



Information Security Associates, LLC.

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SA-1 & SA-2
AUDIO AMPLIFIER

OPERATOR'S MANUAL

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OPERATING INSTRUCTIONS

Description

The SA-1 has been designed as a multiple input/output amplifier that can provide a near perfect match to just about any microphone, line, or earphone. The SA-1 also includes a tone generator for testing amplifier performance and surreptitious lines, and a switchable voltage for powering external accessories or carbon and electret microphones. *The SA-2 includes a contact microphone.*

The input jacks, J1 through J4, provide impedances from 2 megaohms down to 1000 ohms. Maximum amplification is provided through J2 while jacks J3 and J4 are of medium and low gain respectively. J1 and its associated "J1 Gain" control have an adjustable amplification factor. With the "J1 Gain" control advanced fully clockwise, the output level will be approximately the same as a similar input signal fed into 13.

When to use the SA-1

The SA-1 is used to check wires found during a sweep to determine if they are carrying audio from the area being swept. Audio sources can include microphones intentionally installed in the area by an eavesdropper, loudspeakers used for intercom or fire safety systems, and modifications to telephone instruments that use telephone components as room microphones.

Microphones

There are two basic types of microphones as far as detection purposes go. The first group consists of microphones that require an external power source. This includes carbon microphones common in older telephones and electret microphones used in many different applications today. None of these microphones will create an audio signal without low voltage power applied. The power can be connected at the listening post or it can be connect at or near the microphone. The second group is microphones that do not require a power source. This group generates an audio signal with no outside assistance. It includes dynamic, crystal, and peizo microphones.

Loudspeakers

A loudspeaker is very much like a dynamic microphone. It consists of a wire coil called a voice coil located in a permanent magnetic field. A signal from 'an amplifier causes the coil within the magnetic field to move. This creates sound by the coil moving the cone of the speaker.

When there is no signal coming from an amplifier, the speaker acts like a microphone. The speaker cone is moved by sound in the area; it in turn moves the voice coil. Movement of the voice coil in the magnetic field creates an audio signal on the wires connect to the speaker. Under the right circumstances, this makes a remarkable good room microphone.

Telephone Components

In essence, a telephone is a system consisting of microphones, small speakers, and wires. One of the vulnerabilities of a telephone is that it can pass room audio as a result of quirk of manufacture or by modification. Telephone analyzers detect this. The SA-1 can detect it also if it's connected properly to the right pair of wires.

The SA-1 is not a telephone analyzer, but can do one of the typical telephone tests.

Safety

The J1 can sustain, approximately 1000 volts DC continuously. Other inputs can sustain less voltage. J1 should be used when it is uncertain as to the amount of voltage and type of signal found on a surreptitious line pair.

If you are not certain about the condition of a pair of wires, check it with a volt meter. Please, also keep in mind that the case of the amplifier is not isolated from the circuitry, so there is a potential for hazardous electrical shocks if it's connected to an untested pair of wires.

Connection

- Plug the headset into J6. J5 can be used for connecting the SA-1 to a tape recorder.
- Plug the clip lead cable into J1 and connect it to the pair of wires being tested.
- Put all three toggle switches in the down position.
- Turn the amplifier on by rotating the Volume/On-Off in a clockwise direction. Adjust the volume to a comfortable level.
- Turn the "J1 Gain" control slowly clockwise until a signal is recovered or the control reaches maximum.

If no clear audio is heard, plug the clip lead cable into J2 or one of the other two remaining jacks.

J2 (500K) is a high level input jack which utilizes the full capability of the SA-1. This jack is normally used when the DC level and relative signal stage on a line pair are known.

J3 is normally used when the input level at J2 is too high. This jack is also useful when analyzing standard telephone systems.

J4 provides the lowest amplification and lowest impedance of all the input jacks. It is normally used when the input signal is of exceptionally high amplitude. This jack also has the capability of supplying an excitation voltage to external accessories or carbon microphones. J4 is the most commonly used jack.

Toggle Switches

Tone On. This switch turns on the internal tone generator. The tone generator puts out a strong audio frequency tone on J5 and J6.

To use this for line tracing, use the clip lead cable to connect J6 output to the pair of wires to be traced. If the pair leads to a loud speaker, the tone will be heard emanating from the speaker. Certain dynamic microphones may also emit the sound a very low level.

Do Not Connect to a pair that has DC or AC Voltage!!

If the pair of wires goes to a telephone or other type of microphone, the tone can be picked up using a telephone lineman's handset with an inductive probe. Direct connection by the handset will work also.

Filter In. This switch selects the amplifier roll-off characteristics. In the up position it filters out much of 60 cycle hum and gives a more "crisp" signal output.

J4 Volts On. The "J4 Volts On" switch supplies voltage to J4. This will power carbon and electret microphones. Keep in mind that an electret microphone is polarity sensitive.

To test for electret microphones, connect the clip lead cable to the wires being tested. Turn on the amplifier and adjust the volume. Move the Volts **ON** switch to the up position and listen. If no audio is heard, reverse the alligator clip connections. This applies the opposite polarity voltage to the wires. Listen again. If there is an electret microphone, it will be heard.

Battery Check

Check the condition of the amplifier's battery by connecting the clip lead cable from J4 to a volt meter. Turn on the amplifier and the J4 Volts On switch. If the voltage is below 8.5 volts, the battery needs to be replaced.

The battery is inside the amplifier. To access it, loosen the two screws on the long sides of the case. Lift off the bottom cover. Replace the battery with a good quality 9 volt battery. Reassemble the case.

THE SA-2 OPTION

The SA-2 is supplied with a contact microphone which may be used to test the audio transmission through windows, walls, air conditioning ducts, etc.

Connect the contact microphone to J4 or 3.

The microphone is very sensitive and will transmit sounds caused by sliding the microphone on a surface or caused by changing your grip on it.

To check for audio leakage, position the contact microphone on the surface being checked. Hold it firmly in place and turn the amplifier on. Adjust the volume and listen for room sounds. Experimentation and practice will show the proper method of contacting the wall or other objects.

Warranty

Information Security Associates, LLC, warrants to the original user that its products are free from defect in workmanship and material for a period of one year from the date of purchase. Information Security Associates, LLC, under this warranty, is limited to correcting or replacing without charge, at its factory, any part or parts thereof which shall be returned to its factory, transportation prepaid, and upon examination by Information Security Associates, LLC, shall be found to have been originally defective.

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