

Mini SD-TM ZBS Mini Smoke Detector

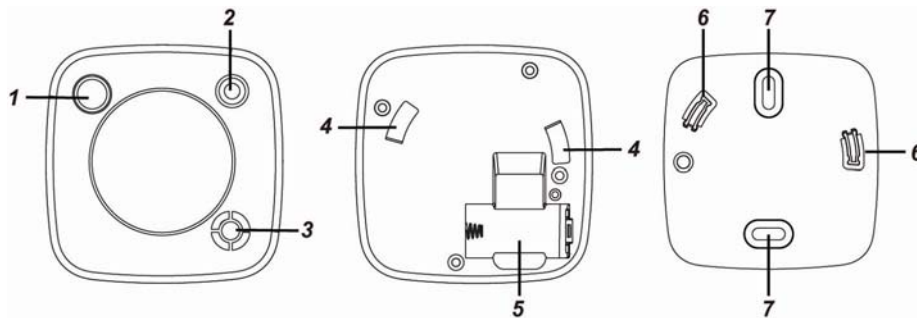
Mini SD-TM-ZBS Mini Smoke Detector is a ZigBee Smoke Detector with built-in PIR and Temperature sensor, it is capable of sending wireless signals to the coordinator in the ZigBee network upon detection of smoke particles or abnormal high heat to protect house from fire hazards. The Mini Smoke Detector's alarm situations, battery condition, operating conditions, supervisory data and general fault information are sent to the ZigBee Control Panel wirelessly.

The Mini Smoke Detector also features IR detection. The it detects infrared signature to pick up movements within an assigned area and signals the Control Panel to activate the alarm if an intruder crosses its' path of detection.

The Mini Smoke Detector utilizes ZigBee technology for wireless signal transmission. ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission.

The Mini Smoke Detector serves as an end device in the ZigBee network. It can be included in the ZigBee network to transmit signal upon activation, but cannot permit any other ZigBee device to join the network through the Mini Smoke Detector.

Parts Identification



1. IR lens

2. LED Indicator / Test Button

Red LED

- Turns ON briefly: Transmitting signal.
- Quick flash: Alarming.
- Flashes every 2 seconds: Mini Smoke Detector under warmup and calibration process.
- Flashes every 1 second: Mini Smoke Detector under Sleep Mode
- Flashes every 4 seconds: battery exhausted.
- Flashes once every 20 minutes: the Mini Smoke Detector has lost connection to its current ZigBee network.

Orange LED

- Flash every second: Device power on/Calibration failed.
- Flashes every 5 seconds: Detecting smoke failed or device malfunctioning.
- Flashes every 4 seconds: battery exhausted.
- Flashes every 45 seconds: Low battery condition

Test Button

- Press and hold the button for 10 seconds then release to reset the Mini Smoke Detector.
- Press and hold the button for 20 seconds to enter calibration process.
- Press the button once to send a supervision signal/test Mini Smoke Detector
- Transmit a radio signal for testing the radio communication range.
- Test if the Mini Smoke Detector is functioning normally.
- Silence the Mini Smoke Detector's alarm.

3. Buzzer

4. Mounting Holes (for Hooks)

The Hooks of the Mounting Bracket can hook into this Mounting Hole.

5. Battery compartment

6. Hooks

7. Mounting Holes

Features

● **Battery**

- A 3V CR123A Lithium Battery is used to supply power to the Mini Smoke Detector.
- The Smoke Detector has a foolproof mechanism which prohibits cover closure without first installing battery.
- When the Mini Smoke Detector is low on battery, a low battery signal will be transmitted along with regular signal transmissions. The Orange LED will flash with accompanying low-volume beep once every 45 seconds.
- The Red and Orange LED will flash once every 4 seconds when the battery is exhausted.

<NOTE>

☞ When changing the battery, after removing the old battery, press the Test Button twice to fully discharge before inserting new battery.

● **Testing the Mini Smoke Detector**

By pressing the Test Button on the Mini Smoke Detector, you can test if the Mini Smoke Detector is functioning normally.

- If the Mini Smoke Detector functions normally, the Red LED will be on for 2 seconds followed by a 2-tone beep.
- If the buzzer sounds 2-tone beeps 3 times, the “**Optical Chamber**” on the Mini Smoke Detector is either dirty or out-of-order.
- If the Red LED doesn't light and no beep is sounded, it means the Mini Smoke Detector is out-of-order.

● **Sleep Timer**

- The Mini Smoke Detector has a “sleep time” of approximately 1 minute to conserve power. After 1 minute any detected movement will be transmitted.

● **Test Mode**

- The Mini Smoke Detector can be put into Test mode by pressing the Test Button. In Test mode, it will disable the sleep timer and will enable the LED indicator to flash every time a movement is detected. Every time the Test Button is pressed, the Mini Smoke Detector will transmit a test signal to the Control Panel for radio range test and enter the test mode for 3 mins. It will exit Test Mode automatically after 3 minutes and return to normal mode.

● **Supervision**

- The Mini Smoke Detector will transmit a supervision signal to report its condition regularly according to user setting. The factory default interval is 30 minutes. The user can also press the Test Button once to transmit a supervision signal manually.

● **Temperature Detection**

The Temperature Sensor will transmit temperature signals regularly according to setting. The factory default interval is 10 minutes.

- The Mini Smoke Detector will also send temperature signal when temperature changes by +/- 2 °C.
- You can also press the Test Button once to transmit a temperature signal manually.
- The temperature detection range is about -10 °C ~ 50 °C.(14 °F ~ 122 °F)

● **Alarm Detection**

The Mini Smoke Detector will activate fire alarm when either of its smoke detection or high heat detection function is triggered. When an alarm is activated, the Mini Smoke Detector will transmit alarm signal and raise alarm with its built in buzzer, the Red LED will flash rapidly. The alarm sound will repeat in pattern of 3-second alarm and 1-second pause.

Smoke Detection:

- The Alarm is activated whenever the smoke concentration exceeds the detection threshold.
- The Mini Smoke Detector will check smoke concentration every 8 seconds, the alarm will continue until the smoke concentration drops below alarm threshold.

Heat Detection:

- Rate of Rise: When the temperature rises by 8.25°C per minute.
- High Heat: When the temperature exceeds 57.3°C

The Mini Smoke Detector will check temperature every 10 seconds. It will only stop alarming if the temperature drops below alarm threshold:

- If the alarm was triggered by Rate of Rise condition (8.25°C per minute or more): The temperature must drop to 4°C below highest temperature detected for the Detector to stop alarming.
- If the alarm was triggered by High Heat condition (57.3°C): The temperature must drop below 49°C for Mini Smoke Detector to stop alarming.
- For both Smoke alarm and Heat Alarm, a restore signal will be transmitted if no smoke is detected again for 160 seconds.

IR Detection:

- The Mini Smoke Detector will only transmit burglar alarm signal to the Control Panel if any movement is

picked up within the IR detection coverage, the buzzer will not sound and the LED will not flash. (Please refer to your Control Panel for details).

● **Alarm Silence**

- After alarm activation, the Mini Smoke Detector can be silenced temporarily by pressing the button.
 1. If the button is pressed within 1 minute after alarm activation, the alarm will be silenced 1 minute after button press. E.g. If the button is pressed 30 seconds after alarm activation, then the alarm will be silenced at 1 minute and 30 seconds after alarm trigger.
 2. If the button is pressed when the alarm has been activated for more than 1 minute, the alarm silenced immediately and will enter Alarm Silence mode for 9 minutes.
- The Alarm Silence mode lasts 9 minutes, the Red LED will flash every second during this period.
- During the Alarm Silence period, if the smoke concentration or temperature continue to rise, the Mini Smoke Detector will sound the alarm again and cannot be silenced by button press. The alarm condition must subside for the alarm to stop
- When the 9-minute Alarm Silence period expires:
If the smoke concentration or temperature has dropped below alarm threshold, the Mini Smoke Detector will sound a 2-tone beep and, transmits an alarm restore signal and returns to normal operation mode.
If the smoke concentration or temperature is still above alarm threshold, the Mini Smoke Detector will sound the alarm again.

● **Recalibration**

As the operation condition of the Mini Smoke Detector may vary after being installed for some time, you may wish to recalibrate the Mini Smoke Detector to take a new smoke detection threshold value and ensure optimal performance of the Mini Smoke Detector. To do this:

- Press 20 seconds on the Test Button and hold until the Red LED starts to flash. The Mini Smoke Detector will sound 3 short beeps then follow the calibration process to take the new reference value with the Red LED will flash every 2 seconds to indicate.
- If calibration fails, the Mini Smoke Detector will continuously beep with Orange LED flashing every second, you need to remove the battery, press the Test Button twice to fully discharge the battery, then reinsert the batteries to restart Mini Smoke Detector.
- Every time the battery is removed and reinserted, the Mini Smoke Detector will also take the new threshold value following the warming and calibration process.

● **Auto-Calibration**

- The Mini Smoke Detector will perform auto-calibration whenever temperature changes by $\pm 5^{\circ}\text{C}$. The Mini Smoke Detector does not give any visual or audio indication during auto-calibration process.

ZigBee Network Setup

● **ZigBee Device Guideline**

ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission.

Due to the fundamental structure of ZigBee network, ZigBee device will actively seek and join network after powering on. Since performing a task in connecting network may consume some power, it is required to follow the instructions to avoid draining battery of a ZigBee device

- Ensure your ZigBee network router or coordinator is powered on before inserting battery into the ZigBee device.
- Ensure the ZigBee network router or coordinator is powered on and within range while a ZigBee device is in use.
- Do not remove a ZigBee device from the ZigBee network router or coordinator without removing the battery from a ZigBee device.

● **Joining the ZigBee Network**

As a ZigBee device, the Mini Smoke Detector needs to join a ZigBee network to transmit signal when smoke concentration or temperature is detected. Please follow the steps below to join the Mini Smoke Detector into ZigBee network.

The Mini Smoke Detector has 3 ZigBee Endpoints for PIR, Smoke Detector and Temperature Sensor function. When joining ZigBee network, it will be recognized as **3 separate ZigBee devices** and will occupy **3 zones** in your ZigBee network coordinator.

1. Insert the battery into the battery compartment to power on the Mini Smoke Detector.
2. The Mini Smoke Detector will emit 2 short beeps, and begin warm up for **1 minute**, LED flashes every 2 seconds.
3. After 1-minute warm up period expires, the Mini Smoke Detector will emit a beep to indicate it now enters calibration process. The calibration process takes 1~7 minutes; the LED will continue to flash during calibration.
Joining ZigBee network is **prohibited** during warm up and calibration process. After calibration process the Mini Smoke Detector will emit a 2-tone beep, LED will turn off.
4. **The Mini Smoke Detector is only available for joining the ZigBee network after completing calibration.**
Press and hold the Test Button for 10 seconds and release to search for existing ZigBee network. Please make sure

the permit-to-join feature on the router or coordinator of your ZigBee network is enabled.

5. After joining the ZigBee network, the Mini Smoke Detector will be registered in the network automatically. Please check the ZigBee coordinator, security system control panel or CIE (Control and Indicating Equipment) to confirm if joining and registration is successful.
6. When calibration is complete, the Mini Smoke Detector will emit 2 beeps and LED will stop flashing to indicate it is now under normal operation. If calibration fails, the Mini Smoke Detector will sound continuous beep.
7. Under normal operation, if the Mini Smoke Detector loses connection to its current ZigBee network, the LED indicator will flash every 20 minutes to indicate the situation. Please check your ZigBee network condition and Mini Smoke Detector signal range to correct the situation.

● **Removing Device from ZigBee Network (Factory Reset)**

To remove the Mini Smoke Detector from current ZigBee network, the Mini Smoke Detector must be put to Factory Reset to complete device removal. Factory Reset function will clear the device of its stored setting information and prompt the device to search for new ZigBee network.

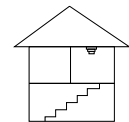
Before removing device, make sure the Mini Smoke Detector is within current ZigBee network signal range

1. Press and hold the function button for 10 seconds, then release the button to reset Mini Smoke Detector.
2. Upon reset, the device will clear current ZigBee network setting and transmit signal to ZigBee coordinator to remove itself from current ZigBee network. It will then actively search for available ZigBee network again and join the network automatically.

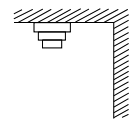
Installation

● **Installation Guideline**

- It is recommended that the installation site be in the center area of the ceiling.
- Do not locate the detector in the following locations:
 - The Kitchen – Smoke from cooking might cause an unwanted alarm.
 - Near a ventilating fan, florescent lamp or air-conditioning equipment – air drafts from them may affect the sensitivity of the detector.
 - Near ceiling beams or over a cabinet – stagnant air in these areas may affect the sensitivity of the detector.
 - In the peak of an “A” frame type of ceiling.



At the top of a stairway



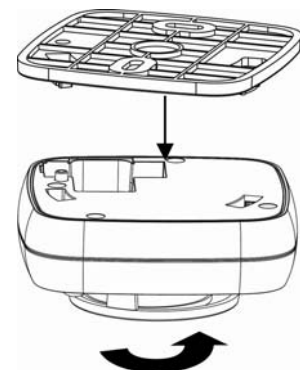
At least 60 cm from the wall

● **Installation Recommendation**

- **It is recommended to install the Mini Smoke Detector in the following locations.**
 - In a ceiling area with full view of its detection coverage unobstructed by appliances and furniture.
 - Near the entrance of a room or house to monitor entry activity.
- **Limitations**
 - Do not install the Mini Smoke Detector exposed to direct sunlight.
 - Avoid installing the Mini Smoke Detector in areas where devices may cause rapid change of temperature in the detection area, i.e. air conditioner, heaters, etc.
 - Avoid large obstacles in the detection area.
 - Do not pointing directly at sources of heat e.g. Fires or boilers, and not above radiators.
 - Avoid moving objects in the detection area i.e. curtain, wall hanging etc.
- Press the Test Button to enter Test Mode. Walk around the protected area noting when the LED lights up and check that the detection coverage is adequate.
- When detection coverage is found to be satisfying, installation is now completed.

● **Mounting the Mini Smoke Detector**

- Step 1.** Place the Mini Smoke Detector at desired mounting location and use the Range Test function to make sure the Mini Smoked Detector can be received by the Control Panel at mounting location.
 - Step 2.** The Mini Smoked Detector has a mounting bracket for ceiling installation. Use the holes on the bracket as template; mark the mounting location on ceiling.
 - Step 3.** Screw the mounting bracket onto the ceiling according marked locations, drill holes in and insert wall plugs if required.
 - Step 4.** Align the mounting holes on Mini Smoke Detector with the hooks on the mounting bracket. Fit the Mini Smoke Detector onto bracket and rotate clockwise to lock the hook. Installation is now complete.
- The Mini Smoke Detector is designed to be mounted on the ceiling.
 - The ideal mounting height for the Mini Smoke Detector is 2.4 meters to 3 meters. Mounting above 3 meters can affect detection performance.

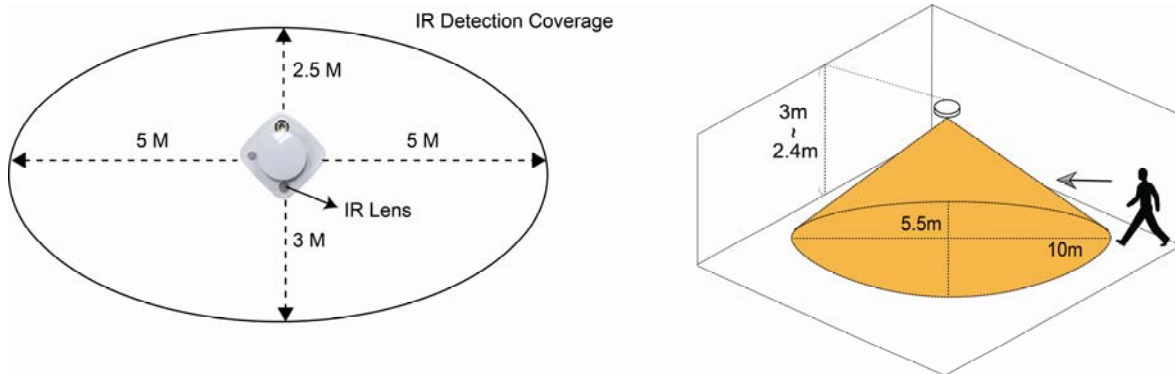


- One side of the Mini Smoke Detector has less detection coverage (2.5 meters) due to Mini Smoke Detector Chamber blocking the IR coverage range.
- The detection coverage for the Mini Smoke Detector is 10 meters horizontally and 5.5 meters vertically when the Mini Smoke Detector is mounted as the below picture:
- For optimal performance, rotate the Mini Smoke Detector so that the intruder would move across its detection area from side to side.

<NOTE>

☞ To find out the “sides” of the Mini Smoke Detector. Hold the Mini Smoke Detector with LED indicator pointing upward, and the left and right sides of the Mini Smoke Detector are considered the Smoke Detector’s sides. The Mini Smoke Detector sensor is most sensitive when the intruder is moving from one side to the other.

- Refer to the diagrams below for more information.

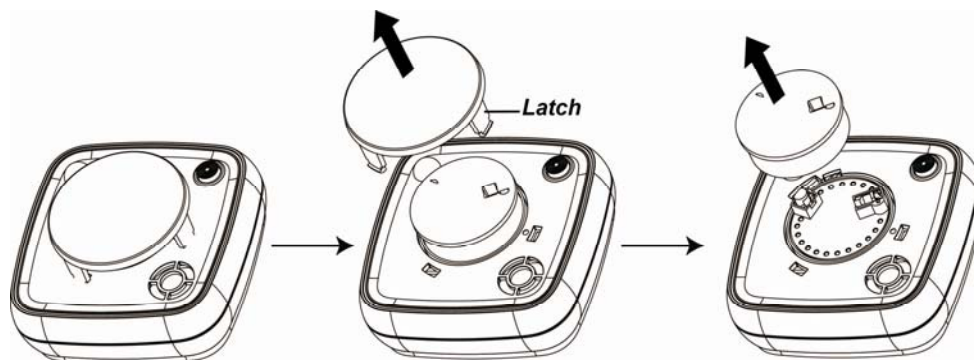


● Maintenance

The top cover and the smoke detecting chamber can be detached from the Mini Smoke Detector for maintenance. Follow the steps below to maintain the smoke detecting chamber:

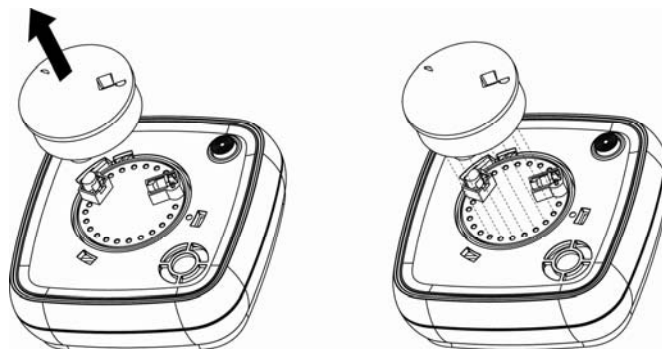
Step 1. Remove the top cover by gently pressing the latches by using your fingers.

Step 2. Pull out the smoke detecting chamber.



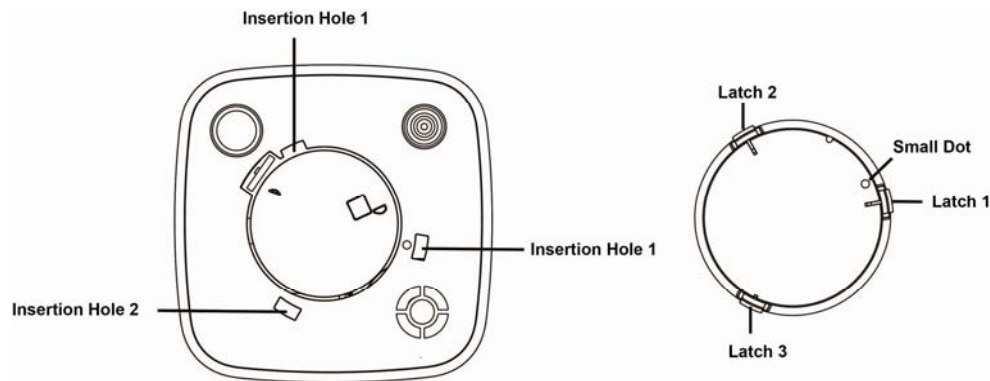
Step 3. Pull out the anti-insect mesh inside the chamber and clean the chamber and mesh with brush or water.

Step 4. Re-insert the anti-insect mesh into the chamber and insert the chamber back onto the Mini Smoke Detector. Please make sure the chamber is dry before re-inserting back onto the Mini Smoke Detector.



Step 5. Insert the top cover back onto the Mini Smoke Detector. The top cover includes 3 insertion latches

to stabilize. Each latch correspond to the insertion holes on the Mini Smoke Detector. Match the numbers as below picture shown to place the top cover back to the Mini Smoke Detector. (Latch 1 is located next to a small dot)



Appendix

(The Appendix information is for developers only.)

• Temperature Sensor Cluster ID

Device ID: IAS Zone 0x402 //SD	
Endpoint: 0x01	
Device ID: IAS Zone 0x402 //IR	
Endpoint: 0x02	
Device ID: Temperature Sensor 0x0302 //TS	
Endpoint: 0x03	
Server Side	Client Side
Mandatory	
Basic (0x0000) – EP1	Basic (0x0000)
Identify(0x0003) – EP1	
IAS Zone (0x402) – EP1, EP2	
Temperature Measurement(0x0302) – EP3	
Optional	
None	None

• Attribute of Basic Cluster Information

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZCLVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0x01	M
0x0001	<i>ApplicationVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0x00	O
0x0003	<i>HWVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0	O
0x0004	<i>ManufacturerName</i>	Character String	0 – 32 bytes	Read only	Climax Technology	O
0x0005	<i>ModelIdentifier</i>	Character String	0 – 32 bytes	Read only	(Model Number)	O
0x0006	<i>DateCode</i>	Character String	0 – 16 bytes	Read only		O
0x0007	<i>PowerSource</i>	8-bit	0x00 –0xff	Read only		M
0x0010	<i>LocationDescription</i>	Character String	0 – 32 bytes	Read / Write		O
0x0011	<i>PhysicalEnvironment</i>	8-bit	0x00 –0xff	Read / Write	0x00	O
0x0012	<i>DeviceEnabled</i>	Boolean	0x00 –0x01	Read / Write	0x01	M

- **Attribute of Identify Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>IdentifyTime</i>	Unsigned 16-bit integer	0x00 –0xffff	Read / Write	0x0000	M

- **Attribute of IAS Zone Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0001	<i>ZoneState</i>	8-bit Enumeration	All	Read only	0x00	M
0x0002	<i>ZoneType</i>	8-bit Enumeration	All	Read only		M
0x0003	<i>ZoneStatus</i>	16-bit bitmap	All	Read only	0x00	M
0x0010	<i>IAS_CIE_ADDRESS</i>	IEEE ADDRESS	Valid 64bit IEEE address	Read / Write		M
0x0011	<i>ZONE_ID</i>	Unsigned 8-bit integer	All	Read only	0xFF	M

- **Attribute of Temperature Measurement Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>MeasuredValue</i>	Signed 16-bit Integer	MinMeasuredValue to MaxMeasuredValue	Read only	0x00	M
0x0001	<i>MinMeasuredValue</i>	Signed 16-bit Integer	0x954d – 0x7ffe	Read only	-10	M
0x0002	<i>MaxMeasuredValue</i>	Signed 16-bit Integer	0x954e – 0x7fff	Read only	90	M

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- . Reorient or relocate the receiving antenna.
- . Increase the separation between the equipment and receiver.
- . Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- . Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 0.5 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 0.5 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.