

GEOQUIP



WORLDWIDE

The Leader in Perimeter Protection Solutions

MICRALERT OPERATION MANUAL

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1 INTRODUCTION

1.1 MICRALERT CONCEPT

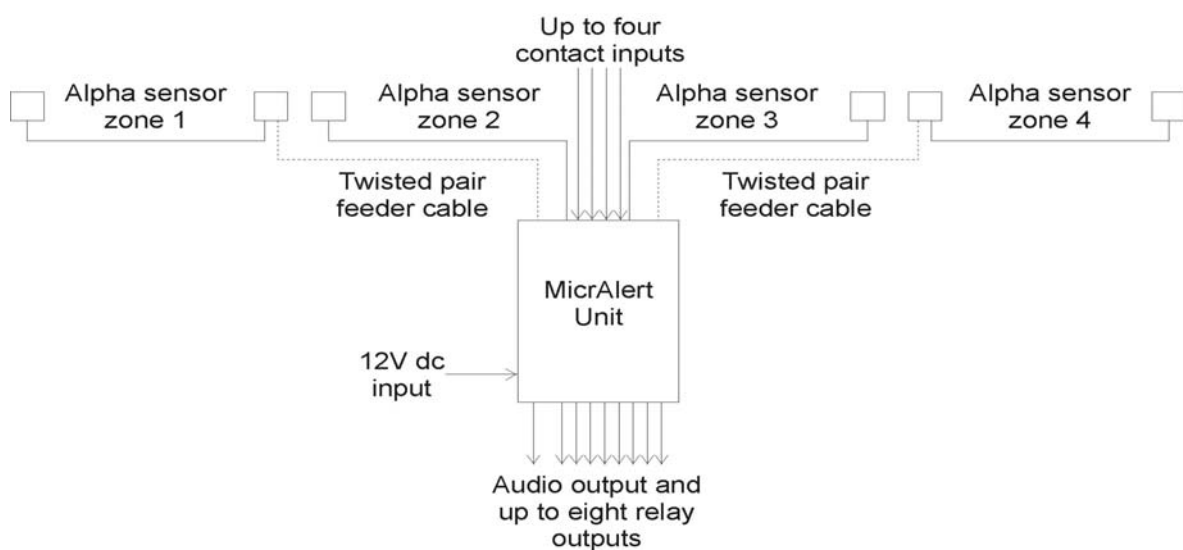
Perimeter fencing is an effective initial deterrent to intruders. However a determined intruder can breach any type of fence structure, usually by cutting through or climbing over. Early detection of an intrusion gives security staff more time to mobilise and deal with the threat and Geoquip have developed a range of detection systems to achieve this.

MicrAlert is the latest addition to our range of Perimeter Protection products, combining the world beating detection standard of our established Defensor system with new Integration, Communication and Control options. Each MicrAlert unit provides up to four zones of perimeter protection using Geoquip's acclaimed Alpha sensor cable, as well as accepting up to four additional contact inputs for monitoring other equipment. Each unit is also has eight relay outputs configurable for annunciation or switching and a range of options for controlling its operation and for its integration with other components of an overall security system.

Resulting from many years of experience of sensor design, the Alpha sensor achieves the highest levels of detection by sensing the fence vibrations caused by an intrusion. These high-quality signals are analysed by the MicrAlert unit using multiple channel Digital Signal Processing to detect cutting, climbing or sawing of the fence fabric. The Alpha sensor's reproduction of the fence vibrations is of such high quality that the Audio signal produced may also be directly monitored by security staff to provide verification of activity at the perimeter. The result is the highest quality of detection with an extremely low false alarm rate, providing the user with a highly reliable perimeter protection system.

1.2 SYSTEM CONFIGURATION

The MicrAlert unit itself may be mounted either on the fence fabric or indoors. The Alpha sensor cables may either be connected directly to the MicrAlert unit or remotely via twisted-pair connections of up to 2km length. In most applications twisted pair cables are used to connect 12V dc power to the unit and to bring the Audio and Relay output signals back to a central monitoring station. Alternatively annunciation may be made by an RS232 link to an alarm management system.



Typical MicrAlert configuration (four zones)

1.3 SYSTEM ADJUSTMENT

For system set up and adjustment each MicrAlert unit may be fitted with an integral LCD screen and buttons, providing a simple yet comprehensive interface for configuring the system's operation. Alternatively, an optional Hand-held Controller may be connected temporarily to the unit when adjustments are needed. The system is fully password protected against unauthorised adjustment.

As well as the Integral Screen and Hand-held Controller options, the system may also be configured and adjusted remotely via the RS232 Management System interface. The protocol for this interface is published separately – please contact Geoquip for further details.

1.4 CONNECTIONS

Inputs	Power supply input Up to four alpha sensor circuit inputs Up to four dry contact circuit inputs
Outputs	Eight relay outputs for annunciation and/or switching of external equipment Audio output for verification of sensor alarms
Other	RS232 connection for annunciation and system adjustment by external management system RJ45 connection for system adjustment by optional handheld controller Gthernet Interface board which plugs onto the RS232 and LCD connectors to provide an RJ45 interface with a Gthernet system via a Gthernet Node

1.5 OUTPUT RELAY OPERATION

MicrAlert's output relays may be configured for different modes of operation. They may be used for annunciation of alarms and tampers or they can be used as general purpose switching relays driven by an external management system.

1.6 ADJUSTABLE PARAMETERS

All parameters may be adjusted using the onboard screen and buttons, with the optional hand-held controller or via the RS232/Gthernet management system interface.

Sensor circuits	Climb/lift detection sensitivity Cut detection sensitivity Hacksaw detection sensitivity Event count for cut detection Time window for multiple-event cut detection Pre-alarm sensitivity
Contact circuits	Polarity (secure = open/closed) Tamper-monitoring resistor values (serial and parallel) Time delay
System parameters	Audio mode Display illumination mode Relay operation mode

2 MICRALERT CONTROLS

2.1 ADJUSTMENT CONTROLS

The MicrAlert unit's operational parameters are configured and adjusted using either an integral 16x2 character LCD screen and six buttons or an external hand-held controller with the same interface. In both cases the screen and buttons are as follows



The general function of the buttons is as follows

- | | |
|-------------|--|
| Mode | This button switches between System menus and Circuit menus

When in System menus, the lower left part of the display reads SYS

When in Circuit menus, the lower left part of the display shows Ana1 to Ana4 or Aux1 to Aux4, indicating the circuit currently being adjusted |
| Circuit -/+ | When System menus are displayed, these buttons have no function

When Circuit menus are displayed, these buttons select the Circuit to be adjusted |
| Param | This button selects which System or Circuit parameter is to be adjusted |
| Value -/+ | These buttons adjust the value of the displayed parameter |

N.B. the words Circuit and Value are not printed on the PCB.

2.2 ANALYSER RESET

This resets the micro-processor on the individual analyser board. This will reset the signal processing so any Events will be discarded. Channel A will be reset to full gain as if it had just been powered up.

2.3 MICRALERT RESET

This resets the master processor which will result in any user being logged off the unit and the analyser cards being reset as described above. If the MicrAlert is connected to a SMS system via the RS232 port the resetting of the MircAlert may cause a false alarm to register.

2.4 JUMPER SETTINGS

Fitting jumper 1 and then resetting or powering up the unit will reset the individual analyser board settings to the default values.

If long lengths of feeder cable are used the MicrAlert system may produce tamper alarms, fitting jumpers 2 and 3 can clear such tampers. The jumpers should be fitted progressively in order to clear the tamper fault with the minimum amount of changes to the tamper monitoring circuitry i.e. start by fitting jumper 3 on it's own, then jumper 2 on it's own and then both jumpers 2 and 3 until the tamper fault clears.

3 SYSTEM MENUS

3.1 GENERAL

For the System menus, the left-hand field will display "SYS" and the Circuit +/- buttons have no function. The PARAM button is used to move through the different System menus and the Value +/- alter the settings of the selected menus.

In order to change any settings on the System or Circuit menus the operator must first be logged on. However, the operator still can navigate through settings to inspect the existing values at any time. Attempting to change a setting without being logged on will show following screen.

```
MicrAlert v0.4
*NOT LOGGED ON!*
```

3.2 LOGGING ON

```
MicrAlert v0.4
SYS Logon=0000
```

Press the Mode button so that SYS is displayed in the bottom left corner and then press the Param button to display the Logon screen shown above. Press the Value +/- buttons to display the passcode. Once the passcode is shown press the Param button to move to the next setting.

3.3 AUDIO SELECTION MENU

```
MicrAlert v0.4
SYS Audio=Auto
```

Pressing the Value +/- buttons to changes the value of the audio setting. The audio can be set to be output as follows

SMS	The audio output is controlled by commands from a suitable Security Management System.
Auto	The most recently alarmed or pre-alarmed Alpha analyser's audio signal is routed to the audio output for thirty seconds after the alarm or pre-alarm.
Ana1 to Ana4	The selected Alpha analyser's audio signal is permanently routed to the audio output.

Once the required audio setting has been selected press the Param button to move to the next setting.

3.4 ILLUMINATION MODE MENU

```
MicrAlert v0.4
SYS Illum=Auto
```

Pressing the Value +/- buttons to changes the value of the LCD backlight setting. The illumination can be set as follow

Off	LCD backlight is never lit
On	LCD backlight is permanently lit
Auto	LCD backlight lights whenever any buttons are pressed and remains lit for a short time before automatically extinguishing to save power. This is the recommended setting

Once the required illumination setting has been selected press the Param button to move to the next setting.

3.5 RELAY MODE MENU

```
MicrAlert v0.4
SYS RlyMd=00
```

Pressing the Value +/- buttons to changes the value of the relay mode setting. Each MicrAlert unit can support up to eight output relays which can be set to operate as follows

- 00 The relays are driven only by external RS232 commands from the Security Management System
- 01 The relays act as individual Alarm and Tamper outputs for the four Alpha Analysers
- 02 The relays act as individual Alarm only outputs for all eight inputs (Alpha and Contact)
- 03 The relays act as individual non-secure (i.e. Alarm or Tamper) outputs for all eight inputs (Alpha and Contact)
- 04 The relays provide Pre-Alarm, Alarm and Tamper notification for each of two Alpha Analyser circuits
- 05 The relays act as Alarm/Tamper and Autonomy/Fault for each of two Alpha Analyser circuits
- 06 The relays act as per mode 05, but Sensor Tamper operate the Technical Fault relays

The relay outputs can be individually configured to be either Form A or Form B by altering which pins on jumpers 1 – 8 are shorted together. If the left pin and the middle pin are shorted together then the relay is Form B and if the right pin and the middle pin are shorted together then the relay is Form A. Jumpers 1 – 8 are located on the main PCB underneath the square PCB housing the alarm and contact input terminal blocks and this board needs to be removed to change the jumpers from the default setting of Form A.

Once the required relay mode setting has been selected press the Param button to move to the next setting.

3.6 LOGGING OFF

```
MicrAlert v0.4
SYS Logon=****
```


When an operator is logged on the screen shows a series of * as shown above. Pressing either Value key logs the operator off.

4 CIRCUIT MENUS

4.1 SELECTING CIRCUITS

Each MicrAlert unit supports up to four Alpha sensor Analysers and four Auxiliary Contact inputs. When the Mode button has been pressed to select CIRCUIT mode, the Circuit -/+ buttons can be used to choose which of the eight possible circuits is to be examined or adjusted.

As Circuit +/- are pressed, the lower left part of the display will show the circuit being adjusted as Ana1, Ana2, Ana3 and Ana4 for the four Analyser circuits followed by Aux1, Aux2, Aux3 and Aux4 for the four contact inputs.

Before changing the circuit settings the operator must Log On as described in Section 3.2.

The settings which may be adjusted for Alpha Analysers are different from those which may be adjusted for Auxiliary Contact inputs as described below.

5 ALPHA ANALYSER CIRCUITS 1 - 4

5.1 INTRODUCTION

Each Alpha Analyser circuit has three channels of Signal Processing, each dedicated to the detection of particular forms of attack on the perimeter fabric.

Channel A is used to detect climbing or lifting of the fence, Channel B is used to monitor “Impact” attacks such as bolt-cropping, and Channel C is used to detect hack sawing. Each of these detection channels has an individual Gain setting, and Channel B, the Impact channel, has additional controls for multiple event detection with a Time Window function.

There is also a Pre-Alarm detection facility, whereby a certain level of overall signal from the fence sensor will trigger a “Pre-Alarm” condition which may be used to route the audio signal from that sensor to the Audio Output.

5.2 GAIN A MENU

```
MicrAlert v0.4  
Ana2 Gain-A=Lo6
```

Once Logged On press the Mode button to access the Circuit menu. Press Circuit +/- buttons to select the required Alpha circuit and then press the Param button to select the Gain-A setting. The Gain or sensitivity of Channel A may be adjusted between Off, Lo0 to Lo9 then Hi0 to Hi9 using the Value +/- buttons. Lo0 is the least sensitive setting i.e. most activity needed to cause an Alarm, Hi9 is the most sensitive i.e. least activity needed to cause an Alarm.

Once the required Gain A setting has been selected press the Param button to move to the next setting.

5.3 GAIN B MENU

```
MicrAlert v0.4  
Ana2 Gain-B=Hi2
```

The Gain or sensitivity of Channel B may be adjusted between Off, Lo0 to Lo9 then Hi0 to Hi9 using the Value +/- buttons. Lo0 is the least sensitive setting i.e. most activity needed to cause an Impact Event to be registered, Hi9 is the most sensitive i.e. least activity needed to cause an Event.

Once the required Gain B setting has been selected press the Param button to move to the next setting.

5.4 EVENTS MENU

```
MicrAlert v0.4  
Ana2 Events=02
```

Channel B features an event counter which is the number of impact events required to cause an alarm condition. The events parameter may be adjusted between 1 and 9 using the Value +/- buttons.

Once the required events setting has been selected press the Param button to move to the next setting.

5.5 TIME WINDOW MENU

MicrAlert v0.4 Ana2 TimWnd=02

Each impact event that occurs starts an individual time window during which the selected number of event counts must occur before the alarm relay operates. The Timer window setting is used to select the required length of this time window. Each step on the Timer window represents a 30 second interval e.g. setting 1 = 30 seconds, setting 2 = 60 seconds etc. The maximum time window is 270 seconds at setting 9.

If the Events counter is set to 1, the Timer window setting can be disregarded. If the timer window is set to Off, the specified number of Events will cause an Alarm condition regardless of the time between them.

To illustrate the operation of the Timer window and Events counter, the following example is given. It is required that the alarm relay is to operate only if three impacts occur within a one minute from when the first impact occurred. The Events counter is set to setting 3 and the Timer window is set to setting 2. The occurrence of an impact Event starts the first time window, which in this example lasts for one minute. If two more Events occur within this window then the alarm relay will operate.

If after the first time window has elapsed only one further Event (which itself started a second time window) has occurred, the first Event and its time window are discarded from the memory, leaving the second event and its time window in the memory. For the alarm relay to now operate two more Events must occur within this second window.

While Events remain in the system memory, the separate time windows will continue to run and when each one elapses, the window and its associated Event are discarded. When there are no more Events left in the memory, the Timer will be cancelled until another impact is detected.

The Channel B Event Counter has a Time Window function whereby the specified number of Events must occur within a certain period of each other. This Time Window parameter may be adjusted between Off and 1 to 9, where 1 to 9 are multiples of 30 seconds i.e. 30 secs to 270 secs. When this function is Off, the specified number of Events will cause an Alarm condition regardless of the time between them.

Once the required timer window setting has been selected press the Param button to move to the next setting.

5.6 GAIN C MENU

MicrAlert v0.4 Ana2 Gain-C=Lo8

The Gain or sensitivity of Channel C may be adjusted between Off, Lo0 to Lo9 then Hi0 to Hi9 using the Value +/- buttons. Lo0 is the least sensitive setting i.e. most activity needed to cause an Impact Event to be registered, Hi9 is the most sensitive i.e. least activity needed to cause an Event.

Once the required Gain C setting has been selected press the Param button to move to the next setting.

5.7 PRE-ALARM THRESHOLD MENU

MicrAlert v0.4 Ana2 PreAlm=Off

The Pre-Alarm detection system allows the automatic routing of an Analyser's audio signal to the Audio Output if it exceeds a certain percentage of full-scale activity. The threshold may be adjusted in the range Off or 1% to 99%. If this parameter is not set to Off, the audio from the specified analyser will be routed to the Audio Output for 20 seconds after the activity level exceeds the threshold.

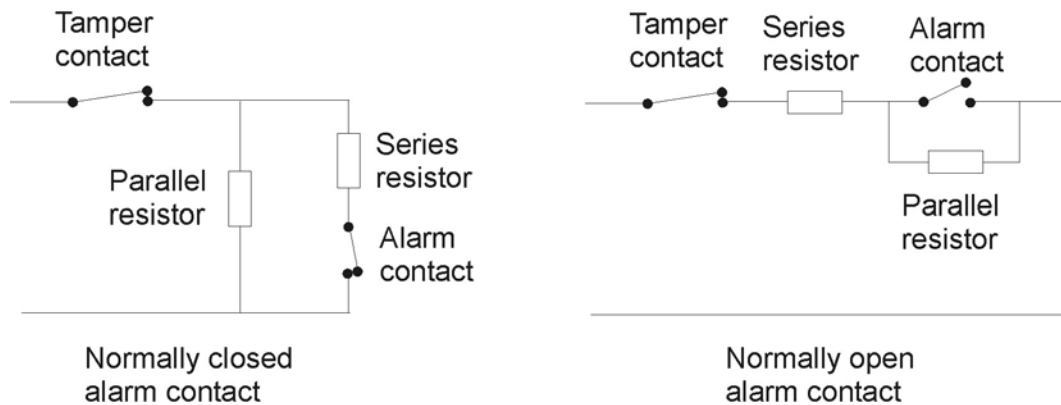
Once the required Pre-alarm threshold setting has been selected press the Param button to move to the next setting.

6 AUXILIARY CONTACT INPUTS 1 - 4

6.1 ALARM MONITORING

Each of the four Auxiliary Contact Inputs may be monitored for a Secure=Closed or Secure=Open condition, with options for Serial and Parallel monitor resistor values and an additional Delay function which provides for a minimum input activation time required to cause an Alarm.

Dependant on whether the alarm contact is normally open or normally closed monitoring resistors can be configured as shown below. If the alarm contact changes state the system detects the change in resistance values and generates an alarm.



6.2 POLARITY MENU

```
MicrAlert v0.4  
Aux3 Secure=Clsd
```

Once Logged On press the Mode button to access the Circuit menu. Press Circuit +/- buttons to select the required contact circuit and then press the Param button to select the Secure setting. The Secure mode of the contact may be adjusted between Open and Clsd using the Value +/- buttons. Open means the contact is normally open, closing on alarm and Clsd means the contact is normally closed, opening on alarm.

The Secure mode setting applies only to the alarm contact as all tamper contacts should be closed opening on tamper as a fail safe method in the event of power failure.

Once the required Secure setting has been selected press the Param button to move to the next setting.

6.3 SERIES MONITOR RESISTOR MENU

```
MicrAlert v0.4  
Aux3 SerRes=2k2
```

The SerRes parameter may be set None, 470R, 1k, 1k5, 2k2, 3k3, 4k7, 6k8, 10k, 22k using the Value +/- buttons. If there is no monitoring resistor in series with the alarm contact then the SerRes should be set to None.

Once the required SerRes setting has been selected press the Param button to move to the next setting.

6.4 PARALLEL MONITOR RESISTOR MENU

MicrAlert v0.4 Aux3 ParRes=4k7

The ParRes parameter may be set None, 470R, 1k, 1k5, 2k2, 3k3, 4k7, 6k8, 10k, 22k using the Value +/- buttons. If there is no monitoring resistor in parallel with the alarm contact then the ParRes should be set to None.

Once the required ParRes setting has been selected press the Param button to move to the next setting.

6.5 TIMER DELAY MENU

MicrAlert v0.4 Aux3 Delay= None

Each alarm contact may be set to have a minimum activation time required to cause an Alarm. The delay time can be increased or decreased using the Value +/- buttons in the range None to 240. This is measured in ¼ seconds i.e. a setting of 16 means the alarm contact must activate for 4.0 seconds in order to cause an alarm to be generated.

7 TECHNICAL SPECIFICATIONS

Maximum sensor zone length	400m
Max interconnecting twisted pair length	2km
Lightning Protection	Sensor inputs transformer-isolated Suppression diodes and gas discharge tubes on all inputs
Output Relays	Switchable between Form A and Form B Maximum voltage 110V ac or 30V dc Maximum current 0.3A ac or 1.0A dc Maximum power 30VA
Audio output	600 ohm balanced output at nominal 0dB
Power requirements	6 – 24V dc Maximum current 400mA at 12V dc Protected against reverse polarity and overvoltage
Housing	Aluminium housing rated to IP65
Dimensions	330mm x 220mm x 110mm
Weight	kg
Operating temperature	-40°C to +80°C
Tamper monitoring	All sensor and contact inputs monitored for tampering Housing monitored for tampering
Fault monitoring	Inbuilt regular self-test and fault-monitoring
The RS-232 serial port connections	Pin 2 Tx Pin 3 Rx Pin 5 Ground This should be connected to the SMS PC's serial port using a straight-through cable (i.e. 1-1, 2-2, 3-3 etc., not null-modem)

8 OVERALL LAYOUT AND CONNECTORS

