G.M. Advanced Fencing & Security Technologies Ltd

V-ALERT
CARD & SENSOR
SETTINGS MANUAL

G.M. **Advanced Fencing & Security Technologies Ltd**
14 Taas St. P.O. Box 2327 Industrial Area Kfar Saba 44425 Israel
Tel: 972-9-7662965 Fax: 972-9-7662964
E-mail: info@gmsecurity.com Website: www.gmsecurity.com

1. Introduction

1.1. The CARD & SENSOR SETTINGS MANUAL will be used after the installer is completely familiar with the operation of the V-AlertCOMM Settings Manager (See separate manual).

1.2. In addition an application called the DOCKLIGHT Application (to be replaced shortly by the DATA STORAGE Application) will be used to read the data values from the V-Alert Sensors (a complete explanation will follow below).

1.3. The CARD and SENSOR SETTINGS features of the V-Alert System will be used when it is required to "fine-tune" the V-Alert Sensor settings to optimize the performance of the system or when it is required to read the sensor data from V-Alert sensors installed in a new type of installation.

1.4. The CARD and SENSOR SETTINGS features should be used after the installer is familiar with the V-AlertCOMM Setting Manager Manual.

1.5. Changes to the CARD and SENSOR settings should be made only after all the default Sensitivity Settings (Sensitivity Settings 1 to 5 options) of the V-AlertCOMM Setting Manager Manual have been used to try to get the system to operate at the optimal level, or when there is a specific problem with the sensitivity of the V-Alert sensor(s) due to a specific problem or condition on site.

1.6. The DOCKLIGHT Application is a testing, analysis and simulation tool for serial communication protocols (RS232, RS485/422 and others). It allows you to monitor the communication between two serial devices or to test the serial communication of a single device. Docklight is easy to use and runs on almost any standard PC using Windows Vista/XP/2000/NT 4/98 operating system.

1.7. The DOCKLIGHT Application is used to simply read the raw data flow from the V-Alert Sensors to the V-Alert Zone Processor Card.

1.8. The DOCKLIGHT application will provide the installer with the required data from each individual sensor that will give the installer the ability to decide which values to change in the CARD and SENSOR SETTINGS windows of the V-AlertCOMM Settings Manager in order to match the capability of the V-Alert Sensor technology with the actual installation.

1.9. GM is currently completing its own DATA STORAGE Application which will be used to replace the use of the DOCKLIGHT Application. The DATA STORAGE Application will in addition to the features of the DOCKLIGHT Application be able to record and store data from the V-Alert Sensors for analysis by GM's technicians or certified GM Installers.

1.10. It is necessary to understand the raw data flow coming from the sensors in order to understand the logic behind the system and in order to understand how to make changes to the system's settings.

1.11. This manual will explain the following:

- How to analyse the raw data flow received from the DOCKLIGHT or DATA STORAGE Applications.
- How to change the parameters in the CARD & SENSOR SETTINGS windows of the V-AlertCOMM Settings Manual.

1.12. It is very important to differentiate between the CARD and SENSOR SETTINGS windows. Please take into account the following:

- The CARD SETTINGS window enables changing the detection capability of the system based on the data flow coming from the sensors.
- The SENSOR SETTINGS window enables changing the SENSITIVITY OF THE SENSOR ITSELF. Changing the sensitivity of the sensor itself will affect the values of the data flowing to the Processor Card and as such will affect the detection capabilities of the CARD SETTINGS window parameters.

1.13. This manual provides the initial method of operation of the system and the initial steps that need to be taken to change the sensitivity and the detection capability of the V-Alert System. We believe that the majority of what can be called standard installations will perform satisfactorily with the standard default settings of the V-AlertCOMM Settings Manager, whilst the minority of projects will require the use of the CARD and SENSOR SETTINGS features.

1.14. PLEASE TAKE INTO ACCOUNT THAT FURTHER TRAINING MAY BE REQUIRED FROM GM'S TECHNICIANS IN ORDER TO PROVIDE THE MOST ADVANCED LEVEL OF TRAINING.

2. V-Alert Technology - What is the V-Alert Sensor checking ?

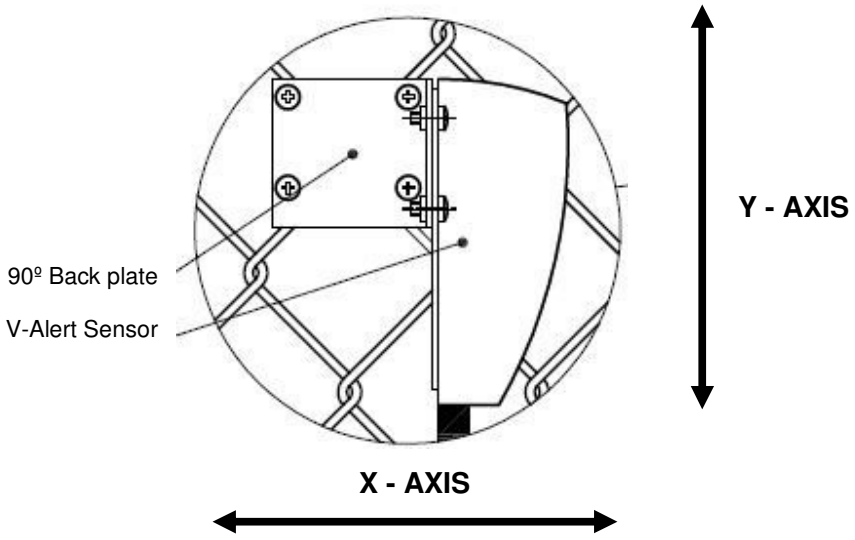
2.1. The V-Alert Sensor's electronic components measure movement or vibrations of the sensor along 2 separate axes – the X-Axis and the Y-Axis as can be seen in the diagram below.

2.2. The Sensor checks the X and Y axis values 250 times every second and then once every second transmits 4 separate data values or numbers FROM EACH V-ALERT SENSOR to the V-Alert Zone Processor Card. That means that 100 sensors connected to the V-Alert Zone Processor Card will transmit a total of 4 x 100 data values for processing by the V-Alert Zone Processor Card EVERY SECOND.

2.3. An explanation of the 4 separate data values that the V-Alert Sensor provides is explained in paragraph (5) below.

2.4. The V-Alert Sensor capability is based on an analysis of the data flow from all the sensors using sophisticated alarm detection algorithms.

2.5. The CARD Settings and SENSOR settings parameters can be adjusted using the V-Alert COMM Settings Manager to change the detection parameters as well as change the sensitivity of each individual V-Alert sensor (explained in paragraphs (6) and (7) below).



PLEASE NOTE:

The X and Y axes are in direct relation to the position of the sensor. The X-axis runs from left to right from the back of the sensor to the front of the sensor, whilst the Y-axis runs from top to bottom along the back of the sensor. On fence installations the sensor is installed at right angles to the fence on a 90º angled back plate as shown in the diagram.

3. Connection: Step-by-Step

3.1. In order to be able to read the Data Flow from each of the V-Alert sensors it is necessary to download and install the Docklight V1.8 Application. As we have mentioned above the Docklight Application will soon be replaced by GM's Data Storage Application. We have explained the use of the Docklight application in paragraph (4) below.

3.2. AT THE INITIAL STAGES OF UNDERSTANDING THE V-ALERT SYSTEM WE ARE EXPLAINING THE USE OF THE DOCKLIGHT APPLICATION SO THAT WE CAN EXPLAIN THE MEANING OF THE DATA VALUES AND PARAMETERS IN THE CARD SETTINGS WINDOW.

3.3. THE DOCKLIGHT OR DATA STORAGE APPLICATIONS ARE USED TO READ RAW DATA FROM THE V-ALERT SENSORS WHICH WILL ENABLE THE TRAINED INSTALLER TO EVALUATE THE DATA AND USE THIS EVALUATION TO SET THE CARD SETTINGS AND SENSOR SETTINGS PARAMETERS.

3.4. Follow the following steps if you are going to use the Docklight Application:

3.4.1. Download the DOCKLIGHT V1.8 application from the internet. Docklight can be downloaded for free. Entering "docklight" in any Internet Search Engine will enable you to find the docklight application and download it.
3.4.2. Install and open the DOCKLIGHT V1.8 application.
3.4.3. Connect the V-Alert Sensors to the V-Alert Processor Card.
3.4.4. OPEN or SAVE a file representing the number of sensors that are connected to the V-Alert Processor Card and WRITE this to the V-Alert Processor Card. (Example: If you are checking 10 sensors then you need to write a file with 10 sensors).
3.4.5. Connect the USB port of the V-Alert Processor Card to a USB Port of your computer.

YOU ARE NOW READY TO START USING DOCKLIGHT TO RECEIVE DATA FROM ALL THE V-ALERT SENSORS THAT ARE CONNECTED TO THE V-ALERT PROCESSOR CARD.

IF YOU ARE NOT GOING TO USE THE DOCKLIGHT APPLICATION, BUT SIMPLY WANT TO UNDERSTAND THE V-ALERT SYSTEM DATA VALUES, THEN GO DIRECTLY TO PARAGRAPH (5).

4. How to use the DOCKLIGHT Application

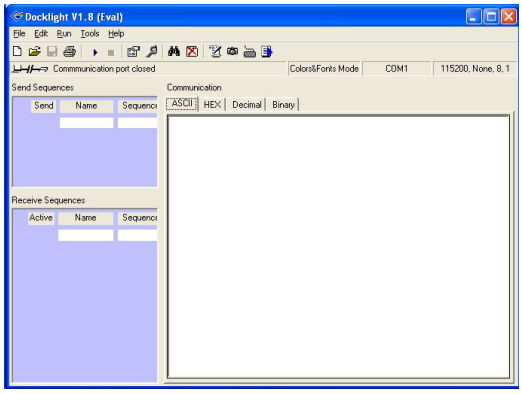
4.1. When using DOCKLIGHT you must check ONE V-Alert Sensor LINE at a time. Disconnect the other Sensor Line from the V-Alert Processor Card if there are 2 Sensor Lines connected.

4.2. DOUBLE CLICK on the DOCKLIGHT icon on your DESKTOP

4.3. The following window will open – CLICK OK

4.4. The following window will open – CLICK CONTINUE

4.5. The following window will open. You can now start using DOCKLIGHT

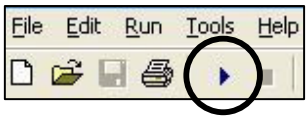


4.6. Open the TOOLS MENU and chose PROJECT SETTINGS.

4.7. Chose the relevant SEND/RECEIVE ON COMM. CHANNEL – the required COMM channel or PORT is the same COMM PORT setting that you chose when installing the V-AlertCOMM Settings Manager Application.

4.8. You are now ready to start receiving data flows from the V-Alert Sensors.

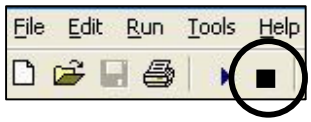
4.9. Click on the START COMMUNICATION BUTTON to START COMMUNICATION (F5) ▶



4.10. You will now start receiving Data Strings in the form of strings of numbers an explanation of which is found in paragraph (5) below. The data will consist of Data Strings from each individual sensor. If there are 10 sensors connected to the V-Alert Processor Card, then Data Strings from 10 sensors will appear in the DOCKLIGHT Communication Window EVERY SECOND. The Data Strings will continue to appear every second until you STOP the communication flow. Similarly, if there are 50 sensors connected to the V-Alert Processor Card, then Data Strings from 50 sensors will appear in the DOCKLIGHT Communication Window EVERY SECOND.

4.11. Click on the STOP COMMUNICATION BUTTON to STOP COMMUNICATION

(F5) ■



4.12. You can record and analyse the relevant data as explained in paragraph (5) below. As soon as you do not need the data in the DOCKLIGHT Communication Window, you may CLEAR the Communication Window by clicking on the CLEAR COMMUNICATION BUTTON (CTRL+W)

5. V-Alert Sensor Data Strings

5.1. Data Strings received in the Communication Window look like this (the example below shows the sensors in a state in which there is no movement on the sensors) :

Date, Time (Hours) 000 001 010 010 000 000 002 010 010 000 000 003 010 010 000 000 004 010 010 000 000 005 010 010 000 000 006 010 010 000 000 007 010 010 000 000 008 010 010 000 000 009 010 010 000 000

5.2. Every Data String will start with the Date, Time and then 000.

5.3. The next 3 numbers after the first 3 zero's (000) denotes the first sensor. In the Data String example above the first sensor is 001 which denotes Sensor No. 1. HOWEVER THE DATA STRING COULD START WITH ANY OF THE OTHER SENSORS AND DOES NOT NECESSARILY HAVE TO START WITH SENSOR NO. 1.

5.4. The Data String from each individual sensor is received as follows:

Date, Time (Hours) 000 001 010 010 000 000
002 010 010 000 000 003 010 010 000 000 004
010 010 000 000 005 010 010 000 000 006 010
010 000 000 007 010 010 000 000 008 010 010
000 000 009 010 010 000 000

The data string marked in the RED is the data from SENSOR **1**

The data string marked in the BLUE is the data from SENSOR **2**

The data string marked in the RED is the data from SENSOR **7**

5.5. In the example above, 9 sensors have been scanned over a period of 1 second. You will continue getting batches of data strings from these 9 sensors every second until such time as you STOP the communication by clicking on the STOP COMMUNICATION BUTTON.

5.6. The Data String numbers are data readings taken from each individual sensor as follows:

001 010 010 000 000				
SENSOR NUMBER	PEAK X	PEAK Y	TEAK X (WIDTH)	TEAK Y (WIDTH)

The numbers shown above represent the sensor's status when there is no movement on that particular sensor.

The following table provides an explanation of the numbers or values received in each field:

SENSOR NUMBER	Displays the sensor number from which the values or data is being received.
PEAK X	Displays the highest data value received from that specific sensor's X-axis value per second.
PEAK Y	Displays the highest data value received from that specific sensor's Y-axis value per second.
TEAK X (WIDTH)	Displays the amount of times the highest data value received from that specific sensor's X-axis per second. In other words this value represents the amount of time or width of the event from that sensor's X-axis each second. The sensor analyses itself 250 times per second. The TEAK X value counts the number of times the highest value occurred (# number of times out 250).
TEAK Y (WIDTH)	Displays the amount of times the highest data value received from that specific sensor's Y-axis per second. In other words this value represents the amount of time or width of the event from that sensor's Y-axis each second. The sensor analyses itself 250 times per second. The TEAK Y value counts the number of times the highest value occurred (# number of times out 250).

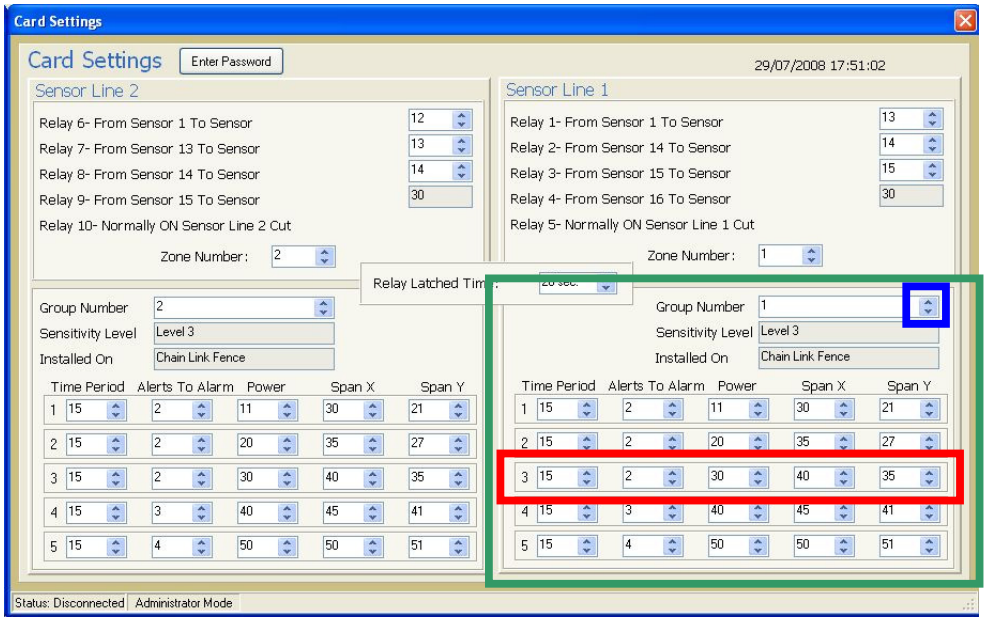
5.7. The Data String from each sensor will enable the installer to decide what settings to enter or change in the CARD SETTINGS WINDOW of the V-AlertCOMM Settings Manager.

5.8. Using the data strings to adjust the Card and Sensor settings parameters will be explained during training provided by GM's technicians.

5.9. The logic and operation of the system will be explained in paragraph (6) below.

6. V-Alert CARD SETTINGS WINDOW

6.1. Before explaining the relationship between the numbers from the Data String and the numbers in the card settings window it is necessary to understand the parameters of the cards settings window:



6.2. The Sensor Line 1 marked in the **GREEN** rectangle above refers to the settings for GROUP 1, LEVEL 3, and CHAIN LINK FENCE. More specifically the **RED** rectangle refers to the specific setting that has been chosen by the installer when using the standard settings of the V-AlertCOMM Settings Manager.

6.3. It is possible to scroll up or down to different groups of sensor Line 1 using the arrows marked in the **BLUE** rectangle above.

6.4. The numbers that appear in the Time Period, Alerts to Alarm, Power, Span X and Span Y settings are the standard default settings of the system for that particular "INSTALLED ON" setting and "SENSITIVITY LEVEL".

6.5. An analysis of the Data String received from the DOCKLIGHT application will give the installer the information required to decide how to change these numbers in order to improve the performance of the V-Alert System.

6.6. The following table provides an initial explanation of the numbers in the **RED** rectangle. Please refer to the example below in which the ALARM DETECTION STAGES are explained in detail:

SPAN Y (PEAK Y)	In order to pass the FIRST stage of an alarm detection, the sensor must provide a value that is greater than the number in the SPAN Y field. In other words the PEAK Y value provided by the sensor is compared with the SPAN Y value. If the PEAK Y value is greater than the SPAN Y value then the FIRST STAGE has been passed. **Using the Group 1, level 3 example below, if the PEAK Y value is greater than 35, then the first stage has been passed.**
SPAN X (PEAK X)	In order to pass the FIRST stage of an alarm detection, the sensor must provide a value that is greater than the number in the SPAN X

	field. In other words the PEAK X value provided by the sensor is compared with the SPAN X value. If the PEAK X value is greater than the SPAN X value then the FIRST STAGE has been passed. **Using the Group 1, level 3 example below, if the PEAK X value is greater than 40, then the first stage has been passed.**

POWER	In order to pass the SECOND stage of an alarm detection, the sensor must provide a POWER value that is greater than the number in the POWER field multiplied by 100.
	
	From the Data String values:
	
	PEAK X multiplied by TEAK X equals POWER (X)
	(PEAK X) X (TEAK X) = POWER (X)
	and
	PEAK Y multiplied by TEAK Y equals POWER (Y)
	(PEAK Y) X (TEAK Y) = POWER (Y)
	
	 
	
	IF (PEAK X) multiplied by (TEAK X) IS GREATER THAN POWER multiplied by 100 THEN GO TO THE NEXT STAGE OF AN ALARM DETECTION.
	
	IF (PEAK Y) multiplied by (TEAK Y) IS GREATER THAN POWER multiplied by 100 THEN GO TO THE NEXT STAGE OF AN ALARM DETECTION.
	
	In the example above the POWER value is 30 multiplied by 100 equals 3000.
	
	If the PEAK X value is 55 and the TEAK X value is 59, then the power value is 55 x 59 = 3245. This number is GREATER than the POWER value of 3000, therefore the system will progress to the next stage.
	
	If the PEAK Y value is 36 and the TEAK Y value is 59, then the power value is 36 x 59 = 2124. This number is SMALLER than the POWER value of 3000, therefore the system will NOT progress to the next stage.
	
	HOWEVER IF ANY ONE OF THE POWER VALUES CALCULATED FROM THE X & Y PEAK/TEAK VALUES IS GREATER THAN THE CARD SETTINGS POWER VALUE THEN THE SYSTEM WILL MOVE ON TO THE NEXT STAGE.
	
	To summarise the example above:

	POWER from X values: 3245 > 3000 – go to next stage **POWER from Y values: 2124 < 3000 – do not go to next stage** **BUT BECAUSE THE X POWER VALUE IS GREATER THEN THE SYSTEM WILL GO TO THE NEXT STAGE.**
ALERTS TO ALARM	The number of ALERTS TO ALARM is the number of times the specific sensor MUST pass the detection criteria of the FIRST and SECOND STAGES.
TIME PERIOD	The TIME PERIOD is the amount of time in SECONDS during which the specified number of ALERTS TO ALARM must be received. The actual TIME PERIOD is the value in the TIME PERIOD field multiplied by 2 TIME PERIOD equals the TIME PERIOD value multiplied by 2 (TIME PERIOD) = (TIME PERIOD) X 2 In the example above the TIME PERIOD value is 15 multiplied by 2 equals 30 seconds. **In the example, STAGES 1 AND 2 MUST OCCUR AT LEAST 2 TIMES IN A TIME PERIOD OF 30 SECONDS**

6.7. Paragraph 6.6 can be summarised as follows:

STAGE 1	[PEAK X] > [SPAN X] OR [PEAK Y] > [SPAN Y]
STAGE 2	[PEAK X] x [TEAK X] > [POWER] x [100] OR [PEAK X] x [TEAK X] > [POWER] x [100]
STAGE 3	[N] ALERTS TO ALARM RECEIVED in the [TIME PERIOD] x 2

6.8. From the explanation provided above we can therefore make the following conclusions:

- ❑ DECREASING the SPAN X and SPAN Y values INCREASES the sensitivity of the system (and vice versa)
- ❑ DECREASING the POWER value INCREASES the sensitivity of the system (and vice versa).
- ❑ DECREASING the ALERTS TO ALARM value INCREASES the sensitivity of the system (and vice versa).
- ❑ DECREASING the TIME PERIOD value DECREASES the sensitivity of the system (and vice versa).

PLEASE NOTE:

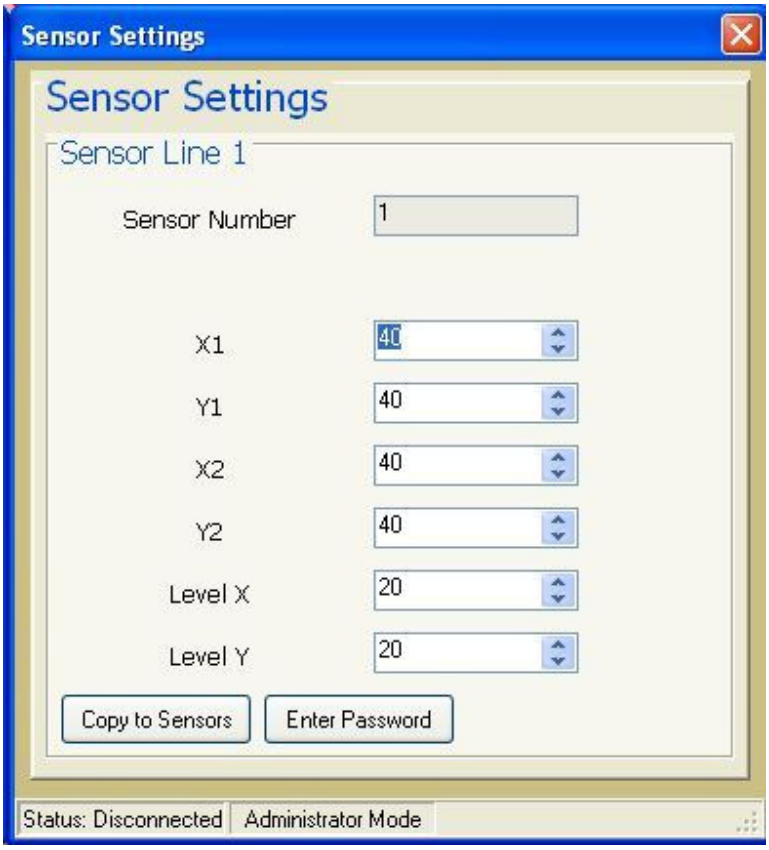
CHANGING THE PARAMETERS IN THE CARD SETTINGS WINDOW ACTUALLY CHANGES THE DETECTION PARAMETERS OF THE SYSTEM AND IN THIS WAY CHANGES THE SENSITIVITY OF THE SYSTEM, HOWEVER THE ACTUAL SENSITIVITY OF THE SENSOR CAN BE CHANGED IN THE SENSOR SETTINGS WINDOW

6.9. We must at this stage mention that the detection algorithms of the V-Alert System are very sophisticated and this manual does not attempt to explain the complete workings of the technology.

6.10. As an example, the WELDED MESH and CHAIN LINK default settings algorithm includes an additional feature which serves to provide better performance of the system in for example high wind conditions. The settings for WELDED MESH and CHAIN LINK take an AVERAGE of the data values generated by all the V-Alert Sensors. In order to pass the first stage of an alarm detection, the average data values of the X and Y Axis PLUS the SPAN X or SPAN Y value will cause the system to go to the next stage. The use of averages serves as a mechanism to prevent false alarms in high wind situations.

6.11. We have mentioned this here, because the WELDED MESH and CHAIN LINK default settings with the use of averages will operate properly in longer run fences of 20-30 sensors or more. Averages of a small amount of for example 5 sensors will not necessary provide a good indication of the events on the fence. This feature of the technology can best be explained during training provided by a GM technician.

7. V-Alert SENSOR SETTINGS WINDOW



7.1. The SENSOR settings window enables the installer to change the SENSITIVITY of the sensor, or in other words change the level of the raw data that is being generated by the V-Alert Sensors.

7.2. The PEAK X and Y values that are generated by the V-Alert sensor are actually a function of two X values (X1 and X2) and similarly a function of two Y values (Y1 and Y2).

7.3. Changing the value of the X1/X2 and Y1/Y2 values must be done carefully because the PEAK X and Y values are generated by the V-Alert Sensor by multiplying the X1 by the X2 value and multiplying the Y1 by the Y2 value.

Example:

The X1/X2/Y1/Y2 default value is 40.

X1 MULTIPLIED BY X2 = 40 X 40 = 1600.

If you wish to INCREASE the sensitivity of the V-Alert Sensor you need to INCREASE the X1/X2/Y1/Y2 values.

Increasing X1 and X2 values to 50 will result in the following:

X1 MULTIPLIED BY X2 = 50 X 50 = 2500.

We can now see that the increase from 1600 to 2500 is a very large increase in the sensitivity of the system.

We recommend that the increase of the X1/X2/Y1/Y2 values be done with small incremental increase or decreases of 2 to 3 points.

7.4. The Level X and Level Y default value is 20. This means that any value under 20 will be disregarded by the system and will not be counted by the system. In this case the TEAK X and Y values will be zero. This provides an initial filter of the data values being transmitted to the zone processor card. Lowering the Level X and Y values will increase the sensitivity of the system. Please note that changing the Level X and Y values should only be completed together with GM's technical support as this feature is almost never required to fine-tune the system.

8. V-Alert PASSWORD generator

8.1. In order to change any of the parameters of the CARD and SENSOR Settings windows it is necessary to enter a PASSWORD.
8.2. GM will provide authorized installers and dealers with a small Software Application called the PASSWORD generator.
8.3. The PASSWORD generator automatically provides a password that is valid for 24 hours. The next day the installer must generate a new password.
8.4. This system prevents the end-user from independently making changes to the data values in the CARD and SENSOR Settings windows.

9. Conclusion

9.1. This manual has explained the way the V-Alert Sensor detects and the method of adjusting the sensitivity of the V-Alert Sensors.
9.2. We would recommend that at some stage more advanced training be carried out with GM's technicians.
9.3. This manual should provide the initial tools to the installer providing a more in-depth understanding of the system and logic behind the technology.
9.4. In our experience the use of the explanation provided in this manual on an actual installation will provide the installer with the initial experience needed to start working with the V-Alert System.
9.5. Kindly contact GM or any GM authorized dealer for additional Technical Support at any time.
9.6. GM would like to thank you the installer for using the V-Alert System for your Intrusion Detection requirements.