

AUDIOMETER

PROTON Sx-3

USER MANUAL



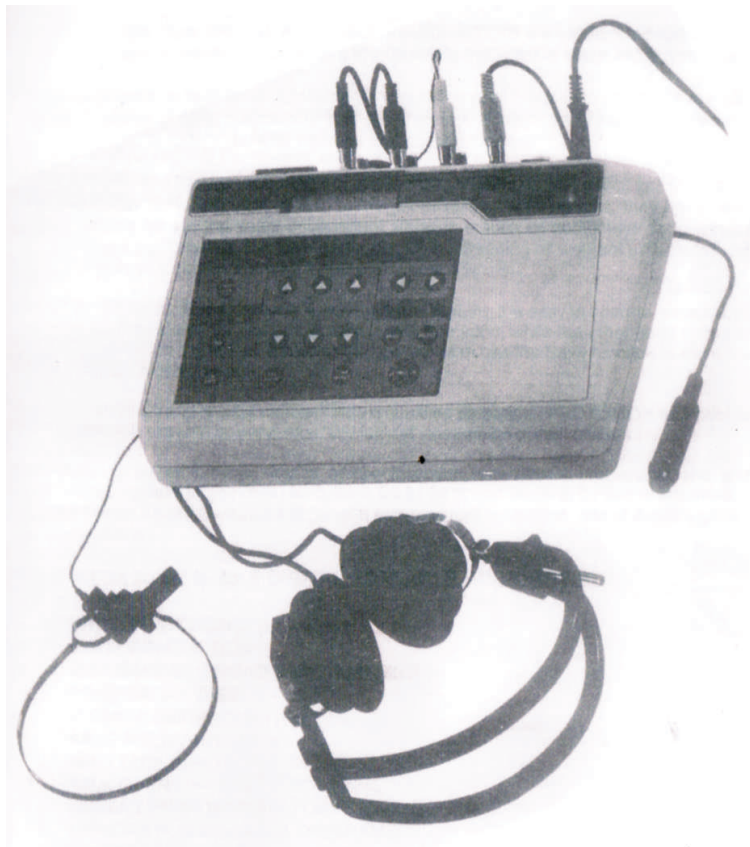
 *Western Surgical* 

www.westernsurgical.in Email : westernsurgical@gmail.com
Email : info@westernsurgical.in Ph. : +91-281-2232871 / 2243159

INDEX

EVERYDAY SOUND INTENSITY LEVELS IN DECIBELS

Source	Power in dB
Threshold of hearing	0
Almost silence	10
Quite room, e.g. library	20
Whisper	30
Quite street	40
Quite conversation	50
Normal Conversation	60
Loud Conversation	70
Alarm clock at 1 meter	80
Everyone taking in a classroom	90
Radio playing very loud (1m away)	95
Pneumatic drill	110
Threshold of pain	120
Aircraft at 25m	140
Rifle close to the ear (rupture of the eardrum)	160



AUDIOMETER

PROTON Sx-3

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.
* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in
Email : westernsurgical@gmail.com
Ph. : +91-281-2232871 / 2243159

PROTON DIGITAL PORTABLE AUDIOMETERS are modern, advanced microprocessor controlled audiometers incorporating the latest in electronic technology

Each audiometer is built for long reliable service to the user. Housed in an attractive ABS moulded cabinet of great mechanical strength, the electronic assembly has been specially built for rigorous and continuous use.

These audiometers have a wide range of applications, routine clinical check ups in hospital and clinics, the ENT Specialist or an Audiologist assessing hearing loss, they have been serving reliably for several years in important situation – such as audiometer for deafness camps. These audiometers can also serve ideally in screening of workers in factories, for general checkups for airlines, armed forces and in deaf schools.

PROTON Digital Audiometers have another special feature, it is easy to operate, keys are so arranged that the examiner can operate them with one hand, while the other hand is free to record observations if required, however the operator can use the Save function to store the audiometric data for a print out.

With normal usage and regular calibration by a qualified personnel, **PROTON** Digital Portable Audiometers will prove to be proverbial "Old faithful" companion of their owners.

The following pages provide details of specifications, operational procedures and test administration details for the **Dx 3 / Sx 3, Sx 3, Dx 5 / Sx 5**, and the **Sx 5**, for further information on the above or for help in respect of general servicing and calibration, one of s offices may be contacted.

PROTON Dx 3 / Sx 3/ Sx 3 DIGITAL PORTABLE AUDIOMETER

- AIR CONDUCTION
- BONE CONDUCTION
- WHITE NOISE (BROAD BAND) MASKING
- TONE DECAY TEST.
- TONE - CONTINUOUS / PULSING
- FREE FIELD PROVISION
- MIC / TAPE INPUT
- TALK OVER
- PATIENT RESPONSE SWITCH
- MEMORY FOR SAVING AUDIOGRAMS
- USB PORT FOR PC CONNECTIVITY (Sx 3)

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

PROTON Dx5 / Sx 5 DIGITAL PORTABLE AUDIOMETER

- AIR CONDUCTION
- BONE CONDUCTION
- WHITE NOISE (BROAD BAND), NARROW & SPEECH BAND MASKING
- TONE DECAY TEST, SISI TEST
- TONE - CONTINUOUS / PULSING/WARBLE
- FREE FIELD PROVISION
- MIC / TAPE INPUT
- TALK OVER
- PATIENT RESPONSE SWITCH
- MEMORY FOR SAVING AUDIOGRAMS
- USB PORT FOR PC CONNECTIVITY (Sx 5)

TECHNICAL DATA

CHANNELS

Two separate channels : one for stimulus and one for masking.

FREQUENCIES

Air, Free Field: 250-500-1000-1500-2000-3000-4000-6000-8000 Hz.

Bone: 250-500-1000-1500-2000-3000-4000 Hz (Dx 3/Sx 3/ Sx 3)
250-500-1000-1500-2000-3000-4000-6000 Hz (Dx 5/ Sx 5)

ATTENUATOR RANGE

-10 dB. to 120 dB steps with Range Extender function. Fully click free operation over entire range.

HEARING LEVEL RANGE

Maximum output is limited by transducer capability.

Typical values for Air: Max 120 dB HL
 Bone: Max 70 dB HL (Dx 3/ Sx 3)
 Bone: Max 80 dB HL (Dx 5/ Sx 5)

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

EXTERNAL INPUTS

Microphone	:	Dynamic / Electret, for speech audiometry and patient communication.
Tape/CD	:	Stimulus channel, Sensitivity 0.1-3.0 Vrms, 47 kOhm

OUTPUTS

Phones	:	Air Conduction.
Bone	:	Bone Conduction.
F.F	:	Free Field Loudspeaker via external Amplifier. Output voltage: max. 1.5 Vrms.

STANDARD FUNCTIONS

Speech Audiometry	:	Stimulus via Microphone or Tape / CD.
Masking	:	Wide band. (Dx 3 / Sx 3) Wide band, Narrow band and speech band (Dx 5 / Sx 5)
Tone	:	Continuous tone Duration Is Controlled Manually.
Pulsing Rate	:	1.5 Hz.
Warble Rate	:	± 5% (Dx 5 / Sx 5)
Left /right shift	:	Automatic Switching of All Selected Parameters from Left to Right Channel and Vice Versa

Special Tests

Tone Decay Test

Pulse counter display.

Test can be aborted midway by using the patient signal switch or Stimulus key.

SISI (Short Increment sensitivity Index) Dx 5 / Sx 5

SISI score is automatically calculated and displayed.

User Functions

User setups are stored in a non-volatile memory (EEPROM)

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Communication and Monitoring

Built in, talk-over with individually adjustable monitoring. Visible Patent Response (LCD display) LCD bar-graph V.U.Meter provides visual indication of stimulus level as well as displaying level for sensitivity adjustment of Microphone /Tape/CD input signals.

Display

Alphanumeric transreflective LCD, 2 rows of 16 characters.
Screen dimensions 155 x 16mm.with LED backlighting.

Distortion

Less than 1% (T.H.D)

Accuracy

Frequency: Better than $\pm 2\%$.
Hearing Level Electrical: Within $\pm 1\text{dB}$ of indication
Acoustical: Within $\pm 3\text{db}$ of indication

Calibration

AIR IEC645/ANS13.6-1996
BONE ISO7556-1987/ANSIS.3.26-1981
MASKING IEC 645/ISO 8798 –1987.
Calibration data are stored in a programmable non-volatile memory.

Power Supply

230Volts, Approximately

Operating Environment

Temperature: 15 degree Celsius – 50 degree Celsius.
Relative Humidity: 30 – 90%.

Construction

Molded ABS, Non-corrosive.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.
* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Dimension & Weight

(275x200x80) mm.-1.7 kgs Approx. Without carrying case.

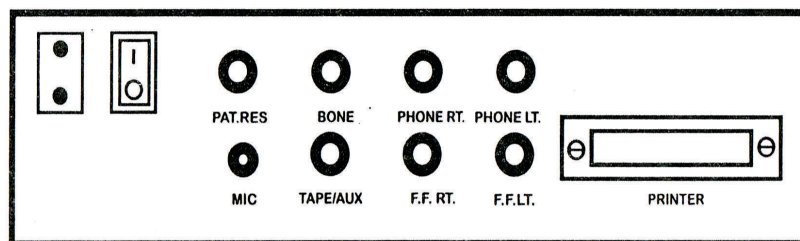
Standard Accessories.

DR 59 Headset,
TDH 39 (Optional)
Bone Conductor with Headband. B 71
Patient Response Hand switch, Dust Cover, Audiogram Pad,
1 Blue and 1 Red Pen. User manual.

CONNECTIONS:

The mains cord is plugged into the socket provided on the rear panel of the audiometer, the On / Off function is by the rocker switch next to the mains input socket.

A row of RCA sockets are provided at the rear for outputs and inputs, all sockets are appropriately labeled, the following sockets are provided in your Audiometer.



OUTPUTS.

- a) Headphone Left
- b) Headphone Right
- c) Bone Vibrator
- d) Free Field Left
- e) Free field Right
- f) D Type connector parallel port for printer

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

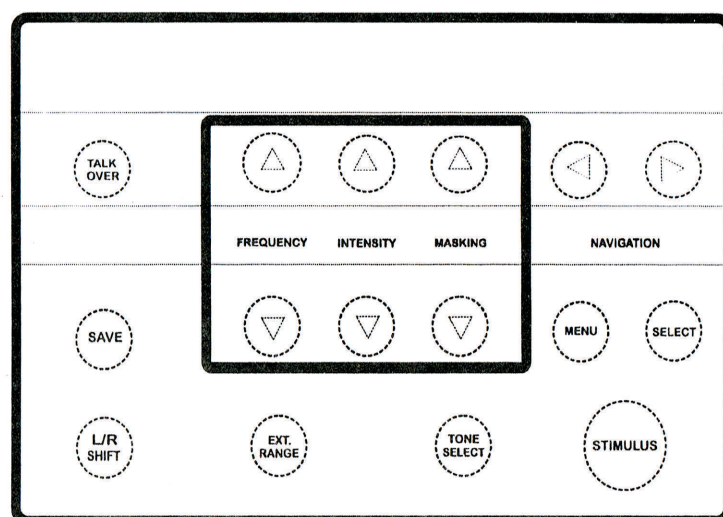
Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

INPUTS.

- a) Patient Response
- b) Microphone
- c) Tape

KEY PAD:



CONNECTING THE PROTON TO YOUR PC

Your PROTON Audiometer is software based and comes with a USB port and PC software to save the Patient data and print Audiograms.

Install the PROTON software provided in the CD, the software is based on Windows dotnet framework 3.5.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

NOTE: If your PC does not have dotnet framework 3.5 or has an older version, please download or update from the net (www.microsoft.com/downloads)

Install PROTON setup from the CD, you are also required to load the USB driver provided.

Once you have loaded all the required software your **PROTON** Audiometer is ready to connect to your PC.

Connect the USB cable provided to the Audiometer (the USB port is on the Left side of the Audiometer), Switch on your Audiometer, wait for the PC to detect the New Hardware Device, proceed as follows once the PC has finished detecting,

Double click on the **PROTON** shortcut on the desk top, the **PATIENT DETAILS** page will open, you will notice **FILE** on the top left hand corner of the screen, click on **FILE**, the following drop down menu will appear-

Save Session
Edit Audiologist Details...
Ports
Print Report
Exit

Take the cursor to **Ports**, it will display all the available com ports in your PC, check the last com port in the list, this will invariably will be the port the USB cable from the Audiometer has been connected to.

Once the LCD display and the display on the PC side software in the Audiometer Module reads the same your Audiometer is successfully interfaced with your PC

PROTON Audiometer has the following user interface-

1. FREQUENCY KEY:

Proton Audiometers have a Test frequency range of 250 Hz to 8000 Hz. To select a particular frequency use the up / down frequency key in the central box on the key pad, the LCD display will indicate the selected frequency.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

2. INTENSITY KEY

Intensity can be changed by using the up / down key situated next to the Frequency keys, the maximum intensity for the particular frequency is mentioned in the table below. The LCD display indicates the intensity along with the ear under test (left or right)

3. MASKING :

The PROTON **Dx / Sx 3** audiometer is provided with wide band masking which can give a masking level of up to 100 dB SPL arranged in 5 db steps. This facility will enable the examiner to test each ear separately and accurately using white noise masking, the keys are situated next to the Intensity keys.

The PROTON **Dx / Sx 5** has the provision of Narrow band and Speech band besides wide band.

4. NAVIGATION :

The **NAVIGATION** key is indicated by a Left / Right arrow, this key is used to move the cursor (flashing) to select a particular function.

5. SELECT :

Once the required function is selected, the **SELECT** key is used.

6. STIMILUS :

Presentation of test signal is done through the Digital Interrupter or **STIMILUS** key, The stimulus key gives a continuous tone output in the head-phone as long as the key is depressed.

7. MENU

The **MENU** key is used to view the menu, this key is also used to revert to the previous screen or function.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

8. SAVE :

Once the user has obtained the threshold for the particular frequency, the **SAVE** key can be used to save the data for printing or viewing at a later stage.

9. TONE SELECT :

The **TONE SELECT** key changes the tone from CONTINUOUS to PULSING and vice versa, the same is indicated in the display as **C** and **P**. In the **Dx / Sx 5** the WARBLE tone will be indicated as **W**

10. EXTENDED RANGE :

The **EXT RANGE** key allows the user to increase the intensity by 20 Db. over and above the maxima in 5 Db. Steps. The same is shown in the display by the legend **DB**, in normal mode the legend is **dB**.

11. L / R SHIFT : The Left / Right shift key allows the user to change the output from one ear to another without going through the menu. The same is shown in the display by **ACR** or **ACL**.

12. TALK OVER :

The **TALK OVER** keys allows the user to communicate to the subject, this key overrides the tone, the operator can talk through the built in or external microphone(optional) to the patient under test.

TONE FREQUENCIES

Nine pure tone signals are available to cover the full spectrum of test frequencies, details of the frequencies and the respective power maxima for air and bone conductions are as under:

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Frequency (Hz)	250	500	1000	1500	2000	3000	4000	6000	8000
Air Conduction Maxima (dB)*	90	100	100	100	100	100	100	100	80
Bone Conduction Maxima (dB)* Model Dx / Sx 3	40	50	50	50	50	50	50	--	--
Bone Conduction Maxima (dB)* Model Dx / Sx 5	50	60	60	60	60	60	60	45	--

* Ext Range facility is provided to deliver 20dB . additional output.

STARTING WITH YOUR AUDIOMETER

This Audiometer is very easy to operate. The headphones, Bone Vibrator and other accessories should be plugged into the RCA sockets provided on the back panel.

On switching on the audiometer, the LCD screen will flash the model and the date of calibration, the display will settle down and read the following legend-

AC	BC	TESTS	REP.
SELECT FUNCTION			

By default **AC** will flash, to select Air Conduction, the **SELECT** key should be used, or the operator can use the **NAVIGATION** key to select BC, TESTS or REP (Reports)

If **AC** is selected, the display will advance to the next screen-

OFF	ON
SET MASK	

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Masking option can be selected by using the Navigation key and select key, if Masking is selected, the screen will display the following-

ACL 1000Hz 30dB MSK: WN030dB

If Masking option is not selected, the screen will display the following-

ACL 1000Hz 30dB MSK: -

PURE TONE AUDIOMETRY FOR AIR CONDUCTION:

Once the **AC** or air conduction test is selected, the intensity, frequency and the test ear should be selected by using the corresponding keys, The stimulus or the tone is presented by using the **STIMULUS** key, It is advisable to start the test with 1000 Hz. next go to higher frequency up to 8000 Hz. come back 1000 Hz. and retest at this frequency to verify reliability of the patient's response. Thereafter test lower frequencies from 1000 Hz. down.

While testing each frequency, the tone should first be presented at a higher level to make the patient aware of the tone he is going to hear, and then gradually the intensity should be reduced to his threshold.

Threshold is the level where the patient gives a 50% response.

Note: The **STIMULUS** should be presented only after changing steps of the INTENSITY key and not while keeping the stimulus key pressed.

The audiogram thus plotted is called Unmasked Air Conduction Threshold.

PURE TONE BONE CONDUCTION AUDIOMETRY:

The **MENU** key is pressed to revert to the previous screen, (the display will shift to the previous screen every time the Menu key is used) use the **NAVIGATION** key to move from **AC** to **BC** mode and use the **SELECT** key to initiate the test, the method for Bone Conduction testing is similar to Air conduction.

The audiogram thus plotted is called Unmasked Bone Conduction Threshold.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

MASKED AIR CONDUCTION AUDIOMETRY:

Use the **MENU** key to revert to the Main screen, (the display will shift to the previous screen every time the Menu key is used) use the **NAVIGATION** key to select **AC**, after selecting **AC**, select **MASK** to **ON**.

ACL 1000Hz 30dB MSK: WN030dB

Masked air conduction threshold is taken when the difference between the Air conduction threshold of the test ear and the bone conduction threshold of the opposite ear is more than 40 db.

The masking is to be applied to the better ear (non test ear), while testing the poorer ear(test ear) calculate the amount of masking by any standard method such as Studebaker's method. In this method the minimum masking for air conduction is calculated by the following formula.

Minimum Masking for AC:

$$\begin{aligned} & \text{Air conduction threshold of the test ear.} \\ & \text{Intra aural attenuation (40 dB for AC) +} \\ & \text{Air bone gap the opposite ear +} \\ & \text{Masking Factor.} \end{aligned}$$

During Air Conduction testing masking will be automatically presented through the opposite earphone. Use the masking key to the desired level. When tone is presented, find out if the subject responds to the tone or not. If he is not responding to the tone, then increase the noise by another 10 db. If the patient does not respond to the tone when additional noise is introduced, then increase tone by 10 dB and also increase the noise by the same amount. This procedure is continued till the patient responds to the tone with increased noise also.

The threshold obtained is Air Conduction Masked Threshold, repeat for other frequencies.

MASKED BONE CONDUCTION AUDIOMETRY:

Masked Bone Conduction threshold is taken when the air-bone gap of the poorer ear under test is more than 10 dB.

Masking should be applied to the better ear while testing the poorer ear. Calculate the amount of masking; by any standard method such as Studebaker's method for example, In this method the amount of masking will be calculated by the following formula:

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Minimum Masking for BC :

Common BC threshold
-Inter aural attenuation (taken at 0 dB)
+Air Bone gap of the opposite ear
+Masking Factor.

If the air bone gap is absent then "Occlusion effect" for low frequency is added (up to 1.5 KHz).

Once the minimum amount of masking is calculated, present masking to the better ear. Now introduce the tone to the poorer ear. Find out if the patient can hear the tone. If he can hear the tone, increase the noise alone by another 10 dB. If the patient still responds to the tone then increase the noise along by another 10 dB. If the patient does not respond to the tone when additional noise is introduced, then increase tone by 10 dB and also increase the noise to the same amount. This procedure is continued till the patient responds to the tone with increased noise also.

This is his Masked Bone Conduction Threshold. The same procedure is repeated for other frequencies also.

NOTE:

1. While the tone is presented through the bone vibrator, masking noise is available in the opposite earphone in this audiometer.
2. During bone conduction testing, it is very important to obtain the best placement of the bone vibrator over the mastoid bone. Choose an area as free of hair as possible. Even a slight change in the placement may affect the threshold. To select the correct position, keep presenting a tone, say 1000 Hz at 20 dB, through the bone conductor placed on the patient's mastoid. Now gradually change, its position till the patient indicates when he can hear the tone loudest. This placement is the correct one for testing.
3. It is very essential to have the room noise as low as possible while testing Bone Conduction.
4. While applying masking during bone conduction testing, AC and BC headbands should not touch each other.

SWEEP CHECK METHOD FOR AIR - CONDUCTION PURE TONE SCREENING

When the hearing of a large number of subjects is to be tested, such as groups of children or industry workers, then the following screening method can be used.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Set the frequency initially at 1000 Hz, and the hearing loss attenuator (intensity) at 20 or 25 dB. After checking if the subject hears the tone at this frequency, the tone interrupter is released and the frequency changed to 2000 Hz. The tone is then reintroduced by operating the tone interrupter. If the subject says he hears the tone the frequency is changed to 4000 Hz then to 6000 Hz, 8000Hz and 250 Hz.

A normal ear can be checked quickly through the entire frequency range in this way. Since the tone is presented at 20 dB or 25 dB at all frequencies, any subject with a hearing impairment in any of the frequencies can be easily detected. A complete audiological examination may be then conducted on such patients, for further investigation.

STORAGE:

The test data can be stored in the memory provided in the Audiometer, this data can be recalled and viewed.

TRANSFERING SAVED DATA TO THE PC

The Proton Audiometer can save thresholds in the internal memory provided, these thresholds can be later transferred to the PC software.

Connect your Proton to the PC through the USB cable.

Interface the Audiometer to the PC software

Open Patient details page

Feed the patient name and other data

Click on New Audiogram

Click on Audiometer Console

Select **REP**

Use Navigation key to select **VIEW**

The Audiometer Console in the software will display in sync with the Audiometer LCD

Select the report to be transferred to the PC software; click on **SELECT**, the thresholds saved in the internal memory of the Audiometer will automatically transfer to the PC software.

TESTS:

The **PROTON Dx 3/Sx 3** has the facility for Tone Decay test, Speech Audiometry and Free Field Audiometry.

Use the **MENU** key and revert to the original screen. use the **NAVIGATION** key and the **SELECT** key to select TESTS, the screen will display the following-

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

AC BC TESTS REP.
SELECT FUNCTION

use the **NAVIGATION** key and the **SELECT** key to select TESTS, the screen will display the following-

TD SPCH FF
SELECT TEST

Select TD for Tone Decay Test.

The screen will read as-

ACL 1000Hz 30dB
COUNTER: 00

The TD Test can be started by depressing the STIMULUS key, the counter will run from 00 to 60, the counter will stop if the patient activates the patient response switch, the operator can also interrupt the test by depressing the Stimulus key.

TONE DECAY TEST :

AIM of the test	:	Differential diagnosis of Retro cochlear Versus Cochlear lesions.
Initial Settings	:	(Before Tone Decay Test, pure tone audiometry should be carried out
Mode	:	Test ear Left / Right
Intensity	:	20 dB above pure tone threshold for the test frequency
Masking	:	Can be used if needed.
Instruction to patient	:	You will now hear a continuous tone in your (left /Right) ear; indicate to me as long as you can hear the tone.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

If after some time the tone reduces and finally stops, let me know then I will again present a tone in your ear. Once more indicate to me if you are able to hear the tone Continuously, and tell me if the tone stops this time also

Test Procedure : Select the test frequency. Let us say, you select 1000 Hz Present tone at 20 dB above the 1000 Hz threshold Press 'Tone Decay' key. Now the selected tone will appear at the test ear for 60 seconds An internal timer automatically stops the tone after 60 seconds. (Your audiometer has the facility of interrupting the tone with the Patient responses switch and also by using the 'STIMULUS' key to proceed to the next frequency without waiting for 60 seconds to elapse, check if the patient hears the tone continuously for 60 seconds. If so the test is completed (see Result below)

If the patient stops hearing the tone before 60 seconds have elapsed. Press the 'Reset' button and increase intensity by 5dB Restart the test by press in the 'STIMULUS' button.

Check if this time the patient can hear tone continuously for 60 seconds, if he stop hearing. Reset and restart at 5dB higher intensity. Stop the test at the tone level at which the patient can hear continuously for the full 60 seconds period.

Repeat the procedure at other desired frequencies

Result : The quantity of tone decay in dB is the difference between initial thresholds at which the test is terminated.

If the patient can hear the tone continuously for 60 seconds at 20 dB above his pure threshold, then the result is NEGATIVE. The patient has no tone decay.

A tone decay of 5dB is NORMAL. Tone decay of 10-15dB. is mild, and a decay of 20-25 dB is moderate. one decay could suggest Retro cochlear lesions.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

If tone decay is more 25 dB, then the patient has MARKED TONE DECAY which indicates presence of Retro cochlear lesions

Speech Audiometry :

Use the MENU key to revert to the previous screen.

TD SPCH FF
SELECT TEST

Navigate and Select **SPCH**, the screen will read as follows-

MIC TAPE
SELECT INPUT

After the input is selected the screen will read as follows-

OFF ON
SET MAX

The Masking can be set to **OFF** or as required, the screen will progress to

LT 30dB
MASK : -

Intensity / output and Masking level can be set using the increase / Decrease keys.

in case masking is selected, the following options are available

OFF WN SN
SET MASK

In speech and Free Field mode, the stimulus key work as press to on and press to off key, the operator is not required to hold down the key.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

A built in microphone is incorporated in the audio meter, situated on the front panel of the instrument.

An external lapel microphone can be used for better speech quality ,the socket is provided at the rear.

SPEECH TESTS :

Aim of the test	:	To find out S.R.T. and S.D. score to support pure tone tests.
Initial Setting	:	Speech
Mode	:	Test ear (Left/Right)
Masking	:	Can be used if needed.
Tone interrupter	:	Depress STIMULUS
Instruction to the patient	:	I will now present you number of words. You have to try to hear them and then repeat them to me
Test procedure	:	To find out the speech reception threshold (S.R.T) disyllable words are used. Present these words at 20 dB above pure tone threshold. Present six words at each level If the patient repeats more than three words, then reduce the intensity by 5 dB and again present six words. This procedure is continued till you reach a level where the patient repeats three words out of six (50%). This is his SRT level.

SRT and PTA (Pure tone Average of 500, 1000 and 2000 Hz) should be within +7 dB

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

To find out the Speech Discrimination (S.D.) score Present, the speech material consisting standardised Monosyllabic words at 35 dB above SRT level. Present 25 to 50 words and find out how many words he could repeat .Now calculate the percentag.

Normal will have 90 to 100% discrimination score.

Note: It is also possible to plug in an external high-quality microphone for improved speech quality. A tape recorder can also be plugged into the audiometer for recorded Speech Test. For the above external connections use the socket provided at the rear.

FREE FIELD:

The PROTON Dx 3/Sx 3 has the unique facility of dedicated Free Field calibration, free field calibration can be independent of Air and Bone calibration.

Please approach the authorized service engineer of the company for FF calibration.

SISI (Short Increment Sensitivity Index)- Available in Model Dx 5/Sx 5

AC	BC	TESTS	REP
SELECT FUNCTION			

use the **NAVIGATION** key and the **SELECT** key to select TESTS, the screen will display the following-

TD	SPCH	FF	Sp TST
SELECT TEST			

use the **NAVIGATION** key and the **SELECT** key to select **Sp TST**, the screen will display the following-

SISI
SELECT TEST

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Use the **SELECT** key to choose.

1 DB	3 DB	5 DB
SELECT INCREMENT		

Choose the required Increment and press **SELECT**

ACL	1000Hz	30dB
INCR: 5 DB		

Set the required Frequency and the Intensity and press the **STIMULUS** key to start the test.

PRSNT : 00	RESP : 00
SISI : 00 %	

Increment :

S.I.S.I (Short Increment Sensivity Index) TESTS

AIM of the test: To detect Cochlear Lesions

Initial Settings	Function Dial	S.I.S.I
	Mode Switch	Test ear (Left / Right)
	Masking I	can be used if needed.
	Tone interrupter	Depress 'Auto'

Instruction to the patient : You will hear a continuous tone in your (Left or right) ear. Occasionally the tone will increase for a short period. You have to indicate to me whenever the tone jumps (then give the patient demonstration)

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Test Procedure

If the right ear is going to be tested, set the Mode switch to 'Right'. Set frequency to 1000 Hz. Set intensity at 20 dB above the patients pure tone threshold. The increment is set to 6 dB first. then to 3 dB, to familiarize the patient to the tone jumps.

Now set the increment to 1dB (only 1dB increment is used in actual test). Present a total of 20 increment and count how many increment the patient responds to giving five points for each correct indication, calculate the percentage (S.I.S.I. score).

Results

Score of 85 to 100% (S.I.S.I. Positive) may be indicative of Presence of Cochlear lesions.

If the percentage is between 0 to 15% (S.I.S.I. negative), this may be indicative of no Cochlear lesions.

If the percentage is between 15 to 85% then diagnosis will depend on other test.

Note : It is necessary to check false responses after approximately every five 1dB increments. This is done by releasing the interrupter from 'Auto position for a few seconds, to interrupt the 5 second rhythm of the S.I.S.I. test.

SAVE

The **PROTON Dx 3/Sx 3** and **Dx 5/ Sx5** have the provision to save patient data and recall for **VIEW** and **MODIFY**, the data can be printed in the tabular form through a parallel impact printer, the Audiometer can store 300 audiograms, the audiograms are retained in the memory, the audiometer is programmed to automatically delete old audiograms to accommodate new data (FIFO)

If the test results are required to be saved, the following procedure should be following

Use the **NAVIGATION** key to select **REP** (Report)

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

AC BC TESTS REP
SELECT FUNCTION

On selecting **REP** the screen will advance to-

NEW MODIFY VIEW

Select **NEW** to start with the new Patient, press the SELECT key, the screen will display the date format, arrive at the date by using the INTENSITY Up / Down key, the display will scroll from 1 to 31, press select, the cursor will automatically move to month, use INTENSITY key to arrive at the month and press SELECT, the cursor will move to the year, use INTENSITY keys to arrive at the year and press SELECT.

The next screen will be displayed

ENTER NAME

Use the INTENSITY key to feed the name, the first alphabet displayed will be A use the up / down keys to arrive at the right alphabet, use **NAVIGATION** right key to move to the next alphabet, after the name is fed use the SELECT key to advance to the next screen. After the date and the name are stored, use the MENU key to revert to the main screen and start testing, press the save key after every threshold.

MODIFY

In case a doubtful frequency has to be retested, revert to **REP** (Reports) and select MODIFY.

Please note that only the thresholds can be modified, the name and the date cannot be changed.

VIEW

The VIEW function allows the user to view the audiograms, no changes can be made.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

Date of Installation	Installed By
Model No.	Serial No.
Warranty Period	
Name of Doctor & Address :	

Customer Sign. With Stamps

Marketed By: Western Surgical
Sign. With Stamps

No Claim Warranty :

1) Any Defect Throught Power Supply

2) Any Physical Damage

3) Under Warranty Standby Unit Not Provide

4) Under Warranty When Company Send Parts or Machine we Imidiat send to Buyer.

* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.



Western Surgical®

www.westernsurgical.in

Email : westernsurgical@gmail.com

Ph. : +91-281-2232871 / 2243159

(23)

Date : 20-9-2014

OUR OTHER PRODUCTS RANGE



* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

* Due to constant upgradation design, price and features are subject to change any time without prior notice.

Western Surgical®

"Happy Home", 1st Floor, 23, Karanpara,
B/h. S.T. Bus Stand, Kanak Road,
Rajkot-360 001. Ph. : 0281-2232871/2243159
Mo. : 98250 69069 - 98250 45997
Email : westernsurgical@gmail.com
Email : info@westernsurgical.in

* www.westernsurgical.in *

