



Information Security Associates, LLC.

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DAR-1 & DAR-3
Discriminated Audio Receiver

OPERATOR'S MANUAL

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INTRODUCTION

The DAR-1 receiving system is used to detect eavesdropping transmitters, either radio frequency or carrier current. Since it is a wideband receiver, it must be used in the area that the suspected transmitter is in. A handheld antenna is used to "sweep" the walls and ceiling areas for signals. All signals present in the room, both legitimate broadcasts and eavesdropping transmissions, will be heard, all at the same time. A sound source, built into the DAR-1, provides a recognizable audio signal that is picked up by transmitters. Special filters in the receiver allow the user to easily discriminate between eavesdropping devices and legitimate broad-casts due to this sound source.

Power for the DAR-1 is supplied by internal rechargeable batteries. A charger is furnished with the unit.

The DAR-3 is a basic DAR-1 that has additional circuitry that allows it to receive signals in the microwave range. It also has a separate antenna for these higher frequencies.

IMPORTANT NOTICE

IF EXTREMELY STRONG LOCAL RADIO STATION SIGNALS ARE ENCOUNTERED WHEN USING THE DAR, THE RECEIVER MAY OVERLOAD. ALTHOUGH NO DAMAGE WILL RESULT, THE SENSITIVITY OF THE RECEIVER WILL BE GREATLY REDUCED DURING USE IN THAT ROOM. REFER TO THE OPERATING INSTRUCTIONS ON PAGE 5 TO OVERCOME "OVERLOAD".

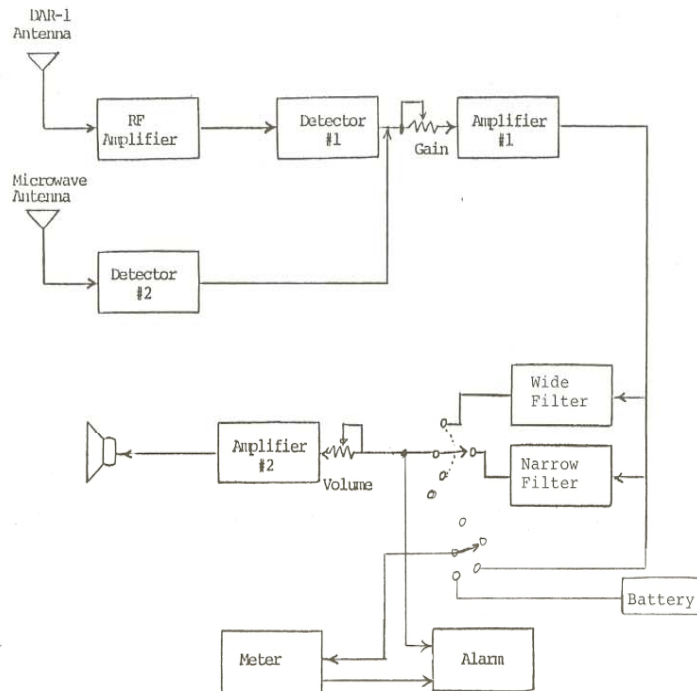


Figure 1 - DAR-1, DAR-3 BLOCK DIAGRAM

THEORY OF OPERATION

The operation of the DAR-1 is quite straight forward and is best under-stood if taken in steps as the signal proceeds through the receiver. *The block diagram (Figure 1) will assist the reader.*

1. The signals present in the room are picked up by the antenna and fed into the broad band amplifier. The antenna is connected to the DAR-1 by a BNC connector on the front panel. The length of the antenna generally needs no adjustment. If the user touches the antenna itself (not the plastic insulator), reception of low frequency signals below 20 megahertz will be improved. Reception of higher frequency signals could possibly be improved by changing the length of the antenna.
2. The broad band amplifier amplifies all signals from 50 kHz to 1300 MHz, bringing the average signal level of even the weaker signals up to a high enough value so that the video detector's signal threshold is exceeded.
3. The video detector is a military type detector designed to fit the impedance of the broadband amplifier. It also has a frequency characteristic wider than the broadband amplifier. This is most important and no field repairs or replacements should be attempted on the video detector of the broadband amplifier, since the units are carefully matched at the factory.
4. A rotary selector switch labeled **WIDE/NAR/METER/BATTERY** provides the capability to select the path for the audio signals.
 - ✚ **WIDE** - Directly through audio amplifiers Nos. 1 and 2, without any filtering of the signals. In this position the audio from several stations at once will probably be heard.
 - ✚ **NAR (narrow)** - Through amplifier No.1, the narrow bandwidth section of the audio active filter and then through amplifier No. 2.
 - ✚ **METER** - Through amplifiers Nos. 1 and 2, but also through the panel meter so that a meter indication of field strength of the entire RF spectrum is available.
 - ✚ The meter may be used to actually locate an eavesdropping device by moving the DAR-1 to different locations until the transmitter is the strongest signal near the antenna. The headset must be used in the meter position.
 - ✚ **BATTERY** - In this position the meter serves as a battery condition indicator, although it will be apparent to the operator when the batteries need charging.
5. The active audio filter can either be bypassed to listen to all signals being demodulated **WIDE**, or used in the **NARROW** position to discriminate against the unwanted signals.
6. The rear two main variable operating controls on the front panel. The **GAIN** control sets the amount of signal entering amplifier No.1. The **VOLUME** control sets the amount of signal entering amplifier No.2. The setting of these two controls may be adjusted each time the DAR-1 is used, depending upon the strength of the unwanted signals in the room and also the position of the filter selection switch.

Note that there is a headphone jack built into the panel. When the headset is plugged in, the loudspeaker is disabled. This is very important in the METER position.

7. The loudspeaker allows the DAR-1 to function as a feedback detector if that is desired. When the DAR-1 is to be used as a constant monitoring device, this is usually the best type of operation, after the standard method explained later in the manual has ascertained that there are no eavesdropping transmitters in the room.
8. The ALARM function allows a threshold to be programmed into the DAR so that it may be used as a monitor during a meeting. If any increase in the average RF level is noted, either an audible or visual alarm is given.
9. The REMOTE function allows the DAR to be used with the optional remote RF transmitter-receiver. It usually is placed in a meeting room during a conference and if an alarm situation occurs, the remote operator is alerted.

OPERATING INSTRUCTIONS

PRELIMINARY

1. Remove the DAR-1 from its carrying case, along with the headset and the adjustable angle whip antenna. The other antenna, with the insulating tube, is used with the long piece of coaxial cable as a probe when walking about an area with the receiver.
2. Set the receiver on a table or desk. The handier can serve as a stand by tightening the knobs on the side of the DAR with the handle underneath. Be careful not to over tighten the knobs.
3. Extend the antenna to its full length and connect it to the BNC connector marked 50 kHz - 1.3 GHz, located in the upper left hand corner of the front panel. *NOTE: Always collapse the antenna one section at a time starting from the bottom. These antennas may bend if collapsed from the top down.*
4. Turn the **VOLUME** control all the way down (counterclockwise) BEFORE turning the DAR on. Turn the **GAIN** control fully clockwise. Plug in the headset. Put the headset on.
5. Put the rotary switch in the **WIDE** position and turn the DAR on with the power switch, located in the center of the panel. Adjust the volume to a comfortable level. Adjust the **GAIN** and **VOLUME** controls and note how they affect the output signals. Turn the rotary switch to the **NARROW** setting and note the effects there. The **NARROW** setting sounds tinnier than **WIDE** and eliminates much of the audio frequency range, except the frequency of the DAR sound source. The audio from other broadcast stations will be effectively removed.

SWEEPING INSTRUCTIONS

Use the hand held antenna and the headset. Turn the DAR on and adjust the **VOLUME** and **GAIN** controls; put the rotary switch in **WIDE**. Move around the room; cover the walls and ceiling. Listen very carefully to detect any room audio. Room sounds might be background music, voices, typewriters, ringing telephones, or even your own voice or whistle. Conduct this sweep prior to turning on the beeping sound source built into the DAR, so that if you do discover a device, the listening post will not be alerted.




To turn on the pulsating sound source, push the red **BEEPER** switch. Put the headset on and adjust the volume control, leave the rotary switch in **WIDE** and listen carefully. Now turn the switch to the **NARROW** position, and walk around the area. Bring the antenna close to the walls, ceilings, windows, etc.

Even if the background radio signals are fairly strong, the sound source should be heard if you are close to the eavesdropping transmitter. Strong signals will present some difficulties. If the meter reads more than 20, when in the **METER** position, you are in a strong signal area and care must be taken to make sure you get the antenna close to the walls and ceiling. To turn off the sound source, push the red **BEEPER** switch once more.

IMPORTANT NOTICE

IF EXTREMELY STRONG LOCAL RADIO STATIONS SIGNALS ARE ENCOUNTERED WHEN USING THE DAR, THE RECEIVER MAY OVERLOAD. ALTHOUGH NO DAMAGE WILL RESULT, THE SENSITIVITY OF THE RECEIVER WILL BE GREATLY REDUCED DURING USE IN THAT ROOM.

TO OPERATE DURING AN OVERLOAD CONDITION:

-  **PLACE THE FUNCTION SWITCH IN THE METER POSITION. IF THE DAR IS OVER-LOADED, THE METER NEEDLE WILL BE AT THE EXTREME TOP (RIGHT END) OF THE SCALE.**
-  **TURN THE GAIN CONTROL COUNTERCLOCKWISE UNTIL THE METER IS BETWEEN 20 AND 30 ON THE SCALE. YOU WILL NOTE THAT THE DAR NOW HAS ITS SENSITIVITY RESTORED.**
-  **WHEN YOU MOVE TO ANOTHER LOCATION WHICH DOES NOT EXPERIENCE AN "OVER-LOAD" SIGNAL, RETURN THE GAIN CDNTROL TO ITS FULLY CLOCKWISE POSITION.**

3. If you do hear the sound source through the headset, the eaves-dropping transmitter can be located using the following methods. First, turn the rotary switch to the **METER** position and walk around the area until the meter goes all the way to 50. Then decrease the length of the antenna until the meter reads 10 or so and continue the "field strength" search. It may be that other signals are fairly strong too. If that is the case, turn the **GAIN** control down slightly and continue the search.

The second method of locating the transmitter involves making a sound and listening to the sounds coming from the transmitter. The closer you are to the transmitter, the clearer and less echo-like the audio will be. The rotary switch can be in either **WIDE** or **NARROW**, whichever seems to work better.

4. The DAR can be operated in the feedback mode as well. Simply disconnect the headset and turn the GAIN and VOLUME controls up all the way. The rotary switch should be in the WIDE position. When the controls are up all the way, an internal mechanical feedback could occur. If it does, back off on the controls until the squeal stops.

Acoustic feedback should be heard if there is a transmitter near the DAR. Use the methods described above to locate the trans-mitter.

5. The last test to do is the Power Line Sweep. This test checks the area for listening devices that operate over the power lines at very low radio frequencies. These devices are commonly called CARRIER CURRENT TRANSMITTERS and are similar in operation to wireless intercoms sold in electronics stores. Carrier current transmitters are hard-wired or plugged into the AC power in the area and actually use the wiring as a common antenna between the transmitter and the receiver, as well as a power source. It is important to note that the RF signal from the carrier current transmitter will not pass through the transformer on the power line. Therefore, the receiver and listening post will be on the same side of the transformer as the transmitter. It is possible to bypass the transformer to allow the signal to cross, but it is difficult and very dangerous. It is seldom, if ever, found in the civilian environment.

To check the power lines:

- a) Connect the short coaxial cable to the power line adaptor box and to the 50 kHz - 1.3 GHz connector.
- b) Plug the AC cord from the carrier current box into the AC outlet. If the outlet has only two wires, use the 2-3 wire adaptor and make sure that the ground tab is connected to ground on the outlet cover.
- c) Plug in the headset, turn the DAR on, and adjust the VOLUME to a comfortable level.
- d) The power line adaptor box has a three position switch. Position 1 selects the hot and neutral wires; position 2 selects hot and ground; position 3 selects neutral and ground. Turn on the BEEPER and listen carefully in position 1, then check positions 2 and 3 carefully, too.
- e) This procedure should be done in each area or room. If there is a carrier current transmitter, you will hear the sound source.
- f) Carrier current transmitters are very difficult to locate using the field strength method. Use the audio proximity method discussed previously or perform a detailed physical search of the area.

OTHER CONTROLS

1. Alarm function: The alarm threshold adjustment is labeled ALARM SET. When the average RF signal level in the area exceeds the point to which the threshold has been set either an audible or a visual (silent) indication is given.

To set the threshold, attach the antenna and turn the ALARM SET control fully counterclockwise. Turn the GAIN control fully clockwise; the volume control may be set in any position.

Slowly turn the ALARM SET control clockwise until an alarm is indicated. Next turn it slightly counterclockwise until the alarm indication disappears.

Use the toggle switch to select the type of alarm- either AUDIBLE or SILENT. An audible alarm will activate the sound source; a silent alarm will turn on the red LED.

RF sources other than from eavesdropping devices may trigger the alarm. They may be walkie-talkies and other types of two-way communication, computers, or even signal reflections due to movements of people in the room. Check and verify the cause of each alarm.

2. METER ADJUST- The METER ADJUST Control is used to set the zero point of the meter (no radio signals present)
 - i. Remove the antenna.
 - ii. Turn the DAR on.
 - iii. Adjust the GAIN control fully clockwise.
 - iv. Adjust the METER ADJUST control so that the meter reads 0.
3. REMOTE function: The remote is an optional wireless alarm indicator. Its threshold is set by the ALARM SET control.

BATTERY CHARGING

To check the battery, put the selector switch in the BATTERY position. If the meter reads less than 40, the battery needs charging. To charge, plug the charger cord into the socket on the back of the DAR and plug the charger into a 110 V outlet. There is a switch on the charger to select 220 V sources, as well. The battery will charge fully in 10-12 hours. Do not leave on charge for more than 18 hours.

TRAVELING AND SHIPPING

The DAR carrying case is very rugged, but it should never be shipped by air freight, UPS, etc. without an outside package for additional protection. The DAR usually withstands aircraft baggage handling, but, if possible, it should be carried on the plane.

The combination lock is set at the factory to 000 and is user change-able.

DAR-3 THEORY

- Refer to the DAR-1 section for the basic operation of the DAR-3.
- The added operation capability of the DAR-3 enables the user to scan the frequencies from 1.3 GHz to 12 GHz.
- The special log periodic antenna covers the frequencies of the DAR-3 but is directional in pickup and must be "aimed" at the area being covered.

OPERATION

- After completion of the low frequency RF sweep as outlined previously in this manual, proceed with the microwave sweep as follows.
- Connect the log-periodic antenna to the BNC connector marked 1.3 - 12 GHz.
- Perform the microwave sweep the same way you did the RF sweep.
- The only precaution to be taken is that the log-periodic antenna must be pointed at the object, wall or ceiling being investigated.