be activated after ABORT has been pressed.

### ANALOGUE INPUTS

Temperature in Computer Room  =  21.5°C '

Current Temperature reading at the described location given in Degrees Centigrade (- 99°C to + 99°C).

**' < TEMPERATURE ALARM** in Computer Room '

Temperature sensor has breached an ALARM limit.  >  and  <  signify upper or lower limit respectively.

**' < TEMPERATURE SHUTDOWN** in Computer Room '

Temperature sensor has breached a SHUTDOWN limit.  >  and  <  signify upper or lower limit respectively.

**' !! Faulty Temp. Sensor** in Computer Room '

      -   Faulty Temperature sensor at the described location. Call CSS for service to rectify problem.

### CLOCK

' --+*+--  Invalid Date/Time  --+*+-- '
- Warns that the date/time entered is incorrect.

' Set date/time:  10/11/96  12:37.56pm  MON '
-  The system is in Clock Set Mode and waiting for new data.

### DIALLER

'  ##  Dialling will commence in 3 min.   ##  '
- The Dialler 3-minute countdown timer has started.

### DIGITAL INPUTS

'  AIR CONDITIONER ALARM in Computer Room.   '
- Alarm message produced by an Air Conditioner input.

'  * FLUID DETECTOR ALARM in Computer Room '
- Fluid presence at the described location.

### DISABLE

**'  PARTIALLY DISABLED**   '

Some of the SafeguardPro inputs have been disabled and are not being monitored (only with SafeguardPro for Windows software installed).

**'  TOTALLY DISABLED  '**

> – Internal DISABLE key has been pressed preventing any alerts being raised until Monitor Mode is restored.

### ERROR CHECKING

**'  ***      HARDWARE  **  FAULT      ***          # 8010  '**

> – SafeguardPro periodic self-test has detected a faulty component. Call CSS to rectify problem.

**'  ***      System      **      Error      ***      #4000  '**

> – A System fault has been detected. Notify CSS immediately if this message is seen.

### POWER SUPPLY

**'  MAINS FAILURE, USING BACKUP BATTERIES  '**

> – Mains voltage is below 210 Volts and backup batteries are being used to supply SafeguardPro circuits.

**'  ***  BATTERIES LOW.  LESS THAN 1 HOUR LEFT  '**

> – SafeguardPro has been operating from internal batteries and will turn off in less than 1 hour if mains power is not restored. Dialler and/or Shutdown will be activated if installed.

### SYSTEM MESSAGES

'  ===  CSS    SAFEGUARDPRO    Ver. 2.63    ===
'
– Software Version number message. Appears on RESET, or on bottom LCD line when NO inputs are being scanned.

'  No Alerts All's Well  1/5/86  5:27.40pm  '
> – No alerts are present on any SafeguardPro input.

'  No Serial Number, Processing Halted.  '                    –

Each SafeguardPro site is allocated a unique serial number which is programmed on commissioning. The unit will not operate without a valid number being entered by CSS.

### SCAN

'  Analogue Inputs, SCAN:  All/Select  '
> – Question asked when SCAN is pressed. Allows selection of analogue inputs scanned on display.

'  Scanning all Analogue Inputs....  '
– All Analogue inputs will be scanned on the bottom display line.

'  Scanning Selected Analogue Inputs    '
– Only those inputs just selected will be scanned on the bottom display line.

'  # 01 TMP  "in Computer Room  "   SCAN; ON  '
> – Shows input number ( with type and location label ) and it's current SCAN status ( ON or OFF 0 .

### SHUTDOWN

'  ##  Shutdown will commence in 3 min.  ##  '
> – The Shutdown timer has started and will expire in 3 minutes. The display  will countdown.

## Appendix D.       NOTES ON THE AUTO DIALLER

The SafeguardPro Auto Dialler includes a sophisticated hardware/software system to detect Telecom line signals. Interpretation of these signals can require some additional knowledge of the Diallers operation. The notes below are intended to assist in the understanding of these messages.

1. Before initiating a call the SafeguardPro will check for Dial Tone on the line. If not present the call is cancelled and another attempt is made a few seconds later. If dial tone is still not detected after 12 attempts the dialling sequence is aborted.

2. Once Dial Tone is received dialling will commence. At completion of dialling the SafeguardPro wait for up to 17 seconds for one of the progress tones (ring, engaged, etc. ) to be received 17 seconds may seem long but some long distance calls may take up to 17 seconds to connect.

3. SafeguardPro requires at least 3 seconds of the relevant tone before an accurate identification can be made. In some cases, dependant of the exchange and how quickly the person answers the call, there may not be 3 seconds of ring tone for the Dialler to detect. In this case SafeguardPro cannot correctly identify that the phone actually rang and therefore cannot state that the call was answered. It will still speak its messages in case the call was answered but will display (if SafeguardPro for windows software is installed) that an 'Unrecognised Tone' was received and try the number again later, if any attempts remain.

4. Note also that in order to allow sufficient time for long distance exchanges the 17 second will also apply before the Dialler decides that there is no tone on the line. Therefore there may be a long period of silence heard on the other end before speech commences.

5. To better understand the Dialler consider the sort of problems that you come across yourself when using the phone. For example, on some occasions you will dial a number and wait for what seems ages but the line remains 'dead', i.e. no ring tone is heard and you are not connected to the other end. This situation occurs to the Dialler just as regularly as to you. In this case the 'Unrecognised Tone' message will be printed.

6. Telecom limit the total number of attempts an automatic Dialler such as SafeguardPro's can make, to 6. They also restrict the total number of successful calls to 3. In order to conform with Telecom regulations the Dialler will uphold these figures. These rules need to be kept in mind when a dialling sequence is being examined.

7. Telecom exchanges are capable of generating several service tones. Many of these are not normally encountered. Some are easily confused with other tones. For example, the Congestion Tone is a series of one second beeps much the same as engaged tone. The difference is that every second beep is a bit lower in volume, i.e. BEEP   ...beep   ...BEEP   ...beep   ...BEEP   ... Congestion Tone is used to indicate that the exchange, either at the calling end or receiving end, is full of calls and cannot accept any new calls at the moment. This may have occurred to you when you have rung a number and heard what you thought as engaged signal but got through when you tried again a few seconds later. SafeguardPro also encounters this problem.

8. SafeguardPro will ring a programmed number and wait 30 seconds, once ringtone has been detected, for someone to answer the call. If not answered the call will be terminated and the 'no answer' message printed.

9. The Software Version.  2.4 and upwards checks the Telecom line for dial tone every 2 hours and will raise an alert if the line appears faulty. To check a faulty line unplug the SafeguardPro Dialler and plug in a standard phone. Try a few calls. If the line appears to be functioning OK then there is most likely a problem with the Dialler. Otherwise leave the phone plugged in and call Telstra

**GENERAL NOTES:-**