



***FUNCTIONAL SPECIFICATION***  
**VCS-ECOTSS01-1**  
**EcoFlow Touch-Screen Transmitter**

Revision History

Rev. 0: Draft Release. M.R. 12/11/2012.

Rev. 1: Clarified transmission delay when cycling to THERMOSTAT mode. M. Rogers 12/12/2012.

Rev. 2: Modified transmission delay to include all modes instead of THERMOSTAT mode only. M. Rogers 12/13/2012.

Rev. 3: Changed transmission delay from 3-seconds to 2-seconds. M. Rogers 12/12/2012

Rev. 4: Changed transmission frequency from 433.92MHz to 303.0MHz. M.R. 12/17/2012.

Rev. 5: Changed reaction to 1<sup>st</sup> touch of LCD screen (will only illuminate backlight – no reaction to associated Zone function). M.R. 12/21/2012.

Rev. 6: Changed reaction to 1<sup>st</sup> press of push-buttons (will only illuminate backlight – no reaction to associated button function). M.R. 2/7/2013.

Rev. 7: Changed Room Temperature Limit feature to operate in ALL modes of operation (including OFF modes). M.R. 3/21/2014.

Rev. 8: Added LCD display flashing sequence during Main Burner ON and Cont. Pilot ignition sequences. Reference SKCN16-019. M.R. 10/19/2016

Rev. 9: Added "1" Suffix to model number per SKYCN17-006. M. Rogers 5/19/2017.

Rev. 10: Clarified Program Setup sequence and factory presets & removed reference to model 5301P, corrected FLAME Zone LCD displays for ON States to include FLAME-B icon and setting. M. Rogers 7/17/2019.

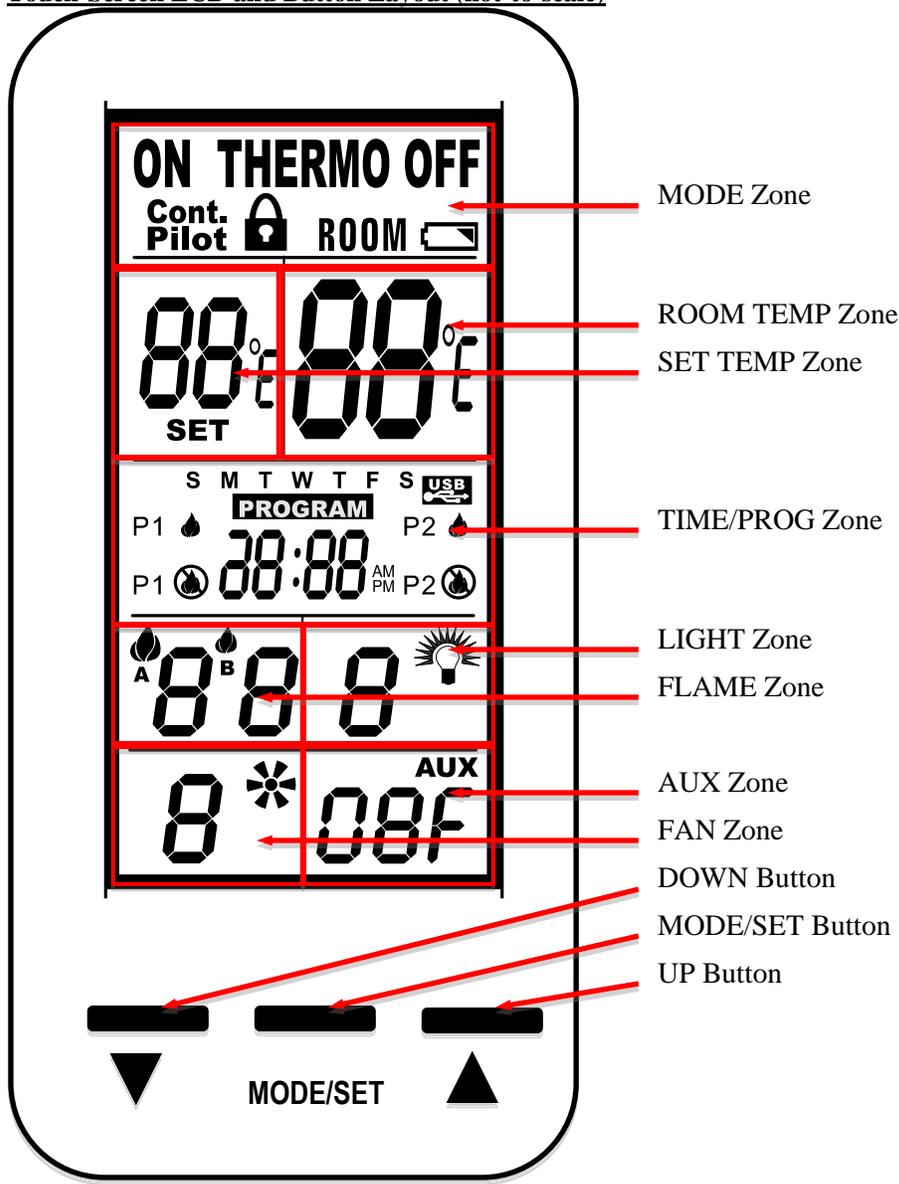
### Objective

Define basic construction, touch-screen LCD & button layout, and operational parameters for a wireless transmitter to operate the Copreci Valve IPI control module.

### Basic Construction

- Transmitter body should be the same construction as model series AF-4000TSS##.
- Touch-Screen LCD and three push buttons will allow input from users - the 1<sup>st</sup> touch of the LCD screen or press of a push button will only illuminate the backlight (will not respond to associated function).
- LCD screen will provide system status & input feedback to user.
- Backlight will illuminate LCD screen for 5 seconds after any user input.
- Powered via four AAA sized batteries (6V nominal) with LOW BATTERY INDICATOR (5.0V).
- Transmission Frequency: 303.8MHz, certified per FCC Part 15B/ANSI C63.4 and IC RSS-210.

### Touch-Screen LCD and Button Layout (not-to-scale)



## **Functional Description**

*Note: All function adjustments will be automatically accepted 15-seconds after pressing a given touch zone or button. The user may press the MODE/SET button to immediately accept the adjustment manually.*

### **Day and Time Display**

- The current day of week and time of day will be continuously displayed in the TIME/PROG Zone (except during Setup operations).
- The day of week will be displayed as one of the following: S, M, T, W, T, F, S
- The time of day will be in 12-hour AM, 12-hour PM format. Midnight will be displayed as 12:00am.
- Day/Time Setup:
  - Press and hold the MODE Zone for 5 seconds to enter Day/Time Setup.
  - Press the UP or DOWN Buttons to adjust the day of week (press the MODE/SET Button or wait for 15 seconds for adjustment to be accepted, then enter hour of day adjustment).
  - Press the UP or DOWN Buttons to adjust the hour of the day. The time will advance in 1-hour increments; AM and PM will change when the hour advances to 12:00 midnight and 12:00 noon respectively (press the MODE/SET Button or wait for 15 seconds for adjustment to be accepted, then enter minute of hour adjustment).
  - Press the UP or DOWN Buttons to adjust the minute of the hour. The time will advance in 1-minute increments (press the MODE/SET Button or wait for 15 seconds and the transmitter will exit Day/Time Setup and return to normal operation).
  - LCD Displays – when in Day/Time Setup:
    - MODE Zone: Blank
    - ROOM TEMP Zone: Blank
    - SET TEMP Zone: Blank
    - LIGHT Zone: Blank
    - FAN Zone: Blank
    - TIME/PROG Zone: Day of Week, or Time of Day will Flash
    - AUX Zone: Blank
    - FLAME Zone: Blank

### **Modes of Operation**

Operation modes:

- MANUAL OFF
- MANUAL ON
- THERMOSTAT
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The modes may be cycled in the order above by pressing the MODE Zone or the MODE/SET Button. There will be a 2-second delay before the associated transmission is sent (the display will be updated immediately).

MANUAL OFF Mode:

- Transmits flame OFF command.
- LCD Displays:
  - MODE Zone: OFF is displayed
  - ROOM TEMP Zone: Measured temperature is displayed

- SET TEMP Zone: Blank
- LIGHT Zone: LIGHT and light setting level is displayed
- FAN Zone: Blank
- TIME/PROG Zone: Current day indicator and current time is displayed
- AUX Zone: AUX and AUX setting is displayed
- FLAME Zone: Blank

MANUAL ON Mode:

- Transmits flame ON command
- LCD Displays:
  - MODE Zone:
    - ON will flash (~0.5 seconds on & ~0.5 seconds off) for 15-seconds, then ON will be displayed continuously.
  - ROOM TEMP Zone: Measured temperature is displayed
  - SET TEMP Zone: Blank
  - LIGHT Zone: LIGHT and light setting level is displayed
  - FAN Zone: FAN and fan setting level is displayed
  - TIME/PROG Zone: Current day indicator and current time is displayed
  - AUX Zone: AUX and AUX setting is displayed
  - FLAME Zone: Flame-A and Flame-B Icons and flame setting level numbers are displayed

THERMOSTAT Mode:

- Will cycle flame on and off based on room and set temperatures. Will transmit ON command if SET TEMP (+SWING) is higher than ROOM TEMP and will transmit OFF command if SET TEMP (-SWING) is lower than ROOM TEMP.
- Built-in thermostat will measure room temperature.
- All programming should be written for deg. F and converted to deg. C when selected.
- Temperatures may be displayed in degrees F (factory default) or degrees C. Press the UP and DOWN Buttons simultaneously to change between degrees F and C.
- SET TEMP: While in THERMOSTAT mode, press the UP or DOWN Button to change the SET TEMP (45-90 deg. F, 7-32 deg. C); the new set temperature will automatically be accepted after 2 seconds. The factory default SET TEMP is 68 deg. F.
- SWING Temperature: This model does not allow for SWING temperature adjustment. This model utilizes thermostatic flame modulation that will modulation the main flame based on the difference between room temperature and set temperature (see example below).
  - Important - factory SWING TEMPERATURE setting is 2 degrees. The thermostatic flame modulation feature will not allow this SWING to be changed.

EXAMPLE:

<u>Set Temperature</u>	<u>Room Temp.</u>	<u>Flame Level</u>
	74F	OFF
	73F	Level 1
Set Temperature (72) →	72F	Level 2
	71F (or less)	Level 3

- Manual Flame Adjustment while in THERMOSTAT mode: If Flame-A is manually adjusted while in thermostat mode, it will override the automatic flame setting until the flame cycles off, then back ON thermostatically; when the flame cycles ON again,

automatic flame adjustment will resume. Automatic flame adjustment will also resume if the operational mode is cycled out of, then back into THERMOSTAT mode or if the SET temperature is changed.

- THERMOSTAT OFF LCD Displays:
  - MODE Zone: THERMO and OFF is displayed
  - ROOM TEMP Zone: Measured temperature is displayed
  - SET TEMP Zone: SET TEMP is displayed
  - LIGHT Zone: LIGHT and light setting level is displayed
  - FAN Zone: Blank
  - TIME/PROG Zone: Current day indicator and current time is displayed
  - AUX Zone: AUX and AUX setting is displayed
  - FLAME Zone: Blank
- THERMOSTAT ON LCD Displays:
  - MODE Zone:
    - THERMO and ON will flash (~0.5 seconds on & ~0.5 seconds off) for 15-seconds, then THERMO and ON will be displayed continuously.
  - ROOM TEMP Zone: Measured temperature is displayed
  - SET TEMP Zone: SET TEMP is displayed
  - LIGHT Zone: LIGHT and light setting level is displayed
  - FAN Zone: FAN and fan setting level is displayed
  - TIME/PROG Zone: Current day indicator and current time is displayed
  - AUX Zone: AUX and AUX setting is displayed
  - FLAME Zone: Flame-A and Flame-B Icons and flame setting level numbers are displayed

#### Thermostat Disable Feature

- The Thermostat Mode (described above) may be disabled for applications where a thermostat is not allowed or undesirable. When Thermostat Mode is Disabled:
  - The Modes of operation will cycle between MANUAL ON and MANUAL OFF (omitting THERMO).
  - Program Operation (described below) is also disabled.
  - The SET TEMP zone will be blank.
  - The room temperature will still be measured & displayed in the ROOM TEMP Zone.
  - The TIME/PROG zone will continue to display the Clock and Day of week, but none of the icons associated with Program Mode will be displayed.
- To disable or re-enable the Thermostat, the transmitter must be in MANUAL OFF Mode, then press and hold the SET TEMP Zone and the DOWN Button simultaneously for 10-seconds. The LCD screen will go blank except either THERMO and OFF or THERMO and ON will flash 3-times (0.5-seconds OFF, 0.5-seconds ON) to indicate the change has been made.

#### Room Temperature Limit

- The Room Temperature Limit Shutdown feature will operate in all modes of operation MANUAL ON & OFF, THERMOSTAT ON & OFF mode, and PROGRAM ON & OFF modes. If the room temperature reaches 95 deg. F or greater, the transmitter will automatically change to MANUAL OFF mode and send a MANUAL OFF command to the control module. If the user turns the control back ON and the room temperature is still 95F or greater, the transmitter will switch to back manual OFF and send another

MANUAL OFF command the next time the transmitter reads & updates the room temperature (2-minute update interval).

### Program Operation

- Press the TIME/PROG Zone to activate or deactivate Program Operation. Pressing the MODE Zone or the MODE/SET Button will also deactivate Program Operation. When Program Operation is deactivated, the transmitter will return to MANUAL OFF Mode.
- Program Operation will cycle fireplace ignition ON and OFF based on time settings (2 weekend periods and 2 weekday periods) and thermostat settings.
- To enter Program Setup, press and hold the TIME/PROG Zone for 5 seconds.
- Press the MODE/SET Button or wait for 15 seconds to advance to each subsequent program setting.
- Program setting sequence and factory default settings:
  - Weekend Program 1
    - ON: 6:00am
    - OFF: 10:00am
    - SET TEMP: 68-Deg. F.
  - Weekend Program 2
    - ON: 5:00pm
    - OFF: 10:00pm
    - SET TEMP: 68-Deg. F.
  - Weekday Program 1
    - ON: 5:00am
    - OFF: 9:00am
    - SET TEMP: 68-Deg. F.
  - Weekday Program 2
    - ON: 4:00pm
    - OFF: 10:00pm
    - SET TEMP: 68-Deg. F.
- Program Setup LCD Displays:
  - MODE Zone: Current mode is displayed
  - ROOM TEMP Zone: Measured temperature is displayed
  - SET TEMP Zone: Set temperature for program segment being adjusted is displayed and will flash if SET TEMP is selected for adjustment.
  - LIGHT Zone: LIGHT and light setting level is displayed
  - FAN Zone: If MODE is in an ON state, FAN and fan setting level is displayed. If MODE is in an OFF state, FAN zone will be blank.
  - TIME/PROG Zone: PROGRAM, currently selected segment icons (either S&S Icons for weekend segment or MTWTF Icons for week day segment, and either P1-ON, P1-OFF, P2-ON or P2-OFF), and currently selected program segment ON/OFF time setting is displayed and will flash if segment time setting is selected for adjustment.
  - AUX Zone: AUX and AUX setting is displayed
  - FLAME Zone: If MODE is in an ON state, Flame-A and Flame-B Icons, and Flame setting levels are displayed. If MODE is in an OFF state, FLAME zone will be blank.
- Program OFF LCD Displays:
  - MODE Zone: OFF
  - ROOM TEMP Zone: Measured temperature is displayed
  - SET TEMP Zone: Blank

- LIGHT Zone: LIGHT and light setting level is displayed
- FAN Zone: Blank
- TIME/PROG Zone: Current day indicator, current time, and Program status (P1-OFF or P2-OFF) is displayed
- AUX Zone: AUX and AUX setting is displayed
- FLAME Zone: Blank
- Program ON LCD Displays:
  - THERMO ON:
    - THERMO and ON will flash (~0.5 seconds on & ~0.5 seconds off) for 15-seconds, then THERMO & ON will be displayed continuously.
  - THERMO OFF: THERMO and OFF is displayed.
  - ROOM TEMP Zone: Measured temperature is displayed
  - SET TEMP Zone: SET TEMP is displayed
  - LIGHT Zone: LIGHT and light setting level is displayed
  - FAN Zone:
    - If Thermostat is ON, FAN and fan setting number is displayed
    - If Thermostat is OFF, display is blank.
  - TIME/PROG Zone: Current day indicator, current time, and Program status (P1-ON or P2-ON) is displayed
  - AUX Zone: AUX and AUX setting is displayed
  - FLAME Zone:
    - If Thermostat is ON, Flame-A and Flame-B Icons and flame setting level numbers are displayed.
    - If Thermostat is OFF, display is blank.

#### Program Disable Feature

- The Program Mode (described above) may be disabled for applications where a program operation is not allowed or undesirable. When Program Mode is Disabled:
  - The user will not be able to activate Program Mode
  - The user will not be able to enter Program Setup or edit Program Mode settings.
  - The TIME/PROG zone will continue to display the Clock and Day of week, but none of the icons associated with Program Mode will be displayed.
- To disable or re-enable the Program Mode, the transmitter must be in MANUAL OFF Mode, then press and hold the TIME/PROG Zone and the DOWN Button simultaneously for 10-seconds. The LCD screen will go blank except either PROGRAM and OFF (OFF display in MODE Zone) or PROGRAM and ON (ON display in MODE Zone) will flash 3-times (0.5-seconds OFF, 0.5-seconds ON) to indicate the change has been made.

#### Flame-A (or Main) Adjustment

- Transmits a flame height setting command to the control module to adjust the Flame-A height.
- Available settings are 1-3 with a factory default of 3. If the Flame-A setting is changed during operation (either manually or automatically), the control will remember and use the adjusted setting on subsequent manual ON cycles (Flame-A setting memory). Refer to the THERMOSTAT Mode section for additional details on flame modulation in THERMOSTAT mode.
- While in MANUAL ON, THERMOSTAT ON, or PROGRAM ON modes, press the FLAME Zone to enter Flame-A Adjustment, then press the UP or DOWN buttons to raise and lower the flame; press the MODE/SET Button or wait for 15 seconds to accept the new setting.

- LCD Display: When setting the Flame-A height, the Flame-A icon, and Flame-A setting number will flash in the FLAME Zone.

#### Flame-B (or Rear) Adjustment

- Transmits a flame height setting command to the control module to adjust the Flame-B height.
- Available settings are 0 (off) – 3 with a factory default of 3. If the user changes the Flame-B setting during operation, the control will remember and use the adjusted setting on subsequent manual ON cycles (Flame-B setting memory).
- While in MANUAL ON, THERMOSTAT ON, or PROGRAM ON modes, press the FLAME Zone twice enter Flame-B Adjustment (first press is Flame-A adjustment), then press the UP or DOWN buttons to raise and lower the flame; press the MODE/SET Button or wait for 15 seconds to accept the new setting.
- LCD Display: When setting the Flame-B height, the Flame-B icon, and Flame-B setting number will flash in the FLAME Zone.

#### Flame-B Adjustment Disable Feature

- The Flame-B Adjustment Feature (described above) may be disabled for applications where secondary flame adjustment is not used. When Flame-B Adjustment is Disabled:
  - The Flame-B Icon and setting number will not be displayed.
  - No adjustment to the Flame-B setting can be made.
- To disable or re-enable the Flame-B Adjustment, the transmitter must be in MANUAL OFF Mode, then press and hold the FLAME Zone and the DOWN Button simultaneously for 10-seconds. The LCD screen will go blank except either the FLAME-B Icon and OFF (OFF display in MODE Zone) or the FLAME-B Icon and ON (ON display in MODE Zone) will flash 3-times (0.5-seconds OFF, 0.5-seconds ON) to indicate the change has been made.

#### Fan Adjustment

- Transmits a fan setting command to the control module to adjust the fan output level.
- Available settings are 0 (off) – 6 with a factory default setting of 3. If the user changes the fan speed during operation, the control will remember and use the adjusted setting on subsequent fan ON cycles (fan speed memory).
- While in Manual ON, THERMOSTAT ON, or PROGRAM ON modes, press the FAN Zone to enter Fan Adjustment, then press the UP or DOWN buttons to increase or decrease the fan output; press the MODE/SET Button or wait for 15 seconds to accept the new setting.
- LCD Displays:
  - When raising or lowering the fan output level with the UP or DOWN buttons, the fan icon and fan setting number will flash in the FAN Zone.

#### Fan Adjustment Disable Feature

- The Fan Adjustment Feature (described above) may be disabled for applications where a fan is not used. When the Fan Adjustment Feature is Disabled:
  - The FAN icon and setting number will not be displayed.
  - No adjustment to the Fan setting can be made.
  - The FAN output will not be energized.
- To disable or re-enable the Fan Adjustment Feature, the transmitter must be in MANUAL OFF Mode, then press and hold the FAN Zone and the DOWN Button simultaneously for 10-seconds. The LCD screen will go blank except either the FAN Icon and OFF (OFF

display in MODE Zone) or the FAN Icon and ON (ON display in MODE Zone) will flash 3-times (0.5-seconds OFF, 0.5-seconds ON) to indicate the change has been made.

#### Light Adjustment

- Transmits a light setting command to the control module to adjust the light output level.
- Available settings are 0 (off) – 6 with a factory default of 0 (off).
- While in any mode of operation, press the LIGHT Zone to enter Light Adjustment, then press the UP or DOWN buttons to raise or lower the light output; press the MODE/SET Button or wait for 15 seconds to accept the new setting.
- LCD Displays:
  - When raising or lowering the light output level with the UP or DOWN buttons, the light icon and light setting number will flash in the LIGHT Zone.

#### Light Adjustment Disable Feature

- The Light Adjustment Feature (described above) may be disabled for applications where electrical lighting is not used. When the Light Adjustment Feature is Disabled:
  - The LIGHT icon and setting number will not be displayed.
  - No adjustment to the Light setting can be made.
  - The LIGHT output may not be energized.
- To disable or re-enable the Light Adjustment Feature, the transmitter must be in MANUAL OFF Mode, then press and hold the LIGHT Zone and the DOWN Button simultaneously for 10-seconds. The LCD screen will go blank except either the LIGHT Icon and OFF (OFF display in MODE Zone) or the LIGHT Icon and ON (ON display in MODE Zone) will flash 3-times (0.5-seconds OFF, 0.5-seconds ON) to indicate the change has been made.

#### AUX Adjustment

- Transmits an AUX setting command to the control module to turn the AUX output ON or OFF.
- While in any mode of operation, press the AUX Zone to enter AUX Adjustment, then press the UP or DOWN buttons to turn the AUX output ON or OFF; press the MODE/SET Button or wait for 15 seconds to accept the new setting.
- LCD Display:
  - When adjusting the AUX output, AUX and AUX setting (ON or OFF) will flash in the AUX Zone.

#### AUX Adjustment Disable Feature

- The AUX Adjustment Feature (described above) may be disabled for applications where an AUX output is not used. When the AUX Adjustment Feature is Disabled:
  - AUX and the setting will not be displayed.
  - No adjustment to the AUX setting can be made.
  - The AUX output may not be energized.
- To disable or re-enable the AUX Adjustment Feature, the transmitter must be in MANUAL OFF Mode, then press and hold the AUX Zone and the DOWN Button simultaneously for 10-seconds. The LCD screen will go blank except either AUX and OFF (OFF display in MODE Zone) or AUX and ON (ON display in MODE Zone) will flash 3-times (0.5-seconds OFF, 0.5-seconds ON) to indicate the change has been made.

### Continuous Pilot Operation

- To activate or deactivate the Continuous Pilot Feature, press and hold the MODE/SET and UP Buttons simultaneously for 5 seconds.
- LCD Display: When activated, CONT. PILOT will flash for 15-seconds, then CONT. PILOT be displayed continuously in the MODE Zone.

### Child-Lock Operation

- Child-Lock operation prevents any user input to the transmitter. No mode of operation or feature may be adjusted when Child-Lock is activated. All automatic functions (thermostat, program, etc.) will continue normally.
- To activate or deactivate the Child-Lock feature, press and hold the MODE/SET and DOWN Buttons simultaneously for 5 seconds.
- LCD Displays:
  - When activated, the LOCK icon will appear in the MODE Zone.
  - If any touch-zone or button is pressed when activated, the LCD backlight will illuminate and the LOCK icon will flash for 5 seconds in the MODE Zone.

### Communication Safety

- In manual ON, thermostat and program modes of operation, the transmitter will send a communication safety transmission every 15-minutes. This signal is further processed by the ignition control module to verify the transmitter is communicating properly.

### FCC REQUIREMENTS

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

Note:

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 or more 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.