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LINKS 2450TM

Long Range RF Transmitter



**SG WIRELESS
COMMUNICATIONS**
A Division of the SafeLink Corporation

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401 Magnetic Drive, Units #24-28
Downsview, Ontario, Canada M3J 3H9
29003619 R001



**SG WIRELESS
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INSTALLATION MANUAL
Version 1.2

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SG Wireless Communications warrants that for a period of twelve months from the date of purchase, the product shall be free from defects in materials and workmanship under normal use and that in fulfillment of any breach of such warranty, SG Wireless Communications shall, at its option, repair or replace the defective equipment upon return of the equipment to its repair depot. This warranty applies only to defects in parts and workmanship and not to damage incurred in shipping or handling, or damage due to causes beyond the control of SG Wireless Communications, such as lightning, excessive voltage, mechanical shock, water damage, or damage arising out of abuse, alteration or improper application of the equipment.

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INTRODUCTION**Section 1**

The LINKS2450 transmits alarm system information over a long-range radio network. It may be used with the following DSC alarm control panels:

- PC1575/1580 v1.0
- PC1555/1565 v2.x and up
- PC580/585 v2.x
- PC4010/4020 v3.x
- PC5015 v2.2
- PC5010 v1.0 and up

This manual will describe how to install and program the LINKS2450 for connection to the above panels.

1.1 Specifications

NOTE: If the panel uses automatic SIA or Contact ID communications formats, the reporting codes the LINKS2450 will send must still be programmed on the panel.

- Power supply: 11.5-14V_{DC} at 750mA (PS1520, PC5204, PC4204, or powered from Bell+/Aux- control panel terminals)
- Radio transmitter frequency: range from 440 to 470MHz
- Communication Buffer: 80 Events
- Transmission Range: Approximately 16 Kilometers (10 Miles)
- Cabinet dimensions: 4.17" high x 5.75" wide x 1" deep (104mm x 146mm x 26mm); color: white
- Module supervision via the alarm control panel
- Protected against static and lightning induced transients
- Programming by keypad or downloading software. The LINKS2450 is complete with a default program and is operational with a minimum of programming.
 - To program via a keypad when connected to PC5015, PC5010, PC1575/1580, PC1555/1565 or PC580/585 panels, program the LINKS2450 using any system keypad
 - To program via a keypad when connected to PC4010/4020 v3.0 panels, program the LINKS2450 using a PC2550RK keypad connected directly to the LINKS2450.
- EEPROM Memory
The LINKS2450 uses EEPROM memory, which will retain all program information even if AC and battery power, are removed.

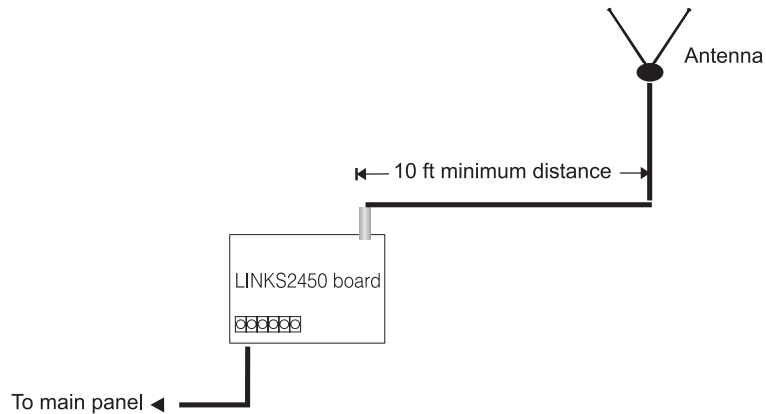
1.2 Antenna

NOTE: You must match the antennas to the frequency you will be using.

The antenna for the LINKS2450 is *not* supplied. For optimum performance of the LINKS2450, use a quality antenna system, such as model SLA-532, available from Safe Link Corporation. This 5/8 over 5/8 wave high performance antenna offers features specifically designed for security radio installations.

- 5db gain two-piece mast with center coil
- Standard frequency range 440-470MHz
- Ten feet of coax with BNC connector attached.

To ensure proper operation, mount the antenna at least ten feet from the LINKS 2450 unit. (See diagram below).



[83] Miscellaneous Alarm Reporting Codes (PC1555/1565 v2.0 panel only)

Default = FF

 |_|_|_| Police Code

 |_|_|_| Delinquency Code

[96][Installer Code][96]

Restore LINKS2450 Factory Default Programming for PC1575/
1580

[993][Installer Code][993]

Restore LINKS2450 Factory Default Programming for PC5015
v2.2, PC5010 v2.0, PC1555/1565 and PC580/585

PC4010/4020 LINKS2450 Toggle Options

Program these options at a PC4010/4020 system keypad. See section 3.2 for more information.

Ref # [000405]	LINKS 2XXX (use arrow keys (< >) to scroll to each option)	Option	Default
		LINKS 2XXX	N (Y for CF panels)
		Alarm/Restore	N (Y for CF panels)
		Open/Close	N (Y for CF panels)
		All Others	N (Y for CF panels)

PROGRAMMING WORKSHEETS

[01] Module Configuration

Default	Option	ON	OFF
ON	<input type="checkbox"/>	1 Communications enabled	Communications disabled
OFF	<input type="checkbox"/>	2 Serial connection	Keybus connection

[10] LINKS2450 Account Code

Default
 FF FF Valid entries are 00-FF
Enter two 2-digit hexadecimal numbers.

[20] Maintenance Alarms and Restoral Reporting Codes

Default = FF

- Keybus/Serial Fault Alarm
- Keybus/Serial Fault Restoral
- For future use

[30] Call Direction Options (PC5015, PC5010, PC1575/1580 and PC1555/1565 panels only)

Default	Option	ON	OFF
ON	<input type="checkbox"/>	1 Alarm/restore reporting enabled	Disabled
ON	<input type="checkbox"/>	2 Tamper/restore reporting enabled	Disabled
OFF	<input type="checkbox"/>	3 Opening/closing reporting enabled	Disabled
ON	<input type="checkbox"/>	4 System maintenance reporting enabled	Disabled
ON	<input type="checkbox"/>	5 System test transmission reporting enabled	Disabled
OFF	<input type="checkbox"/>	6-7 For future use	Enabled
OFF	<input type="checkbox"/>	8 Future event Support	Disabled

[81] Miscellaneous Alarm Reporting Codes (PC1575/1580 panel only)

Default = FF

- General Zone Fault Alarm
- General System Tamper Alarm
- General System Supervisory Alarm

[82] Miscellaneous Restoral Reporting Codes (PC1575/1580 panel only)

Default = FF

- General Zone Fault Restore
- General System Tamper Restore
- General System Supervisory Restore

INSTALLING THE LINKS2450

Section 2

Before installing the LINKS2450, install and test the security system to which it will be connected, according to the system's Installation Manual.

2.1 Unpacking the LINKS2450

Check that each of these parts is included in your LINKS2450 package.

- LINKS2450 circuit board
- LINKS2450 plastic cabinet

CAUTION: Due to the sensitivity of the RF circuitry, avoid any contact with the coils and potentiometers on the LINKS2450 circuit board.

2.2 Select a Mounting Location

The area where you mount the LINKS2450 should be:

- dry
- close to the installed alarm control panel cabinet.
- far from sources of interference, including: electrical noise such as computers, televisions and electric motors in appliances and heating and air conditioning units; large metal objects like heating ducts and plumbing which may shield the antenna. If you must mount the LINKS2450 near such items, you may have to mount the antenna on a remote bracket away from the LINKS2450.
- close to the power supply. See section 2.3 "Connect a Power Supply".

2.3 Connect a Power Supply

You can use the Bell+ and Aux- terminals from the control panel to power the LINKS2450. If you will be using a separate power supply, install it near the LINKS2450. Refer to the power supply's installation instructions, for more information.

NOTE: The current drawn by the LINKS2450 and the siren(s) connected to the Bell terminals must not exceed that specified by the rating of the control panel. Refer to your control panel's Intallation Manual for more information.

The wiring between the LINKS2450 and the power supply should not be longer than indicated in the table below:

Wire Gauge (AWG) Maximum Wire Length (feet / meters)

22	15' / 4.5m
20	25' / 7.5m
18	40' / 12.0m

You can double the maximum wire length if you double the conductors and connect them in parallel. **Mount the LINKS2450 as close to the power supply as possible.**

2.4 Mount and Wire the LINKS2450

1. Run the panel wiring and the power supply wiring to the LINKS2450 mounting location.
2. Remove the four screws that attach the LINKS2450 circuit board to the plastic cabinet.
3. Pull all wires through the hole at the back of the cabinet.
4. Mount the cabinet securely to the wall. Use the appropriate wall anchors when securing the panel to drywall, plaster, concrete, brick or similar surfaces.
5. Reattach the LINKS2450 into the mounted cabinet using the four mounting screws.
6. Find the antenna connection in the hole at the top of the cabinet. Secure the antenna to the LINKS2450 antenna connector.

NOTE: Make sure an antenna is always connected to the LINKS2450 whenever it is operated. The unit will not work and may be damaged if an antenna is not installed.

7. Complete all wiring: If you will be connecting the LINKS2450 to a PC5015, PC5010, PC1575/1580, PC1555/1565 or PC580/585 panel, go to step 8a. If you will be connecting the LINKS2450 to a PC4010 or PC4020 panel, go to step 8b.
 - 8a. Connect the LINKS2450 according to diagram 2-2. Make sure jumper J3 on the LINKS2450 is NOT shorted.
 - 8b. Connect the LINKS2450 to a PC2550RK keypad according to diagram 3-1. Make sure jumper J3 on the LINKS2450 IS SHORTED. When you have finished programming, disconnect the power supply and the PC2550RK keypad from the LINKS2450. *Remove the short from jumper J3.* Connect the LINKS2450 to the control panel according to diagram 2-3.

NOTE: Double-check all wiring to ensure that it is correct. Incorrect wiring connections may cause the LINKS2450 to operate improperly, or may damage the unit.

8. Connect the power: Connect the power terminals (VTX+ and VTX-) to a 11.5 - 14Vdc, 1A power supply.

CAUTION: Do not connect the power supply until all other wiring, including the antenna connection, has been completed and checked to ensure that it is correct.

RESET LINKS2450 PROGRAMMING TO FACTORY DEFAULT

Section 6

If you need to reset the LINKS2450 to factory default programming, follow the directions in the appropriate sections below.

6.1 Reset the LINKS2450 on a PC1575/1580 Panel

To reset the LINKS2450 on a PC1575/1580 panel, enter [96] [Installer's Code] [96].

6.2 Reset the LINKS2450 on a PC5015 v2.2, PC5010 v2.0, PC1555/1565 or PC580/585 Panel

To reset the LINKS2450 on a PC5015 v2.2, PC5010 v2.0 or PC1555/1565 panel, enter [993] [Installer's Code] [993].

NOTE: This command is unavailable on PC5010 v1.0. If v1.0 is used, you must perform a hardware reset (see section 6.3 below).

6.3 Perform a Hardware Reset (All panels)

To reset the LINKS2450 when connected to a PC5010 v1.0 or a PC4010/4020 panel, you must perform a hardware reset. To do this:

1. Remove all power from the LINKS2450
2. Short jumper J3
3. Remove all wires from the YEL and GRN terminals
4. With a piece of wire, short the YEL terminal to the GRN terminal
5. Apply power to the LINKS2450 for 5 seconds.
6. Remove power from the LINKS2450
7. Reconnect all original wiring and re-power the LINKS2450

NOTE: If the LINKS2450 is connected to a PC4010/4020 panel, the programming done in the panel software will not be reset. See section 3.2, step 5 for information on re-programming the PC4010/4020 sections.

TESTING THE LINKS2450

Section 5

Before testing the LINKS2450, ensure that the control panel is correctly programmed and operating properly. Refer to your system Installation Manual for instructions on testing your system. The control panel must be programmed properly in order for the LINKS2450 to operate.

To check that the LINKS2450 is working, apply power to the unit after all wiring connections have been made. When the LINKS2450 is sending a transmission, the LED on the circuit board will turn on.

5.1 Performing a LINKS Test Transmission

Contact the monitoring station to request a transmission test. Remove the telephone cord from the RJ31-X jack. Perform a Bell Test as described in the control panel's Installation Manual. When the test is complete, contact the monitoring station to confirm the transmission. Perform additional test transmissions as required by the central station.

5.2 "On Air" Indication

Whenever the LINKS unit is communicating, the LED on the unit's circuit board will turn ON for each round of communications. Each event has 3 rounds. Therefore, if one reporting code is sent, the LED will activate 3 times to indicate each round.

5.3 Troubleshooting

If the LINKS2450 is not working properly, check that all wiring and all programming is correct before calling for technical support.

5.4 Testing Tools

The following tools are available from Safe Link:

UHF RF Power Meter - Connects to the antenna jack on the LINKS2450. Indicates the transmit power of the radio.

UHF Scanner - Checks that the radio is transmitting data.

Frequency Counter - Checks that the LINKS2450 is transmitting on the correct frequency.

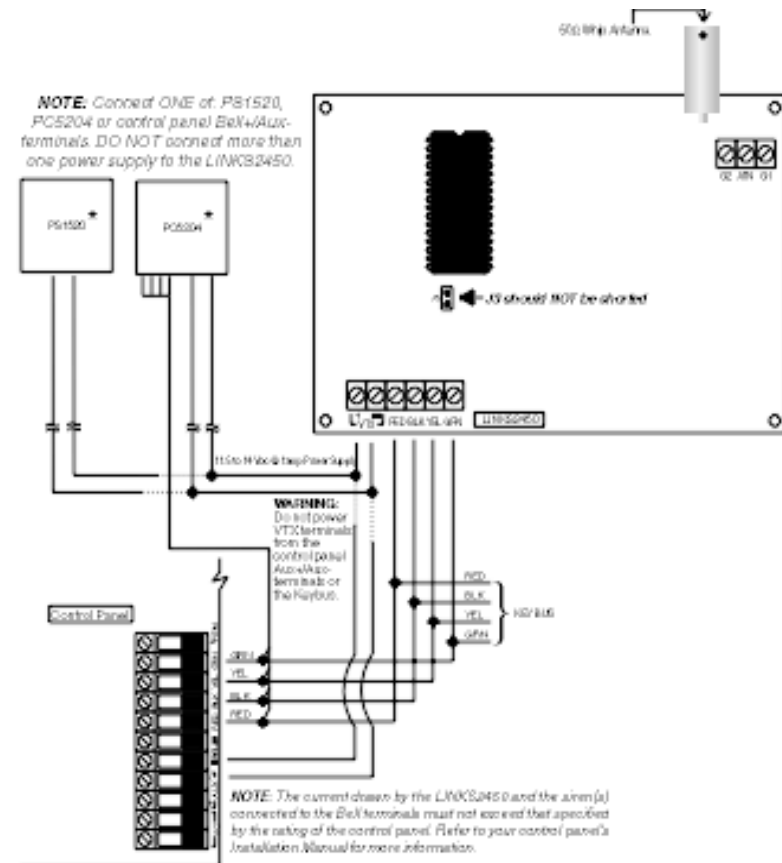
5.5 Periodic Test Transmission

The LINKS 2450 will transmit a periodic test transmission at the time/day/interval using the Reporting code programmed in the main control panel.

DIAGRAM 2-1

Hook-up For PC5010, PC5015, PC1555/1565, PC1575/1580 or PC580/585 Panels

NOTE: Programming section [01], option 2 must be OFF for LINKS2450 to work with these panels.



CAUTION: Due to the sensitivity of the RF circuitry, avoid any contact with the coils and potentiometers on the LINKS2450 circuit board.

*If power supply supervision is required for the LINKS2450 VTX terminals, use the PC5204. If no supervision is needed, you can use the PS1520 or the control panel Bell+/Aux- terminals.

PROGRAMMING DESCRIPTIONS

Section 4

[01] Module Configuration

Option 1: Communications Enabled / Disabled

Enable this option to have the LINKS2450 initiate communications for all events that have reporting codes and call direction options (section [30]) programmed. Disable this option to test the system.

Option 2: Serial Connection / Keybus Connection

Enable this option if you will use the LINKS2450 with a PC4010/4020 panel. Disable this option if you will use the LINKS2450 with a PC5015, PC5010, PC1575/1580, PC1555/1565/1565 or PC580/585 panel.

[10] LINKS2450 Account Code

This 4-digit code is used to identify the system and is transmitted when the LINKS2450 initiates communications. Program a 4-digit code in this section using 2 two-digit Hexadecimal numbers. Refer to your control panel Installation Manual for instructions on programming hexadecimal digits.

NOTE: An account number must be entered in this section before the LINKS2450 can send any communications. Programming [FFFF] will disable the LINKS2450.

[20] Maintenance Alarms and Restoral Reporting Codes

Program 2 digit reporting codes for the following:

- **Keybus/Serial Fault Alarm:** This code will be sent when connection is lost to the panel for more than 30seconds.
- **Keybus/Serial Fault Restoral:** This code will be sent when connection is restored to the panel for more than 30seconds.
- **For future use.**

[30] Call Direction Options (PC5015, PC5010, PC1575/1580, PC1555/1565 and PC580/585 panels only)

Program which of the following reporting code types the LINKS2450 will send to the central station:

- Alarm/restore reporting
- Tamper/restore reporting
- Opening/closing reporting
- System maintenance reporting
- System test transmission reporting
- Future event support

In most installations, you should program the tranmission of alarm/restore reporting codes only. Your radio network has limited bandwidth and capacity. The more signals each LINKS2450 transmits, the fewer LINKS2450s you will be able to install on your network.

The Future Event Support option refers to reporting codes (events) that may be added to future software versions of DSC control panels. If you turn on the Future Event Support option, when the new events occur, the LINKS2450 will send reporting codes for the events to the central station. If you do not turn this option on, the LINKS2450 will not send reporting codes for events that are not currently included in one of the call direction groups.

PROGRAMMING THE LINKS2450

Section 3

See section 3.1 for programming instructions when connecting the LINKS2450 to a PC5015, PC5010, PC1575/1580, PC1555/1565 or PC580/585 panel. See section 3.2 for programming instructions when connecting the LINKS2450 to a PC4010 or PC4020 v3.0 panel.

3.1 Programming a LINKS2450 Connected to a PC5015, PC5010, PC1575/1580, PC1555/1565 or PC580/585 Panel.

Program the LINKS2450 through Installer's Programming at a system keypad. For instructions on using Installer's Programming sections, please refer to Section 4 "How to Program" in your control panel Installation Manual.

1. Go to Installer's Programming by entering [*][8][Installer's code].
2. **For PC5015, PC5010, PC1555/1565 and PC580/585:** Go to the LINKS2450 programming section by entering [803]. Program the following sections only (see section 4 for a description of each section). Record your programming choices in the worksheets at the end of this manual.

[01] Module Configuration

Option 1: Communications Enabled / Disabled

Option 2: Serial Connection / Keybus Connection

[10] LINKS2450 Account Code

[20] Maintenance Alarms and Restoral Reporting Codes

[30] Call Direction Options

[83] Miscellaneous Alarm Reporting Codes (PC1555/1565 v2.0 panel only)

3. **For PC1575/1580:** Go to the LINKS2450 programming section by entering [86]. Program the following sections only. See section 4 for a description of each section. Record your programming choices in the worksheets at the end of this manual.

[01] Module Configuration

Option 1: Communications Enabled / Disabled

Option 2: Serial Connection / Keybus Connection

[10] LINKS2450 Account Code

[20] Maintenance Alarms and Restoral Reporting Codes

[30] Call Direction Options

[81] Miscellaneous Alarm Reporting Codes (PC1575/1580 panel only)

[82] Miscellaneous Restoral Reporting Codes (PC1575/1580 panel only)

4. To exit Installer's Programming, press [#].

3.2 Programming a LINKS2450 for Use with a PC4010/PC4020 v3.0 or higher panel.

There are two stages in programming the LINKS2450 for a PC4010 or PC4020 panel:

1. Program the LINKS2450 programming sections from a PC2550RK keypad connected directly to the LINKS2450.
2. Program the LINKS2450 toggle options on the PC4010/4020 control panel.

Program the LINKS2450 from a PC2550RK Keypad:

1. Make sure the LINKS2450 is connected to a PC2550RK keypad (refer to diagram 3-1). Make sure that jumper J3 is shorted.
2. Program the following sections only. Other programming sections are not relevant to PC4010/4020 panels. See section 4 for a detailed description of these sections.

Enter the two-digit number for each section you want to program, then, enter the data required to complete the section programming. If you enter information into a section and make a mistake, press [#] to exit the section. Select the section again, and re-enter the information correctly.

Record your programming choices in the worksheets at the end of this manual.

[01] Module Configuration

Option 1: Communications Enabled / Disabled. Press [1] to alternately enable or disable the option.

Option 2: Serial Connection (Enabled) / Keybus Connection (Disabled). Press [2] to alternately enable or disable the option.

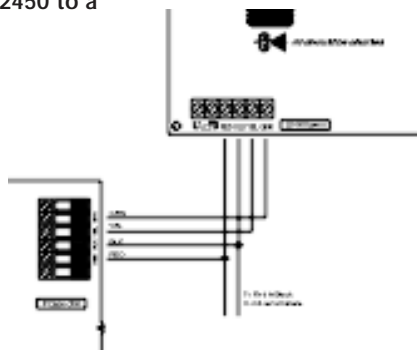
[10] LINKS2450 Account Code. Enter 2 two-digit hexadecimal numbers. Refer to your Installation manual for information on Hexadecimal programming.

[20] Maintenance Alarms and Restoral Reporting Codes. Enter two hexadecimal digits for each code.

3. When you have finished programming the above sections, disconnect the power and the PC2550RK keypad.
4. Connect the LINKS2450 to the panel as in diagram 2-2.

Diagram 3-1

Connecting the LINKS2450 to a PC2550RK Keypad



Program the LINKS2450 Toggle Options on the Panel

At a PC4010 or PC4020 system keypad, enter reference # [000405] and [*], or scroll to the "LINKS2XXX" programming section. (See the "How to Program" section in your PC4010/4020 Installation Manual for more information.) Use the arrow keys (< >) to scroll to each of the following toggle options. Press [*] to toggle the option ON or OFF. Record your programming choices in the worksheets at the end of this manual.

LINKS 2XXX	Yes	When enabled the PC4010 or PC4020 will send the events that are programmed to the LINKS 2450. The PC4010/4020 will only send the events that have reporting codes programmed and dialer directions enabled for them.
	No	The PC4020 will not send events to the LINKS2450. Default condition is No.

NOTE: The Communications Toggle option "Comms Enabled" must also be set to Yes for the PC4010/4020 to be able to send events to the LINKS 2XXX. To disable the PC4010/4020 telephone communications, but still allow the PC4010/4020 to communicate events through the LINKS 2XXX, set "Comms Enabled" to Yes, and the Dialer Directions to No for all 3 telephone numbers. Leaving all 3 telephone numbers unprogrammed will also disable telephone communications. See the "Communications Programming" section in your PC4010/4020 Installation Manual for more information.

Alarm/Restore	Yes	Alarm and Restoral reporting codes are sent to the central station by the LINKS2450.
	No	Alarm and Restoral reporting codes are not sent to the LINKS2450. Default: No (Yes on PC4010CF/4020CF panels)
Open/Close	Yes	Opening and Closing reporting codes are sent to the central station by the LINKS2450.
	No	Opening and Closing reporting codes are not sent to the LINKS2450. Default: No (Yes on PC4010CF/4020CF panels)
All others	Yes	All other reporting codes are sent to the central station by the LINKS2450.
	No	All other reporting codes are not sent to the LINKS2450. Default: No (Yes on PC4010CF/4020CF panels)

To exit the LINKS2XXX programming section, press [#].

Program Panel Supervision for the LINKS2450

Panel supervision of the LINKS2450 is recommended when connected to PC4010/4020 panels. To have the panel supervise the LINKS2450, make sure the zone that the LINKS2450 is connected to on the panel is programmed for LINKS Supervisory (zone type [28]). When the zone is programmed this way, if the YEL terminal is not grounded (e.g. the wire is cut), the panel will generate a zone trouble and a LINKS trouble and will send the reporting code for the zone.

See your PC4010/4020 Installation Manual for information on zone programming.

FCC COMPLIANCE STATEMENT

CAUTION: Changes or modifications not expressly approved by Digital Security Controls Ltd. could void your authority to use this equipment.

This equipment generates and uses radio frequency energy and if not installed and used properly, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for Class B device in accordance with the specifications in Subpart "B" of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in any residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to television or radio reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna
- Relocate the alarm control with respect to the receiver
- Move the alarm control away from the receiver
- Connect the alarm control into a different outlet so that alarm control and receiver are on different circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the FCC helpful: "How to Identify and Resolve Radio/Television Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock # 004-000-00345-4.

Notice to the user:

It is the responsibility of the modem user to ensure that the modem / radio terminal combination has been aligned by qualified personnel before the equipment is used. Written proof, with the name of the technician and address of the service depot, should be available on request for inspection by representatives / radio inspectors of Industry Canada.