Instructions for

Oscar 7

Electro Acoustic Ear

&

Octave Monitor

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1. GENERAL DESCRIPTION

The Tremetrics Oscar 7 (Figure 1) is a high-quality measuring device used to fulfill the requirements for daily biological tests of audiometers. The Oscar 7, when used in conjunction with the Tremetrics HT Wizard audiometer provides the capability to continuously monitor room noise in octaves during an actual hearing test and pause the test if these levels are exceed. This real time monitoring ensures and documents compliance to the OSHA allowable background noise limits for audiometric test rooms.

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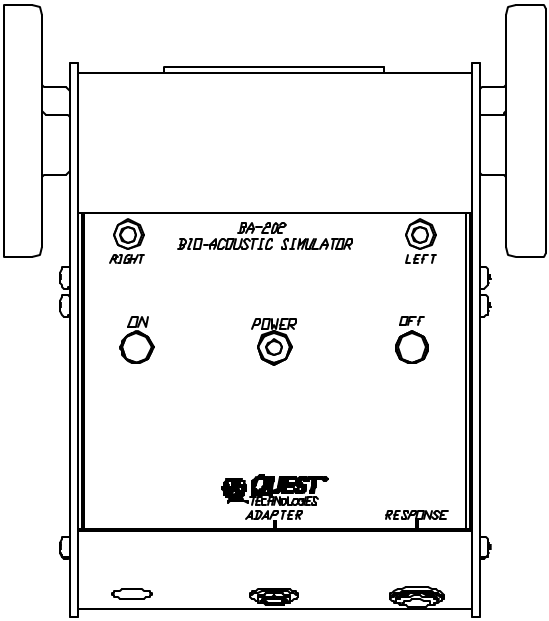

Figure 1. Oscar 7 Electro Acoustic Ear

The Oscar 7 Electro Acoustic Ear is simply substituted for a human test subject, thus eliminating the need to use the same person with a known hearing threshold level. The Electro Acoustic Ear's performance is consistent every day. This eliminates the variables that can be present when using a human test subject whose hearing can be affected by such things as a head cold, allergy, recreational noise exposure, etc.

Audiometric room background noise can easily be monitored during the hearing test by using the Octave Monitor capability of the Oscar 7. See Section **3.2 Oscar 7 Octave Monitor Section** on page 6. Other factory-set octave levels can be special ordered if requested by the purchaser.

2. OPERATING PROCEDURE

2.1 Operation Inside of the Audiometric Room

The Oscar 7 has been designed to be mounted on an inside wall of an audiometric room with two screws (pan head style, not provided) and a Velcro® patch (provided). A suggested location would be on the inside of the test room where the headphone can be easily positioned for the daily biological test. It should also be located where the subject's head will not contact the unit. When a good location is determined, fasten the unit as follows:

1. Locate the long slot on the back of the chassis. This slot is intended to slide onto the screw heads. The 4 rubber feet are not used when wall-mounting the unit.

2. Mark the location for the two mounting screws, approximately 3½ inches apart.

3. If necessary, make two small "starting" holes in the room wall for the screws.

4. Screw the two screws into the wall. Let the screw heads protrude just far enough so that the long slot on back of the unit will slide onto them. Test to be sure that the unit slides onto the screw heads.

5. There are two Velcro® patches on the back of the unit. The "hook" patch is fastened to the unit; the "loop" patch is stuck onto the "hook" patch. Peel the backing from the "loop" patch.

6. Slide the unit onto the screw heads while holding the sticky Velcro® patch surface away from the wall.

7. Once the unit is centered on the screw heads, press the bottom of the unit firmly against the wall so that the patch sticks to the wall.

8. The unit is now fastened securely. The Velcro® holds the unit from sliding sideways, off of the screws.

To remove the unit from the wall, pull the bottom away from the wall to separate the Velcro®. Then slide the unit to the side.

After sticking the unit's patch to the wall, you may want to remove the unit from the wall and firmly press the Velcro® patch to the wall to ensure proper bonding.

2.2 Microphone Location Oscar 7

The Oscar 7 requires the use of a cable-mounted microphone to operate the octave band filters. It is recommended that the microphone be suspended by its cable close to the ceiling of the audiometric room. Also locate the microphone in the best position so that the test subject's head will not interfere with it when entering and leaving the room. Be sure to attach the cable in such a fashion so that it can be easily removed from the ceiling mount for periodic calibration. The use of a "screw-type" hook is one way to attach it. Since room ceiling material varies, use the best method for that type of material.

2.3 General Considerations

The Oscar 7 Electro Acoustic Ear section checks the audiometer earphones in the 45dB HL to 75 dB HL range. Therefore, it is important to have a relatively quiet background when performing the HL tests. All tests should be performed within an audiometric room for best results.

An original baseline test should be made when the audiometer is calibrated. Every successive test should then be compared against the baseline. By doing this, as long as the new HL values are within ± 5dB of the original Oscar 7 baseline, the audiometer accuracy is acceptable for testing subjects.

2.4 Testing With the HT Wizard

A typical test procedure would be as follows:

1. Switch the audiometer on and allow it to stabilize.

2. Connect the RESPONSE CABLE between the patient response jack of the audiometer and the RESPONSE jack of the Electro Acoustic Ear.

3. Place the earphones onto the Electro Acoustic Ear.

4. Perform a daily biological test. An audiogram will be produced.

5. Keep a copy of the test. Always compare the new HL values to the original baseline that was established earlier in the present calibration interval of the audiometer. All data should compare within ± 5dB of the original baseline.

2.5 Testing Audiometric Room Noise

The Oscar 7 and the HT Wizard work together to insure that the ambient noise levels inside the test enclosure do not exceed the prescribed levels. The Oscar 7 receives its power from the audiometer and operates continuously. Testing is performed as follows:

1. Hang the microphone from the ceiling slightly above the test subject's head.

2. With the door closed, occasionally view the frequency indicator lights on the monitor. They should NOT be on. If the frequency lights are activating at random, these frequencies are exceeding expectable noise levels and the test cannot be conducted. The offending sound source(s) should then be located and eliminated. If elimination is not possible, either the audiometric booth should be moved to a quieter location or the test should be scheduled for a more quiet time. See Section **3.2 Oscar 7 Octave Monitor Section** on page 6, for the allowable values.

3. SPECIFICATIONS

3.1 Bio-Acoustic Ear Section

Test Frequencies: 125Hz to 8kHz

Calibration: 60 HL ± 1dB at 1kHz continuous tone with TDH-39 earphones.

Accuracy: When using automatic audiometers, the Oscar 7 will be repeatable within the HL step increments of the audiometer (usually 5dB).

Hysteresis: 10dB ± 1dB between ON and OFF indication for the LEFT/RIGHT headphone indicators when used with continuous tone input. This means once activated, the LEFT/RIGHT headphone signal must be lowered by at least 10 dB to deactivate the Indicator Light and Relay.

Indicators: 3 LED's; RIGHT, LEFT, and POWER.

Transducers: Two independent Electret Microphones.

Response Output: Normally, open relay contacts.

Application: For use with HT Wizard automatic audiometers using either pulsed or continuous tones. Will measure all earphones equipped with either MX-41/AR cushions or Telephonics Model 51 cushions, with or without Audiocups or similar earmuffs.

3.2 Oscar 7 Octave Monitor Section

Test Octaves (Hz) and Activation Levels:

125Hz	--	78dB
250Hz	--	64dB
500Hz	--	40dB
1kHz	--	40dB
2kHz	--	47dB
4kHz	--	50dB
8kHz	--	56dB

Indicators: 7 LED's; One for each monitored frequency.

Microphone/Amplifier: ANSI S1.4 - 1983 & S1.4A - 1985, Type 2

Octave Filters: ANSI S1.11 - 1986, Class II

Preamp: Cable-mounted FET type for electret microphone.

Microphone: Quest QE7052 (1/2") Type 2 electret.

Calibration: Requires 114dB, 1kHz acoustical calibrator (such as the Quest QC-10)

3.3 General Features

Power: The Oscar 7 is self-powered from the HT Wizard audiometer.

Size: 173 x 165 x 107 mm (6.8 x 6.5 x 4.2 inches)

Weight: 740 g (1.6 lb) not including the remote microphone**.**

Construction: Rugged aluminum housing with molded ABS polycarbonate ear cups.

4. CONTROLS (See Figure 1)

POWER Indicator Light: This light will flash when the power is on.

RIGHT/LEFT Indicator Lights: One light will activate when either the Right (Red) or Left (Blue) earphone output exceeds an internally set dB level. Once lit, the signal must be reduced approximately 10dB (called "hysteresis") to cause the light to go off.

RESPONSE Output Jack: This output is connected to the HT Wizard OSCAR jack. When either the RIGHT or LEFT indicator lamp is on, the internal relay contact is operated to simulate the test subject pressing the Patient Response Switch.

MIC. Input Connector: Allows the external preamp and microphone system to be connected for making audiometric room background noise measurements in octave bands.

125, 250, 500, 1K, 2K, 4K, 8K Indicator Lights: Each individual light will activate if the room noise in the corresponding octave band exceeds the internal preset level.

CAL. Adjustment: Allows the user to calibrate the 1K octave band with a 1kHz, 114dB acoustic calibrator (such as the Quest QC-10 or QC-20 calibrators). When the 1K filter is calibrated, all other octave bands are automatically within calibration.

5. PRINCIPLES OF OPERATION

The Oscar 7 uses two independent microphones to convert earphone signals to AC voltages. These voltages are then amplified and sent to rectifiers for AC to DC conversion. The DC voltage enters its respective detector. When sufficient signal is present at the earphone coupler, the appropriate indicator light (RIGHT or LEFT) will light and the response relay will activate. Once this occurs, the earphone signal must be decreased by at least 10 dB (hysteresis) to deactivate the indicator light and the response relay.

The 9VDC power is supplied by the HT Wizard audiometer. The POWER indicator light flashes during operation.

The Oscar 7 contains a microphone and amplifier used to condition the acoustic signal and then present this signal to resistive voltage dividers. These dividers allow the filter inputs to have various sensitivities. For example, Oscar 7 uses resistive dividers to set levels to 78dB at 125Hz, 64dB at 250Hz, 40dB at 500Hz, etc. These divided signals then go to the inputs of the octave band filters.

The filter and detector circuits select and detect various frequency components within the room noise spectrum. If the room noise is intense enough within a given octave band, it will activate the respective indicator light.

Various resistor dividers can be installed by Tremetrics to allow different levels to be detected. Contact Tremetrics for special orders.

6. MAINTENANCE AND CALIBRATION

The Electro Acoustic Ear section should maintain its accurate calibration for many months of use. Since both the LEFT and RIGHT test circuits are identical, the following procedure can be used to verify that the Electro Acoustic Ear section is functioning properly.

6.1 Headphone Calibration Check (Left/Right Earphone)

1. Turn the unit on.

2. Place the headphones onto the simulator with the Right (Red) earphone in the coupler on the side marked RIGHT. Test and record the HL values in 5dB increments (45, 50, 55, etc.) at all frequencies.

3. Remove the headphones, turn them around, and place the same Right (Red) earphone in the other coupler on the side marked LEFT. Again, test and record the HL values in 5dB increments (45, 50, 55, etc.) at all frequencies.

4. Compare both sets of data. If the difference between both sets of data is 5 dB or less at each frequency, the Bio-Acoustic Ear is functioning properly. If it is more than 5 dB at any frequency, the unit should be sent in for calibration/repair. (See TREMETRICS WARRANTY POLICY)

6.2 Octave Monitor Calibration

The Octave Monitor section should maintain its accuracy for many months of use. However, to insure consistently accurate operation, it is recommended that the 1K filter be tested and calibrated weekly or at least monthly. Calibration of the 1K filter requires a 1kHz, 114dB acoustic calibrator capable of adapting to the microphone diameter. Quest Calibrators meeting this requirement are the QC-10 (1kHz, 114dB) and the QC-20 (1kHz / 250 Hz, 114dB / 94dB).

1. Switch the calibrator on. Note: If other settings are available, make sure that they are set to produce a 1kHz tone at 114 dB.

2. Place the microphone into the calibrator.

   - When using the ½inch microphone, use the ½inch to 1 inch adapter between the calibrator and the microphone.

- When using the 1-inch microphone, an adapter is not required.

3. Connect the Oscar 7 to the HT Wizard and turn the HT Wizard on.

4. While holding the CAL button in, observe the 1kHz light while slowly turning the CAL adjustment with a screwdriver. Adjust it until the light appears to glow at approximately one-half intensity.

5. Release the CAL button. All octave filters are now in calibration.

6.3 Microphone Care

The Octave Monitor Microphone is a delicate and expensive component. Therefore, it should be treated with care to avoid costly replacement due to physical damage. Reading and adhering to the following information will help avoid damage to the microphone:

- NEVER unscrew and remove the microphone grid unless great care is taken. Removing it will expose the very delicate microphone diaphragm to possible physical damage.

- If the grid is removed for inspection of the diaphragm, NEVER touch the diaphragm. Cleaning should only be performed by a Tremetrics service technician, if it is ever needed.

6.4 Preamplifier Care

The Octave Monitor Preamplifier is somewhat delicate. Reading and adhering to the following information will help avoid damage to the preamplifier.

- NEVER flatten the cable between tight door joints.

- NEVER kink the cable sharply since this may cause wire breakage.

- ALWAYS connect and disconnect the connector from the Oscar 7 by screwing and unscrewing only the "knurled" shiny part of the connector. Never try to unscrew the black rubber "strain relief". If the "strain relief" is forcefully unscrewed, it will destroy the connector and will twist and break all of the wire connections within the connector.

7. NOTES

8. TREMETRICS WARRANTY POLICY

Tremetrics, "Seller", warrants the goods sold will conform with all pertinent specifications including performance specifications, drawings and approved samples, as furnished. Seller also warrants said goods to be free of defective materials and workmanship. This warranty is in lieu of all other warranties, expressed or implied. Seller makes no warranty that said goods are fit for any particular purpose, nor any warranty as to the merchantability or quality of good sold except as herein stated. All claims for alleged defects of goods under this warranty shall be deemed waived unless made in writing and delivered to Seller within twelve (12) months after date of shipment, unless otherwise specified herein below, and on any such claims, Seller has the option of inspecting the goods claimed defective at the Buyer's place of business or having them reshipped to Seller for inspection. Instrument parts which have been repaired or replaced during the warranty period are themselves warranted only for the remaining unexpired portion of the original warranty. This warranty shall not apply where goods have been subject to misuse, neglect, accident or improper application or have been repaired or substantially altered by others, nor does this warranty apply to items consumed in the ordinary course of use of the goods, such as, but not limited, to fuses or batteries. Transportation charges covering returned goods will be borne by Buyer. No returns will be accepted unless authorized by Seller. SELLER'S LIABILITY FOR BREACH OF WARRANTY SHALL BE LIMITED TO SELLER'S STATED SELLING PRICE PER UNIT OF ANY DEFECTIVE GOODS AND SHALL IN NO EVENT INCLUDE BUYER'S MANUFACTURING COST, LOST PROFITS, GOODWILL OR ANY OTHER SPECIAL OR CONSEQUENTIAL DAMAGES. Seller may, at its discretion, repair with new or factory refurbished parts, replace, or give Buyer credit for such defective items. Items produced by third party manufacturers shall carry that warranty provided to Seller by said third party manufacturers. Such warranty shall be passed by Seller to the Buyer. Seller will pay motor freight both ways on all warranty returns.