InfraSignal Radio

Operators Manual & Installation Guide

The **InfraSignal Radio** is an extremely low frequency (ELF) radio receiver with Built-In-Test, Alarm and Safety functions.

HEAR THE WHISPERED WARNINGS

Our primary mission is to provide safety devices for persons to alert them of impending dangers from geological, solar and man-made sources. However, the ELF receiver has other valuable uses.

Thank you for buying one of our personal safety alarm systems. We hope this system brings you piece of mind, knowing that if there is an impending danger, you will be alerted.

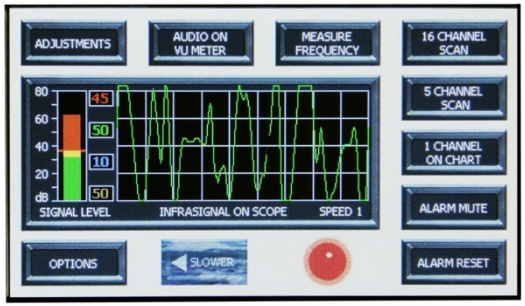
All mode pages in this manual explain how the modes are used and how to set them up. Once they are set up, they will retain all the settings when powered off.

The installation pages are a guide to help you install the safety systems. These pages are a guide only. Other installation methods may be used. Any damage to property during installation is the responsibly of the person or persons performing the installation. Infrasignal Radio, LLC will not be held responsible for any damages.

Under normal use and conditions, the Infrasignal Radio, the 3D Seismic Sensor and the EMP Sensor are warranted for two (2) years from date of purchase, parts and labor.

To receive warranty service Call Infrasignal Radio, LLC. 1-844-774-4625 and ask for an RMA, (Return Material Authorization).

DETECTOR MODES
INFRASIGNAL ON SCOPE



This is the mode recommended for homeowners. This mode is used with the 3D seismic sensor to detect ground vibrations from dangerous local sources. In this display the scope shows a rambling and noisy signal from the 3D seismic sensor and the SIGNAL LEVEL bar graph shows an extremely strong signal level, (the red part) above the adjustable alarm threshold. A signal level of this magnitude would only be seen in extreme and dangerous conditions. In this display the alarm sounded and the red light started flashing the instant the signal level exceeded the alarm threshold, (just above the yellow part). They have been flashing and sounding for some time in this display. It takes several seconds for the SIGNAL LEVEL bar graph to build up to the extreme indicated value. If you were using the **InfraSignal Radio** as a personal safety device to warn you of dangerous ground vibrations you should have evacuated already.

To set the system up to detect dangerous ground vibrations from local sources, first, take note of the level on the SIGNAL LEVEL bar graph, then go to the OPTIONS page. Ensure that the ALARM IS ENABLED, then go to FAST AGC (Automatic Gain Control). FAST AGC will appear in the CURRENT AGC SETTINGS window. Then go to INFRASIGNAL ON CHART or GO BACK TO MODE. From INFRASIGNAL ON CHART or INFRASIGNAL ON SCOPE, go to ADJUSTMENTS and adjust the red ALARM threshold to just above the signal level you took note of on the SIGNAL LEVEL bar graph. Then go back to the INFRASIGNAL ON CHART or SCOPE. The alarm threshold is shown numerically and by the two red markers, one on each side of the green/yellow/red signal level bar graph. This may require several tries (ADJUSTMENTS page – MODE page – ADJUSTMENTS page etc.) before reaching the "no faults alarms" level. If you get short burst of vibrations occasionally, try to identify the source and determine if they are benign. If they are not dangerous, the settings may be better if you set OPTIONS >> NORMAL AGC >> INFRASIGNAL ON CHART or GO BACK TO MODE and don't use the FAST AGC option. Every location and installation are different, so only local trial and error can determine the proper adjustments and settings to prevent faults alarms and yet be sensitive enough to detect very early rumbling of dangerous ground vibrations.

DETECT PULSE ON CHART

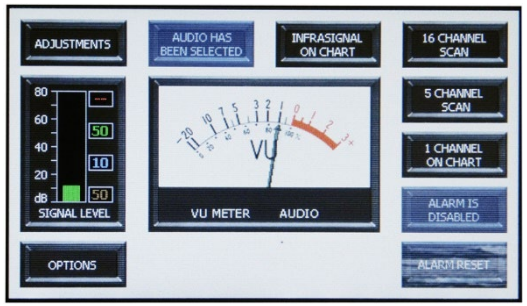
This is the normal mode used by those concerned with EMP. This mode of operation is used with the Nuclear & Solar EMP Sensor to detect both sources of EMP. In this display the strip chart shows a pulse that sounded the alarm immediately when it first appeared on the right edge of the screen. Unlike the alarm system setup to monitor for ground vibrations, the EMP Sensor setup does not require adjustments of the ALARM threshold. The EMP Sensor alarm setup works strictly with a magnetic pulse as seen on the DETECT PULSE ON STRIP CHART screen above. The EMP Sensor components are housed in an aluminum shield and do not respond to a voltage signal, only a magnetic variation such as a magnetic pulse. The signal level as seen on the SIGNAL LEVEL bar graph to the left will always be low except during a varying and prolonged Electromagnetic Pulse, (EMP).

To setup the system to detect a nuclear or solar EMP, go to OPTIONS >> NORMAL AGC >> FAST IMPULSE RESPONSE >> DETECT PULSE buttons. A red-letter P will appear in the CURRENT AGC SETTINGS window. This red-letter P indicates that the radio is setup to detect a fast pulse and sound the alarm. Select the DETECT PULSE ON CHART or the INFRASIGNAL ON CHART button. To monitor the system you can also use the INFRASIGNAL ON SCOPE mode. The system is now set up.

When an EMP is detected while using the detect pulse option, it is saved to nonvolatile memory very fast before the system loses AC power. When power is restored, (perhaps with a generator or backup battery) the alarm will sound and show a message that says "A pulse was detected before loss of power. To reset the alarm, go to OPTIONS >> ALARM TEST >> ALRM RESET". This ensures that you are alerted to a NUCLEAR or SOLAR EMP and power loss, the two events occurring together. The only way that this alarm condition can be reset, that is, when using the detect pulse option and after power is lost and then restored, is for a person to use the special sequence to reset it (go to OPTIONS >> ALARM TEST >> ALARM RESET). This special reset sequence is designed to prevent younger members of your crew from accidentally resetting it without your knowledge. They can easily mute the alarm sound, but unless they can read, it would be very unlikely they could reset the alarm. When a less than severe NUCLEAR or SOLAR EMP occurs and the power is not lost, the alarm will sound until it's reset. In this case, resetting the alarm is normal and does not require the special sequence.

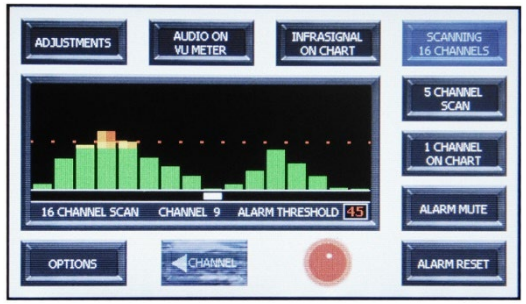
ADDITIONAL MODES & “BIT” TESTS

AUDIO ON VU METER



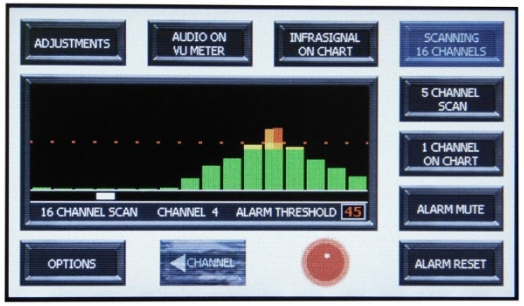
The **InfraSignal Radio** has a regular audio mode. This mode is very useful when used with an infrasound microphone or an infrasound hydrophone whose frequency response also covers the audio frequency range. Assuming you are monitoring an infrasound signal using one of the non-scanning modes i.e., INFRASIGNAL ON CHART, INFRASIGNAL ON SCOPE, 1 CHANNEL ON CHART, 1 CHANNEL ON SCOPE or FREQUENCY MEASUREMENT. You can switch to AUDIO ON VU METER to see if you hear a sound with the same rhythm. This can help you identify the source of the infrasound. You can measure the frequency of this infrasound by using the procedure described in the MEASURE FREQUENCY paragraph. The ALARM function is not available in the AUDIO ON VU METER mode.

16 CHANNEL SCAN, MULTIPLE SIGNALS



This is the mode of operation to use when you want to detect a signal that is mixed in with other signals as might be observed when using one of the wide-band infrasignal modes. The radio can process infrasignals from several sources, such as infrasonic microphones, infrasonic hydrophones and extremely large loop antennas, all of which can contain multiple signals. This mode scans the frequency range of 1 Hz to 30 Hz in 16 channels and uses narrow band filters to separate the signals. This mode of operation can be used with or without the alarm function turned on. In this display the alarm function is turned on. When either one or both signals cross the alarm threshold level the alarm will sound. See more details in the 16 CHANNEL SCAN – ONE SIGNAL paragraph.

16 CHANNEL SCAN – ONE SIGNAL

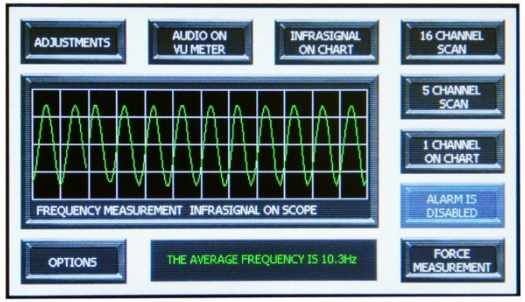


In this display, the alarm function is turned on and a relatively strong test signal is used. In this case it was detected and peaked in channel 12. When the signal level approaches the alarm threshold (red dotted line), it turns yellow. When it crosses the alarm threshold the first time the signal level turns orange and pauses for a few seconds to take a second measurement. If the signal level crosses the alarm threshold during the second measurement, it will turn red and sound the alarm. Making a second measurement greatly reduces the chance that a noise spike will cause a false alarm.

5 CHANNEL SCAN

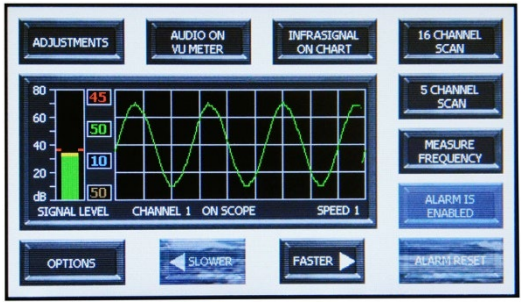
Occasionally you may want to watch for an infrasignal who’s frequency you’re not quite sure of. You don’t want to scan the whole frequency band, because it takes over one and a half minutes to scan the 16 channels and you might miss an abrupt signal. First, determine the channel number of the frequency you’re not quite sure of. Touch the OPTIONS >> USER GUIDE buttons. Go to PAGE 5. In the paragraph “5 CHANNEL SCAN” there is a list of channel numbers and corresponding upper and lower frequencies. Select the channel number that most likely covers the right frequency. Touch the GO BACK TO MODE >> 5 CHANNEL SCAN mode buttons, if not already selected. Then use the left <CHANNEL or right CHANNEL> buttons and continue to touch until the channel number indicated on the status bar is the one you selected from the list. The scan will start on the channel you selected. It will scan to the right, then scan to the left, back and forth across the five channels. You can speed up the scan by touching SCAN FASTER, but with a tradeoff. The signal strength measurement may not peak as strong and you may miss a very weak signal. When an infrasignal appears in a channel off to one side of center, the scan can be adjusted using the left <CHANNEL or right CHANNEL> buttons. To monitor the infrasignal, touch the 1 CHANNEL ON CHART button when the proper channel number appears on the status bar. To measure its frequency, touch 1 CHANNEL ON SCOPE >> MEASURE FREQUENCY.

MEASURE FREQUENCY



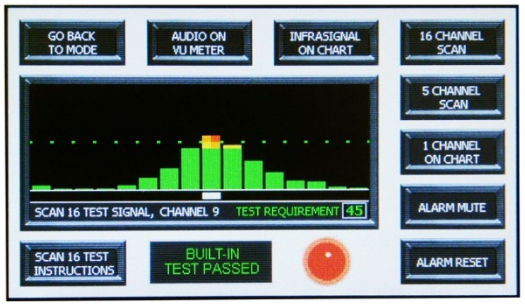
Measuring the frequency of a strong signal in one of the infrasignal modes is easy. Touch the INFRASIGNAL ON CHART >> INFRASIGNAL ON SCOPE >> MEASURE FREQUENCY buttons. The radio takes a sample of the signal and displays the frequency in green text in a window at the bottom of the screen. If the signal strength decreases and a message appears in the window "WAITING FOR A STRONGER SIGNAL", you can touch the FORCE MEASUREMENT button. This allows frequency measurements to be made all the way down to the noise level. The frequency measurements will be displayed in yellow text to indicate that the measurements are less accurate. When the signals are not strong, it is recommended that frequency measurements be made using the 1 CHANNEL mode. The first step is to determine which channel displays the strongest signal. Touch the 16 CHANNEL SCAN button and make a full scan. When you see which channel has the strongest signal, touch the 5 CHANNEL SCAN button and use the left CHANNEL button to back up. After the scan starts again and pauses in the channel with the strongest signal, touch the 1 CHANNEL ON CHART >> 1 CHANNEL ON SCOPE >> MEASURE FREQUENCY. The display will change to show the signal on the scope and an accurate frequency measurement in green text in the window below the scope. Again, you may want to measure the frequency of a much weaker signal that falls below a level that ensures an accurate measurement. As before, a message appears in the frequency measurement window, "WAITING FOR A STRONGER SIGNAL". Touch the FORCE MEASUREMENT button. The message disappears. The text in the frequency measurement window will turn yellow to indicate that the frequency measurements will be less accurate as those with the stronger signal.

1 CHANNEL ON SCOPE / CHART



This display shows a 1Hz signal in channel 1. The "1 CHANNEL ON SCOPE / CHART" are the **InfraSignal Radio's** most sensitive modes. Under test conditions, signals in the range of 2uv to 3uv (microvolts) have been detected. To monitor signals using these modes you must first select the channel you want to monitor. You can go to 16 CHANNEL SCAN or 5 CHANNEL SCAN and use the <left CHANNEL or right CHANNEL> buttons. When the channel number you want to monitor appears on the status bar, touch the 1 CHANNEL ON CHART button. The screen will change to show the SIGNAL LEVEL bar graph and the signal on the STRIP CHART window. If you prefer, you can touch the 1 CHANNEL ON SCOPE button and monitor the signal on the scope display. You can touch the same located button again (MEASURE FREQUENCY) and measure the signal's frequency. More detailed information is covered in the MEASURE FREQUENCY paragraph.

SCAN 16 TEST SIGNAL

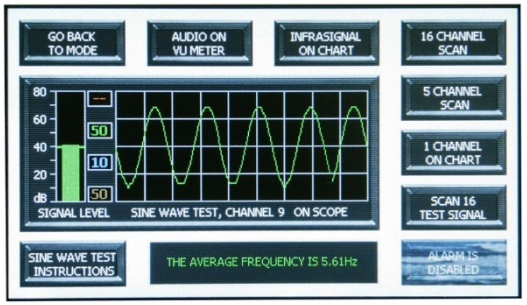


There are four (4) BUILT-IN-TEST (BIT) in the **InfraSignal Radio**. They are SCAN 16 TEST SIGNAL, SINE WAVE TEST SIGNAL, ALARM TEST and FREQUENCY MEASUREMENT test. To run these tests, go to the OPTIONS page. All of these tests are located in the lower right corner of the page. If you start with the SCAN 16 TEST SIGNAL test, the button will change to the SINE WAVE TEST SIGNAL test. The FREQUENCY MEASUREMENT test results are displayed at the bottom of the SINE WAVE TEST SIGNAL screen.

Except for the ALARM TEST, for best results, turn the radio off then disconnect the sensor from the radio. This can be done at any cable connection between the sensor and the radio. Turn the radio on and go back to the OPTIONS page. The SCAN 16 TEST SIGNAL and the SINE WAVE TEST SIGNAL are both system level test. That is, a signal from a built-in signal generator is fed into the signal input of the radio and goes through the entire system. The result is displayed on the screen. The SCAN 16 TEST SIGNAL is the first test to run when you want to test the radio's performance.

During this test, the radio will scan the 16 channels. As it approaches the middle of the screen, increasing signal strengths will be observed on the bar graphs. As it progresses, the signal strengths will increase until it reaches the center channel and crosses the test required green dotted alarm threshold. At this point the scan will pause and take a second measurement. If the second measurement crosses the green dotted alarm threshold, the alarm will sound. The red light will flash and a green message will appear at the bottom of the screen, "BUILT-IN TEST PASSED". If the scan completes the full 16 channels and the signal strengths do not cross the test required green dotted alarm threshold, a red message will appear at the bottom of the screen "BUILT-IN SYSTEM TEST FAILED". See Miscellaneous Notifications on page 3. At any time during this test, you can go to SCAN 16 TEST INSTRUCTIONS for more information. Touch the BACK TO SCAN 16 TEST button to return.

SINE WAVE TEST SIGNAL



The SINE WAVE TEST SIGNAL test is the second system level test to run when you want to check the radio's performance. Touch the SINE WAVE TEST SIGNAL button. The screen will change to show the SIGNAL LEVEL bar graph and scope display on channel 9. The SIGNAL LEVEL bar should be even (+/- 2 pixels @ room temperature) with the top of the two green markers. This is the gain calibration adjusted level to insure the maximum signal dynamic range. if so, the radio signal sensitivity part of the test has passed. A sine wave will show on the scope and you will hear the transformed infrasignal. At the bottom of the screen is the FREQUENCY MEASUREMENT window. The average frequency measurement should read between 5.4Hz and 5.7Hz, if so, the sine wave frequency measure test has passed. At any time during this test, you can touch the SINE WAVE TEST INSTRUCTIONS button for more information. Touch BACK TO SINE WAVE TEST to return.

SETTING UP THE EMP DETECTOR SYSTEM

Locate the **InfraSignal Radio** and Nuclear & Solar EMP Sensor in a convenient location close to an AC power outlet. Before attaching the radio to the display stand, route the AC to DC wall adapter power cord through the 1 1/4" hole in the display stand and connect to the radio. Connect the special 2' long cable with the red connectors to the radio and sensor, also through the 1 1/4" hole in the display stand. Plug in the AC to DC wall adapter to the AC power outlet. Remove the protective backing from the sticky side of the Velcro. This may require the use of a small pen knife or other small point tool. Carefully align the radio with the display stand and press them together. Turn the Nuclear & Solar EMP Sensor so that either broad side is facing generally north. The exact direction is not critical. Turn the radio on. Wait until the radio has finished booting up, then touch the OPTIONS >> NORMAL AGC >> FAST IMPULSE RESPONSE >> DETECT PULSE buttons. A red-letter P will show in the CURRENT AGC SETTINGS window. This red-letter P indicates that the radio is setup to detect a fast pulse and sound the alarm. Touch the DETECT PULSE ON CHART button to go to the chart display. If you like, you can monitor the system using the INFRASIGNAL ON SCOPE mode. The EMP DETECTOR system is now set up.

PLEASE TAKE NOTE OF THIS "ALARM" INFORMATION

When an EMP is detected, it is saved to nonvolatile memory very fast before the radio loses sufficient power. When power is restored, (perhaps with a generator or backup battery) the alarm will sound and a message will appear on screen that says "A pulse was detected before loss of power. To reset the alarm, touch the OPTIONS >> ALARM TEST >> ALARM RESET" buttons. This ensures that you are alerted to a NUCLEAR or SOLAR EMP and loss of power, the two events occurring together. The only way that this alarm condition can be reset, that is, when using the detect pulse option and after power is lost and then restored, is to use the special sequence in the message to reset it. This special reset sequence is designed to prevent members of your crew from accidentally resetting it without your knowledge. They can easily mute the alarm sound, but unless they can read, (young children) it would be very unlikely they could reset the alarm. When a less than severe NUCLEAR EMP, SOLAR EMP or extremely close LIGHTEN strike occurs and the power is not lost, the alarm will sound until reset. In this case, because power was not loss, resetting the alarm is normal and does not require the special sequence.

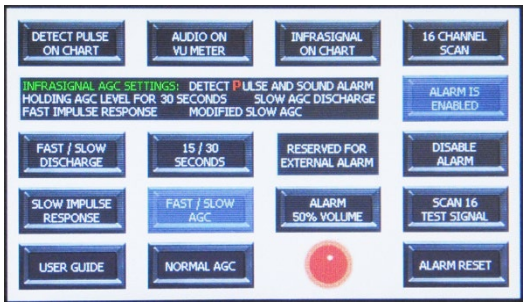
TEST THE NUCLEAR & SOLAR EMP SYSTEM

Under normal circumstances when using the **InfraSignal Radio** with the NUCLEAR & SOLAR EMP Sensor, the display will show only low-level noise. To generate a pulse and test the system, we have provided a small magnet in an envelope. Hold the envelope at the top and an inch or so from the sensor face. Swing it side-to-side several times in front or back of the Nuclear EMP Sensor. You should see a pulse displayed on the screen. Now position the envelope and magnet close to the sensor, swing it side-to-side several times. You should see a stronger pulse and the alarm should sound. If so, it has passed the test. If you want to see the previously mentioned message, don't reset the alarm. Turn the power off and then back on. After the radio boots up, the message will appear on screen.

POWER SWITCH & PHONE JACKS

ON the right side of the radio is an ON/OFF power switch and two (2) phone jacks. These phone jacks, by design, require a more than usual amount for insertion force. The top (black) phone jack outputs the infrasignal at a fixed level. This output is provided for recording and/or monitoring on a video display. When using the AUDIO ON VU METER mode, regular audio can be heard from this phone jack at a fixed level. This output is quite loud in most headphones. The bottom phone jack (gray) provides regular audio and tone-adjusted-transformed-infrasignal audio. The audio level from this phone jack is adjustable with the volume control. When a headphone is plugged into the audio phone jack, it turns off the audio from the speaker. It does not affect or disable the alarm sound from the speaker and alarm sound is not heard in the headphones.

OPTIONS



The **OPTIONS** page is where you set up the AGC (Automatic Gain Control) parameters and:

- Turn the alarm function on / off;
- Set the alarm volume;
- Check the connectivity of the optional remote alarm;
- Turn the remote alarm on / off;
- Run the alarm test;
- Run the scan 16 test signal test;
- Run the sinewave test;
- Run the frequency measurement test;
- Calibrate the LCD;
- Select language, English or Spanish;
- Reset system default settings;
- Read the user's guides;
- Read the radio's Serial Number in the "English" user's guide, page 14;
- Read the radio's software versions in the "English" user's guide, page 14;

CURRENT AGC SETTINGS, [window] This window displays the current AGC settings. This window also displays the text, "DETECT PULSE AND SOUND ALARM" when the detect pulse option is turned on.
NORMAL AGC, [button] This is the setting for all general monitoring of infrasignals. NORMAL AGC returns all AGC functions to slow. It also turns off the DETECT PULSE option.
FAST IMPULSE RESPONSE, [button and in window] This setting provides a faster response to a strong signal when it is first detected. This is a good setting to use when the signal is strong and intermittent.
SLOW IMPULSE RESPONSE, [button and in window] This is the normal setting.
DETECT PULSE, [button] Detect pulse is a special option designed specifically for use with the EMP sensor. It turns on an alarm function that responds to a fast pulse, sounds the alarm and saves the event to memory. In the event that power is lost during or after the pulse is detected, both events are saved to memory. When power is restored, (perhaps with a generator or backup battery) the alarm will sound and a message (in red letters) will appear on screen, saying "A pulse was detected before loss of power". To protect this message from accidentally being reset, a special reset sequence is provided in the message.

FAST / SLOW DISCHARGE, [button and in window] This setting determines the rate of AGC discharge once the input signal decreases.

HOLD AGC LEVEL, [button] This setting delays the discharge function for a selectable amount of time determined by the 15 / 30 SECONDS setting.

15 / 30 SECONDS, [button] This setting determines the amount of time the HOLD AGC LEVEL holds the AGC level before allowing it to discharge.

FAST / SLOW AGC, [button] This setting determines the overall response of the AGC function. Slow AGC is normal and is modifiable by the other settings. Fast AGC disables all other AGC touch buttons except NORMAL AGC. *Fast AGC is only fast from an infrasignal point of view. It is very slow when compared to other higher frequency receiving equipment.

Transparent (ALARM IS ENABLED), [button] The alarm is turned on for all modes except the AUDIO ON VU METER, FREQUENCY MEASUREMENT and scope speeds 3 and 4.

ENABLE ALARM, [button] The alarm is presently turned off.

Transparent (ALARM IS DISABLED), [button] The alarm is presently turned off.

DISABLE ALARM, [button] The alarm is turned on for all modes except the AUDIO ON VU METER, FREQUENCY MEASUREMENT and scope speeds 3 and 4.

ALARM TEST, [button] When this button is touched, four things happen. The alarm will sound, the red light will flash, the ESPANOL button will change to ALARM 50% VOLUME and the SCAN 16 TEST SIGNAL button will change to a transparent (ALARM VOLUME IS AT 100%). While the alarm is sounding, the volume can be changed to 50% and back to 100% if desired. When the radio is turned off, then turned back on, the alarm volume setting will return to its default value, 100%.

RESERVED FOR EXTERNAL ALARM, [small window] When an optional alarm device is connected, this window will change to a button and display green text, EXT ALARM ENABLED. This is the default setting when the power is first turned on and the external alarm is connected. When the local alarm sounds, the external alarm will also sound. Touch the green EXT ALARM ENABLED button, it will change to display yellow text EXT ALARM DISABLED. The external alarm connection requires a “future” distribution adapter, to be announced.

EXT ALARM DISABLED, [button] When the local alarm sounds, the external alarm will not sound.

USER GUIDE, [button] The user guide is written in both English and Spanish. It explains the use of all touch buttons used in the **InfraSignal Radio**. The user guide also provides step by step instructions for the 2 system level tests, i.e., SCAN 16 TEST INSTRUCTIONS and SINEWAVE TEST INSTRUCTIONS. Additional information such as FCC Part 15 test results, Patent status, Copyright information, Model number, Serial number, software versions and firmware version can be found on page 14 of the English language version only.

ESPANOL / ENGLISH, [button] This is the button to touch to switch languages from English to Spanish and vice versa. In addition to switching between two different languages, this button also resets adjustments, AGC settings, alarm activation and non-volatile memory to default values. This is very handy to reset the system when you want to return to default values. Switch to the other language, then switch back.

LCD CALIBRATION, [button] If you touch one button and an adjacent button response, chances are, the touch screen needs to be recalibrated. This doesn’t happen very often, almost never, but if it does, touch the LCD CALIBRATION button and follow the on-screen instructions.

There are a lot of select-able AGC settings when using the infrasignal modes, most of which will never be needed by most setups. Most of these AGC settings are designed to optimize reception performance for tape or digital recordings. An example would be when trying to record a strong signal that occurs in burst with long pauses (thinking elephants here). You would set the AGC by touching the FAST IMPULSE RESPONSE >> HOLD AGC LEVEL >> 15 / 30 SECONDS buttons to hold for about 15 seconds. Touch the 15 / 30 SECONDS button again to hold for about 30 seconds. You can monitor the signal by going to INFRASIGNAL ON CHART or the INFRASIGNAL ON SCOPE button. If the first strong signal burst is long enough in time, it will level off the AGC to the proper level so the next burst will be received with little or no distortion. If the first strong signal burst is not long enough in time, the AGC will hold a lower value but subsequent burst will add to that value until it reaches the proper level. This is assuming that the strong signal burst occur before the selected hold time runs out. If the hold time runs out and the AGC starts to discharge, the next strong burst will start to increase the AGC from that discharged point.

ADJUSTMENTS

The **ADJUSTMENTS** page has 5 slider type adjustments, BACKLIGHT, ALARM, VOLUME, SQUELCH and TONE.

The **BACKLIGHT** [white] adjustment controls the brightness of all parts of the screen. The screen can easily be seen in bright sunlight. When the InfraSignal Radio is battery operated, reducing the BACKLIGHT will increase the battery life. When using the radio with a battery and the voltage drops below a certain value, the radio will stop operating and a notice will appear at the bottom of the screen "THE BATTERY VOLTAGE IS TOO LOW". See Miscellaneous Notifications on page 13.

The **ALARM** [red] adjustment controls the alarm threshold. Its value is displayed on the sliding scale and also displayed numerically in red above the sliding scale. The value is also displayed at the top of the SIGNAL LEVEL bar graph on the mode pages. When the alarm is disabled, the red numerical value at the top of the SIGNAL LEVEL bar graph on the mode pages is replaced with two red dashes.

The **VOLUME** [green] adjustment controls the volume of the speaker and the gray colored headphone output on the right side of the radio. When using the AUDIO ON VU METER mode, audio can be heard on the black colored infrasignal output jack, also on the right side of the radio. Please take note. This output is quite loud in the headphones. It is set to a fixed level for recording and is not controlled by the VOLUME adjustment.

The **SQUELCH** [blue] adjustment silences the speaker when the signal level drops below the adjusted squelch value. This eliminates all unnecessary noise from the speaker. The headphone output is not affected by the squelch adjustment.

About the **TONE** [brown] adjustment. All sounds at and below about 20 Hertz (cycles) cannot be heard by the human ear. In order to hear these sounds, i.e., infrasound, a higher frequency tone must be added to the infrasound to increase it up to the audio frequency range. This tone adjustment is provided for the convenience and preference of the person monitoring the infrasound.

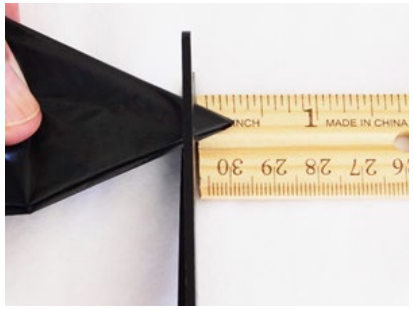
SEISMIC SENSOR INSTALLATION

The first thing to consider when installing your 3D seismic sensor is location. This sensor is very sensitive to all vibration sources. Try to locate the sensor as far away as possible from local vibration sources that vibrate the ground such as motors, machinery, farm equipment, houses, buildings, roads, highways, and railroads etc. Double check that the signal cable is long enough to reach between the **Infrasignal Radio** or the Thru-The-Wall cable adapter and the 3D seismic sensor. Use a long measuring tape, do not use the cable itself. If not long enough, consider finding a closer location or purchase a longer cable from Infrasignal Radio. Custom cable lengths up to 1000 feet in 50-foot increments are available. If the cable you have is still coiled up, tied with the original cable ties and in brand new unused condition, you will get full credit for it when you return it to **InfraSignal Radio**, **LLC** and purchase a longer one. Before returning it, contact **InfraSignal Radio**, **LLC** for an RMA (Return Material Authorization) number. Call 1-8 His Signal (1-844-774-4625) or write to us, using the form on the "ABOUT THE RADIO" page on this website.

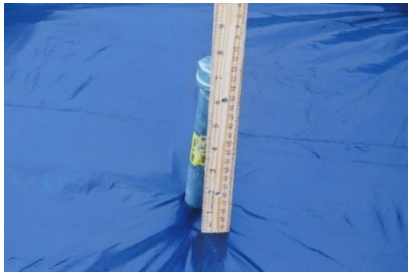
The following information can be used to install your 3D seismic sensor. All the hardware items used can be purchased at Home Depot, Lowes, Ace Hardware and/or other similar stores. The following is a list of items and tools to be used with this installation. Other items and tools may be needed if different installation methods are used.

- **Infrasignal Radio** 3D Seismic Sensor and hardware installation kit.
- Signal cable with Green Connectors, (designed for seismic sensor only).
- A standard two-hole concrete block, 16"x8"x8".
- A standard solid concrete block, 16"x8"x4".
- 4 steel rebar stakes, 2 feet long. Longer rebar stakes may be needed if the ground is soft.
- 1 steel ½" water pipe with end cap, ½"x18". Longer pipe may be needed if the ground is soft.
- Galvanized steel wire, 18 gauge.
- Plastic sheet, 1.1mil or thicker. Large leaf or trash bag.
- 12-inch Ruler.
- Work gloves.
- Scissors (not shown in photo)

- Side Cutters for wire and plastic cable ties.
- Pliers
- Hammer or small Axe.

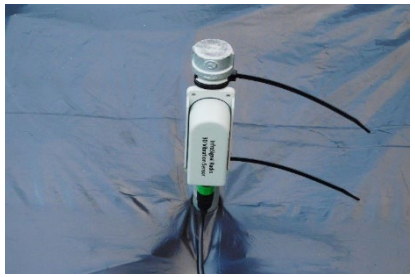


STEP 1. The 1.1mil thick plastic sheet is used as a moister barrier. If you use a large trash bag, cut it open. Make a small hole in the middle by folding in half, then fold it in half again, then fold the folded square corner a third time. Using the scissors, cut 3/8" off the corner that was made when you folded the plastic sheet three times. That will leave an octagon shaped hole about ¾" across in the plastic sheet to drive the water pipe (ground stake) through.



STEP 2. Lay the plastic sheet out flat at the location you have chosen for the 3D seismic sensor. Drive the water pipe, i.e., "ground stake" through the hole and straight (not leaning over) into the ground, leaving 7 inches from firm ground sticking up. If the ground is sloped, consider whether or not to slope the ground stake. If so, the ground stake should be sloped the same amount and in the same direction.

CAUTION: Do not drive the ground stake further into the ground after attaching the very sensitive seismic sensor. Remove the sensor, drive the ground stake further into the ground, then re-attach the sensor.

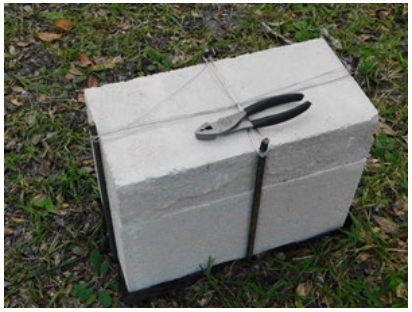


STEP 3. Attach the 3D seismic sensor high on the ground stake, just under the end cap, using 2 of the provided cable ties. The green signal connector should be pointing down. Pull the cable ties tight and cut the excess off using the side cutters. Connect the cable to the sensor. There is an O-ring seal in the cable connector. Push snug and twist to the right. Make sure the green locking nut on the cable is locked to the green sensor connector. Sometimes it takes a very hard twist to get it to snap in place.

STEP 4. Smooth out the plastic sheet and carefully place the two-hole concrete block around the sensor and ground stake as shown. The cable is routed under and held down by the center section of the concrete block. While the cable in the other hole should have a loop. This loop provides some isolation from vibrations in the event that the cable gets tripped over or jerked. Consider burying the cable 2 or 3 inches in exposed areas.

STEP 5. Place the 16"x8"x4" solid concrete block on top of the 2-hole concrete block. Using the scissors, trim the excess plastic sheet around the concrete blocks. Be careful not to cut the outer cover of the signal cable. Any cut could allow moisture to seep in and over time ruin the cable.

STEP 6. Using your hammer or small axe, drive the four steel rebar stakes into the ground, around the concrete blocks as shown in the picture. These stakes should be tight against the bottom of the concrete blocks. Leave about 1 inch of the stakes sticking up above the concrete blocks. This will allow the stakes to be pulled up tight against the top of the concrete blocks using steel wire. With the stakes being tight against the bottom of the blocks and the steel wire pulling the stakes tight at the top of the blocks will help to keep the blocks from moving in the event that something bumps into them.



STEP 7. Using the pliers, wrap the steel wire from one ground stake across to another while pulling the wire tight so the stakes are tight against the concrete blocks as shown

.

STEP 8. Anchor the signal cable to the steel rebar ground stake to prevent the cable from being pulled out in the event someone trips over it. Place 2 cables ties around the cable and ground stake as shown in the picture. The 2 cable ties want to be crisscrossed so the cable enters and exits at the same angle with the ground.

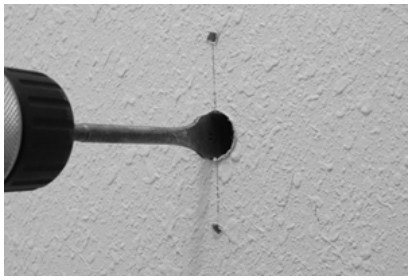
STEP 9. The cable ties want to be snug but not tight to prevent damage. Cut off the excess cable ties with the side cutters.

STEP 10. If the 3D seismic sensor installation is an eyesore, consider camouflaging it with indoor/outdoor spray paint.

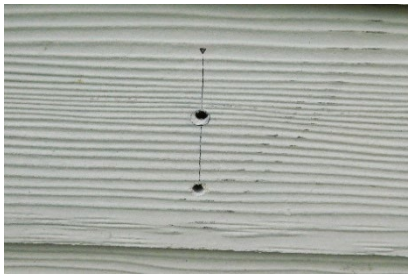
STEP 11. Test the system. Finish laying out the cable, making sure there are no kinks or twists. Connect the cable to the radio and turn the radio on. Go to the OPTIONS page and touch the NORMAL AGC >> FAST IMPULSE RESPONSE >> DETECT PULSE >> DETECT PULSE ON CHART buttons. Go out to the 3D seismic sensor installation. Start by standing 5 to 10 feet away and stomp the ground a couple of times. The distance from the sensor installation will vary widely depending on the soil, how heavy you are and how hard you stomp. The alarm should sound.

Thru-The-Wall cable adapter.

STEP 1. Locate a spot for the inside connector face plate. The pilot hole should be about 15” high from the floor and in between studs. Use a stud finder to avoid electrical wires and pipes. Use the 12” long 3/16” drill bit. Drill straight and level all the way through the wall.



STEP 2. Draw a vertical line, up and down through the pilot hole. Use the inside face plate as a templet and mark the upper and lower inside screw holes. Use the 3/16” drill bit for the inside screw holes. Use the ¾” spade drill bit to drill the cable hole. Drill both just through the inside wall. DO NOT drill all the way through the outside wall.



STEP 3. Draw a vertical line through the pilot hole. Use the inside face plate as a templet and mark the positions for the cable hole and the second screw hole. Drill a pilot hole through the outer wall middle mark just deep enough for use by the ¾” spade drill bit.

STEP 4. The original pilot hole came out low in this installation. When possible, holes that are too high or too low to use for the cable hole, consider it a screw hole for the face plate. When it's not possible, consider filling it with putty, (not supplied).

STEP 5. Use the ¾” spade drill bit to open up the cable hole. If the wall is rock, brick, or cement a masonry drill bit (not supplied) may be needed.

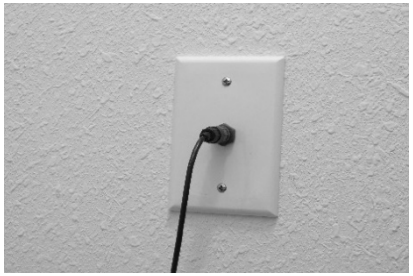
stores. **STEP 6.** Drill the top face plate screw hole. If the wall is soft wood, use just the 3/16” drill bit. If the wall is hard, use a 13/64” drill bit to further open up the 3/16” hole.

STEP 7. Use the 15” dowel or 12” long drill bit to open up a hole through the insulation large enough to pass the cable and small connector through.
In this case, aim down a little bit because the original pilot hole is lower than the cable hole.

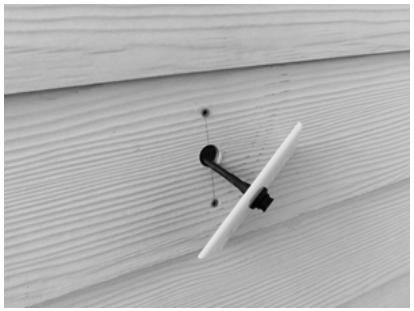
STEP 8. Tape the pointed end of the dowel to the back end of the small cable connector. Push it through to the inside.

STEP 9. Remove the tape and dowel.

STEP 10. Install the screw anchors in the 3/16” holes. Attach the inside face plate to the cable connector. The rubber gasket should be on the back side of the plate. Tighten the green nut up snug by hand or use a 5/8” socket wrench by hand. Do not over tighten.

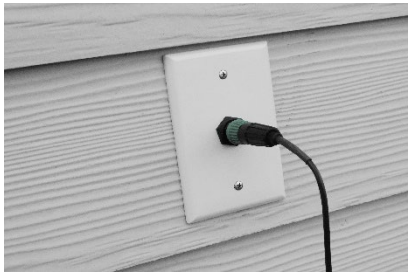


STEP 11. Screw the face plate to the wall and attach the 12’ signal cable.



STEP 12. Mount the outside face plate to the cable end with the larger connector. The rubber gasket should be on the back side of the face plate. Tighten the green nut up snug by hand, or use a 13/16” socket wrench by hand. Do not over tighten.

STEP 13. Consider sealing up the cable hole with putty (not supplied) before attaching the cable and face plate to the outside wall.

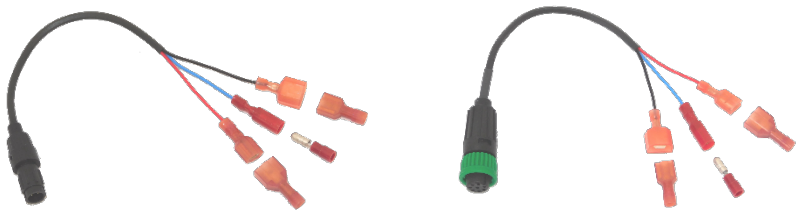


STEP 14. Align the connectors keys and push together. There is an O-ring seal in the cable connector, so push snug and twist to the right. That’s it. You’re finished.

In the future, if you wish to relocate the THRU-THE-WALL cable adapter, simple remove it and replace it with blank face plates. Blank face plates are available at Lowe’s, Home Depot, Ace Hardware and other similar stores.

SPECIFICATIONS

- 9 Modes of operation: Infrasignal on strip chart mode, infrasignal on scope mode, measure frequency in infrasignal mode, 1 channel in strip chart mode, 1 channel in scope mode, measure frequency in 1 channel mode, 5 channel scan mode, 16 channel scan and voice on VU meter modes.
- 5 Adjustments: Backlight intensity of touch screen, alarm threshold, volume, squelch and tone.
- 9 AGC options: Normal AGC, fast / slow AGC, fast / slow AGC discharge, hold AGC level 15 / 30 seconds and fast / slow AGC impulse response.
- 4 Local alarm options: Enable alarm, disable alarm, alarm 50% volume and alarm 100% volume.
- 2 Remote alarm options: External alarm enabled / External alarm disabled.
- 4 built-in-test (BIT): Scan 16 test signal with test instructions, sinewave test signal with test instructions, measure frequency of test signal and alarm test.
- 1 Calibration: LCD calibration, follow the on-screen instructions.
- 2 Languages: English / Spanish.
- 2 User guides: English user guide, Spanish user guide.
- 2 Phone jacks: 1 phone jack for monitoring the output of the infrasonic modulator and normal voice audio on headphones and 1 phone jack for connecting the AGC leveled infrasonic signals output to a high input impedance infrasonic recorder or other device.
- All modes, adjustments and optional settings are saved to memory and retrieved when the power is turned on. Two default exceptions, 1: The alarm is enabled and is set to 100% volume. 2: The Backlight intensity is set to maximum.
- Input voltage range: +10 to +28 Volts DC.
- Input current at +12 volts: 200 milliamps (ma).
- Maximum peak input current during alarming conditions: At +10 volts = 350 ma, +12 volts =300 ma, +28 volts = 165 ma.
- Infrasignal frequency range: 0.35 hertz (Hz) to 45 Hz.
- Scan 16 channels frequency range: 1 Hz to 30 Hz.
- Voice band frequency range: 300 Hz to 3 KHz.
- Power line frequency notch filter: factory selected 50 Hz / 60 Hz.
- 60 Hz power line frequency rejection: 50 decibels (dB).
- Input sensitive: 3 microvolts minimum discernable signal (MDS).
- Maximum low distortion input signal: 375 millivolts (mv) root mean square (rms) in the infrasignal frequency range of 0.35 Hz to 45 Hz.
- Input signal low distortion dynamic range: 102 dB in the infrasignal frequency range of 0.35 Hz to 45 Hz.
- Accuracy of frequency measurement: Infrasignal mode = @ 1 Hz +/- 0.03 Hz. @ 45 Hz +/- 1.30 Hz.
  1 Channel modes = Channel 1 +/- 0.03 Hz, Channel 11 +/- 0.08 Hz, Channel 12 +/- 0.3 Hz, Channel 16 +/- 0.4Hz.
- The radio has three signal inputs, one AC coupled, one DC coupled and one AC coupled to a +10dB amplifier for weak input signals.
- Input impedance to all signal inputs, 2.0 Kilohms to radio's virtual ground.
- Case: splash proof, Size: 7.7" x 5.0" x 1.9", Weight: 1.1 pounds



ADAPTER CABLES

Red wire: The red wire provides a positive voltage of +3.6v @ 2ma, +2.6v @ 10ma relative to the black wire.

This is usually enough power to operate a small operational amplifier / line driver.

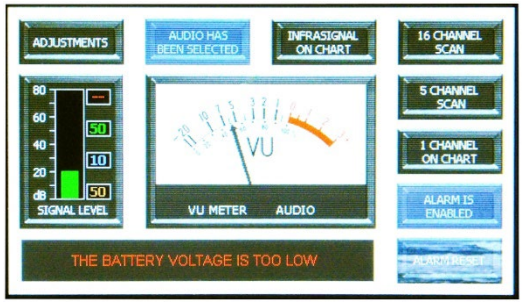
Black wire: The black wire connects to the Infrasignal Radio's virtual ground return.

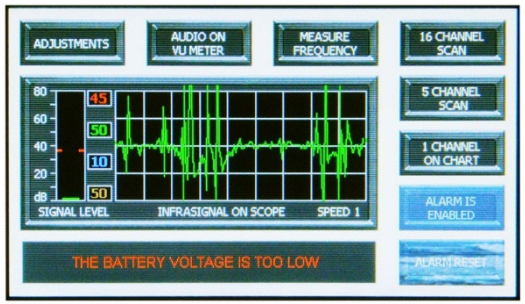
Blue wire: The blue wire is the signal input to the radio, from the customer's sensor.

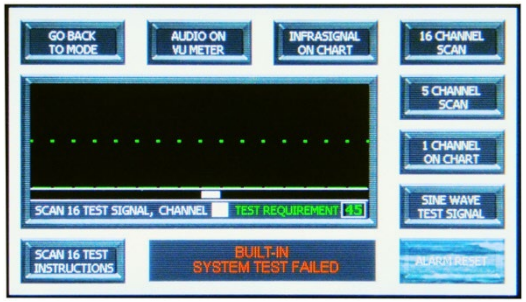
Customer's sensors not requiring power from the red wire should connect to the black and blue wires only.

CAUTION: No other electrical connections should be made to the radio or customer's sensor. The radio and sensor system should be isolated from all outside electrical sources.

Miscellaneous Notifications







QR Code for the InfraSignal Radio website

Manual Version r. 11 August 2023