



Operating Instructions MA 41





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WARRANTY

This warranty is extended to the original purchaser of the MA 41 Portable Diagnostic Audiometer by Maico, through the authorized Special Instrument Distributor from whom it was purchased. This warranty covers defects in material and workmanship for a period of one year from date of delivery of the MA 41.

Should the Maico MA 41 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 MA 41 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 Maico MA 41 is designed to be used with a hospital grade outlet. Injury to personnel or damage to equipment can result when a three-prong to two-prong adapter is connected between the power plug and an AC outlet or extension cord.



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1.0 SPECIFICATIONS

Test signals: Pure tone, pulsed, warble; narrow band and speech masking noise with two channels

Frequency accuracy: To within $\pm 1\%$ maximum of indicated frequency

Frequency and HL ranges:

Frequency	Air conduction HL range
125 Hz	-10 to +80 dB _{HL}
250 Hz	-10 to +100 dB _{HL}
500 Hz	-10 to +110 dB _{HL}
750 Hz	-10 to +110 dB _{HL}
1000 Hz	-10 to +110 dB _{HL}
1500 Hz	-10 to +110 dB _{HL}
2000 Hz	-10 to +110 dB _{HL}
3000 Hz	-10 to +110 dB _{HL}
4000 Hz	-10 to +110 dB _{HL}
6000 Hz *	-10 to +110 dB _{HL}
8000 Hz *	-10 to +100 dB _{HL}

*= Maximum level for insert phones is 10 dB lower at 6000 Hz and 8000 Hz.

Attenuator linearity: $\pm .5$ dB per 5 dB step, ± 3 dB overall

Distortion: .5% typical, 2% maximum

Sound pressure level calibration accuracy: ± 3 dB

Pulsed stimulus: 2.5 pulses/second, 50% duty cycle

Rise/Fall time: 35 msec. typical

Freq. mod. rate: $\pm 5\%$ triangle wave modulation at 5 Hz modulating rate

Dimensions: 12.5" W x 6.25" H x 15.5" D
32cm W x 16cm H x 40cm D

Weight: 16.5 lb/7.5 kg

Case: Structural foam



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Voltage requirements: 117/234 volts AC, switchable

Narrow band noise and bone specifications:

Frequency	Narrow band HL range	Bone conduction HL range
125 Hz	-10 to +70 dB _{HL}	-----
250 Hz	-10 to +90 dB _{HL}	-10 to +45 dB _{HL}
500 Hz	-10 to +100 dB _{HL}	-10 to +60 dB _{HL}
750 Hz	-10 to +100 dB _{HL}	-10 to +70 dB _{HL}
1000 Hz	-10 to +100 dB _{HL}	-10 to +70 dB _{HL}
1500 Hz	-10 to +100 dB _{HL}	-10 to +70 dB _{HL}
2000 Hz	-10 to +100 dB _{HL}	-10 to +70 dB _{HL}
3000 Hz	-10 to +100 dB _{HL}	-10 to +70 dB _{HL}
4000 Hz	-10 to +100 dB _{HL}	-10 to +70 dB _{HL}
6000 Hz	-10 to +100 dB _{HL}	-10 to +50 dB _{HL}
8000 Hz	-10 to +90 dB _{HL}	-----

Roll off is 12 dB per octave minimum; narrow band calibration is for effective masking.

**Masking level
attenuation:**

Variable intensity with a 5 dB step detent

**Speech air conduction
calibration:**

0 dB_{HL} for a 0 VU signal corresponds to a 19.5 dB SPL

**Speech air conduction
HL range:**

-10 to +100 dB_{HL}, 5 dB steps

Speech input selector:

Selects microphone, CD or tape input

Speech gain adjustment:

Gain control adjusts 40 dB range differences in speech signal level

Speech level indicator:

LED meter with characteristics as defined by ANSI S3.6

Microphone type:

Electret condenser

Tape input:

Sensitivity: 50 mV RMS 0 VU
Distortion: 2% THD

Speech noise range:

-10 dB to 100 dB_{HL}

Inputs

CD/tape, live speech microphone, patient microphone and patient response switch

Outputs:

Air, bone, insert phone, free field, and monitor

Calibrated to ANSI S3.6 1996.



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2.0 INTRODUCTION

2.1 Instrument Description

The MA 41 is a portable 1 1/2-channel audiometer, offering pure tone, speech and free field audiometric testing.

It performs tests using TDH 39 headphones, a B-71 bone conduction receiver, optional insert phones or optional loudspeakers. Built-in test signals include pure tone, pulse tone, warble tone, narrow band and broad band noise. Inputs include ports for live speech and CD/tape speech test material; outputs have separate jacks for TDH 39s, optional insert phones, optional free field speakers and bone conduction.

The MA 41 offers air conduction frequencies from 125 Hz to 8 kHz, with intensity levels from $-10 \text{ dB}_{\text{HL}}$ to $110 \text{ dB}_{\text{HL}}$. Bone conduction test frequencies are 250 Hz to 6 kHz with intensity levels of $-10 \text{ dB}_{\text{HL}}$ to $70 \text{ dB}_{\text{HL}}$. Sound field measurements are possible using the built-in amplifier and optional speakers.

The MA 41 has a built-in RS 232 interface.



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3.0 UNPACKING AND INSPECTION

3.1 External Inspection

Your MA 41 was carefully inspected and packed for shipping. 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.

3.2 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 sign of any damage. Notify the carrier immediately if any signs of mechanical or physical damage are noted. This will ensure that a proper claim is made. Save all packing material so that the claim adjuster can inspect it as well. When the adjuster has completed the inspection, notify the Maico Special Instrument Distributor you purchased this unit from.

Save all the original packing material and the shipping carton so the instrument can be properly packaged if it needs to be returned for service or calibration.

3.3 Accessories Supplied

Standard accessories are packaged and shipped inside the MA 41 storage compartment. Open the compartment by unsnapping the side latches and folding the cover up and back. Please check that all accessories listed below are received in good condition. If any accessories are missing or damaged, notify your Maico Special Instrument Distributor immediately.

Standard Accessories	Part
TDH 39 headset	4687
B-71 bone receiver and cord	2835
Bone headband	1037-37
Audiogram pad	1162-417
Operator's Manual	1162-0003
Monitor/Mic headset	5520
Noah Audiometer Module Diskette	1154-2026

Optional Accessories:

Patient response switch	2169
Talk-back microphone	6619
Patch cords	1025-352
Audiocup TM headset	4695
Insert phones	4790
Sound Room Kit (Old)	6608
Free field kit (New)	5525



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4.0 FRONT AND REAR PANEL CONTROLS AND DESCRIPTIONS

4.1 Front Panel Controls

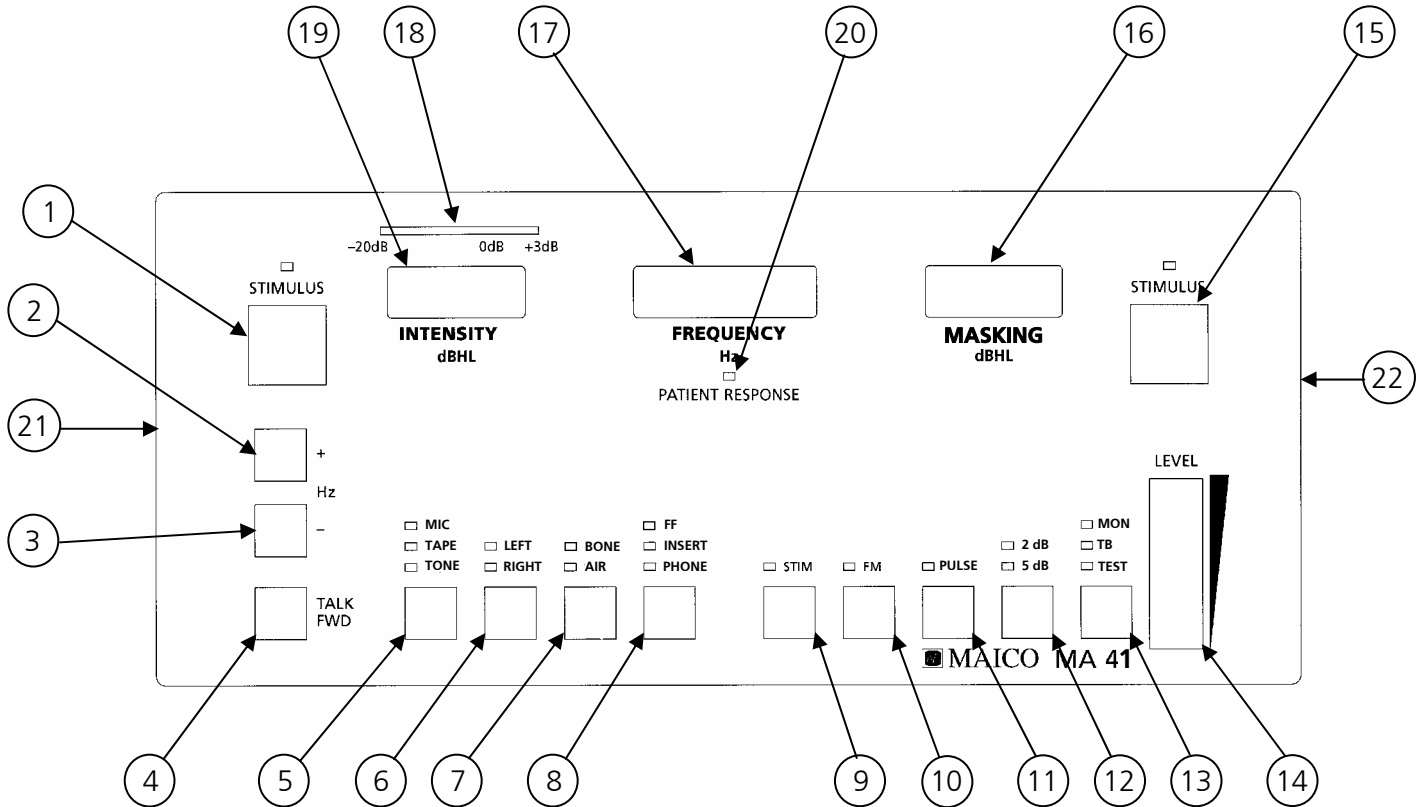


Figure 1

1. STIMULUS - Stimulus present/interrupt switch. Stimulus is present when the LED above the switch is lit.
2. + Hz - Frequency select increase key.
3. - Hz - Frequency select decrease key.
4. TALK FWD - Talk forward enable key. Press and hold to talk to the patient via the talk forward monitor/microphone headset.
5. MODE SELECT - Press and release to cycle through the available signal.
 MIC = microphone
 TAPE = tape player
 TONE = pure tone
 LED of selected signal will light.



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6. EAR SELECT - Press and release to select either the Left or Right ear.
LEFT = left ear
RIGHT = right ear
LED of selected ear will light.
7. AIR or BONE CONDUCTION SELECT - Press and release to select either Air or Bone conduction.
AIR = air conduction
BONE = bone conduction
LED of selected conduction type will light.
8. TRANSDUCER SELECT - Press and release to cycle through the available transducers.
FF = free field speakers
INSERT = insert phones
PHONE = TDH-39 headphones
LED of selected transducer type will light.
9. STIM - Press to Reverse function of STIMULUS key to act as an INTERRUPT key, i.e. stimulus always on unless the STIMULUS key is depressed.
10. FM LED on = Pure tone stimulus will warble.
11. PULSE LED on = Pure tone stimulus will be pulsed.
Note: Both PULSE and FM LED's off = Pure tone stimulus only.
12. dB INCREMENT SELECT - Press and release to cycle through the available test signal increments.
2 dB = test signal will change in 2 dB increments
5 dB = test signal will change in 5 dB increments
LED of selected increment will light.
13. MONITOR FUNCTIONS - Used with the LEVEL set wheel (#14) to adjust sound levels:
MON = Adjusts the monitor headset sound level.
Use the LEVEL set wheel to adjust the sound to your comfort level.
TB = Adjusts the talk-back microphone sound level.
Use the LEVEL set wheel to adjust the sound to your comfort level.
TEST = Adjusts the test sound level.
Use the LEVEL set wheel to adjust the sound to your comfort level.
14. LEVEL - Adjusts sound levels of speech input, talk-back mic and monitor headset. Use with key #13.
15. STIMULUS - Masking present/interrupt switch. Masking is present when the LED above the switch is lit.



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16. MASKING - Displays intensity level of the masking signal.
17. FREQUENCY - Displays the frequency test setting.
18. VU - VU meter for calibrating speech signals.
19. INTENSITY - Displays intensity level of the selected earphone.
20. PATIENT RESPONSE - LED lights when patient response switch is pressed.
21. INTENSITY CONTROL DIAL - Adjusts intensity for the test signal.
22. INTENSITY CONTROL DIAL - Adjusts intensity for the masking signal.



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4.2 Rear Panel Controls

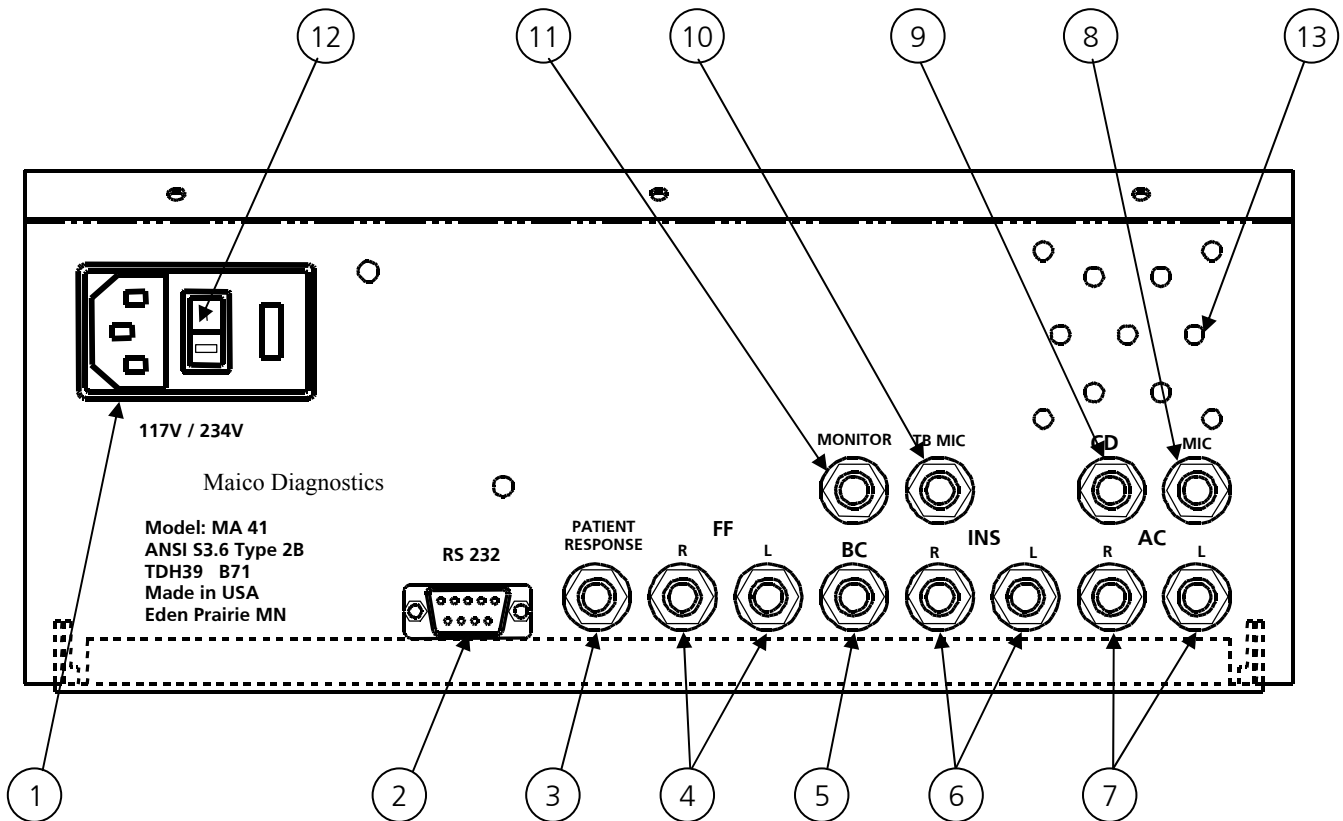


Figure 2

1. AC INPUT - Power input.
2. RS 232 PORT - 9-pin RS 232 port.
3. PATIENT RESPONSE - Input for the optional patient response switch.
4. FF - Right and left output jacks for optional free field speaker.
5. BC - Bone conduction output jack.
6. INS - Right and left jacks for optional insert phones.
7. AC - Right and left jacks for air conduction TDH 39 earphones.
8. MIC - Input jack for monitor headset speech microphone.
9. CD - Input jack for CD/tape speech testing.
10. TB - Input jack for talk-back microphone.
11. MONITOR - Input jack for monitor headset phone.
12. ON/OFF - On/Off power switch.
13. MONITOR SPEAKER - Listen to the talk-back mic or speech input without the monitor headset.



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5.0 INSTALLATION AND SETUP

5.1 Headset/Insert Phones

Place the MA 41 on a stable counter or table. Flip open the side latches and fold the lid back. Fold the lid back one more time to reveal the accessories that are packaged within the rear storage compartment. If you haven't already done so, unpack and inspect the accessories.

The TDH 39 headphones are serialized and should match the serial number on the instrument. Check to see that the numbers match, as this will confirm that the headphones and MA 41 were calibrated together. The optional insert phones do not have a serial number, but if they were ordered at the same time as the MA 41 they were calibrated to that particular instrument and should not be used on another without calibration.

Turn the MA 41 around so that you can view the rear jacks. Insert the RED (right) plug of the TDH 39 headset into the right air conduction earphone jack labeled **R**, under **AC (Air Conduction)**. Insert the BLUE (left) plug into the left **AC** earphone jack labeled **L**.

The insert phones are installed in the same manner. Insert the RED (right) plug of the insert phone cord into the insert phone jack labeled **R**, under **INS (INSert phones)**. The BLUE (left) plug is inserted into the jack labeled **L**.

5.2 Bone Conduction Transducer

Insert the bone conduction plug into the port labeled BC (**B**one **C**onduction).

5.3 Monitor/Microphone Headset

The monitor headset has two plugs, one labeled MICROPHONE and one labeled MONITOR. Plug MICROPHONE into the port marked **MIC** and MONITOR into the port marked **MONITOR**.

5.4 Patient Response Switch - Optional

Locate the **PATIENT RESPONSE** jack on the rear panel and insert the plug end of the switch.

5.5 Sound Room Patch Cords - Optional

When using the MA 41 in a sound room, connect the patch cords from the sound room to the proper right and left earphone/insert phone jacks, patient response jack, bone conduction jack, and talk-back mic.



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5.6 Tape/CD Player - Optional

Speech testing may be conducted using live voice via the monitor headset or recorded speech via a CD or tape player.

The MA41 comes with a hinged bracket for an optional CD or tape player. For proper fit the maximum front-to-back dimension of the player should be less than 6 inches. Four pairs of 1-inch square hook and loop tape are provided to attach the player to the bracket.

Remove the backing from three or four of the pieces and place on appropriate locations on the bracket. Make sure the locations you chose do not obstruct the battery access cover of the player. Before removing the other backing determine the proper positioning of the player. The player must sit far enough back on the bracket to allow the player and bracket to swing up for access to the accessory compartment, but not so far back as to hit the rear of the compartment. Once the proper location has been determined remove the backing from the tape and press the player into position on the bracket.

5.7 Speakers - Optional

Free field speakers use the **R**ight and **L**eft ports under **FF**.

5.8 Power Up

Insert the power plug into the rear socket, then into a three-conductor electrical outlet (or the appropriate outlet for your country).

WARNING

This Maico instrument has been designed to meet the most exacting electrical safety requirements for patient care equipment.

The hospital grade, 117 volt alternating current, three-prong plug should be inserted into a mating three-prong hospital grade receptacle that is properly grounded. This will ensure reliable and safe operation of this precision instrument. The use of a three-prong to two-prong adapter should be avoided. If you have any questions, check with your Maico Special Instrument Distributor.



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NOTICE

This Maico product is equipped with a universal power interlock to change the power/mains input voltage from 115 VAC to 230 VAC.

To change the power/mains voltage input:

1. Unplug the power/mains cord from the unit (#2 in Figure 3).
2. Using the flat edge of a small screwdriver, pry open the cover and remove the voltage selector
3. Replace fuses with enclosed .25 amp.
4. Replace voltage selector switch with 230V label displayed in window.
5. Apply .25A label to the back panel.

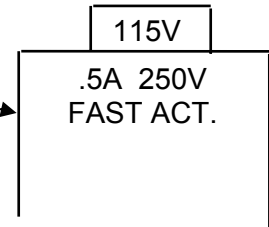


Figure 3

Place the power switch to the "ON" position (Figure 2). To ensure accuracy, let the instrument warm up 5-10 minutes before running tests.



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6.0 OPERATION - PURE TONE AUDIOMETRY

6.1 Air Conduction Testing

Air conduction testing is used to measure the patient's hearing threshold levels. The test is usually started on the ear with better hearing.

1. Turn the MA 41 on and let it warm up for 10 minutes before using. Upon power-up the initial setting will be in audiometric testing mode, left ear on air conduction, 1 kHz, 30 dB intensity, right ear on noise, 0 dB.
2. Seat the patient so that he/she is facing away from the instrument at a 90° angle and cannot see what the operator is doing. Give a brief description of what the patient can expect to hear. Using a consistent explanation will help provide more reliable results. Instructions may be expressed as follows: "I am going to place these headphones on your ears. You will hear a tone or beeping sound, which may be loud or soft. Whenever you hear, or think you hear one of these tones, raise your hand. Lower it when you no longer hear the tone. Listen carefully because some tones are very soft."
3. Eliminate any obstructions that could interfere with placement of the earphone cushion on the ear (i.e. hair, earring, eyeglasses, hearing aids, etc.). Adjust the headband so that the earphone cushions are centered over the ears (RED on the right ear, BLUE on the left) and the receivers line up with the ear canals. The headband should rest firmly over the center of the head and place firm pressure on both ears.
4. Set the OUTPUT SELECT to AC and SIGNAL SELECT to TONE. Choose PULSE and/or FM if you wish. Set the INTENSITY and FREQUENCY to the desired level.
5. Press STIMULUS to present the test tone. The STIM LED should light. If the patient hears the tone he/she will raise their hand or press the patient response switch, indicated by the patient response LED.

The most commonly used hearing threshold procedure is called a modified Hughson-Westlake procedure.

1. Start at 1000 Hz with a level of 0 dB and present a signal for at least 1 second. If no response, increase in 10 dB steps until the patient responds.
2. Increase another 10 dB for a confirmation and orientation. If the patient responds again, decrease the presentations in 10dB steps until the patient no longer responds.
3. Increase in 5 dB steps until the patient responds. Once the patient responds, descend 10 dB until there is no response. Increase again in 5 dB steps.
4. Repeat until you have 2 out of 3 ascending responses at the same level. Change the frequency and repeat above procedure until you have thresholds for the number of frequencies that you wish to test.

The hearing threshold is defined as the lowest hearing level at which the patient responds to *two out of three ascending stimuli at the same level*.



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6.2 Bone Conduction Testing

Bone conduction is the transmission of sound waves through the skull directly to the inner ear. This test conveys useful information about the function of the inner ear and whether there is neural hearing loss. Threshold differences between air conduction and bone conduction are a good indicator of middle ear disease or external ear canal obstruction.

1. Place the bone conduction receiver so that the flat, circular side of the transducer is seated on the mastoid, right on the ledge of the cranial bone behind the auricle. The other side of the headband is placed in front of the opposite ear.
2. Set the OUTPUT SELECT to BC (bone conduction) and the SIGNAL SELECT to TONE. Perform the test in the same manner as for air conduction testing (see section 6.1). Record all measurements and results.

6.3 Masking

To ensure that the patient does not experience crossover (sound transmitted through bone conduction over to the opposite ear) you must mask the opposite ear. Masking is performed with a noise signal in the headphone. A narrowband noise is used in pure tone audiometry. The noise automatically changes its center frequency following the frequency of the test signal.

1. Masking is automatically routed to the non-test ear. Adjust the INTENSITY level to the required masking level.
2. The masking noise is continuously presented for effective masking. You may interrupt the masking signal by pressing the STIMULUS key next to the masking display.
3. To mask while performing bone conduction tests, place the headphone on the non-test ear so that the receiver is directly in line with the ear canal. Adjusting the headband, place the other headphone so that it sits directly on the cheekbone.
4. Adjust the masking intensity level whenever you change the test signal level.



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7.0 OPERATION - SPEECH AUDIOMETRY

7.1 Calibrating CD or Tape Speech Test Material

The MA 41 must be calibrated to the particular speech test material in use to ensure valid test levels. *Every time you change the CD or tape you must recalibrate the instrument.*

1. Connect the cable of your tape or CD to the port under the **CD** label on the rear panel.
2. Select TAPE with key #5 then select TEST with key #13. Start the calibration tone on the tape/CD and turn the LEVEL wheel until the signal peaks just below the red LEDs.

7.2 Calibrating the Microphone for Live Speech Testing

1. Connect the monitor headset cables to **MIC** and **MONITOR** on the rear panel.
2. Select MIC on the SIGNAL SELECT key #5, then select the right test on key #13. Speak test words while turning the LEVEL wheel until the signal peaks just below the red LEDs.

7.3 Talk-Back Microphone and Monitor Headset

1. Connect the talk-back mic to the port labeled **TB**, and the monitor headset to the ports labeled **MONITOR** and **MIC**.
2. Select TB (key #13) and adjust the sound level to your comfort using the LEVEL wheel. Select MON (key #13) and adjust the sound level to your comfort using the LEVEL wheel.

7.4 Monitor Speaker

If you do not wish to use the monitor headset, you may listen to the tape/CD input and the patient talk-back mic via the MONITOR SPEAKER. To do this, simply do not connect the monitor headset, select TB (key #13) as in 7.3, then adjust the volume to your comfort with the LEVEL wheel. Repeat for MON.



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7.5 Speech Testing

The SRT (Speech Reception Threshold) is defined as the lowest intensity level at which the patient can correctly repeat the speech stimuli (i.e. baseball, hot dog, ice cream) 50% of the time. A modified version of this procedure utilizes a picture board where the patient correctly points to the picture that corresponds to the speech stimulus.

1. Explain to the patient that he/she should repeat each word they hear.
2. Eliminate any obstructions that could interfere with placement of the earphone cushion on the ear (i.e. hair, earring, eyeglasses, hearing aids, etc.). Adjust the headband so that the earphone cushions are centered over the ears (red on the right ear and blue on the left) and the receivers line up with the ear canals. The headband should rest firmly over the center of the head and place firm pressure on both ears.
3. Set the OUTPUT SELECT to AC and the SIGNAL SELECT to TAPE or MIC, depending on your input.
4. You may use the monitor phone or the monitor speaker to hear the test words and the patient's response.
5. Set the start level.
6. Perform the test words.

You may perform the speech test with free field speakers or bone conduction by selecting the appropriate OUTPUT SELECT.

Masking may be used with speech testing. Masking is automatically routed to the non-test ear. The MA 41 will automatically produce speech weighted noise.

7.6 MCL (Most Comfortable Level) Procedure

The MCL test determines the level at which a patient finds listening to speech most comfortable. This procedure is normally done after you have obtained a Speech Reception Threshold and is important for selecting appropriate aided amplification.

1. Begin by presenting speech levels (either live voice or recorded) at a 30 - 40dB_{HL} level above the patient's SRT.
2. Conduct a bracketing procedure similar to pure tone threshold testing and have the patient indicate at what level the speech is most comfortable.
3. Record the level.

7.7 UCL (Uncomfortable Loudness Level) Procedure

The UCL is another important test used to determine the acoustic dynamics of aided amplification. The test procedure is very similar to the MCL, except that the level you are looking for is that which the patient feels would be unbearable for any length of time. Begin this test with an ascending procedure starting with the patient's recorded MCL.



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8.0 NOAH INSTALLATION INSTRUCTIONS

This section assumes that you have previously installed your own NOAH software program. The following instructions will help you use your Maico equipment with your PC after it has been inter-connected with a standard 9-pin RS232 cable.

8.1 Maico Audiogram and Impedance Disk Installation

1. Turn on the NOAH program.
2. Click on Setup.
3. Select Install Module.
4. Insert Maico Audiogram Disk into drive A or floppy disk drive.
5. Click on OK and it will start the installation.

After the installation is complete:

1. Go back into the Setup mode and select Preferences.
2. Click on the down arrow key by Tool Bar Configuration Preferences and select Maico Audiogram and/or Maico Impedance.
3. Click on OK to exit.
4. Begin with a new patient by clicking on the folder icon.
5. Select the Audiogram icon and this will automatically configure the tool bar in NOAH to default to the Maico Audiogram module.

By simply clicking on the blue instrument icon located at the far right side of the toolbar (after selecting audiometry or testing) it will automatically start the audi-link function to NOAH using one of the Maico modules.

8.2 Installing Maico Audi-Link Software

1. Go into the NOAH software program by clicking on the NOAH icon.
2. Click on the file folder icon.
3. Click on the New Patient folder icon or the Search for Patient icon.
4. Enter new patient name or select an existing patient file.
5. The Audiogram icon will now be active in the tool bar section of the screen.
6. Click on the Audiogram icon.
7. Click on Audi-Link.
8. Click on Connect To.
9. Select Add.
10. Insert the Audi-Link disk into drive A or the floppy disk drive. Type in the directory \Audi.
11. Click on OK and it will start to install automatically.



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8.3 Activating the Audi-Link Driver

Click on the icon farthest to the right (it looks like a little blue box with a headset), or you can click on Audi-Link, then Connect to and then you will see Maico Audi-Link in the box; select OK and then go back and click on Measure. As soon as the Audi-Link driver is activated you will see a flashing Audi-Link message at the bottom of the screen. You are ready to start testing.

Now the audiometer instrument will automatically start to transfer data to the NOAH audiometer screen. In audiometry mode, any time you press the stimulus key the thresholds will be marked with the appropriate symbols.

8.4 Maico Audiogram Module

The Maico Audiogram Module provides some enhanced data transfer functions that are not available on the standard NOAH audiogram format. For example, you will be able to transfer SRTs, speech MCL and UCL information under earphones or in the free field test situation.

8.5 Transferring SRT, MCL and UCL Information on the MA 41

1. Select either microphone or Tape input on the MA 41.
2. Perform SRT test.
3. Press the corresponding Stimulus key for the ear tested and the data will appear in the speech fields.
4. MCL function – press the + Hz key and MCL will appear in the frequency screen. The symbol actually does not look like an M but an upside down U because of the limitations of the LED segment display. Press the stimulus key for the desired test ear and the data will appear in the appropriate MCL box.
5. For UCL, press the – Hz key and the UCL will appear in the frequency screen. To transfer your data simply press the stimulus key for the ear tested and the data will appear in the appropriate UCL box.



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9.0 MAINTENANCE

9.1 Preventive Maintenance

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, bone vibrator and monitor phone permanently connected to the audiometer to minimize strain on the connections. It is not necessary to disconnect accessories 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 calibration of the MA 41.
4. Close the audiometer cover 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, microphone and bone vibrator. Headset, bone vibrator and microphone cords may be replaced without calibrating the audiometer.

9.2 Cleaning the MA 41

First, disconnect the power cord **before** cleaning. Clean the instrument, headphones, bone conduction receiver, loudspeakers, and other accessories with a soft cloth dampened with a little warm, soapy water. Do not use alcohol to clean.

The ear cushions of the headphones can be detached for cleaning. To remove, gently pull the cushion away from the headphone. To re-assemble, press it back onto the headphone. Make sure that the sound outlet hole sits exactly in the middle of the earphone.



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9.3 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 tests show major changes, calibration is probably in error.

All repair and calibration should be done 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. If you don't know who that is, or need to find the Distributor closest to you, contact the factory at:

Maico Diagnostics
7625 Golden Triangle Drive
Eden Prairie, MN 55344
Toll free 888-941-4201
Phone 952-941-4200
Fax 952-903-4200

Customers outside of North America and South America may contact:

Maico Diagnostic GmbH
13/14 Salzufer
10587 Berlin, Germany
phone ++030 70 71 46 50
fax ++030 70 71 46 99



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9.4 Shipping Instructions for Calibration and Repair

In the event it becomes necessary to return the instrument for calibration or repair, please follow these instructions:

1. Place the instrument in the original shipping carton, using the packaging provided. 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.

**DO NOT ATTEMPT TO REMOVE THE INSTRUMENT CASE YOURSELF.
THIS SHOULD BE DONE ONLY BY AN AUTHORIZED MAICO SERVICE
TECHNICIAN.**

