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Book Descriptions:

california audiometry manual

Should the Detective Audiometer require service due to a defect in material or workmanship, Maico, at its option, will repair or replace the instrument at no charge except for transportation to and from the point of service. It is the purchaser's responsibility to return the Detective Audiometer to the Maico Special Instrument Distributor from whom it was purchased or directly to Maico after receiving a return authorization. This warranty does not cover breakage or failure caused by tampering, misuse, carelessness, accident or modification. The warranty is void if the instrument is serviced by other than an authorized Maico Special Instrument Service Center. NOTE Specifications in this manual are in effect at the time of printing. Maico reserves the right to modify or change specifications or design at any time without notice or incurring obligation. WARNING The Detective Audiometer is designed to be used with a hospital grade outlet. Injury to personnel or damage to equipment can result when a threeprong to twoprong adapter is connected between the power plug and an AC outlet or extension cord.

1 Operating Instructions Detective Audiometer 1 Instrument description Our products are designed to put children at ease, allowing you to make a diagnosis quickly, easily and accurately. The Detective audiometer is intended for use with school age children in order to quickly screen for a hearing loss or establish an airconduction threshold. The Detective Audiometer has both a manual puretone audiometer as well as automatic audiometry function for older children. This allows accurate screening of more mature children, while allowing the tester time to attend to other tasks during the test, such as filling out necessary paperwork or screening documentation.

2 Operating Instructions Detective Audiometer 2 Unpacking and inspection 2.1 External inspection Your Detective Audiometer was carefully inspected and packed for shipping. <http://paseygol.com/userfiles/how-to-manually-install-dll.xml>

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However, it is good practice to thoroughly inspect the outside of the shipping container for signs of damage. If any damage is noted, please notify the carrier immediately.

2.2 Unpacking Remove the upper layer of packing material from the top of the instrument. Carefully lift the instrument from the shipping carton and remove the plastic bag. Inspect the case for signs of any damage. Notify the carrier immediately if any signs of mechanical or physical damage are found will ensure that a proper claim is made. Save all packing materials so that the claim adjuster can inspect them as well. When the adjuster has completed the inspection, notify your Maico Special Instrument Distributor. Save all the original packing materials and the shipping carton so the instrument can be properly packaged if it needs to be returned for service or calibration. If you haven't purchased a carrying case, be sure to save the box your unit came in. It has been specially designed to protect it during transportation. Please check that all items listed above are received in good condition. If any items are missing or damaged, immediately notify your Maico Special Instrument Distributor.

3 Operating Instructions Detective Audiometer 3 Installation and setup 3.1 Where to set up A quiet room furnished with a desk or table is ideal for using the Detective Audiometer. If a separate room is not available, try to locate an area with minimal noise and distractions. Remember background or ambient noise can distract the child and affect the results of the test. Electromedical instruments emit strong electromagnetic fields e.g., microwaveradiotherapy devices which can influence the function of this device. Therefore, do not use those types of instruments in close proximity to the Detective Audiometer. The test room should be at normal room temperature

15. Turn on the

Detective with the switch at the rear of the

device. http://anonelectronics.com/admin/fckeditor/editor/filemanager/connectors/php/upload_jpg/2011071626357648.xml

The device is in standby mode now and a manual or automatic audiometry test may be started. 3.3 Calibrating the device The instrument and headphones are a set. Because the headphones have been calibrated to this particular instrument, use of other transducers is not recommended. This threshold is measured in dB decibels. As a result of largescaled mass screenings the hearing threshold of young normalhearing people is defined as 0 dBHL. Index HL is short for hearing level. So, a hearing threshold of 0 dBHL is called normal and means that there is no hearing loss. On the other hand, a threshold of 70 dBHL would indicate poorer hearing since sound is heard only when its intensity is 70 dB higher than normal. In the reverse case of a negative value e.g., 10 dBHL the hearing is even better than normal. The hearing threshold is measured using pure tones sine wave with frequencies from about 125 Hz up to 8000 Hz with adults and 250 Hz up to 4000 Hz with children. These pure tone audiometric tests are rather timeconsuming and require high concentration and cooperation of the tested person. So the tests can be difficult, especially with children. To find out if there is a hearing disorder, it is not necessary to start the examination with a pure tone audiometric test but instead by checking the hearing threshold below a certain limiting level using a screening test. If the patient's hearing threshold is below that limit, normal hearing is indicated. If the hearing threshold exceeds the limit, or there are other concerns or indications, the patient should be referred for further audiological examination. An adult may have sustained a mild hearing loss of 35 dBHL without being conscious of the disorder. With children, particularly at the preschool age, a similarly mild hearing loss can be critical for further speech and language development. With children, the most widespread reason for problems with hearing is a loss caused by disorders of sound conduction.

Mostly this is temporary and varying within rather wide limits. The hearing loss can differ from day to day by 5 to 30 dB. Two more children are diagnosed during early childhood. Much more frequently, a conductive type hearing loss is found. Otitis media is the most widespread disease during infancy and childhood and thus the most frequent reason for consulting a pediatrician. Over 90% of all the children are diagnosed with otitis media once or several times. The World Health Organization WHO states that otitis media is the worldwide numberone reason for hearing loss during childhood. Author Dr. Jerry Northern, in his book Hearing in Children supposes that 30% of all the children under the age of eleven suffer from an ear infection and therefore have a certain degree of hearing loss. If the hearing loss remains untreated a delay in speech development is inevitable. 7 Operating Instructions Detective Audiometer 5 Performing Automatic Audiometry 5.1 Preparing the child Directions regarding the hearing test should be explained to the child. The child will hear a series of soft "beeps" and should listen very carefully. Testing will be conducted in the right ear first and then the left ear. The child will hear directions given through the earphones, and should listen to those carefully when they are presented. After the test is explained, carefully place the headphones on the child with the RED phone on the RIGHT ear and the BLUE phone on the LEFT ear. Be sure that the speaker portion of the earphone is lined up with the opening of the child's ear canal. Give the hand switch to the child and the test is now ready to begin. 5.2 Testing To start a new test, press the NEW button 16. The Detective will display the automatic assigned patient ID number. Press enter to confirm this number and the main test screen will be displayed with a blank audiogram or table ready to start a new test.

If you would like to enter a customized ID number, press the NEW button 16, then enter an ID number up to 9 digits using the numbers displayed next to the keys on the front panel of the instrument Figure 1. Press ENTER 15 to confirm and begin the test. The following procedure is based on the basic screen that appears. Chapter 7 will instruct you how to customize the set up.

Testing will begin in the right ear at 1000HZ. "Right" will be highlighted and the cursor will indicate the level and frequency where the test will start. Figure 1 Press the START button 5 in order to start the automatic audiometry test. The child will hear the following initial set of instructions in their headphones "You will hear different tones through your headphones. As soon as you hear a tone, even if it is very soft, quickly press and release the hand button." 8 Operating Instructions Detective Audiometer Following these instructions, the test will immediately begin by presenting the first tone. The tone is represented as crosshairs in the audiogram view Figure 1A. The horizontal axis indicates the frequencies 250 Hz 8 kHz and the vertical axis indicates the levels at which the test tone is given. Frequency of the tone being presented in the table view is indicated by the column in which the cursor is located. The level of the signal is displayed as a numerical value under the current test frequency Figure 1B. Figure 1A Audiogram at 20 dB If the child does not respond by pressing the hand button, the tone will go up 5dB. This will continue until the child responds to the tone. When the child presses the hand button in response to the tone, the level will decrease by 10dB and then ascend in 5dB steps until the child responds again. This pattern of increasing by 5dB and decreasing by 10dB will continue until the child has two out of three responses at a particular level. After this threshold is established, it is displayed on the test screen.

The level and frequency of the response is marked by an "O" for the right ear or "X" for the left ear in the audiogram view Figure 1C. The response in the table view is stored as a numerical value in the row for the appropriate ear. The test will continue until all frequencies have been tested for both the right and the left ear. If any of the following errors occur, an appropriate instruction will be played through the earphones to the patient and the error will be displayed on the screen for the operator to view. Multiple responses to a tone If the child is continuously pressing and releasing the response button multiple times after only one tone is presented then the following message will play through the headset "Listen carefully and make sure you hear a tone before pressing the hand button. " Release patient response switch If the child is continuously holding down the response button without releasing it, the following message will play through the headset "You are not releasing the hand button quickly enough. Remember to press and release the hand button as soon as you hear a tone." Not responding at maximal level If the child is not responding at all to the tones even at the loudest level, then the following message will play through the headset "As soon as you hear a tone, even if it is very soft, quickly press and release the hand button." NR no response will be recorded for particular ear and frequency for which this condition occurred. 5.4 Evaluation of the test The test results are recorded on the screen display for each test frequency for both ears. NOTE Most states define a normal hearing level for a puretone screening as 20 dBHL. However, it is recommended that you check with your state or the American SpeechLanguageHearing Association ASHA for specific guidelines. To start a new test, press the NEW button 16. Results for a current session or all stored sessions may be printed by pressing the PRINT 2 key from the main test screen.

Confirm your choice by pressing the appropriate button. Detective printer must be attached and set up in the user menu. Press the ERASE button 1 in order to delete the results on the display and to start a test for a new patient. Just the current session may be deleted or the entire database includes all stored patients may be deleted. Confirm your choice by pressing the appropriate button ERASE 1 to delete session, PRINT 2 to delete the database. 10 Operating Instructions Detective Audiometer 5.5 Changing the voice prompt language To change the language of the instructions the child hears during the test, press MENU 9. Move the arrow key 19 down until Voice Prompt Language is highlighted and press ENTER 15. The next screen will show you the language options that are programmed into the Detective. Press the down arrow key until the language you wish to select is highlighted and press ENTER 15. You can now start the test. 11 Operating Instructions Detective Audiometer 6 Performing Manual Puretone Tests 6.1 Changing from an automatic to a manual test The automatic audiometry test can be overridden at any time in order to continue with a manually administered test. Press STOP 11 at any time during the automatic test to pause the test. Press

STOP 11 again in order to end the automatic test and continue with a manual presentation of the tones. "Test Finished" will be displayed on the screen to indicate that the automatic test has been stopped. 6.2 Testing in manual mode Press the STOP button 11 twice as stated above in order to stop automatic testing and begin manual testing. Any thresholds that were stored during the automatic test will remain on the screen. By pressing either the button 20, the frequencies can be selected. The chosen test level is shown on the display. A tone will be presented when you touch the STIMULUS button 11. As soon as the button is touched, the STIMULUS field on the display is highlighted.

If the field is already highlighted when starting the test, the Interruption Mode is selected. The tone is presented as crosshairs in the audiogram view Figure 1A. When the patient's hearing threshold is established, or screening protocol has been met, press the ENTER key to manually store the result on the screen. The level and frequency of the response is marked by an "O" for the right ear or an "X" for the left ear in the audiogram view. The crosshairs automatically go on to the next frequency. Change level with arrow keys as described above. Save the patient's response by pressing the ENTER button 15. The measurements are connected by a line in the audiogram view Figure 2. Proceed with the test as described above for all of the other test frequencies. The next measured points will be reflected on the table. After saving the results at the highest test frequency, the crosshairs automatically return to the test results at 1 kHz. 12 Operating Instructions Detective Audiometer Retest the results at 1 kHz. The patient is now trained and a better result can be expected. Select the low frequencies by pressing the button you can now go from one test result to the other. RIGHT or LEFT will also be highlighted on the test screen. 6.4 Evaluation of the test results The test results can now be printed by pressing the PRINT 2 button from the main test screen. Results from the current session only, or from all stored sessions may be printed. Confirm your choice by pressing the appropriate button. Press the ERASE button 1 from the main test screen in order to delete the results on the display for the current session or all of the data in the database. Confirm your decision by pressing the appropriate button. For hygienic reasons the ear cushions of the headphone should be cleaned after finishing the examination. A new test can now be started by pressing the NEW button 16, then the ENTER button 15 to confirm.

A patient ID will automatically be assigned to the patient and can be viewed on the main test screen. If you would like to enter a customized ID number, press the NEW button 16, then enter an ID number up to 9 digits using the numbers displayed next to the keys on the front panel of the instrument Figure 1. 13 Operating Instructions Detective Audiometer 7 Set up the Detective Audiometer for your individual needs The Detective Audiometer is preconfigured for most requirements. If you still require some functions to be set up for your individual needs, enter the user menu. After having set the changes they are saved in the device. The settings remain unchanged even if the device has been switched off. Press the MENU button 9. The selected menu is highlighted. Press the ENTER button 15 to choose the respective submenu and to select, confirm and save the new setting. Press the MENU button 9 again to exit the respective menu or user menu Figure 3. After leaving the user menu you will return to the test you last selected. The possible settings of the Detective Audiometer are as follows User Menu Voice Prompt Language The instructions and voice prompts of the Detective Audiometer will be played back with the selected language. Two languages are programmed in the Detective Audiometer. The choices are English or Spanish. Level after frequency change. Automatic Audiometry Figure 5 This menu sets how the Detective Audiometer is performed in Automatic Mode. This level can only be as low as the Minimal Level choose from 0 to 90dB in 5dB steps Pause length Length between tone presentations in addition to the randomized time variable. choose from 1 to 99 seconds. These include instructions and error messages. "OFF" will conduct testing without any voice prompts to instruct the patient. The Advanced Settings screen Figure 6 displays additional audiometry settings.

Advanced frequency selection Allows only specific frequencies to be displayed and tested from the audiometer test screen. The 1000 Hz frequency is turned on by default and cannot be turned off by the user. These frequencies will be displayed for both the manual and automatic tests. Additional items on the User Menu screen Figure 3 include Display language The language of the instructions shown on the display can be selected. English, Spanish, German and French are available as operating languages. This selection does NOT affect the voice prompt language. Device information General information can be found here, e.g., software version, serial number, and quantity of tests. PC or Print Select Print serial or PC data transfer. If detective printer is attached, "Print serial" must be selected in this menu. Press the ENTER button 15 to confirm your selection. Reset to Default Returns all settings to factory default settings. 16 Operating Instructions Detective Audiometer 8 Care and maintenance of the instrument Disconnect the main cables before cleaning. To clean the instrument, headphones and accessories use a soft cloth dampened with a little warm soapy water; no alcoholbased cleaner should be used. The ear cushions of the headphones can be detached for cleaning. To remove the ear cushion, pull it gently from the earphone. To assemble the cleaned or changed cushion, press it on the earphone and make sure that it sits properly. The sound outlet hole must be exactly in the middle of earphone. During cleaning, make sure that no liquids run into the switches, headphone capsules or loudspeaker openings. To maximize the service life of your audiometer and accessory equipment, we suggest the following 1. Turn off the instrument overnight. 2. Wipe the headset cords, ear cushions and casing occasionally with a cloth dampened not dripping wet with warm water. Dry with a soft cloth. 3.

Leave the accessories such as the headset, power supply module, and operator earphone permanently connected to the audiometer to minimize strain on the connections. It is not necessary to disconnect accessories that are not in use while performing other tests. Should it be necessary to disconnect cords, always grasp the barrel of the plug — never pull the cords. Never drop or snap the headphones together. Mechanical shock may change the earphone's electrical and operational characteristics and require recalibration of the Detective. 4. Cover the audiometer at the end of each day to minimize dust collection. 5. Avoid sharply bending or twisting any of the cords. Although they are designed to be highly flexible, rough treatment may cause damage. Broken or defective cords can cause crackling noise and intermittent or weak operation in the headset. No sound from headphone Is the headphone cable plugged correctly in socket Is the lead loose or defective. If your instrument still does not work properly after this short check, please consult your dealer or send the instrument to your dealer or a service center. Please include a detailed description of faults. 20 Operating Instructions Detective Audiometer 11 Aftersales service and calibration 11.1 Aftersales service The Detective Audiometer may be repaired and serviced only by your dealer or by a service center recommended by your dealer. We urgently advise you against attempting to rectify any faults yourself or commissioning nonexperts to do so. In the event of repair during the guarantee period, please enclose evidence of purchase with the instrument. In order to ensure that your instrument works properly, the Detective Audiometer should be checked and calibrated at least once a year. This check has to be carried out by your dealer. When returning the instrument for repairs it is essential to send the headphones, as well. Send the device to your dealer or to a service center authorized by your dealer.

Please include a detailed description of faults. In order to prevent damage in transit, please use the original packing if possible when returning the instrument. 11.2 Calibration The optimum length of time between calibrations for audiometers varies, depending upon the treatment given the instrument and the headphones. It is recommended that the instrument have a laboratory calibration at least once every year. Since rough handling, such as dropping the headphones, can easily cause calibration errors it is advisable to establish a biological calibration check as soon as you receive the instrument. Should you feel at a later date that the audiometer's calibration might be in error, perform a biological check on a known ear. If all retests show major changes, calibration is probably

in error. All repairs and calibrations should be completed at an authorized Maico Special Instruments Distributor service center. This assures the use of quality materials by trained and experienced technicians using the proper, accurate equipment. Maico Special Instruments Distributors are located in major cities throughout the world. To minimize costs and time delays, contact the Distributor that you purchased the instrument from. Be sure to include all accessories, as they are required for proper calibration. 2. Enclose an explanatory letter describing the service you require, carefully detailing any operational problems. Be sure to include your name, phone number, the serial number and your full return address for return shipping. 3. Ship, prepaid, to your Maico Special Instrument service center. NOTE Warranty service is provided by your authorized Maico Special Instruments Distributor. The instruments are not intended for operation in areas with an explosion hazard. Measuring accuracy To guarantee that the audiometer works properly, the instrument has to be checked and calibrated at least once a year. The service and calibration must be performed by an authorized service center.

The instruments are not intended for operation in areas with an explosion hazard. 13.3 Installation After unpacking the unit, make sure it is complete and undamaged. If you encounter any problems, contact technical support at Maico Diagnostics. 1. Place the appliance on a work surface away from water taps, basins and sources of heat. Check the polarity and the voltage level on the power supply. The voltage in the connector should range between 6VDC to 9VDC. AC input 100-240 V, 1.0 A, 50-60 Hz. 2. Connect the power supply to the thermal printer. 3. Connect the serial communication plugs to the printer and the Detective Audiometer. The LED A will flash. The LED A will turn off. 14.2 Inserting paper into the printer Manual load 1. Open the cover 1 of the printer. 2. Lift the green lever 4 in the printer. 3. Place the end of the paper, with the heat sensitive side down, under the roller 2 of the printer. 4. Slide the paper past the roller. Place your fingers on the positions of the paper guiding ribs 3. 5. Put the green lever down again. 6. Place the roll of paper in the paper storage 7. 7. Close the cover of the printer, so that the end of the paper sticks out the unit. Press the PRINT button and choose one of the following print commands from your Detective Audiometer 1. Choose to print only the current session by pressing PRINT again. 2. Choose to print all the stored sessions in the database by pressing START. 14.7 Cleaning Before performing any cleaning operations, the machine must be disconnected from any power supply and data. Do not use solvents or abrasive detergents to clean the printer. A soft damp cloth will suffice. When cleaning the inside of the cover, only use dry cloth or a small vacuum cleaner.

Printer is not connected Serial jacks are interchanged No paper in the printer Check all the connections and signs of your power supply Put paper in the printer Lever is up Put lever down The paper goes through the The printer is printing on printer but there is nothing the wrong site of the paper on it 30 Replace the paper with the thermal side to the printing head of the printer. We are a nonprofit group that run this service to share documents. We need your help to maintain and improve this website. However, especially hearing-impaired individuals and hearing instrument users generally have the most problems in communication situations where background noise is present. Results from pure-tone audiometry do not necessarily describe these problems well. To better assess the real-life hearing performance, sound field audiometry SFA systems have been developed, in which loudspeakers are used instead of headphones. Speech and real or synthetic background noise materials are typically used in SFA systems. However, most of the current SFA systems are either too large and complex for clinical environments or do not reproduce the spatial characteristics of the sound scene correctly. Directional Audio Coding DirAC is a parametric spatial sound reproduction technique, which utilizes the knowledge on the temporal and spectral resolution of human hearing. With DirAC, the spatial attributes of sound can be captured and reproduced with arbitrary loudspeaker setups. In this thesis, DirAC was applied to audiometric purposes. A sound field audiometry system was proposed, with which speech intelligibility assessments can be done in realistic prerecorded sound scenes where external test speech is augmented. With acoustic

measurements and psychoacoustic listening tests, a comparison was made between a reference sound scene and a reproduced scene where the reference was reproduced by the method under investigation.

The main result was that speech intelligibility did not differ notably between the reference and the proposed system. This was confirmed in listening tests conducted with both a group of normal hearing test subjects and a group consisting of cochlear implant and hearing aid users. The results suggested that the proposed method is valid for clinical hearing diagnostics. The main advantage of the system is that it enables the assessments of real-life hearing abilities using a relatively compact loudspeaker setup. Requirements were specified for a clinical implementation of the system, considering the loudspeaker setup and the test room acoustics. Keywords Psychoacoustics, audiology, sound field audiometry, spatial sound, parametric spatial audio, DirAC n diplomityö tiivistelmä aaltoyliopisto. Perinteinen metodi on ainesaudiometria, jossa potilaan kuulokynnys mitataan sinia aneksilla ja kuulokkeita käyttäen. Kuulovammaiset ja kuulolaitteen käyttäjät kuitenkin tyypillisesti kokevat hankalimpina. Aina ongelmia kunnolla. Aina anikenttaaudiometriassa käyttäjät antavat kaiuttimien kuulokkeiden sijaan, jolloin kuulon kytön suorituskykyä voi mitata paremmin. Tällaisissa järjestelmissä käyttäjät antavat testimateriaalina tyypillisesti puhetta sekä Directional Audio Coding DirAC on parametrinen tila-äänien analysointi ja toistotekniikka, joka hyödyntää tietoa ihmisen kuulon aikaa ja taajuusresoluutiosta. DirAC:n avulla äänen tilaan liittyvät ominaisuudet voidaan tallentaa ja toistaa mielivaltaisella kaiutinjärjestelmällä. Tässä työssä sovellettiin DirAC:ää audiometriaan. Työssä esiteltiin äänikenttäaudiometriasovellus, jonka avulla kuulon diagnostiikkaa voidaan tehdä realistisissa ennalta äänitetyissä ääninympäristöissä, joihin on augmentoitu ulkoista testipuhetta. Referenssiä ääninympäristöä ja sen DirAC-toistettua kopiota verrattiin kesken. Päätulos oli, että ei poikennut merkittävästi niiden ympäristöjen välillä. Tämä todistettiin kuuntelukokein, joissa koehenkil.