

Sonetics®

SON200 Series Digital Intercoms

SON201, SON202, SON203, SON204 Series Digital Intercoms & Remote Intercoms

Installation & Operation Manual

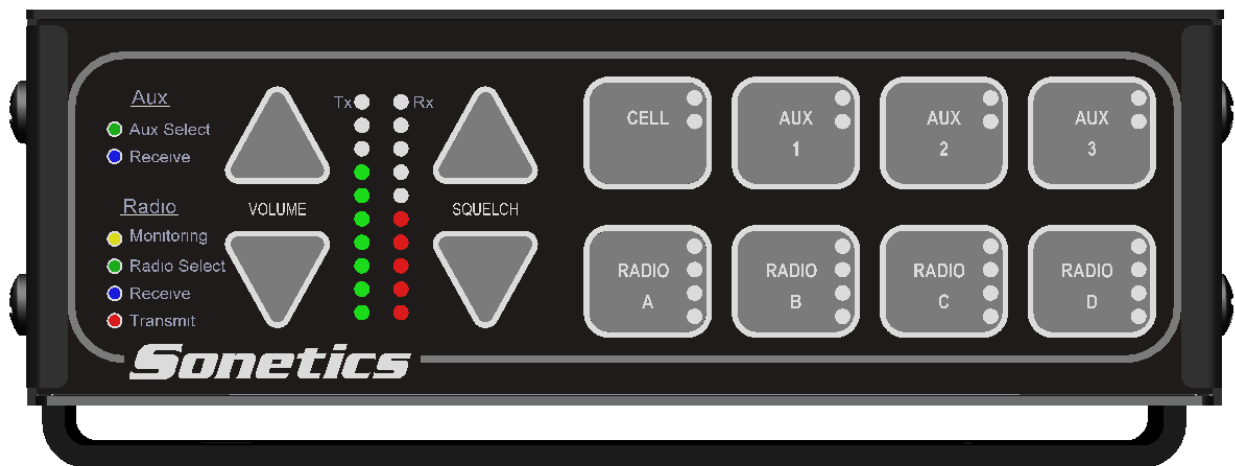


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DIGITAL INTERCOMS OVERVIEW

SON200 Series Digital Intercoms

The Sonetics SON200 Series Digital Intercoms, when used with Sonetics noise attenuating headsets, provide protection from hearing loss that can occur from exposure to high noise levels, while also providing each user clear communication with the other crew members.

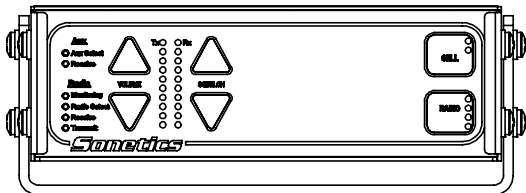
New Features:

- Digital Intercoms have an Analog Devices DSP for easy of configurability
- Squelch control
- USB interface for advanced programmability
- Programmable from the faceplate
- 4 radio capable
- Incoming/Outgoing transmission light
- Increased background noise suppression
- Waterproof remote intercom head for outdoor installations.

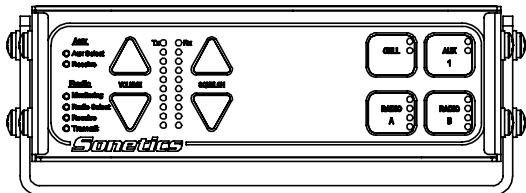
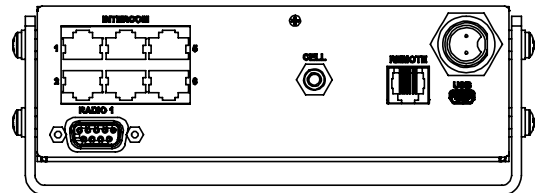
Each crew member will hear all radio traffic and be able to communicate over the intercom. Crew members wearing Radio-Transmit headsets may transmit over the apparatus radio, from any headset position in the system. "Intercom Only" headsets will not transmit over the radio.

The SON200 Series Digital Intercoms feature advanced circuitry that effectively suppresses distracting background noise and eliminates clipping without affecting communication. The result is clear, crisp, on-board communication that has no competition.

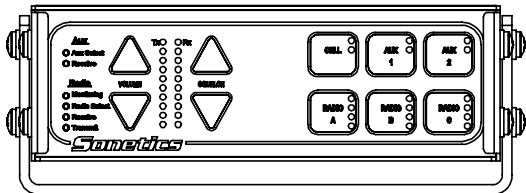
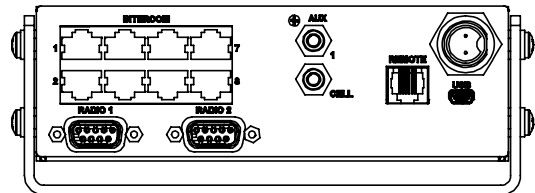
There are 4 models of Intercoms in the Sonetics SON200 Series as shown below.



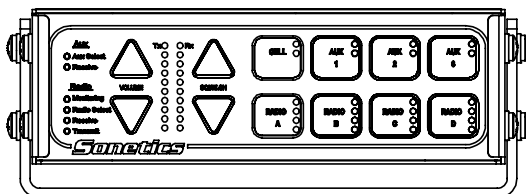
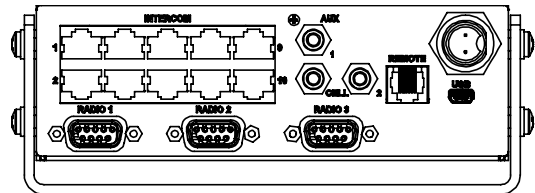
Model SON201 (6 Headsets, 1 Auxiliary, 1 Radio)



Model SON202 (8 Headsets, 2 Auxiliary, 2 Radio)



Model SON203 (10 Headsets, 3 Auxiliary, 3 Radio)



Model SON204 (10 Headsets, 4 Auxiliary, 4 Radio)

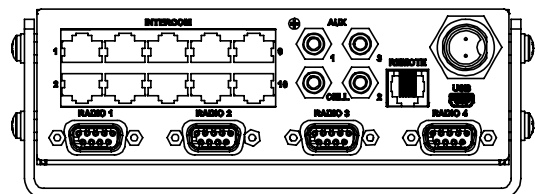


FIGURE 1

SYSTEM ORIENTATION

This section provides an overview of the SON200 Series Digital Intercom System and an introduction to its individual components. Figure 2 shows a typical system. Refer to this diagram for each component.

INTERCOM

The main control unit for the SON200 Series Intercom System which contains all the controls and interface circuitry.

WIRELESS BASE STATION

A Module which provides wireless communications between wireless headset users, belt pack users, and intercom and radio users.

2-WAY RADIO

The existing 2-way radio in the apparatus.

MOBILE RADIO INTERFACE CABLE

Provides the interface connections between the SON200 Series Intercom Unit and the 2-way radio in the apparatus. There are many cable assemblies available; the cable needed depends on the make and model of your radio. Contact your local Sonetics Dealer for more information regarding an Interface Cable specific to your radio.

POWER CABLE ASSEMBLY

Provides the power connections for the SON200 Series Intercom Unit. The power connections should be made at the same place as the power connections for your radio.

CA CABLES

Six-conductor flat cable which connects the SON200 Series Intercom Unit to the Wireless Bases, Headset Module, and the Remote Head.

REMOTE HEAD INTERCOMS

Remote Head Intercoms can be connected to the main control unit to control the unit from a remote location. Up to 5 remotes heads can be connected to the digital intercom by utilizing an RJ-12 splitter or by splicing into the 6 conductor modular cable.

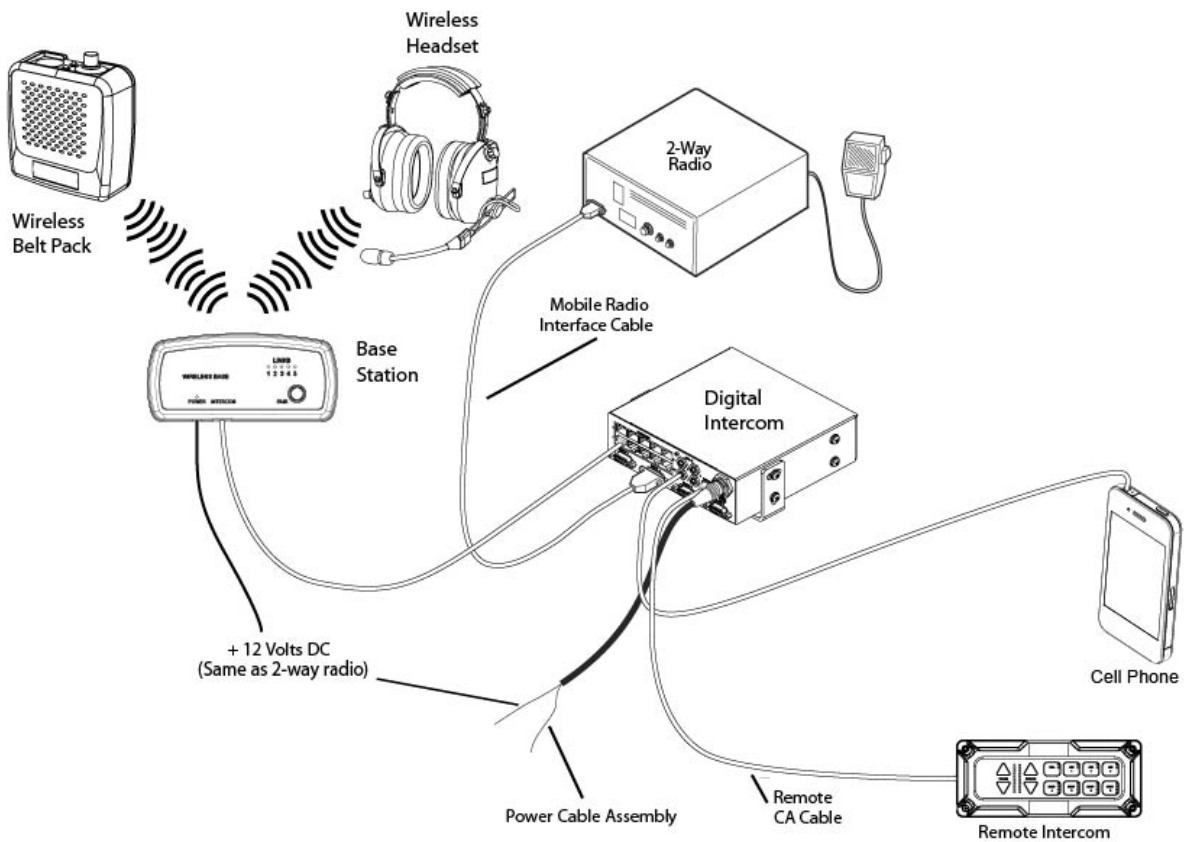


Figure 2

SYSTEM ORIENTATION

DEFINITIONS:

This section lists some of the more common terms used in this manual and gives their description. Familiarize yourself with these terms before proceeding with the installation of a SON200 Series Intercom.

- HEADSET LOCATION:** Any combination of CA Cables, Headset Modules, PP-20's, and Headsets connected to a single port on the rear of the intercom.
- INTERCOM AUDIO:** Audio present when communicating via the intercom system. Intercom audio is heard only on board the apparatus.
- INTERCOM ONLY HEADSET:** The Intercom-Only Headset receives both intercom and audio at all times.
- INTERCOM PORT:** Any one of the modular jacks under INTERCOM on the rear of the Intercom.
- RADIO INTERFACE PORT:** A 9-pin D-sub jack on the rear of the Intercom.
- RADIO INTERFACE CABLE:** The cable which plugs into the Radio Interface Port at one end, and connects to a 2-way radio at the other.
- RADIO-TRANSMIT HEADSET:** The Radio-Transmit Headset receives both intercom and audio at all times. The mic is **ALWAYS** active for intercom communication.
- RECEIVE AUDIO:** Audio from incoming radio transmissions. This is the same audio that is heard from the radio's speaker.
- RJ-12 MODULAR PLUGS** The six conductor plugs on the ends of the CA Cables. These connectors plug into the Base Stations, Remote Intercom and the Intercom.
- TRANSMIT AUDIO:** Audio signals being transmitted on the radio via a Radio-Transmit Headset.
- TRANSMIT PRIORITY PORT:** The Intercom Port marked "1" on the rear of the intercom which has transmit priority over the other ports.
- REMOTE HEAD:** A panel or bracket mounted device for remotely controlling the intercom.
- WIRELESS BASE STATION:** Provides full duplex audio and PTT communication between the wireless headsets, belt-packs, and the intercom.
- WIRELESS HEADSET:** Provides wireless audio communication between headset users and the intercom.
- WIRELESS BELT PACK:** Connected to a wired headset to provide wireless audio communication between belt-pack users and the intercom.
- AUX:** Connections on the back of the intercom for auxiliary devices such as cell phones and electronic music devices.
- PROGRAMMABLE SQUELCH:** Used to adjust the microphone volume and sensitivity for various ambient background noise levels.

SYSTEM ORIENTATION

SON200 SERIES FRONT PANEL CONTROLS:

VOLUME UP & VOLUME DOWN BUTTONS:

Adjust the master volume for the Intercom System.

VOLUME INDICATOR LED'S:

10 green LED's which indicate the master volume level setting. There are 3 volume changes between lights.

SQUELCH LEVEL INDICATOR LED'S:

10 red LED's which indicate the master volume level setting. There are 3 volume changes between lights.

SQUELCH LEVEL UP & SQUELCH LEVEL DOWN BUTTONS:

10 red LED's which indicate the master volume level setting. There are 3 volume changes between lights.

RADIO SELECT LED BUTTONS:

Green LED:

The green LED indicates which radio is the transmit radio.

Yellow LED:

All active radios are indicated with a yellow LED.

Red LED:

The red LED provides indication that a radio transmission is occurring.

Blue LED:

The blue LED indicates audio traffic on a radio.

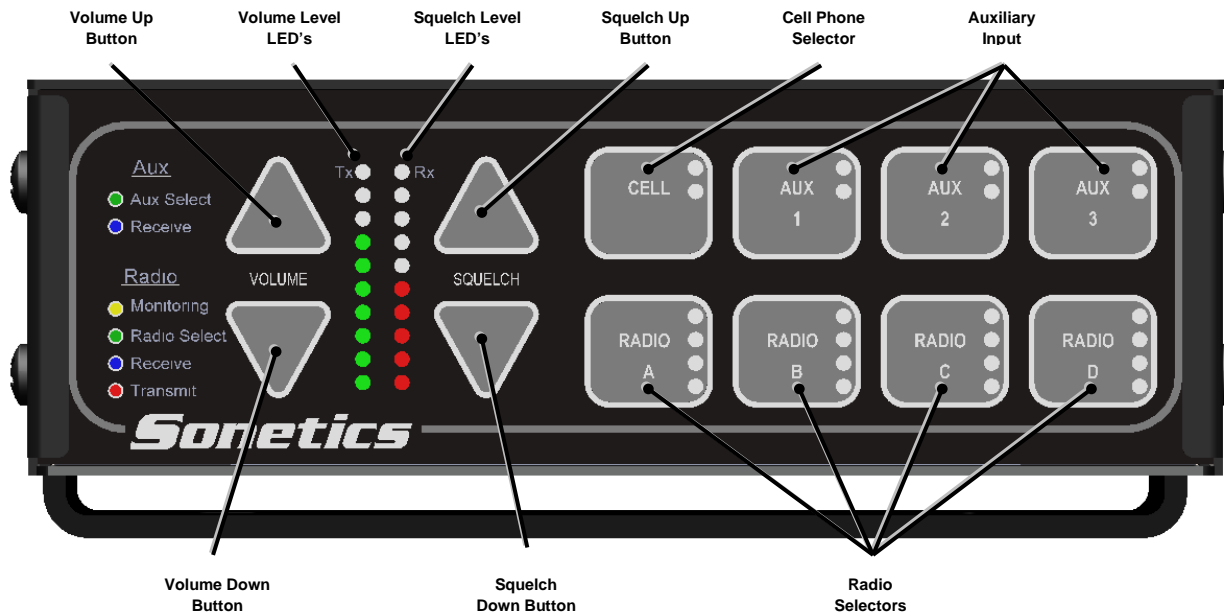
AUX & CELL BUTTONS:

Green LED:

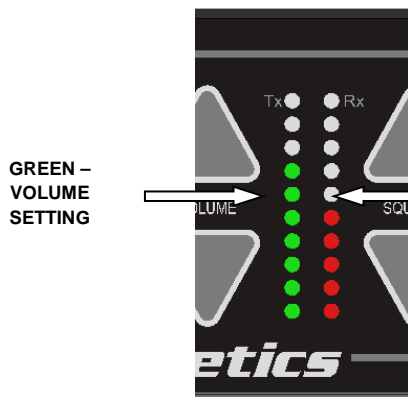
The Digital Intercom lights a green LED to indicate an active Aux port.

Blue LED:

The blue LED provides indication that there is audio traffic on an Aux port.



LED COLORS



RED - SQUELCH SETTING

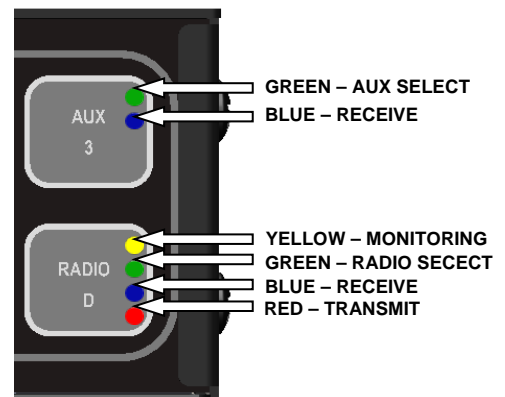


FIGURE 3

SYSTEM ORIENTATION

SON200 SERIES REAR PANEL

The Rear Panels of the SON200 Series Digital Intercoms are shown below. This section describes the different connectors located on the rear of the intercom.

RADIO INTERFACE JACK(S)

A 9-Pin D-Sub connector, which provides the attachment point for the Mobile Radio Interface Cable; the SON201 has 1 jack, the SON202 has 2 jacks, the SON203 has 3 jacks, and the SON204 has 4 jacks.

POWER CONNECTOR

A 2-Pin connector where the Power Cable Assembly is plugged in to interface the SON200 Series Intercom to the vehicle's power supply.

MODULAR JACKS

The modular jacks are the connection points for the CA Cables leading from the Intercom Unit to the Base Station and Remote Head.

AUXILIARY INPUT/OUTPUT

A 3.5 mm stereo (3-conductor) jack used to bring audio (cell phone, music player, etc) into the intercom system, and to bring Intercom Audio and Radio Receive Audio out of the intercom system.

REMOTE INTERCOM JACK

This modular jack is the connection point from the CA Cable leading from the Intercom Unit to the Remote Head.

USB

Used for advanced programming.

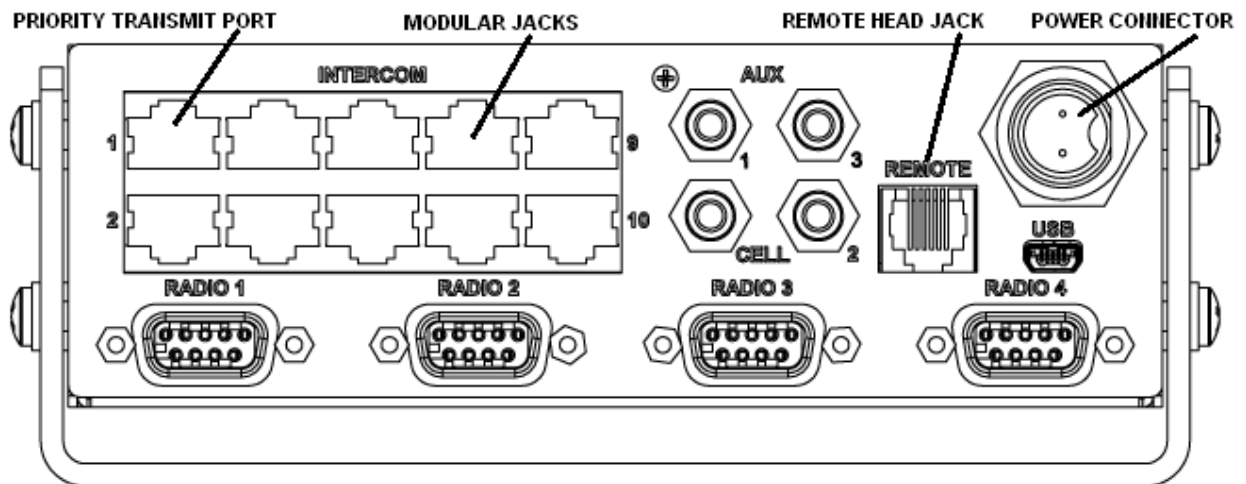


FIGURE 4

PRE-INSTALLATION

Before installing a Sonetics SON200 Series Intercom System, it is very important to take time and plan the installation. This section will provide information to assist in planning the installation. You should read and understand all of the information contained in this section as well as the sections on the System Orientation (page 2) and Installation (page 9) before installing the SON200 Series Intercom onto the apparatus.

IMPORTANT: Taking time to plan the installation BEFORE installing the SON200 Series Intercom System may prevent many installation errors which could result in improper system operation.

If you have any questions regarding the information contained in this section, contact your local Sonetics Dealer for clarification BEFORE proceeding with the installation.

INTERCOM LOCATION:

When choosing a location to mount the SON200 Series Intercom Unit, the following conditions should be considered:

Remote mounting of the intercom box should not be piggy-backed to radio transceiver unit by screws or Velcro.

Power cable should be routed to buss bar power and properly grounded to chassis on a clean surface with no more than 4.0" difference in chassis ground and selected spot for Sonetics ground.

The intercom should not be mounted close to the 2-way radio antenna on the vehicle.

Allow for at least 3 inches clearance on the sides and rear of the intercom unit for service and installation.

The intercom should be placed where it will be easy to route all the CA Cables from the Headset Modules.

The intercom should be placed where the controls may be easily accessed.

If the intercom cannot be located where it is easily accessible, a Remote Intercom can be used to allow the base unit to be mounted out of the way yet still have control access where it's more convenient.

Do not mount the intercom directly above or below the radio transceiver.

PRE-INSTALLATION

ROUTING THE CA CABLES:

CA cables are flat with six conductors, and may have RJ-12 Modular plugs on each end used to make connections between the intercom unit and Remote Head.

The path which you intend to run the CA Cables from the Intercom to the Remote Head should also be planned **BEFORE** the installation. The items below are some of the items to consider when planning where to route the CA Cables.

Route the CA Cables away from hot surfaces (such as the vehicle exhaust system).

Route the CA Cables away from any moving equipment on the vehicle.

Route the CA Cables away from the antenna or the antenna cable.

DO NOT store excess cable. The length of each CA Cable should allow for approximately 10 inches of excess cable in each run for service loops (**VERY IMPORTANT**, especially in installations with a radio operating in the lower frequencies).

When routing the CA Cables through bulkheads or other sheet metal, use a rubber grommet in the hole to prevent damage to the cables.

REMOTE INTERCOM

The intercom unit can be remotely controlled by the Remote Head. This panel functions the same as the intercom front panel.

Regardless of which button is pressed, all units will respond and update at the same time. Power to the unit is supplied through the CA Cable from the Intercom. The Remote Head can be mounted either flush on the apparatus surface or with a special bracket.

INTERCOM CONNECTIONS:

AUDIO MODULAR JACKS

On the rear of the intercom, there is a modular jack under INTERCOM (Figure 7). This jack is for connecting the CA Cable from the Remote Head to the intercom. All of these modular jacks will provide intercom and radio communication to the headset positions.

REMOTE MODULAR JACKS

On the rear of the intercom, there is 1 modular jack under REMOTE (Figure 7). This jack is for connecting CA Cables for the Remote Head. The CA Cables are all the same. Multiple Remote Intercoms can be installed by using an RJ12 splitter.

PRIORITY TRANSMIT

It may be desirable for one member of the crew to have priority for transmitting on the radio. Any headset position plugged into this jack will have priority for radio transmit over all other headset positions. When the person in this position presses the PTT on the headset, **ALL** transmissions from any other headset position will be stopped and the person in the priority position will be able to transmit.

Priority Transmit Assignments:

SON201: Headset #1 has priority over Headset 2-6

SON202: Headset #1 has priority over Headsets 2-8, Headset #2 has priority over Headsets 3-8

SON203: Headset #1 has priority over Headset 2-10, Headset #2 has priority over Headsets 3-10, Headset #3 has priority over Headsets 4-10

SON204: Headset #1 has priority over Headset 2-10, Headset #2 has priority over Headsets 3-10, Headset #3 has priority over Headsets 4-10, Headset #4 has priority over Headsets 5-10

POWER CONNECTIONS

The SON200 Series Intercom requires at least +12 volts DC nominal (with a negative ground) at 1.5 amps. This Intercom will accept DC voltage as high as 36 volts. The SON200 Series Intercom comes with a Power Cable Assembly and a 1.5 amp, in-line fuse. We suggest connecting the Intercom power and ground to the apparatus power buses.

RADIO INTERFACE

All Radio Interface cables are purchased separately.

IMPORTANT: ALL connections to the 2-way radio should be performed by a Qualified Radio Technician to ensure proper interface between the 2-way radio and the SON200 Series Intercom System.

There are many interface cables available from Sonetics to interface the SON200 Series Digital Intercoms with specific radios. These custom interface cables will make interfacing the radio easier, but should still be installed by a qualified radio technician. Contact your local Sonetics Dealer for more information regarding the availability of an interface cable for your radio.

If a radio specific cable is not available for a particular radio, a MR-0X cable will be required to interface the radio and intercom. This cable is a 9-wire, shielded cable with a 9 pin D-sub to connect to the intercom and unterminated wires to be connected to the radio.

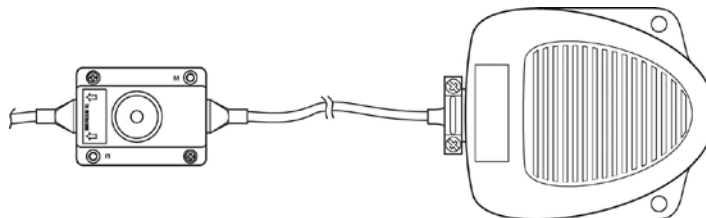


FIGURE 5: Foot Switch (Remote PTT)

INSTALLATION

BEFORE INSTALLING the Sonetics SON200 Series Intercoms, make sure you have read AND UNDERSTOOD the ENTIRE installation procedure. You should also read the sections on Pre-Installation (page 6) and System Orientation (pages 2 - 5). If any item in the Installation Procedure is not understood, or if you have any questions which are not addressed in this manual, contact your local Sonetics Dealer for more information BEFORE you proceed with the installation.

MOUNTING THE INTERCOM:

Using the mounting bracket as a template, mark the location of the mounting holes.

Using a 3/16" drill bit, drill 2 holes for the #8 sheet metal screws (supplied).

IMPORTANT: Be sure the area behind the panel you are drilling into is free of wires or other obstructions that could be damaged while drilling the holes

Install the mounting bracket with the sheet metal screws (Figure 6).

Remove the 4 screws (2 on each side) closest to the rear of the intercom unit and mount the intercom on the mounting bracket with the 4 screws.

IMPORTANT: DO NOT completely tighten the intercom mounting hardware until the entire installation is complete.

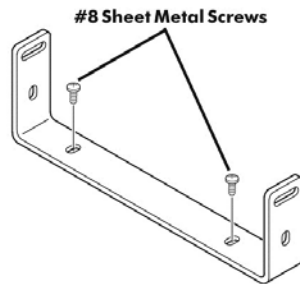


FIGURE 6: The Mounting Bracket

INSTALLATION

IMPORTANT: The Modular Jack marked “1” is the Priority Transmit Position. The Headset Location plugged into this jack will have priority over all other Headset Locations for transmitting on the radio.

POWER & GROUND CONNECTIONS:

Before making the power connections, make sure the apparatus master switch is: **FIGURE 7: Modular Jacks**

IMPORTANT: Connect the Power Cable Assembly (Figure 8) to the rear of the Intercom Unit.

Connect the black wire (from pin 1) to the vehicle's negative ground, or use the supplied self-tapping screw and star washers as shown in Figure 8.

IMPORTANT: We suggest connecting the intercom power connections to the vehicles power buses (preferably, to the same point that the 2-way radio is connected).

Connect the red wire (from pin 2) to one end of the supplied in-line fuse holder.

Connect the other end of the fuse holder to the vehicle's switched positive power supply.

The SON200 Series Intercom System is installed and ready for connection to the radio.

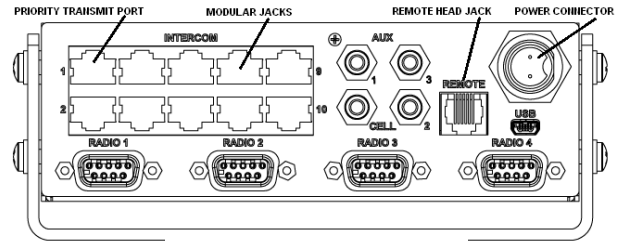


FIGURE 7: Modular Jacks

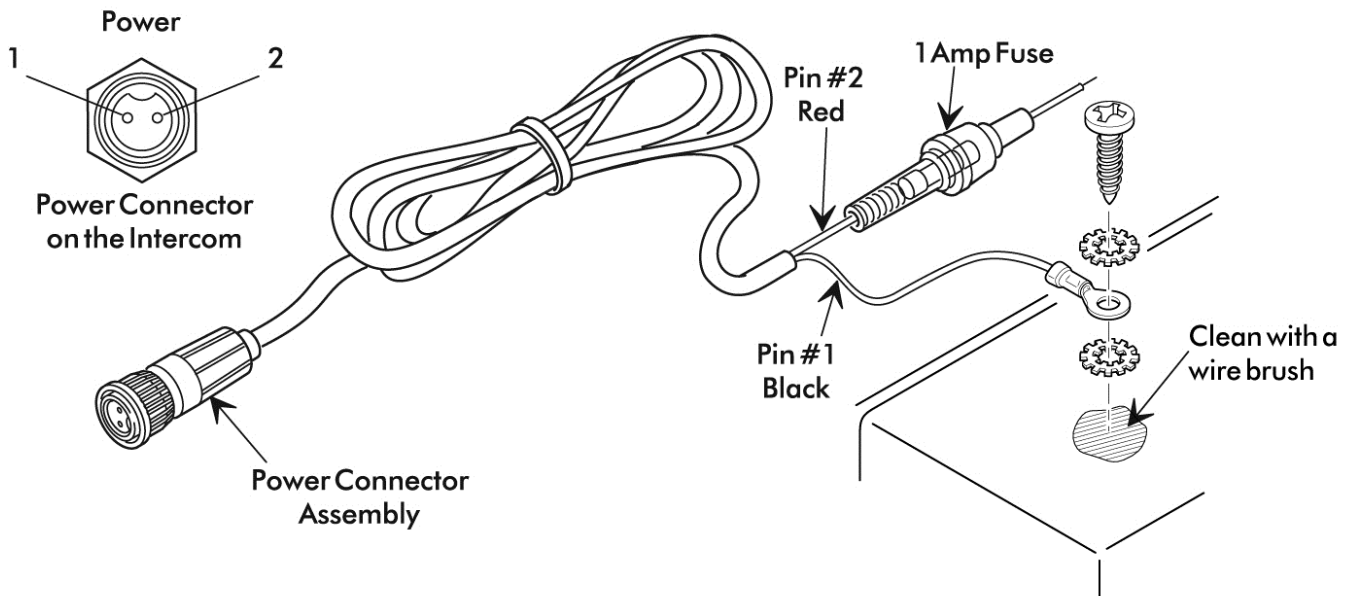


FIGURE 8: Power Cable Assembly

INSTALLATION

RADIO CONNECTIONS

IMPORTANT: To ensure proper operation, the connection to the radio should be performed by a Qualified Radio Technician.

If you are using a radio-specific interface cable, follow the directions included with the interface cable, then proceed with this Installation Procedure.

IMPORTANT: If you are unsure that your Interface Cable is the proper one, or you want to know if Sonetics manufactures a Radio-Specific Interface Cable for your radio(s), contact your local Sonetics Dealer.

Plug the 9-Pin plug on the end of the MR-0X Mobile Radio Interface Cable into the desired Radio Interface Jack on the rear of the intercom (Figure 9).

IMPORTANT: Tighten the 2 screws on the plug of the MR-0X. If these screws are not tightened, the 9-pin plug may vibrate loose and cause problems with transmission, reception or other radio problems.

Using the information in Figure 10, connect the wires on the MR-0X Mobile Radio Interface Cable to the appropriate places on the 2-way radio.

If the intercom is a SON202 repeat "Radio Connections" steps for the second radio.

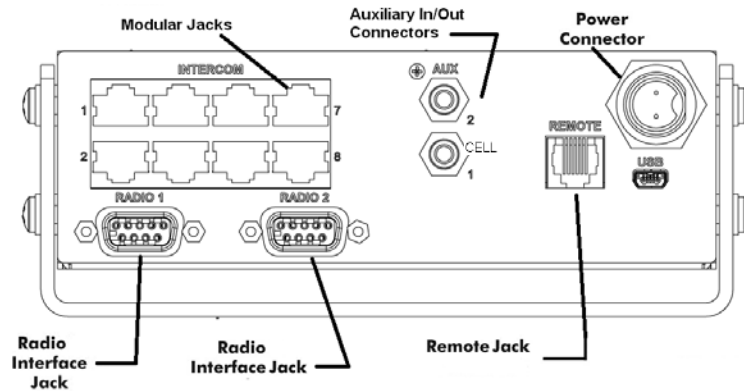


FIGURE 9: SON202 Rear Panel

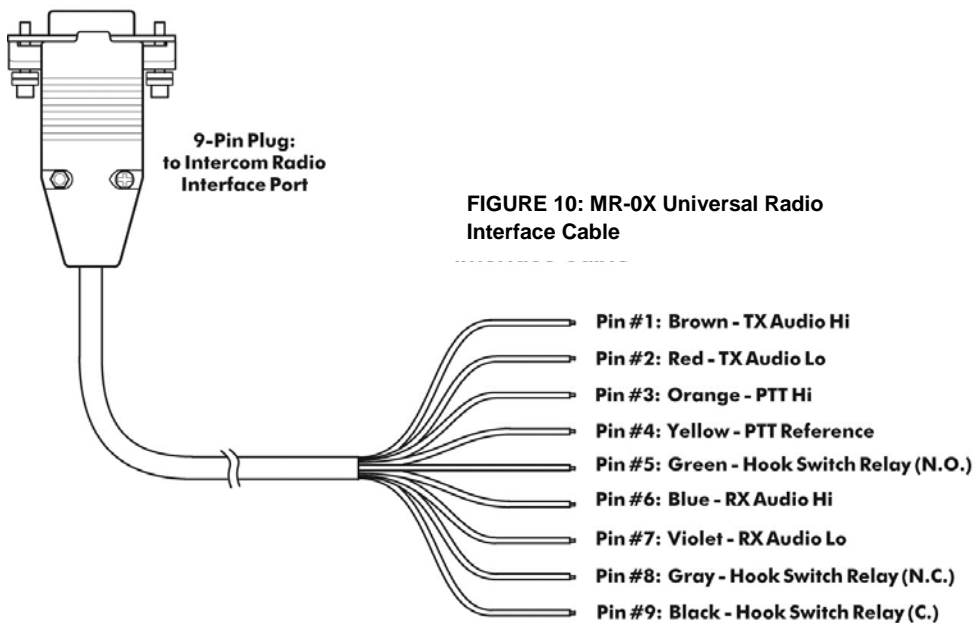


FIGURE 10: MR-0X Universal Radio Interface Cable

INSTALLATION

AUXILIARY INPUT & OUTPUT

On the back of the SON200 Series Intercom, there may be 1 to 4 jacks labeled Aux (Figure 11). These jacks are 3.5 mm stereo (conductor) jacks. If a mono plug is inserted in this jack, it may damage the auxiliary device. A mono-to-stereo adapter is required. The auxiliary input signal will be mixed with the radio and the intercom audio. The auxiliary input signal **CANNOT** be directed to the transmit circuits for radio broadcast. The auxiliary output signal strength will be exactly 1/2 the strength of the signal in the headsets. The auxiliary output signal will consist of intercom audio, receive audio from radios A & B, and any audio from the auxiliary input.

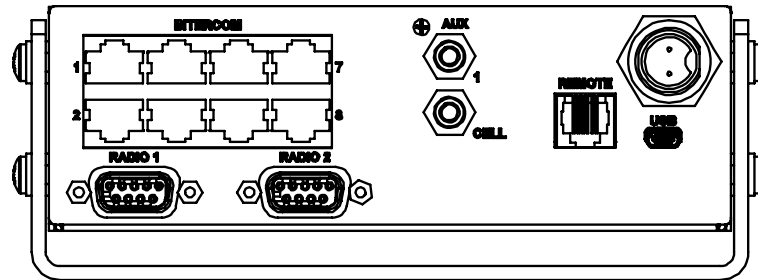


FIGURE 11: SON202 Rear Panel

INSTALLING A REMOTE HEAD:

Mounting Flush to a Flat Surface

1. Remove the 4 Torx bolts (T-10) and nuts from the corners of the remote head
2. Use the bracket as a template to mark and drill (4) mounting holes: 7/64" diameter for sheet metal screws or 5/32" for machine screws
3. For an installation where the wire passes through the mounting surface, drill a 3/8" hole and install the supplied rubber grommet. Pass the wire through.
4. For inside installation, mount the panel using the supplied sheet metal screws (4), making sure the cable is not pinched
Recommended torque : 10 in-lbs
5. Determine the correct length for the CA cable, and cut cable to correct length.

Mounting with Bracket

1. Remove the 4 Torx bolts (T-10) and nuts from the corners of the remote head
2. Before mounting the bracket, drill a 3/4" hole at the desired wire pass-through location.
3. Snap the grommet into the bracket as shown in (Figure 12) and then use the bracket as a template to mark the mounting holes.
4. Drill (4) mounting holes: 7/64" for #6 sheet metal screws or 9/64" for #6 machine screws. Mount the bracket using the included hardware
5. Secure the Remote Head to the front of the bracket with the included machine screws, split washers, and nuts as shown in Figure 12. **Recommended torque : 10 in-lbs**
6. Thread the cable through the bracket assembly as shown in (Figure.12).
7. Using the supplied cable ties secure the CA Cable to the bracket anchors as shown (Figure 12).
8. Adjust the panel to a desirable viewing angle with the two hand knobs.

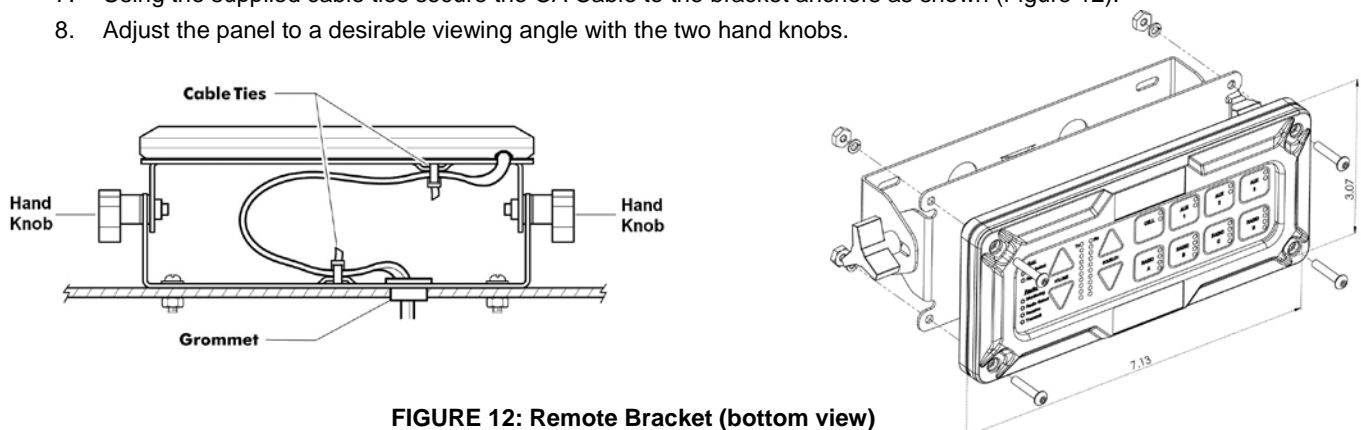


FIGURE 12: Remote Bracket (bottom view)

Connecting Multiple Remote Heads

Up to five remote heads can be used to control a digital intercom. To install multiple remote heads, contact Firecom for a 'Y' adapter (PN: A00-0027-10), or splice multiple CA Cables together. Refer to Remote Head wiring diagram.

SYSTEM TEST

This procedure tests all functions of the SON200 Series Intercom System and is used to test the system for proper operation after installation. In the event of a system failure, it may be used to identify exact symptoms before troubleshooting a problem, and to test the system after repair work has been performed.

POWER ON:

Turn on the apparatus master switch.

Confirm that power is applied to the intercom by observing that at least one Volume Indicator LED (Figure 13) is lit.

Using the Up and Down Buttons, adjust the Volume Control (Figure 14) to the middle of its range.

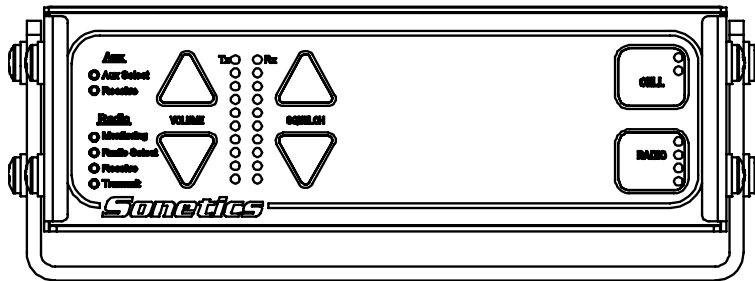


FIGURE 13

TEST INTERCOM OPERATION:

Plug a headset into the appropriate Headset Module.

Turn the headset Volume Control all the way down (counterclockwise).

Put a headset on your head and adjust the headband/headstrap for a comfortable fit.

Adjust the microphone boom to place the microphone in front of your mouth and approximately 1/8" from your lips.

Speak into the microphone to confirm intercom operation. You should hear yourself through the headset speakers.

Refer to your Headset User's Guide to determine how to activate the microphone.

Turn the headset Volume Control fully clockwise.

While speaking into the microphone, adjust the volume control on the intercom unit slightly louder than a comfortable listening level.

Adjust the headset volume for a comfortable listening level.

Monitor radio communications. Verify that the incoming radio transmissions are the same volume as the intercom volume.

Repeat steps outlined in "Test Intercom Operation" for each headset/headset position on the apparatus.

TEST RADIO COMMUNICATION

IMPORTANT: The next 4 steps are for Radio-Transmit Headsets only! These are the BEHIND-THE-HEAD, -51 Series models and OVER-THE-HEAD, - 51 Series models, and have a red PTT on the ear dome.

Put on a Radio-Transmit Headset (Behind the Head or Over the Head headset, red PTT models).

Confirm radio transmission by pressing the red PTT button on the ear dome and speaking into the microphone.

If using a foot switch; test radio transmission by pressing the foot switch and speaking into the microphone on the headset.

Repeat steps outlined in "Test Radio Communication" for each Radio-Transmit Headset on the apparatus.

SYSTEM DYNAMIC TEST

Start the apparatus engine.

Using a Radio-Transmit Headset close to the intercom unit, check the intercom and radio functions.

Final adjustment of the Volume Controls may be required under actual apparatus operating conditions.

IMPORTANT: If excessive engine/siren noise is present in the headsets, the intercom volume level should be reduced slightly. To compensate for this reduced volume, you must speak louder into the microphone.

REMOTE INTERCOM TEST

Press the Volume Up and Down arrow. Note the same changes on the base unit.

Press the radio select buttons. Note the same changes on the base unit.

HEADSETS

Sonetics offers many styles of headsets for use with SON200 Series Intercoms. Headsets are available in an Over-The-Head, or Behind-the-Head style. Either of these styles can be Radio-Transmit capable, or Intercom-Only.

For more information regarding the different models of headsets available, contact your local Sonetics Dealer.

RADIO-TRANSMIT HEADSETS

The Radio-Transmit Headsets receive both intercom and radio communications at all times. The mic is always active for intercom communications. Radio-Transmit Headsets are typically used at the Driver position.

INTERCOM OPERATION

VOLUME CONTROLS (ALL MODELS):

VOLUME INDICATOR

The Volume Indicator is a vertical row of 10 colored LED's. Minimum volume is indicated by only the bottom yellow indicator being lit. Maximum volume is indicated by all 10 LED's being lit. **Master headset volume is set with the front face volume pad**

IMPORTANT: When power is turned off to the intercom, the intercom and Remote Intercoms remember the last volume setting and will return to that volume level when power is turned on again.

VOLUME UP BUTTON (ALL MODELS)

Pressing this button once increases the intercom volume by one step. After pressing the button three times one more LED in the Volume Indicator lights. Once maximum volume has been reached (all LED's in the Volume Indicator are lit), pressing the Volume Up Button will have no effect.

VOLUME DOWN BUTTON (ALL MODELS)

Pressing this button once decreases the intercom volume by one step. After pressing the button three times, one less LED in the Volume Indicator lights. Once minimum volume has been reached (only the bottom LED in the Volume Indicator is lit), pressing the Volume Down Button will have no effect.

The minimum volume level is not zero volume. It is NOT possible to turn the intercom audio off using the Volume Control Buttons.

The Volume Controls on the SON200 Series Digital Intercoms adjust the volume of INTERCOM COMMUNICATION ONLY! The Volume Controls DO NOT adjust the volume of the Receive Audio from the radio(s). To adjust the volume of the Receive Audio, adjust the Receive Audio Adjustment (page 16) or the radio's volume control.

INTERCOM ADJUSTMENTS AND OPERATIONS:

For the Radio, Aux, and Cell connections to the intercom the user can adjust input gain and output gain to allow interfacing the intercom to other equipment.

It is important to set your device gain levels appropriately for your connected equipment.

- An input gain that is too low results in insufficient volume level.
- An output gain that is too low causes insufficient volume level in your end device.
- An output gain that is too high results in audio distortion caused by clipping in your output device.

Programming Input and Output Device Gain

1. To enter **Device Gain Adjust Mode**, simultaneously press and hold Volume up and Volume down buttons for 5 seconds. (FIGURE 14)
2. Once Device Gain Adjust Mode has been successfully entered, the Volume level LEDs and the Squelch level LEDs will flash.
3. Press the button corresponding to the device you want to adjust, for example, Radio 1.
4. Note that the Blue and Green LEDs on the Radio 1 button will begin to flash.
5. Use the Volume up and down buttons to adjust input gain to the desired setting
 - o Have a coworker transmit to you over the radio
 - o Adjust input gain until his voice is at the level you want it to be.
6. Use the Squelch up and down buttons to adjust output gain to the desired setting
 - o Pressing the PTT button on your headset, transmit over the radio to your coworker
 - o Adjust output gain until your audio level is where your coworker wants it to be.
7. To adjust another Radio or Aux, repeat Steps 3-6.
8. When you are finished adjusting input and output gains for your devices, press and hold any of the device buttons (Radio1, Aux1, etc) for 5 seconds.

For each headset, the user can activate or deactivate the squelch for that headset. A user will probably desire squelch for wired headsets, to keep breathing noises and small background noises from entering the system. Squelch is not necessary for Wireless Bases since these already have squelch built in.

**Press & Hold
Both Buttons**

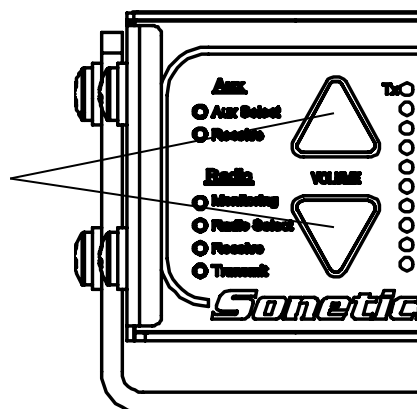


FIGURE 14

Squelch

The Squelch is a system wide squelch adjust. All headsets that have squelch enabled will respond to changes in the squelch level. To change the Squelch level, press the Squelch up or Squelch down buttons to increase or decrease the squelch level. Higher squelch levels are needed for higher noise environments.

Tech Note:

For wireless base stations, it is suggested that you disable squelch for the headset port which you have plugged your wireless base into.

Headset Squelch Enable/Disable

1. To enter **Headset Squelch Adjust Mode**, simultaneously press and hold Squelch up and Squelch down buttons for 5 seconds. (FIGURE 15)
2. Once squelch control mode has been successfully entered, the squelch level LEDs will flash.
3. You will also note that the lowest volume LED is flashing, corresponding to Headset #1.
 - a. When you first enter squelch control mode, you will be adjusting headset #1.
 - b. This is indicated on the volume level LEDs by the bottom most LED flashing
4. Use the squelch up and squelch down buttons activate/deactivate squelch for that headset
5. The red LED next to your flashing green LED will be lit, indicating squelch is active, or off, to show no squelch.
6. When you are finished adjusting a headset, use the volume buttons to change to a new headset.
7. The LED on the volume indicator that is lit corresponds to the headset you are adjusting
 - a. So, if the 2nd LED from the bottom is lit, you are adjusting headset #2
 - b. If the 3rd LED from the bottom is lit, you are adjusting headset #3, etc.
8. When you are finished adjusting headset squelch for your headsets, press and hold any of the devices buttons (Radio1, Aux1, etc) for 5 seconds.

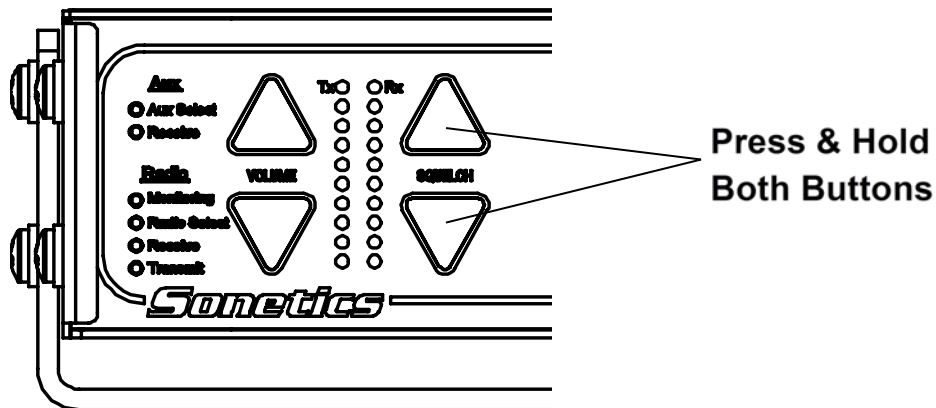


FIGURE 15

INTERCOM OPERATION

RADIO SELECT CONTROLS

The Radio Select Controls/Indicators (FIGURE 16) control which radio will be used to transmit when a PTT Button on a Radio-Transmit Headset is pressed. They do **NOT** control which radio is heard in the headsets. All radios are monitored at all times in the headsets.

RADIO A SELECT BUTTON

Pressing the Radio A Select Button, selects radio A as the radio for transmission. The green Radio A Selected Indicator will then light.

RADIO B SELECT BUTTON

Pressing the Radio B Select Button, selects radio B as the radio for transmission. The green Radio B Selected Indicator will then light.

RADIO C SELECT BUTTON

Pressing the Radio C Select Button, selects radio C as the radio for transmission. The green Radio C Selected Indicator will then light.

RADIO D SELECT BUTTON

Pressing the Radio D Select Button, selects radio D as the radio for transmission. The green Radio D Selected Indicator will then light.

PRO TIP:

You can press multiple radio buttons at the same time, enabling transmission on multiple radios simultaneously. All selected radios will light their green LEDs, indicating that they are selected.

RADIO SELECT LED BUTTONS:

Green LED:

The Digital Intercom allows the user to select the transmit radio by pressing one of the Radio buttons. A green LED will indicate which radio is the transmit radio. This radio will be used when any user presses the PTT button on their headset. To select another radio as the transmit radio, simply press the button that corresponds to that radio and the new radio button green LED will light, indicating that it is the transmit radio. Only a single radio will be designated the transmit radio. Selecting one radio as the transmit radio deselects the previous transmit radio.

Yellow LED:

The Digital Intercom allows the user to monitor traffic from multiple radios. All active radios are indicated with a yellow LED. Any radio button with a yellow LED indicates that audio from that radio can be heard by everybody wearing a headset. This allows multiple radios to be monitored simultaneously.

When a radio has too much traffic and is distracting, it can be deactivated by pressing and holding the radio button for 3 seconds. This will turn off the yellow LED and no audio from that radio will be heard by the users.

Red LED:

When a user is transmitting on a radio a red LED will light up on that radio button for the duration of the transmission. The red LED provides indication that a radio transmission is occurring.

Blue LED:

The Digital Intercom monitors audio on all radio channels and a blue LED indicates audio traffic on a radio. This is useful when a radio has been deactivated. On deactivated radios the blue LED will light indicating that unheard audio traffic is occurring on that radio.

AUX & CELL BUTTONS:

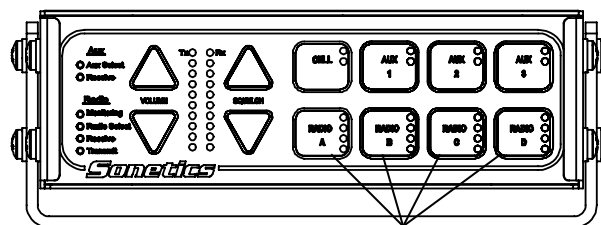
Green LED:

The Digital Intercom allows the user to select which Aux ports are enabled for audio input and output. Unlike radios, multiple Aux ports can be selected at once. An Aux port that is selected will have audio heard by all users, and all audio traffic present will be sent out that Aux channel. The Digital Intercom lights a green LED to indicate an active Aux port.

When an Aux port has too much traffic and is distracting, it can be deactivated by pressing and holding the Aux button for 3 seconds. This will turn off the green LED indicating that no audio from that Aux Port will be heard by the users.

Blue LED:

The Digital Intercom monitors audio on all Aux channels, and lights a blue LED if audio is detected. The blue LED provides indication that there is audio traffic on an aux port. This is useful when an Aux port has been deactivated. On deactivated Aux ports, the blue LED will light, indicating that unheard audio traffic is occurring on that port.



Radio Select Buttons

FIGURE 16: Radio Select Controls & Indicators

MODULAR PLUG INSTALLATION

This section describes the installation of the RJ-12 Modular Plugs onto the flat CA Cable.

1. Using the cutter blade on the crimping tool (labeled **A** in Figure 17), cut the flat CA Cable so the cut is clean and 90 degrees to the sides of the cable.
2. Fully insert one end of the CA Cable between the stripping blades (labeled **C** in Figure 17) until the end of the cable hits the stop (labeled **B** in Figure 17).

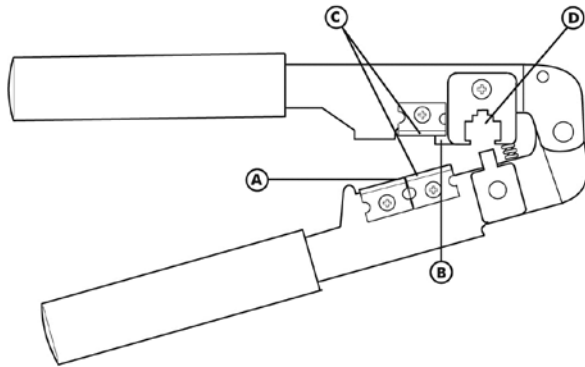


FIGURE 17: RJ-12 Modular Plug Crimping Tool

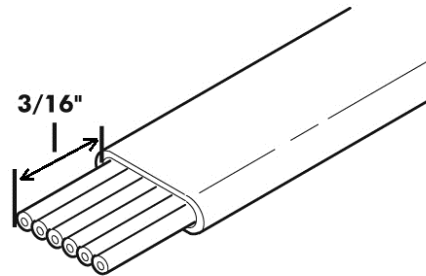


FIGURE 18: Stripped CA Cable

3. Squeeze the handles of the crimping tool together until the tool bottoms out.
4. While holding the handles together, pull the cable out of the tool.
5. The stripped insulation should expose approximately 3/16" of wire (Figure 18).
6. Push a RJ-12 Modular Plug into the plug holder on the crimping tool (labeled **D** in Figure 17) until the release tab on the plug locks into position.
7. Holding the cable so that the printed side of the cable is toward the release-tab on the plug, push the cable into the plug as far as it will go.

ALWAYS make sure the printed side of the cable is facing the release-tab on the RJ-12 Modular Plug (Figure 21). This ensures proper orientation of the plug on each end of the cable.

8. Squeeze the tool handles **COMPLETELY** together. You may feel the crimper finish punching the contacts through the insulation on the wires.
9. Let the handles spring open.
10. Push down on the release-tab on the RJ-12 Modular Plug (Figure 19) and remove the RJ-12 Modular Plug from the crimping tool.
11. Inspect the plug to ensure that the cable is held securely in place.
12. Repeat this procedure as necessary to install a RJ-12 Modular Plug on each end of each CA Cable.

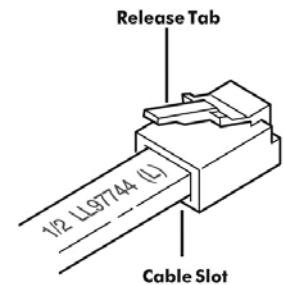


FIGURE 19: RJ-12 Modular Plug

TROUBLESHOOTING

The Sonetics SON200 Series Intercoms, when installed properly and adjusted according to specifications, will perform reliably and offer you the finest in hearing protection and enhanced communication. However, as with any electronic equipment, occasionally a malfunction may occur.

In the following sections, you will find information that will help familiarize you with the intercom system and aid in the troubleshooting process.

If the symptoms you are experiencing are not covered in this manual, or if you are having difficulty troubleshooting your system, contact your local Sonetics Dealer for assistance.

IF THE SYSTEM DOES NOT OPERATE AS EXPECTED, CHECK THE FOLLOWING ITEMS FIRST:

- Check that the apparatus master switch is on.
- Check the fuse or circuit breaker.
- Check system wiring and interconnections.
- Check the orientation of **ALL** RJ-12 Modular Connectors on **BOTH** ends of each CA Cable. See Modular Plug Installation (page 27).
- Check that the headsets are charged, have power turned on, and are connected to the base station.
- Check intercom and headset control settings.
- Check all intercom ports for bent or stuck pins that need to be straightened.

If these steps do not correct the problem, review the Advanced Troubleshooting procedures on pages 21-22.

ALTERNATOR WHINE & OTHER DISTRACTING NOISES

Because of the level of ambient noise present with the apparatus motor running, alternator whine and other noises may not be noticed in the communications systems until an intercom is added. A noisy system will always be more apparent, once an intercom is installed.

COMMON CAUSES OF NOISE ON THE COMMUNICATION CIRCUIT

Improper installation

Intercom adjusted improperly

Radio Interface not connected properly

Intercom power connections dirty, loose or connected to the wrong location

Battery terminals corroded

A faulty alternator

Generally, the problem is not caused by the alternator, but is usually the result of a difference in potential between the apparatus radio signal ground and intercom signal ground. Additional sources may also exist in the apparatus electrical system.

TO REDUCE OR ELIMINATE ALTERNATOR WHINE

Connect the apparatus radio to the cleanest power source: a source without motors (e.g. heaters, windshield wipers, etc.), sirens, strobes or flashers.

Use the same precautions when connecting the intercom power.

Ensure that the power and ground connections for the radio and the intercom are clean and tight.

Ensure that the power and ground wires for the radio and the intercom are no smaller in diameter than 18 AWG.

Keep all battery connections clean and free from dirt and corrosion.

Use separate noise filters on radio and/or intercom power as needed

TROUBLESHOOTING A BASE STATION

To see a complete list of Base Station Troubleshooting steps, refer to the Wireless Base Station User's Guide.

ADVANCED TROUBLE-SHOOTING

This section is designed for use by a QUALIFIED RADIO TECHNICIAN only!

The headset was working properly, but has now failed. Make sure you read and understand the **ENTIRE** procedure **BEFORE** attempting any of the troubleshooting steps in this section.

If there are questions regarding this information, contact your local Sonetics Dealer for more information **BEFORE** proceeding with the troubleshooting steps.

The System Test on page 20 is also a helpful tool in isolating and determining the actual symptoms of the problem.

THERE IS NO SOUND IN THE HEADSET FROM EITHER THE INTERCOM OR THE RADIO

Check the headset Volume Control. Make sure it is not turned all the way down.

Check the headset location for faulty connections or components. See Troubleshooting a Headset Location (page 20).

Verify that some of the Volume Indicator LEDs on the front panel of the intercom are lit, indicating that the intercom is powered on.

Measure the voltage between pins 1 & 2 on the Power Cable. There should be at least 12 volts DC present, and not more than 36 volts DC.

Check the wiring to the intercom and any fuses or circuit breakers in the power circuits to the intercom and correct any faults.

If there is sufficient power to the intercom, and it doesn't work, the Intercom Unit is faulty. Contact Sonetics Service for a Return Material Authorization (RMA) Number to return the Intercom Unit for repair.

THERE IS SOUND IN THE HEADSET FROM THE INTERCOM, BUT NOT FROM THE RADIO

(Perform one or more of the following as needed.)

Check the radio volume. Make sure it is not turned all the way down.

If there is no audio from the radio's speaker:

Disconnect the Radio Interface Cable from the radio. If there is audio from the radio's speaker, the Radio Interface Cable is faulty.

If there is still no audio from the radio's speaker, the radio is faulty.

Disconnect the Radio Interface Cable from the back of the intercom unit. If there is audio from the radio's speaker, the Intercom Unit is faulty. Contact Sonetics Service for a Return Material Authorization (RMA) Number to return the Intercom Unit for repair.

If there is audio from the radio's speaker, check the connections to pins 6 & 7 on the Radio Interface Port on the back of the intercom unit.

Verify that Receive Audio is present by listening to the radio's speaker.

Try swapping the intercom unit with a known good one (if one is available). If the problem persists, the problem is in the Radio or the Mobile Radio Interface wiring.

If no fault can be found, then the fault must lie in the Intercom Unit. Contact Sonetics Service for a Return Material Authorization (RMA) Number to return the Intercom Unit for repair.

ADVANCED TROUBLE-SHOOTING

THERE IS SOUND IN THE HEADSET FROM THE RADIO, BUT NOT FROM THE INTERCOM

Check the headset location for faulty connections or components. See Troubleshooting a Headset Location (page 20).

The Intercom Unit is faulty. Contact Sonetics for a Return Material Authorization (RMA) Number to return the Intercom Unit for repair.

THERE IS SOUND IN ONLY ONE EAR

Check to see if the headset is a model BEHIND THE HEAD-10S headset. The BEHIND THE HEAD-10S has one slotted ear dome without a speaker in it. This is normal operation for a BEHIND THE HEAD-10S.

The headset is faulty. Contact Sonetics for a Return Material Authorization (RMA) Number to return the headset for repair.

YOU CAN HEAR OTHERS ON THE INTERCOM, BUT THEY CANNOT HEAR YOU

If the headset is an Intercom-Only Headset with a Black PTT, be sure that the PTT button is fully depressed when trying to talk on CREEK

If the headset is an Intercom-Only Headset with a Yellow PTT, press and release the PTT and test again.

Check the headset location for faulty connections or components. See Troubleshooting a Headset Location (page 20).

The headset is faulty. Contact Sonetics for a Return Material Authorization (RMA) Number to return the headset for repair.

YOU CAN'T HEAR OTHERS ON THE INTERCOM, BUT THEY CAN HEAR YOU

Check the headset location for faulty connections or components. See Troubleshooting a Headset Location (page 20).

The Intercom Unit is faulty. Contact Sonetics for a Return Material Authorization (RMA) Number to return the Intercom unit for repair.

THERE IS A LOUD SQUEAL IN THE INTERCOM SYSTEM WHEN THE INTERCOM VOLUME IS TURNED UP

Check for an open mic too near the speakers of a headset. Feedback problems are often fixed by turning the intercom volume down, moving the mic away from the headset speakers, or unplugging a headset when not in use.

If the problem persists, unplug the headset locations one at a time from the rear of the Intercom Unit until the squeal stops.

Check the headset location for faulty connections or components. See Troubleshooting a Headset Location (page 20).

THE RADIO RECEIVE AUDIO IS WEAK

Check the setting of the radio's volume control. The radio's volume should be set at the normal volume for use with **NO** intercom system present.

Verify proper connection to pins 6 & 7 on the Radio Interface Cable.

Try swapping the Intercom Unit with a known good one (if one is available). If the problem persists, the problem is in the radio or the Mobile Radio Interface wiring.

If no fault can be found, then the fault must lie in the Intercom Unit. Contact Sonetics for a Return Materials Authorization (RMA) Number to return the Intercom Unit for repair.

THE RADIO KEYS BUT HAS NO TRANSMIT AUDIO (CARRIER BUT NO AUDIO)

Check the affected headset location for faulty connections or components. See Troubleshooting a Headset Location (page 20).

Check the Transmit Audio adjustment See Intercom Adjustments (page 15).

Verify connection of pins 1 & 2 on the Radio Interface Cable and the Radio Interface Port.

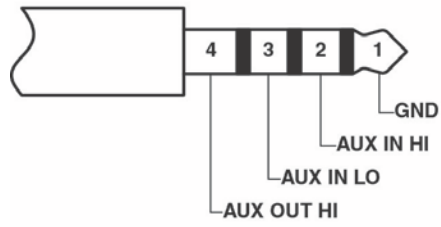
Try swapping the Intercom Unit with a known good one (if one is available). If the problem persists, the problem is in the Mobile Radio Interface wiring.

If no fault can be found, then the fault must lie in the Intercom Unit. Contact Sonetics for a Return Materials Authorization (RMA) Number to return the Intercom Unit for repair.

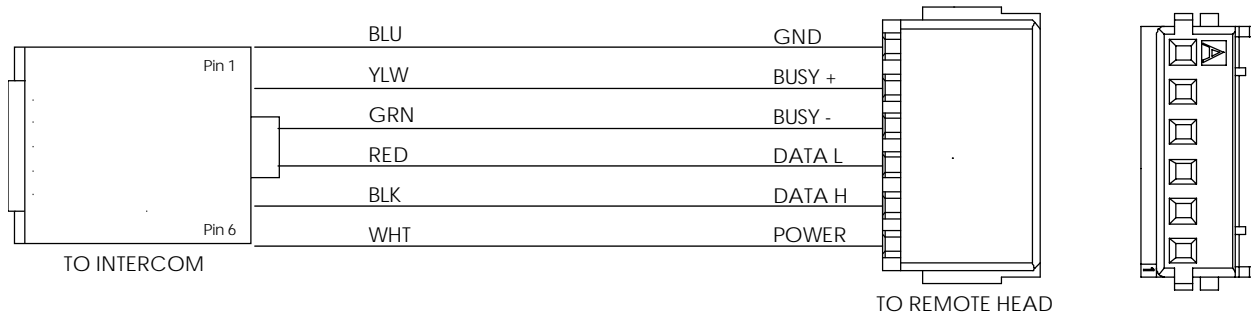
Try swapping the intercom unit with a known good one (if one is available). If the problem persists, the problem is in the Radio or the Mobile Radio Interface wiring.

If no fault can be found, then the fault must lie in the Intercom Unit. Contact Sonetics Service for a Return Material Authorization (RMA) Number to return the Intercom Unit for repair.

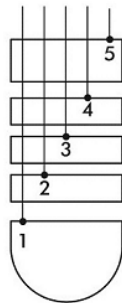
Auxiliary Plug Pinout



Remote Head Wiring

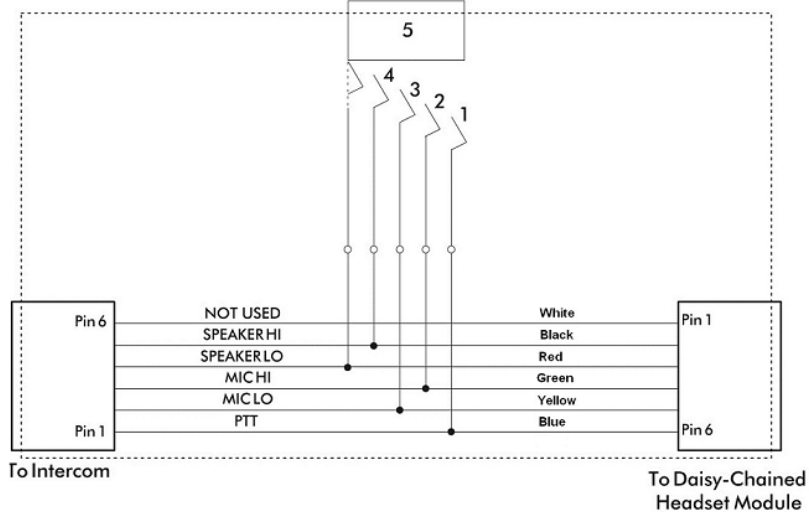


5 Conductor Plug



Headset Module Wiring

5 Conductor Jack



SPECIFICATIONS

HEADSETS:

Sensitivity: 104 dB re .0002 microbar @ 1000 Hz, 1 Mw
Frequency Response: 100-17,000 Hz +5 dB in 6 cc coupler
Impedance: 600 ohms nominal, 150 to 1200 ohm source
Weight: 21.2 oz. (FH models) 19.6 oz (UH models)

MICROPHONE:

DC Bias Supply: 8-16 volts, not polarity sensitive
Source Resistance: 200 to 2200 ohms
Output Voltage:370 mV @ 114 SPL re .0002 microbar
Frequency Response: Optimized for speech clarity and noise reduction
Max. Amb. Noise Level:125 dB SPL re .0002 microbar
Weight:0.2 oz.

INTERCOM:

Size:6.6" L x 6.1" W x 2" H (with mounting bracket)
Weight: 42.6 oz. (without mounting bracket)
Output: 375 mW into a total of 6, 150 ohm headsets (1 each channel)
Power Requirements: 0.5A at 12V nominal, (-) GND (Operating range from 11-36 VDC)

REMOTE INTERCOM:

Size: 7.125" L x 3" W x .875 Deep
Weight: 15 oz
Power Requirements: Supplied by Intercom

OPTIONS & ACCESSORIES

CLOTH COVERS: Replacement cloth covers, sold only by the dozen. Part Number: 108-0003-00

CRIMPER: Crimping tool used for installing the RJ-12 Modular Plugs onto the CA Cables (instructions included). Part Number: 108-0023-00

EAR SEAL: Replacement liquid foam ear seals, sold by the pair. Part Number: 108-0012-10

FOOT SWITCH: A heavy-duty foot switch for use as a remote PTT. Part Number: 108-0670-10

HEADSTRAP: Cloth headstrap used on the BEHIND THE HEAD-10, BEHIND THE HEAD-10S, BEHIND THE HEAD-52 & BEHIND THE HEAD-54 model headsets. Part Number: 108-0025-00

HEADSET HANGER HOOKS: Rubber-coated, steel headset hanger hook. Part Number: 108-0676-00

HANDHELD RADIO INTERFACE: Works with all Sonetics headsets. Contact your Sonetics Dealer for specific information regarding your particular handheld radios.

HS-1: System Selector Switch. Part Number: 108-0677-10

MIC MUFFS (DOZEN): Replacement mic muffs with O-rings, sold only by the dozen. Part Number: 108-0004-00

RJ-12: Modular connectors used with the CA Cable to make the interface cables between the intercom & Headset Modules or Remote Intercom. Part Number: 351-0002-00

TC-3.1: Triple radio interface for use with the Sonetics intercoms. Part Number: 108-0672-10

POWER CABLE: 15 ft. power cable. Part Number: 108-0036-00

REMOTE CONTROL SON200RH Series: This will control the SON200 Intercom

BRACKET ASSEMBLY: Remote Head Kit: **Part Number: 108-0303-00**

WARRANTY

Two-Year Limited Warranty to the Original Purchaser

Sonetics Corporation ("Sonetics") warrants to the original purchaser of its products that products will be free from defects in materials and workmanship under normal and proper use for the period of **two years** from date of purchase.

Sonetics Corporation will repair or replace, at its option, any products showing factory defects during this warranty period, subject to the following provisions and obligations:

1. This warranty applies only to a new product sold through authorized channels of distribution.
2. All work under warranty must be performed by Sonetics Corporation.
3. All returned products must be shipped to our address, freight prepaid and Sonetics will return products to customer via ground freight. Any expedite fees or additional freight charges will be charged to customer.
4. Any attempt to repair, service, or alter the product in any way voids this warranty.
5. This warranty does not apply in the event of accident, abuse, misuse, liquid contact, improper installation, unauthorized repair, tampering, modification, fire, earthquake, or damage from other external sources – including damage caused by user-replaceable parts.
6. This warranty does not apply: (a) to consumable parts such as batteries, ear seals, intercom bags, cables, external power supplies, parts listed as accessories to a system, or other parts designed to diminish in function over time unless a failure is due to a defect in materials or workmanship; (b) to cosmetic damage or to defects caused by normal wear and tear or aging of the product; (c) to damage caused by use with non-Sonetics products; (d) to damage caused by operating the product outside the permitted or intended uses or environments described by Sonetics; (e) to damage caused by service performed by anyone who is not a representative of Sonetics or an Sonetics Authorized Service Provider; (f) to a product or part that has been modified without the written permission of Sonetics; (g) if any Sonetics serial number has been removed or defaced.
7. This warranty does not extend to any other equipment, apparatus, vehicle, aircraft, or watercraft to which this product may be attached or connected.

THE FOREGOING IS YOUR SOLE REMEDY FOR FAILURE IN SERVICE OR DEFECTS. SONETICS CORPORATION SHALL NOT BE LIABLE UNDER THIS OR ANY IMPLIED WARRANTY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, NOR FOR ANY INSTALLATION OR REMOVAL COSTS OR OTHER SERVICE FEES. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTY OF MERCHANTABILITY OR FITNESS OF USE, WHICH ARE HEREBY EXCLUDED. TO THE EXTENT THAT THIS EXCLUSION IS NOT LEGALLY ENFORCEABLE, THE DURATION OF SUCH IMPLIED WARRANTIES SHALL BE LIMITED TO **TWO YEARS** FROM DATE OF PURCHASE. NO SUIT FOR BREACH OF EXPRESS OR IMPLIED WARRANTY MAY BE BROUGHT AFTER **TWO YEARS** FROM DATE OF PURCHASE.

Subject to the terms and limitations of this Sonetics Standard Limited Warranty, this warranty covers any new covered product found to be defective within the applicable warranty period. Sonetics reserves the right to examine the alleged defective covered product to determine whether this Sonetics Standard Limited Warranty is applicable, and final determination of warranty coverage lies solely with Sonetics. If Sonetics determines that warranty coverage applies, Sonetics reserves the right to either repair or replace a covered product or any part thereof, as determined by Sonetics in its sole discretion. If the product has been subjected to conditions which exclude coverage under the warranty, customer will be so advised. Customer may then authorize paid repair service or other disposition of the product. Notwithstanding any other provision of this warranty, if you sell or otherwise transfer ownership of your covered product, this Sonetics Standard Limited Warranty shall automatically terminate.



7340 SW Durham Road * Portland, Oregon 97224 U.S.A. * 800-527-0555 * 503-684-6647 * Fax: 503-620-2943
email: sales@Sonetics.com * service@Sonetics.com * Sonetics.com

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Document number 600-3047-00 Rev D